

TABLE OF CONTENTS

AUD-L1: MUSIC INFORMATION RETRIEVAL I

AUD-L1.1: ADDRESSING THE CONFOUNDS OF ACCOMPANIMENTS IN SINGER IDENTIFICATION 1

Tsung-Han Hsieh, Kai-Hsiang Cheng, Zhe-Cheng Fan, Academia Sinica, Taiwan; Yu-Ching Yang, KKBOX Inc., Taiwan; Yi-Hsuan Yang, Academia Sinica, Taiwan

AUD-L1.2: DISENTANGLED MULTIDIMENSIONAL METRIC LEARNING FOR MUSIC SIMILARITY 6

Jongpil Lee, Korea Advanced Institute of Science and Technology (KAIST), Korea (South); Nicholas J. Bryan, Justin Salamon, Zeyu Jin, Adobe, United States; Juhan Nam, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)

AUD-L1.3: LEARNING THE HELIX TOPOLOGY OF MUSICAL PITCH 11

Vincent Lostanlen, Cornell Lab of Ornithology, France; Sripathi Sridhar, Brian McFee, New York University, France; Andrew Farnsworth, Cornell Lab of Ornithology, United States; Juan Pablo Bello, New York University, United States

AUD-L1.4: AUDIO-BASED AUTO-TAGGING WITH CONTEXTUAL TAGS FOR MUSIC 16

Karim M. Ibrahim, Telecom Paris, France; Jimena Royo-Letelier, Elena Epure, Deezer, France; Geoffroy Peeters, Gaël Richard, Telecom Paris, France

AUD-L1.5: ACCURATE AND SCALABLE VERSION IDENTIFICATION USING MUSICALLY-MOTIVATED EMBEDDINGS 21

Furkan Yesiler, Universitat Pompeu Fabra, Spain; Joan Serrà, Dolby Laboratories, Spain; Emilia Gómez, Universitat Pompeu Fabra, Spain

AUD-L1.6: SIMILARITY LEARNING FOR COVER SONG IDENTIFICATION USING CROSS-SIMILARITY MATRICES OF MULTI-LEVEL DEEP SEQUENCES 26

Chaoya Jiang, Deshun Yang, Xiaou Chen, Peking University, China

AUD-L2: DEEP LEARNING FOR SOURCE SEPARATION

AUD-L2.1: TWO-STEP SOUND SOURCE SEPARATION: TRAINING ON LEARNED LATENT TARGETS 31

Efthymios Tzinis, Shrikant Venkataramani, Zhepei Wang, University of Illinois at Urbana-Champaign, United States; Cem Subakan, Mila-Quebec Artificial Intelligence Institute, Canada; Paris Smaragdis, University of Illinois at Urbana-Champaign, Adobe Research, United States

AUD-L2.2: A MULTI-PHASE GAMMATONE FILTERBANK FOR SPEECH SEPARATION VIA TASNET 36

David Ditter, Timo Gerkmann, Universität Hamburg, Germany

AUD-L2.3: IMPROVING VOICE SEPARATION BY INCORPORATING END-TO-END SPEECH RECOGNITION 41

Naoya Takahashi, Sony Corporation, Japan; Mayank Singh, Indian Institute of Technology Bombay, India; Sakya Basak, Indian Institute of Science, India; Parthasaarathy Sudarsanam, Sony India Software Centre, India; Sriram Ganapathy, Indian Institute of Science, India; Yuki Mitsufuji, Sony Corporation, Japan

AUD-L2.4: DUAL-PATH RNN: EFFICIENT LONG SEQUENCE MODELING FOR TIME-DOMAIN SINGLE-CHANNEL SPEECH SEPARATION 46

Yi Luo, Columbia University, United States; Zhuo Chen, Takuya Yoshioka, Microsoft, United States

AUD-L2.5: CONTROLLING THE PERCEIVED SOUND QUALITY FOR DIALOGUE ENHANCEMENT WITH DEEP LEARNING 51

Christian Uhle, Matteo Torcoli, Jouni Paulus, Fraunhofer Institute for Integrated Circuits IIS, Germany

AUD-L2.6: UNSUPERVISED TRAINING FOR DEEP SPEECH SOURCE SEPARATION WITH KULLBACK-LEIBLER DIVERGENCE BASED PROBABILISTIC LOSS FUNCTION	56
<i>Masahito Togami, LINE Corporation, Japan; Yoshiki Masuyama, Waseda University, Japan; Tatsuya Komatsu, LINE Corporation, Japan; Yu Nakagome, Waseda University, Japan</i>	
 AUD-L3: ACOUSTIC EVENT DETECTION	
AUD-L3.1: A FRAMEWORK FOR THE ROBUST EVALUATION OF SOUND EVENT DETECTION	61
<i>Cagdas Bilen, Giacomo Ferroni, Francesco Tuveri, Juan Azcarreta, Sacha Krstulovic, AudioAnalytic, United Kingdom</i>	
AUD-L3.2: WEAKLY-SUPERVISED SOUND EVENT DETECTION WITH SELF-ATTENTION	66
<i>Koichi Miyazaki, Tatsuya Komatsu, LINE Corporation, Japan; Tomoki Hayashi, Nagoya University, Japan; Shinji Watanabe, Johns Hopkins University, United States; Tomoki Toda, Kazuya Takeda, Nagoya University, Japan</i>	
AUD-L3.3: A SEQUENCE MATCHING NETWORK FOR POLYPHONIC SOUND EVENT LOCALIZATION AND DETECTION	71
<i>Thi Ngoc Tho Nguyen, Nanyang Technological University, Singapore; Douglas L. Jones, University of Illinois at Urbana-Champaign, United States; Woon-Seng Gan, Nanyang Technological University, Singapore</i>	
AUD-L3.4: FEW-SHOT ACOUSTIC EVENT DETECTION VIA META LEARNING	76
<i>Bowen Shi, Toyota Technological Institute at Chicago, United States; Ming Sun, Krishna Puvvada, Chieh-Chi Kao, Spyros Matsoukas, Chao Wang, Amazon, Inc., United States</i>	
AUD-L3.5: FEW-SHOT SOUND EVENT DETECTION	81
<i>Yu Wang, New York University, United States; Justin Salamon, Nicholas J. Bryan, Adobe, United States; Juan Pablo Bello, New York University, United States</i>	
AUD-L3.6: SOUND EVENT DETECTION IN SYNTHETIC DOMESTIC ENVIRONMENTS	86
<i>Romain Serizel, Nicolas Turpault, Université de Lorraine, CNRS, Inria, Loria, France; Ankit Shah, Carnegie Mellon University, United States; Justin Salamon, Adobe Research, United States</i>	
 AUD-L4: AUDIO AND SPEECH SOURCE SEPARATION	
AUD-L4.1: LEARNING TO SEPARATE SOUNDS FROM WEAKLY LABELED SCENES	91
<i>Fatemeh Pishdadian, Northwestern University, United States; Gordon Wichern, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
AUD-L4.2: IMPROVING UNIVERSAL SOUND SEPARATION USING SOUND CLASSIFICATION	96
<i>Efthymios Tzinis, University of Illinois at Urbana-Champaign, United States; Scott Wisdom, John R. Hershey, Aren Jansen, Google, United States; Daniel P. W. Ellis, Google Research, United States</i>	
AUD-L4.3: SOURCE SEPARATION WITH WEAKLY LABELLED DATA: AN APPROACH TO COMPUTATIONAL AUDITORY SCENE ANALYSIS	101
<i>Qiuqiang Kong, Yuxuan Wang, Xuchen Song, ByteDance, United States; Yin Cao, Wenwu Wang, Mark D. Plumbley, University of Surrey, United Kingdom</i>	
AUD-L4.4: BOOSTED LOCALITY SENSITIVE HASHING: DISCRIMINATIVE BINARY CODES FOR SOURCE SEPARATION	106
<i>Sunwoo Kim, Haici Yang, Minje Kim, Indiana University Bloomington, United States</i>	
AUD-L4.5: A FREQUENCY-DOMAIN BSS METHOD BASED ON L1 NORM, UNITARY CONSTRAINT, AND CAYLEY TRANSFORM	111
<i>Satoru Emura, Hiroshi Sawada, Shoko Araki, Noboru Harada, NTT, Japan</i>	

AUD-L4.6: END-TO-END NON-NEGATIVE AUTOENCODERS FOR SOUND SOURCE SEPARATION	116
<i>Shrikant Venkataramani, Efthymios Tzinis, University of Illinois at Urbana-Champaign, United States; Paris Smaragdis, University of Illinois at Urbana-Champaign, Adobe Research, United States</i>	
AUD-L5: CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS	
AUD-L5.1: COINCIDENCE, CATEGORIZATION, AND CONSOLIDATION: LEARNING TO RECOGNIZE SOUNDS WITH MINIMAL SUPERVISION	121
<i>Aren Jansen, Daniel P. W. Ellis, Shawn Hershey, R. Channing Moore, Manoj Plakal, Ashok Papat, Rif A. Saurous, Google Research, United States</i>	
AUD-L5.2: ACOUSTIC SCENE CLASSIFICATION FOR MISMATCHED RECORDING DEVICES USING HEATED-UP SOFTMAX AND SPECTRUM CORRECTION	126
<i>Truc Nguyen, Franz Pernkopf, Graz University of Technology, Austria; Michal Kosmider, Samsung R&D Institute, Poland</i>	
AUD-L5.3: LIMITATIONS OF WEAK LABELS FOR EMBEDDING AND TAGGING	131
<i>Nicolas Turpault, Romain Serizel, Emmanuel Vincent, Université de Lorraine, CNRS, Inria, Loria, France</i>	
AUD-L5.4: MT-GCN FOR MULTI-LABEL AUDIO TAGGING WITH NOISY LABELS	136
<i>Harsh Shrivastava, National University of Singapore and MIDAS Lab, IIIT-D, India; Yifang Yin, National University of Singapore, Singapore; Rajiv Ratn Shah, MIDAS Labs, IIIT Delhi, India; Roger Zimmermann, National University of Singapore, Singapore</i>	
AUD-L5.5: ACOUSTIC SCENE CLASSIFICATION USING DEEP RESIDUAL NETWORKS WITH LATE FUSION OF SEPARATED HIGH AND LOW FREQUENCY PATHS	141
<i>Mark D. McDonnell, Wei Gao, University of South Australia, Australia</i>	
AUD-L5.6: END-TO-END AUDITORY OBJECT RECOGNITION VIA INCEPTION NUCLEUS	146
<i>Mohammad Ebrahimpour, University of California, Merced, United States; Timothy Shea, Andreea Danielescu, Accenture Technology Labs, United States; David Noelle, Chris Kello, University of California, Merced, United States</i>	
AUD-L6: ACOUSTIC ENVIRONMENTS AND SPATIAL AUDIO II	
AUD-L6.1: TRANSLATION OF A HIGHER ORDER AMBISONICS SOUND SCENE BASED ON PARAMETRIC DECOMPOSITION	151
<i>Maximilian Kentgens, Andreas Behler, Peter Jax, RWTH Aachen University, Germany</i>	
AUD-L6.2: BLASTER: AN OFF-GRID METHOD FOR BLIND AND REGULARIZED ACOUSTIC ECHOES RETRIEVAL	156
<i>Diego Di Carlo, Clément Elvira, Inria Rennes - Bretagne Atlantique, France; Antoine Deleforge, Inria Nancy - Grand Est, France; Nancy Bertin, CNRS IRISA, France; Rémi Gribonval, Univ Lyon - Inria, France</i>	
AUD-L6.3: EVALUATION OF SENSOR SELF-NOISE IN BINAURAL RENDERING OF SPHERICAL MICROPHONE ARRAY SIGNALS	161
<i>Hannes Helmholtz, Jens Ahrens, Chalmers University of Technology, Sweden; David L. Alon, Sebastià V. Amengual Garí, Ravish Mehra, Facebook Reality Labs, United States</i>	
AUD-L6.4: MUTUAL-INFORMATION-BASED SENSOR PLACEMENT FOR SPATIAL SOUND FIELD RECORDING	166
<i>Kentaro Ariga, Tomoya Nishida, Shoichi Koyama, Natsuki Ueno, Hiroshi Saruwatari, University of Tokyo, Japan</i>	
AUD-L6.5: FAST ACOUSTIC SCATTERING USING CONVOLUTIONAL NEURAL NETWORKS	171
<i>Ziqi Fan, University of Florida, United States; Vibhav Vineet, Hannes Gamper, Nikunj Raghuvanshi, Microsoft Research, United States</i>	

AUD-L6.6: FREQUENCY-DEPENDENT DIRECTIONAL FEEDBACK DELAY	176
NETWORK	
<i>Benoit Alary, Aalto University, Finland; Archontis Politis, Tampere University, Finland</i>	
 AUD-L7: SIGNAL ENHANCEMENT AND RESTORATION I	
AUD-L7.1: SPEECH ENHANCEMENT USING SELF-ADAPTATION AND MULTI-HEAD	181
SELF-ATTENTION	
<i>Yuma Koizumi, NTT Corporation, Japan; Kohei Yatabe, Waseda University, Japan; Marc Delcroix, NTT Corporation, Japan; Yoshiki Masuyama, Daiki Takeuchi, Waseda University, Japan</i>	
AUD-L7.2: PEVD-BASED SPEECH ENHANCEMENT IN REVERBERANT	186
ENVIRONMENTS	
<i>Vincent W. Neo, Christine Evers, Patrick A. Naylor, Imperial College London, United Kingdom</i>	
AUD-L7.3: DNN-BASED SPEECH PRESENCE PROBABILITY ESTIMATION FOR	191
MULTI-FRAME SINGLE-MICROPHONE SPEECH ENHANCEMENT	
<i>Marvin Tammen, Dörte Fischer, Bernd T. Meyer, Simon Doclo, University of Oldenburg, Germany</i>	
AUD-L7.4: NONLINEAR SPATIAL FILTERING FOR MULTICHANNEL SPEECH	196
ENHANCEMENT IN INHOMOGENEOUS NOISE FIELDS	
<i>Kristina Tesch, Timo Gerkmann, Universität Hamburg, Germany</i>	
AUD-L7.5: GENERALIZED COHERENCE-BASED SIGNAL ENHANCEMENT	201
<i>Heinrich Loellmann, Andreas Brendel, Walter Kellermann, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	
AUD-L7.6: SPEAKER INDEPENDENCE OF NEURAL VOCODERS AND THEIR EFFECT	206
ON PARAMETRIC RESYNTHESIS SPEECH ENHANCEMENT	
<i>Soumi Maiti, Graduate Center, City University of New York, United States; Michael I Mandel, Brooklyn College, City University of New York, United States</i>	
 AUD-L8: ACOUSTIC SENSOR ARRAY SIGNAL PROCESSING II	
AUD-L8.1: ROBUST AND STEERABLE KRONECKER PRODUCT DIFFERENTIAL	211
BEAMFORMING WITH RECTANGULAR MICROPHONE ARRAYS	
<i>Gongping Huang, Technion - Israel Institute of Technology, Israel; Jacob Benesty, University of Quebec, Canada; Jingdong Chen, Northwestern Polytechnical University, China; Israel Cohen, Technion - Israel Institute of Technology, Israel</i>	
AUD-L8.2: JOINTLY OPTIMAL DEREVERBERATION AND BEAMFORMING	216
<i>Christoph Boeddeker, Paderborn University, Germany; Tomohiro Nakatani, Keisuke Kinoshita, NTT Corporation, Germany; Reinhold Haeb-Umbach, Paderborn University, Germany</i>	
AUD-L8.3: EXPLOITING RAYS IN BLIND LOCALIZATION OF DISTRIBUTED	221
SENSOR ARRAYS	
<i>Szymon Woźniak, Konrad Kowalczyk, AGH University of Science and Technology, Poland</i>	
AUD-L8.4: A NOVEL METHOD FOR OBTAINING DIFFUSE FIELD MEASUREMENTS	226
FOR MICROPHONE CALIBRATION	
<i>Noman Akbar, Glenn Dickins, Australian National University, Australia; Mark R. P. Thomas, Dolby Laboratories USA, United States; Prasanga N. Samarasinghe, Thushara D. Abhayapala, Australian National University, Australia</i>	
AUD-L8.5: MULTI-CHANNEL SPEECH SOURCE SEPARATION AND	231
DEREVERBERATION WITH SEQUENTIAL INTEGRATION OF DETERMINED AND UNDERDETERMINED MODELS	
<i>Masahito Togami, LINE Corporation, Japan</i>	
AUD-L8.6: FAST AND STABLE BLIND SOURCE SEPARATION WITH RANK-1 UPDATES	236
<i>Robin Scheibler, Nobutaka Ono, Tokyo Metropolitan University, Japan</i>	

AUD-L9: MUSIC SIGNAL PROCESSING II

AUD-L9.1: MODELING PLATE AND SPRING REVERBERATION USING A DSP-INFORMED DEEP NEURAL NETWORK 241

Marco A. Martínez Ramírez, Emmanouil Benetos, Joshua D. Reiss, Queen Mary University of London, United Kingdom

AUD-L9.2: DEEP AUTOTUNER: A PITCH CORRECTING NETWORK FOR SINGING PERFORMANCES 246

Sanna Wager, Indiana University Bloomington, United States; George Tzanetakis, University of Victoria, Canada; Cheng-i Wang, Smule, Inc, United States; Minje Kim, Indiana University Bloomington, United States

AUD-L9.3: PERCEPTUAL LOSS FUNCTION FOR NEURAL MODELLING OF AUDIO SYSTEMS 251

Alec Wright, Vesa Välimäki, Aalto University, Finland

AUD-L9.4: ONE-SHOT PARAMETRIC AUDIO PRODUCTION STYLE TRANSFER WITH APPLICATION TO FREQUENCY EQUALIZATION 256

Stylianos I. Mimitakis, Fraunhofer-IDMT, Germany; Nicholas J. Bryan, Adobe, United States; Paris Smaragdis, Adobe and University of Illinois at Urbana-Champaign, United States

AUD-L9.5: SPEECH-TO-SINGING CONVERSION IN AN ENCODER-DECODER FRAMEWORK 261

Jayneel Parekh, Telecom Paris, Institut Polytechnique de Paris, France; Preeti Rao, Indian Institute of Technology Bombay, India; Yi-Hsuan Yang, Academia Sinica, Taiwan

AUD-L9.6: TENSORFLOW AUDIO MODELS IN ESSENTIA..... 266

Pablo Alonso-Jiménez, Dmitry Bogdanov, Universitat Pompeu Fabra, Spain; Jordi Pons, Dolby Laboratories, Spain; Xavier Serra, Universitat Pompeu Fabra, Spain

AUD-P1: DEEP LEARNING FOR AUDIO CLASSIFICATION

AUD-P1.1: ANOMALOUS SOUND DETECTION BASED ON INTERPOLATION DEEP NEURAL NETWORK 271

Kaori Suefusa, Hitachi, Ltd., Japan; Tomoya Nishida, University of Tokyo, Japan; Purohit Harsh, Ryo Tanabe, Takashi Endo, Yohei Kawaguchi, Hitachi, Ltd., Japan

AUD-P1.2: A-CRNN: A DOMAIN ADAPTATION MODEL FOR SOUND EVENT DETECTION 276

Wei Wei, National University of Singapore, Singapore; Hongning Zhu, Fudan University, China; Emmanouil Benetos, Queen Mary University of London, United Kingdom; Ye Wang, National University of Singapore, Singapore

AUD-P1.3: SPIDERNET: ATTENTION NETWORK FOR ONE-SHOT ANOMALY DETECTION IN SOUNDS 281

Yuma Koizumi, Masahiro Yasuda, Shin Murata, Shoichiro Saito, Hisashi Uematsu, Noboru Harada, NTT Corporation, Japan

AUD-P1.4: SOUND EVENT DETECTION VIA DILATED CONVOLUTIONAL RECURRENT NEURAL NETWORKS 286

Yanxiong Li, Mingle Liu, South China University of Technology, China; Konstantinos Drossos, Tuomas Virtanen, Tampere University, Finland

AUD-P1.5: A DEEP NEURAL NETWORK-DRIVEN FEATURE LEARNING METHOD FOR POLYPHONIC ACOUSTIC EVENT DETECTION FROM REAL-LIFE RECORDINGS 291

Manjunath Mulimani, Manipal Institute of Technology Manipal, India; Akash B Kademani, Symbiosis Institute of Technology, India; Shashidhar G Koolagudi, National Institute of Technology Karnataka, India

AUD-P1.6: WEAKLY LABELLED AUDIO TAGGING VIA CONVOLUTIONAL NETWORKS WITH SPATIAL AND CHANNEL-WISE ATTENTION 296

Sixin Hong, Yuexian Zou, Peking University, China; Wenwu Wang, University of Surrey, United Kingdom; Meng Cao, Peking University, China

AUD-P1.7: A STUDY ON THE TRANSFERABILITY OF ADVERSARIAL ATTACKS IN SOUND EVENT CLASSIFICATION	301
<i>Vinod Subramanian, Arjun Pankajakshan, Emmanouil Benetos, Queen Mary University of London, United Kingdom; Ning Xu, SKoT McDonald, ROLI Ltd., United Kingdom; Mark Sandler, Queen Mary University of London, United Kingdom</i>	
AUD-P1.8: PROPELLER NOISE DETECTION WITH DEEP LEARNING	306
<i>Thomas Mahiout, Thales, France; Lionel Fillatre, UCA, France; Laurent Deruaz-Pepin, Thales, France</i>	
AUD-P1.9: DURATION ROBUST WEAKLY SUPERVISED SOUND EVENT DETECTION	311
<i>Heinrich Dinkel, Kai Yu, Shanghai Jiao Tong University, China</i>	
AUD-P1.10: A COMPARISON OF POOLING METHODS ON LSTM MODELS FOR RARE ACOUSTIC EVENT CLASSIFICATION	316
<i>Chieh-Chi Kao, Ming Sun, Amazon, Inc., United States; Weiran Wang, Salesforce Research, United States; Chao Wang, Amazon, Inc., United States</i>	
AUD-P1.11: AN ONTOLOGY-AWARE FRAMEWORK FOR AUDIO EVENT CLASSIFICATION	321
<i>Yiwei Sun, Pennsylvania State University, United States; Shabnam Ghaffarzadegan, Bosch Research and Technology Center, United States</i>	
AUD-P1.12: TASK-AWARE MEAN TEACHER METHOD FOR LARGE SCALE WEAKLY LABELED SEMI-SUPERVISED SOUND EVENT DETECTION	326
<i>Jie Yan, Yan Song, Li-Rong Dai, University of Science and Technology of China, China; Ian McLoughlin, University of Kent, United Kingdom</i>	
AUD-P2: DEEP LEARNING FOR SPEECH AND AUDIO	
AUD-P2.1: WAWENETS: A NO-REFERENCE CONVOLUTIONAL WAVEFORM-BASED APPROACH TO ESTIMATING NARROWBAND AND WIDEBAND SPEECH QUALITY	331
<i>Andrew Catellier, Stephen Voran, Institute for Telecommunication Sciences, United States</i>	
AUD-P2.2: A NEURAL NETWORK FOR MONAURAL INTRUSIVE SPEECH INTELLIGIBILITY PREDICTION	336
<i>Mathias Bach Pedersen, Aalborg University, Denmark; Asger Heidemann Andersen, Oticon A/S, Denmark; Søren Holdt Jensen, Jesper Jensen, Aalborg University, Denmark</i>	
AUD-P2.3: SOURCE CODING OF AUDIO SIGNALS WITH A GENERATIVE MODEL	341
<i>Roy Fejgin, Dolby Laboratories, United States; Janusz Klejsa, Lars Villemoes, Dolby Sweden AB, Sweden; Cong Zhou, Dolby Laboratories, United States</i>	
AUD-P2.4: FULL-REFERENCE SPEECH QUALITY ESTIMATION WITH ATTENTIONAL SIAMESE NEURAL NETWORKS	346
<i>Gabriel Mittag, Sebastian Möller, Technische Universität Berlin, Germany</i>	
AUD-P2.5: ENHANCED METHOD OF AUDIO CODING USING CNN-BASED SPECTRAL RECOVERY WITH ADAPTIVE STRUCTURE	351
<i>Seong-Hyeon Shin, Kwangwoon University, Korea (South); Seung Kwon Beack, Wootae Lim, Electronics and Telecommunications Research Institute (ETRI), Korea (South); Hochong Park, Kwangwoon University, Korea (South)</i>	
AUD-P2.6: AUDIO CODEC ENHANCEMENT WITH GENERATIVE ADVERSARIAL NETWORKS	356
<i>Arijit Biswas, Dolby Germany GmbH, Germany; Dai Jia, Dolby Laboratories, China</i>	
AUD-P2.7: EFFICIENT AND SCALABLE NEURAL RESIDUAL WAVEFORM CODING WITH COLLABORATIVE QUANTIZATION	361
<i>Kai Zhen, Indiana University, United States; Mi Suk Lee, Jongmo Sung, Seungkwon Beack, Electronics and Telecommunications Research Institute (ETRI), Korea (South); Minje Kim, Indiana University, United States</i>	

AUD-P2.8: A DUAL-STAGED CONTEXT AGGREGATION METHOD TOWARDS EFFICIENT END-TO-END SPEECH ENHANCEMENT	366
<i>Kai Zhen, Indiana University, United States; Mi Suk Lee, Electronics and Telecommunications Research Institute (ETRI), Korea (South); Minje Kim, Indiana University, United States</i>	
AUD-P2.9: A RECURRENT VARIATIONAL AUTOENCODER FOR SPEECH ENHANCEMENT	371
<i>Simon Leglaive, CentraleSupélec, IETR, France; Xavier Alameda-Pineda, Inria Grenoble Rhone-Alpes, France; Laurent Girin, Univ. Grenoble Alpes, Grenoble INP, GIPSA-lab, France; Radu Horaud, Inria Grenoble Rhone-Alpes, France</i>	
AUD-P2.10: SPEAKERFILTER: DEEP LEARNING-BASED TARGET SPEAKER EXTRACTION USING ANCHOR SPEECH	376
<i>ShuLin He, Hao Li, XueLiang Zhang, Inner Mongolia University, China</i>	
AUD-P2.11: TACKLING REAL NOISY REVERBERANT MEETINGS WITH ALL-NEURAL SOURCE SEPARATION, COUNTING, AND DIARIZATION SYSTEM	381
<i>Keisuke Kinoshita, Marc Delcroix, Shoko Araki, Tomohiro Nakatani, NTT Corporation, Japan</i>	
AUD-P2.12: TIME-DOMAIN AUDIO SOURCE SEPARATION BASED ON WAVE-U-NET COMBINED WITH DISCRETE WAVELET TRANSFORM	386
<i>Tomohiko Nakamura, Hiroshi Saruwatari, University of Tokyo, Japan</i>	
AUD-P3: ACOUSTIC ENVIRONMENTS AND SPATIAL AUDIO I	
AUD-P3.1: AUDITORY MODEL BASED SUBSETTING OF HEAD-RELATED TRANSFER FUNCTION DATASETS	391
<i>Simone Spagnol, Aalborg University, Denmark</i>	
AUD-P3.2: IMPULSE RESPONSE DATA AUGMENTATION AND DEEP NEURAL NETWORKS FOR BLIND ROOM ACOUSTIC PARAMETER ESTIMATION	396
<i>Nicholas J. Bryan, Adobe, United States</i>	
AUD-P3.4: INDIVIDUAL DISTANCE-DEPENDENT HRTFS MODELING THROUGH A FEW ANTHROPOMETRIC MEASUREMENTS	401
<i>Mengfan Zhang, Xihong Wu, Tianshu Qu, Peking University, China</i>	
AUD-P3.6: EVALUATION OF DEEP-LEARNING-BASED VOICE ACTIVITY DETECTORS AND ROOM IMPULSE RESPONSE MODELS IN REVERBERANT ENVIRONMENTS	406
<i>Amir Ivry, Israel Cohen, Baruch Berdugo, Technion - Israel Institute of Technology, Israel</i>	
AUD-P3.7: A MINIMAL PERSONALIZATION OF DYNAMIC BINAURAL SYNTHESIS WITH MIXED STRUCTURAL MODELING AND SCATTERING DELAY NETWORKS	411
<i>Michele Geronazzo, Aalborg University, Denmark; Jason Tissi�res, GN Group, Denmark; Stefania Serafin, Aalborg University, Denmark</i>	
AUD-P3.8: SOUND TEXTURE SYNTHESIS USING RI SPECTROGRAMS	416
<i>Hugo Caracalla, Axel Roebel, Institut de Recherche et Coordination Acoustique/Musique (IRCAM), France</i>	
AUD-P3.9: TIME DOMAIN VELOCITY VECTOR FOR RETRACING THE MULTIPATH PROPAGATION	421
<i>J�r�me Daniel, Sr�dan Kiti�, Orange, France</i>	
AUD-P3.10: ACOUSTIC MATCHING BY EMBEDDING IMPULSE RESPONSES	426
<i>Jiaqi Su, Princeton University, United States; Zeyu Jin, Adobe Research, United States; Adam Finkelstein, Princeton University, United States</i>	
AUD-P3.11: JOINT ESTIMATION OF ACOUSTIC PARAMETERS FROM SINGLE-MICROPHONE SPEECH OBSERVATIONS	431
<i>David Looney, Nikolay D. Gaubitch, Pindrop, United Kingdom</i>	

AUD-P3.12: A FAST REDUCED-RANK SOUND ZONE CONTROL ALGORITHM USING THE CONJUGATE GRADIENT METHOD	436
<i>Liming Shi, Taewoong Lee, Aalborg University, Denmark; Lijun Zhang, Northwestern Polytechnical University, China; Jesper Kjær Nielsen, Mads Græsbøll Christensen, Aalborg University, Denmark</i>	
AUD-P4: FEEDBACK, NOISE, AND REVERBERATION	
AUD-P4.1: AN EMPIRICAL STUDY ON ACOUSTIC FEEDBACK PATH ACROSS HEARING AID USERS	441
<i>Meng Guo, Demant, Denmark</i>	
AUD-P4.2: LOW COMPLEXITY NLMS FOR MULTIPLE LOUDSPEAKER ACOUSTIC ECHO CANCELLER USING RELATIVE LOUDSPEAKER TRANSFER FUNCTIONS	446
<i>Ofer Schwartz, CEVA-DSP, Israel; Emanuël A. P. Habets, International Audio Laboratories Erlangen, Germany; Sharon Gannot, Bar-Ilan University, Israel</i>	
AUD-P4.3: A MULTICHANNEL KALMAN-BASED WIENER FILTER APPROACH FOR SPEAKER INTERFERENCE REDUCTION IN MEETINGS	451
<i>Patrick Meyer, Samy Elshamy, Tim Fingscheidt, Technische Universität Braunschweig, Germany</i>	
AUD-P4.4: PRIMARY PATH ESTIMATOR BASED ON INDIVIDUAL SECONDARY PATH FOR ANC HEADPHONES	456
<i>Johannes Fabry, Peter Jax, RWTH Aachen University, Germany</i>	
AUD-P4.5: EFFICIENT MULTICHANNEL NONLINEAR ACOUSTIC ECHO CANCELLATION BASED ON A COOPERATIVE STRATEGY	461
<i>Mhd Modar Halimeh, Walter Kellermann, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	
AUD-P4.6: ACTIVE CONTROL OF LINE SPECTRAL NOISE WITH SIMULTANEOUS SECONDARY PATH MODELING WITHOUT AUXILIARY NOISE	466
<i>Meiling Hu, Jing Lu, Nanjing University, China</i>	
AUD-P4.7: ROBUST FREQUENCY-DOMAIN RECURSIVE LEAST M-ESTIMATE ADAPTIVE FILTER FOR ACOUSTIC SYSTEM IDENTIFICATION	471
<i>Hongsen He, Southwest University of Science and Technology, China; Jingdong Chen, Northwestern Polytechnical University, China; Jacob Benesty, University of Quebec, Canada; Yi Yu, Southwest University of Science and Technology, China</i>	
AUD-P4.8: NEAREST KRONECKER PRODUCT DECOMPOSITION BASED NORMALIZED LEAST MEAN SQUARE ALGORITHM	476
<i>Sankha Subhra Bhattacharjee, Nithin George, Indian Institute of Technology Gandhinagar, India</i>	
AUD-P4.9: JOINT BEAMFORMING AND REVERBERATION CANCELLATION USING A CONSTRAINED KALMAN FILTER WITH MULTICHANNEL LINEAR PREDICTION	481
<i>Sahar Hashemgeloogordi, University of Rochester, United States; Sebastian Braun, Microsoft Research, United States</i>	
AUD-P4.11: MULTI-MICROPHONE COMPLEX SPECTRAL MAPPING FOR SPEECH DEREVERBERATION	486
<i>Zhong-Qiu Wang, Deliang Wang, Ohio State University, United States</i>	
AUD-P4.12: PREDICTING WORD ERROR RATE FOR REVERBERANT SPEECH	491
<i>Hannes Gamper, Dimitra Emmanouilidou, Sebastian Braun, Ivan Tashev, Microsoft Research, United States</i>	
AUD-P5: MUSIC INFORMATION RETRIEVAL II	
AUD-P5.1: AUTOMATIC LYRICS ALIGNMENT AND TRANSCRIPTION IN POLYPHONIC MUSIC: DOES BACKGROUND MUSIC HELP?	496
<i>Chitralekha Gupta, Emre Yilmaz, Haizhou Li, National University of Singapore, Singapore</i>	

AUD-P5.2: LOCAL KEY ESTIMATION IN CLASSICAL MUSIC RECORDINGS: A CROSS-VERSION STUDY ON SCHUBERT’S WINTERREISE	501
<i>Hendrik Schreiber, Christof Weiß, Meinard Müller, International Audio Laboratories Erlangen, Germany</i>	
AUD-P5.3: IMPROVING MUSIC TRANSCRIPTION BY PRE-STACKING A U-NET	506
<i>Fabrizio Pedersoli, George Tzanetakis, Kwang Moo Yi, University of Victoria, Canada</i>	
AUD-P5.4: LEARNING TO RANK MUSIC TRACKS USING TRIPLET LOSS	511
<i>Laure Pr��tet, Creaminal, France; Ga��l Richard, Geoffroy Peeters, LTCI, T��l��com Paris, France</i>	
AUD-P5.5: TRANSFORMER VAE: A HIERARCHICAL MODEL FOR STRUCTURE-AWARE AND INTERPRETABLE MUSIC REPRESENTATION LEARNING	516
<i>Junyan Jiang, Carnegie Mellon University, United States; Gus Xia, New York University Shanghai, China; Dave Carlton, Chris Anderson, Ryan Miyakawa, Hooktheory, LLC, United States</i>	
AUD-P5.6: A COMPARATIVE STUDY OF WESTERN AND CHINESE CLASSICAL MUSIC BASED ON SOUNDSCAPE MODELS	521
<i>Jianyu Fan, Simon Fraser University, Canada; Yi-Hsuan Yang, Academia Sinica, Taiwan; Kui Dong, Dartmouth College, United States; Philippe Pasquier, Simon Fraser University, Canada</i>	
AUD-P5.7: AUDIO-BASED DETECTION OF EXPLICIT CONTENT IN MUSIC	526
<i>Andrea Vaglio, Deezer Research & Development / LTCI, T��l��com Paris, Institut Polytechnique de Paris, France; Romain Hennequin, Manuel Moussallam, Deezer Research & Development, France; Ga��l Richard, Florence d’Alch��-Buc, LTCI, T��l��com Paris, Institut Polytechnique de Paris, France</i>	
AUD-P5.8: NEW METRICS FOR EVALUATING THE ACCURACY OF FUNDAMENTAL FREQUENCY ESTIMATION APPROACHES IN MUSICAL SIGNALS	531
<i>Johanna Devaney, Brooklyn College, City University of New York, United States</i>	
AUD-P5.9: DATA-DRIVEN HARMONIC FILTERS FOR AUDIO REPRESENTATION LEARNING	536
<i>Minz Won, Universitat Pompeu Fabra, Spain; Sanghyuk Chun, Naver Corporation, Korea (South); Oriol Nieto, Pandora Media Inc., United States; Xavier Serra, Universitat Pompeu Fabra, Spain</i>	
AUD-P5.10: LEARNING A REPRESENTATION FOR COVER SONG IDENTIFICATION USING CONVOLUTIONAL NEURAL NETWORK	541
<i>Zhesong Yu, Xiaoshuo Xu, Xiaou Chen, Deshun Yang, Peking University, China</i>	
AUD-P5.11: TOWARDS LINKING THE LAKH AND IMSLP DATASETS	546
<i>TJ Tsai, Harvey Mudd College, United States</i>	
AUD-P5.12: A MULTI-DILATION AND MULTI-RESOLUTION FULLY CONVOLUTIONAL NETWORK FOR SINGING MELODY EXTRACTION	551
<i>Ping Gao, Cheng-You You, Tai-Shih Chi, National Chiao Tung University, Taiwan</i>	
AUD-P6: ACOUSTIC SENSOR ARRAY SIGNAL PROCESSING I	
AUD-P6.1: AN IMPROVED SOLUTION TO THE FREQUENCY-INVARIANT BEAMFORMING WITH CONCENTRIC CIRCULAR MICROPHONE ARRAYS	556
<i>Xudong Zhao, Northwestern Polytechnical University, China; Gongping Huang, Israel Institute of Technology, Israel; Jingdong Chen, Northwestern Polytechnical University, China; Jacob Benesty, University of Quebec, Canada</i>	
AUD-P6.2: BINAURAL AUDIO SOURCE REMIXING WITH MICROPHONE ARRAY LISTENING DEVICES	561
<i>Ryan Corey, Andrew Singer, University of Illinois at Urbana-Champaign, United States</i>	
AUD-P6.3: EXPLOITING PERIODICITY FEATURES FOR JOINT DETECTION AND DOA ESTIMATION OF SPEECH SOURCES USING CONVOLUTIONAL NEURAL NETWORKS	566
<i>Reza Varzandeh, HoerTech gGmbH, Germany; Kamil Adilo��lu, H��rTech gGmbH, Germany; Simon Doclo, Volker Hohmann, University of Oldenburg, Germany</i>	

AUD-P6.4: UNSUPERVISED MULTIPLE SOURCE LOCALIZATION USING RELATIVE HARMONIC COEFFICIENTS	571
<i>Yonggang Hu, Prasanga N. Samarasinghe, Thushara D. Abhayapala, Australian National University, Australia; Sharon Gannot, Bar-Ilan University, Israel</i>	
AUD-P6.5: DATA-DRIVEN WIND SPEED ESTIMATION USING MULTIPLE MICROPHONES	576
<i>Daniele Mirabilli, Kishor Kayyar Lakshminarayana, Wolfgang Mack, Emanuël A. P. Habets, International Audio Laboratories Erlangen, Germany</i>	
AUD-P6.7: A DYNAMIC STREAM WEIGHT BACKPROP KALMAN FILTER FOR AUDIOVISUAL SPEAKER TRACKING	581
<i>Christopher Schymura, Ruhr-Universität Bochum, Germany; Tsubasa Ochiai, Marc Delcroix, Keisuke Kinoshita, Tomohiro Nakatani, Shoko Araki, NTT Corporation, Japan; Dorothea Kolossa, Ruhr-Universität Bochum, Germany</i>	
AUD-P6.8: MAXIMUM LIKELIHOOD MULTI-SPEAKER DIRECTION OF ARRIVAL ESTIMATION UTILIZING A WEIGHTED HISTOGRAM	586
<i>Elior Hadad, Sharon Gannot, Bar-Ilan University, Israel</i>	
AUD-P6.9: OVERDETERMINED INDEPENDENT VECTOR ANALYSIS	591
<i>Rintaro Ikeshita, Tomohiro Nakatani, Shoko Araki, NTT Corporation, Japan</i>	
AUD-P6.10: SPATIALLY GUIDED INDEPENDENT VECTOR ANALYSIS	596
<i>Andreas Brendel, Thomas Haubner, Walter Kellermann, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	
AUD-P6.11: FAST INDEPENDENT VECTOR EXTRACTION BY ITERATIVE SINR MAXIMIZATION	601
<i>Robin Scheibler, Nobutaka Ono, Tokyo Metropolitan University, Japan</i>	
AUD-P6.12: REGULARIZED FAST MULTICHANNEL NONNEGATIVE MATRIX FACTORIZATION WITH ILRMA-BASED PRIOR DISTRIBUTION OF JOINT-DIAGONALIZATION PROCESS	606
<i>Keigo Kamo, Yuki Kubo, Norihiro Takamune, University of Tokyo, Japan; Daichi Kitamura, National Institute of Technology, Kagawa College, Japan; Hiroshi Saruwatari, University of Tokyo, Japan; Yu Takahashi, Kazunobu Kondo, Yamaha Corporation, Japan</i>	
AUD-P7: AUDIO CLASSIFICATION	
AUD-P7.1: BEYOND THE DCASE 2017 CHALLENGE ON RARE SOUND EVENT DETECTION: A PROPOSAL FOR A MORE REALISTIC TRAINING AND TEST FRAMEWORK	611
<i>Jan Baumann, Timo Lohrenz, Technische Universität Braunschweig, Germany; Alexander Roy, IAV GmbH, Germany; Tim Fingscheidt, Technische Universität Braunschweig, Germany</i>	
AUD-P7.2: METRIC LEARNING WITH BACKGROUND NOISE CLASS FOR FEW-SHOT DETECTION OF RARE SOUND EVENTS	616
<i>Kazuki Shimada, Yuichiro Koyama, Akira Inoue, Sony Corporation, Japan</i>	
AUD-P7.3: SOUND EVENT DETECTION BY MULTITASK LEARNING OF SOUND EVENTS AND SCENES WITH SOFT SCENE LABELS	621
<i>Keisuke Imoto, Noriyuki Tonami, Ritsumeikan University, Japan; Yuma Koizumi, Masahiro Yasuda, Nippon Telegraph and Telephone Corporation, Japan; Ryosuke Yamanishi, Yoichi Yamashita, Ritsumeikan University, Japan</i>	
AUD-P7.4: GUIDED LEARNING FOR WEAKLY-LABELED SEMI-SUPERVISED SOUND EVENT DETECTION	626
<i>Liwei Lin, Xiangdong Wang, Hong Liu, Yueliang Qian, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	

AUD-P7.5: STAGED TRAINING STRATEGY AND MULTI-ACTIVATION FOR AUDIO TAGGING WITH NOISY AND SPARSE MULTI-LABEL DATA	631
<i>Kexin He, Tsinghua University, China; Yuhan Shen, Northeastern University, United States; Wei-Qiang Zhang, Jia Liu, Tsinghua University, China</i>	
AUD-P7.6: LEARNING WITH OUT-OF-DISTRIBUTION DATA FOR AUDIO CLASSIFICATION	636
<i>Turab Iqbal, Yin Cao, Qiuqiang Kong, Mark D. Plumbley, Wenwu Wang, University of Surrey, United Kingdom</i>	
AUD-P7.7: MULTI-BRANCH LEARNING FOR WEAKLY-LABELED SOUND EVENT DETECTION	641
<i>Yuxin Huang, Xiangdong Wang, Liwei Lin, Hong Liu, Yueliang Qian, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
AUD-P7.8: SCENE-DEPENDENT ACOUSTIC EVENT DETECTION WITH SCENE CONDITIONING AND FAKE-SCENE-CONDITIONED LOSS	646
<i>Tatsuya Komatsu, LINE Corporation, Japan; Keisuke Imoto, Ritsumeikan University, Japan; Masahito Togami, LINE Corporation, Japan</i>	
AUD-P7.9: SOUND EVENT LOCALIZATION BASED ON SOUND INTENSITY VECTOR REFINED BY DNN-BASED DENOISING AND SOURCE SEPARATION	651
<i>Masahiro Yasuda, Yuma Koizumi, Shoichiro Saito, Hisashi Uematsu, NTT Corporation, Japan; Keisuke Imoto, Ritsumeikan University, Japan</i>	
AUD-P7.10: HIGH-RESOLUTION ATTENTION NETWORK WITH ACOUSTIC SEGMENT MODEL FOR ACOUSTIC SCENE CLASSIFICATION	656
<i>Xue Bai, Jun Du, Jia Pan, Heng-Shun Zhou, Yan-Hui Tu, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
AUD-P7.11: POLYPHONIC SOUND EVENT DETECTION USING TRANSPOSED CONVOLUTIONAL RECURRENT NEURAL NETWORK	661
<i>Chandra Churh Chatterjee, Jalpaiguri Government Engineering College, India; Manjunath Mulimani, Manipal Institute of Technology Manipal, India; Shashidhar G Koolagudi, National Institute of Technology Karnataka, India</i>	
AUD-P7.12: SECOST: SEQUENTIAL CO-SUPERVISION FOR LARGE SCALE WEAKLY LABELED AUDIO EVENT DETECTION	666
<i>Anurag Kumar, Facebook Inc, United States; Vamsi Krishna Ithapu, Facebook, United States</i>	
AUD-P8: SOURCE SEPARATION AND ARRAY PROCESSING	
AUD-P8.1: DEEP SPEECH EXTRACTION WITH TIME-VARYING SPATIAL FILTERING GUIDED BY DESIRED DIRECTION ATTRACTOR	671
<i>Yu Nakagome, Waseda University, Japan; Masahito Togami, LINE Corporation, Japan; Tetsuji Ogawa, Tetsunori Kobayashi, Waseda University, Japan</i>	
AUD-P8.2: ADAPTIVE BLIND AUDIO SOURCE EXTRACTION SUPERVISED BY DOMINANT SPEAKER IDENTIFICATION USING X-VECTORS	676
<i>Jakub Janský, Jiří Málek, Jaroslav Čmejla, Tomáš Kounovský, Zbyněk Koldovský, Jindřich Žďánský, Technical University of Liberec, Czech Republic</i>	
AUD-P8.4: CONVERGENCE-GUARANTEED INDEPENDENT POSITIVE SEMIDEFINITE TENSOR ANALYSIS BASED ON STUDENT'S T DISTRIBUTION	681
<i>Tatsuki Kondo, Kanta Fukushima, Norihiro Takamune, University of Tokyo, Japan; Daichi Kitamura, National Institute of Technology, Kagawa College, Japan; Hiroshi Saruwatari, University of Tokyo, Japan; Rintaro Ikeshita, Tomohiro Nakatani, NTT Corporation, Japan</i>	
AUD-P8.5: DETERMINED SOURCE SEPARATION USING THE SPARSITY OF IMPULSE RESPONSES	686
<i>Yuki Takahashi, Daichi Kitahara, Koichiro Matsuura, Akira Hirabayashi, Ritsumeikan University, Japan</i>	

AUD-P8.6: IMPROVING SPEAKER DISCRIMINATION OF TARGET SPEECH	691
EXTRACTION WITH TIME-DOMAIN SPEAKERBEAM	
<i>Marc Delcroix, Tsubasa Ochiai, NTT Corporation, Japan; Kateřina Žmolíková, Brno University of Technology, Czech Republic; Keisuke Kinoshita, Naohiro Tawara, Tomohiro Nakatani, Shoko Araki, NTT Corporation, Japan</i>	
AUD-P8.7: WHAMR!: NOISY AND REVERBERANT SINGLE-CHANNEL SPEECH	696
SEPARATION	
<i>Matthew Maciejewski, Johns Hopkins University, United States; Gordon Wichern, Mitsubishi Electric Research Laboratories (MERL), United States; Emmett McQuinn, Whisper AI, United States; Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
 AUD-P9: TOPICS IN AUDIO ANALYSIS AND CLASSIFICATION	
AUD-P9.1: IMPACT OF A SHIFT-INVARIANT HARMONIC PHASE MODEL IN FULLY	701
PARAMETRIC HARMONIC VOICE REPRESENTATION AND TIME/FREQUENCY SYNTHESIS	
<i>Anibal Ferreira, João Silva, Francisca Brito, University of Porto, Portugal; Deepen Sinha, ATC Labs, United States</i>	
AUD-P9.2: HEARING AID RESEARCH DATA SET FOR ACOUSTIC ENVIRONMENT	706
RECOGNITION	
<i>Andreas Hüwel, HoerTech gGmbH, Germany; Kamil Adiloğlu, HörTech gGmbH, Germany; Jörg-Hendrik Bach, HoerTech gGmbH, Germany</i>	
AUD-P9.3: AUDIO FEATURE EXTRACTION FOR VEHICLE ENGINE NOISE	711
CLASSIFICATION	
<i>Luca Becker, Alexandru Nelus, Johannes Gauer, Lars Rudolph, Rainer Martin, Ruhr-Universität Bochum, Germany</i>	
AUD-P9.4: TIME-FREQUENCY FEATURE DECOMPOSITION BASED ON SOUND	716
DURATION FOR ACOUSTIC SCENE CLASSIFICATION	
<i>Yuzhong Wu, Tan Lee, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
AUD-P9.5: VGG SOUND: A LARGE-SCALE AUDIO-VISUAL DATASET	721
<i>Honglie Chen, Weidi Xie, Andrea Vedaldi, Andrew Zisserman, University of Oxford, United Kingdom</i>	
AUD-P9.6: TRANSFER LEARNING FROM YOUTUBE SOUNDTRACKS TO TAG ARCTIC	726
ECOACOUSTIC RECORDINGS	
<i>Enis Berk Çoban, Graduate Center, City University of New York, United States; Dara Pir, Guttman Community College, CUNY, United States; Richard So, Staten Island Technical High School, United States; Michael I Mandel, Brooklyn College, City University of New York, United States</i>	
AUD-P9.7: DATA AUGMENTATION USING EMPIRICAL MODE DECOMPOSITION ON	731
NEURAL NETWORKS TO CLASSIFY IMPACT NOISE IN VEHICLE	
<i>Gue-Hwan Nam, Hyundai Mobis, Korea (South); Seok-Jun Bu, Na-Mu Park, Yonsei University, Korea (South); Jae-Yong Seo, Hyeon-Cheol Jo, Won-Tae Jeong, Hyundai Mobis, Korea (South)</i>	
AUD-P9.8: CLOTHO: AN AUDIO CAPTIONING DATASET	736
<i>Konstantinos Drossos, Samuel Lipping, Tuomas Virtanen, Tampere University, Finland</i>	
AUD-P9.9: ROBUST FUNDAMENTAL FREQUENCY ESTIMATION IN COLOURED	741
NOISE	
<i>Alfredo Esquivel Jaramillo, Aalborg University, Denmark; Andreas Jakobsson, Lund University, Sweden; Jesper Kjær Nielsen, Mads Græsbøll Christensen, Aalborg University, Denmark</i>	
AUD-P9.10: EFFICIENT BIRD SOUND DETECTION ON THE BELA EMBEDDED	746
SYSTEM	
<i>Alexandru-Marius Solomes, Dan Stowell, Queen Mary University of London, United Kingdom</i>	

AUD-P9.11: IMPROVING AUTOMATED SEGMENTATION OF RADIO SHOWS WITH AUDIO EMBEDDINGS	751
<i>Oberon Berlage, University of Amsterdam, Netherlands; Klaus-Michael Lux, Radboud Universiteit Nijmegen, Netherlands; David Graus, FD Mediagroep, Netherlands</i>	
AUD-P9.12: SECL-UMONS DATABASE FOR SOUND EVENT CLASSIFICATION AND LOCALIZATION	756
<i>Mathilde Brousmiche, Université de Mons, Belgium; Jean Rouat, Université de Sherbrooke, Canada; Stéphane Dupont, Université de Mons, Belgium</i>	
AUD-P10: MUSIC SIGNAL PROCESSING I	
AUD-P10.1: SYNTHESIZING ENGAGING MUSIC USING DYNAMIC MODELS OF STATISTICAL SURPRISAL	761
<i>Sandeep Reddy Kothinti, Benjamin Skerritt-Davis, Johns Hopkins University, United States; Aditya Nair, University of Washington, United States; Mounya Elhilali, Johns Hopkins University, United States</i>	
AUD-P10.2: HARMONICS BASED REPRESENTATION IN CLARINET TONE QUALITY EVALUATION	766
<i>Yixin Wang, Xiaohong Guan, Youtian Du, Nan Nan, Xi'an Jiaotong University, China</i>	
AUD-P10.3: SIMULTANEOUS SEPARATION AND TRANSCRIPTION OF MIXTURES WITH MULTIPLE POLYPHONIC AND PERCUSSIVE INSTRUMENTS	771
<i>Ethan Manilow, Prem Seetharaman, Bryan Pardo, Northwestern University, United States</i>	
AUD-P10.4: THE ROLE OF ANNOTATION FUSION METHODS IN THE STUDY OF HUMAN-REPORTED EMOTION EXPERIENCE DURING MUSIC LISTENING	776
<i>Timothy Greer, Karel Mundnich, University of Southern California, United States; Matthew Sachs, Columbia University, United States; Shrikanth Narayanan, University of Southern California, United States</i>	
AUD-P10.5: CONTENT BASED SINGING VOICE EXTRACTION FROM A MUSICAL MIXTURE	781
<i>Pritish Chandna, Merlijn Blaauw, Jordi Bonada, Emilia Gómez, Universitat Pompeu Fabra, Spain</i>	
AUD-P10.6: NEURAL PERCUSSIVE SYNTHESIS PARAMETERISED BY HIGH-LEVEL TIMBRAL FEATURES	786
<i>António Ramires, Pritish Chandna, Xavier Favory, Universitat Pompeu Fabra, Spain; Emilia Gómez, Universitat Pompeu Fabra; Joint Research Centre, European Commission, Spain; Xavier Serra, Universitat Pompeu Fabra, Spain</i>	
AUD-P10.7: NON-GRIFFIN-LIM TYPE SIGNAL RECOVERY FROM MAGNITUDE SPECTROGRAM	791
<i>Ryusei Nakatsu, Daichi Kitahara, Akira Hirabayashi, Ritsumeikan University, Japan</i>	
AUD-P10.8: VAPAR SYNTH - A VARIATIONAL PARAMETRIC MODEL FOR AUDIO SYNTHESIS	796
<i>Krishna Subramani, Preeti Rao, Indian Institute of Technology Bombay, India; Alexandre D'Hooge, ENS Paris-Saclay, France</i>	
AUD-P10.9: BANDWIDTH EXTENSION OF MUSICAL AUDIO SIGNALS WITH NO SIDE INFORMATION USING DILATED CONVOLUTIONAL NEURAL NETWORKS	801
<i>Mathieu Lagrange, Félix Gontier, LS2N, France</i>	
AUD-P10.10: TOWARDS REAL-TIME SINGLE-CHANNEL SINGING-VOICE SEPARATION WITH PRUNED MULTI-SCALED DENSENETS	806
<i>Markus Huber, Graz University of Technology, Austria; Günther Schindler, Heidelberg University, Germany; Wolfgang Roth, Graz University of Technology, Austria; Holger Fröning, Heidelberg University, Germany; Christian Schörkhuber, sonible GmbH, Austria; Franz Pernkopf, Graz University of Technology, Austria</i>	

AUD-P10.11: STATE-BASED TRANSCRIPTION OF COMPONENTS OF CARNATIC MUSIC	811
<i>Venkata Viraraghavan, Arpan Pal, Tata Consultancy Services, India; Hema Murthy, R Aravind, Indian Institute of Technology Madras, India</i>	
AUD-P10.12: META-LEARNING EXTRACTORS FOR MUSIC SOURCE SEPARATION	816
<i>David Samuel, Charles University, Czech Republic; Aditya Ganeshan, Jason Naradowsky, Preferred Networks, Japan</i>	
AUD-P11: SIGNAL ENHANCEMENT AND RESTORATION II	
AUD-P11.1: CONSISTENCY-AWARE MULTI-CHANNEL SPEECH ENHANCEMENT USING DEEP NEURAL NETWORKS	821
<i>Yoshiki Masuyama, Waseda University, Japan; Masahito Togami, Tatsuya Komatsu, LINE Corporation, Japan</i>	
AUD-P11.2: PHASE RECONSTRUCTION BASED ON RECURRENT PHASE UNWRAPPING WITH DEEP NEURAL NETWORKS	826
<i>Yoshiki Masuyama, Kohei Yatabe, Waseda University, Japan; Yuma Koizumi, NTT Corporation, Japan; Yasuhiro Oikawa, Waseda University, Japan; Noboru Harada, NTT Corporation, Japan</i>	
AUD-P11.3: PERFORMANCE STUDY OF A CONVOLUTIONAL TIME-DOMAIN AUDIO SEPARATION NETWORK FOR REAL-TIME SPEECH DENOISING	831
<i>Samuel Sonning, Christian Schüldt, Hakan Erdogan, Scott Wisdom, Google, Sweden</i>	
AUD-P11.4: CHANNEL-ATTENTION DENSE U-NET FOR MULTICHANNEL SPEECH ENHANCEMENT	836
<i>Bahareh Tolooshams, Harvard University, United States; Ritwik Giri, Amazon Web Services, United States; Andrew Song, Massachusetts Institute of Technology, United States; Umut Isik, Arvinth Krishnaswamy, Amazon Web Services, United States</i>	
AUD-P11.5: A COMPOSITE DNN ARCHITECTURE FOR SPEECH ENHANCEMENT	841
<i>Yochai Yemini, Shlomo E. Chazan, Jacob Goldberger, Sharon Gannot, Bar-Ilan University, Israel</i>	
AUD-P11.6: GEOMETRICALLY CONSTRAINED INDEPENDENT VECTOR ANALYSIS FOR DIRECTIONAL SPEECH ENHANCEMENT	846
<i>Li Li, University of Tsukuba, Japan; Kazuhito Koishida, Microsoft Corporation, United States</i>	
AUD-P11.7: REAL-TIME SPEECH ENHANCEMENT USING EQUILIBRIATED RNN	851
<i>Daiki Takeuchi, Kohei Yatabe, Waseda University, Japan; Yuma Koizumi, NTT Corporation, Japan; Yasuhiro Oikawa, Waseda University, Japan; Noboru Harada, NTT Corporation, Japan</i>	
AUD-P11.8: SUBSPACE-BASED SPEECH CORRELATION VECTOR ESTIMATION FOR SINGLE-MICROPHONE MULTI-FRAME MVDR FILTERING	856
<i>Dörte Fischer, Simon Doclo, University of Oldenburg, Germany</i>	
AUD-P11.10: TIME-FREQUENCY LOSS FOR CNN BASED SPEECH SUPER-RESOLUTION	861
<i>Heming Wang, Deliang Wang, Ohio State University, United States</i>	
AUD-P11.11: TIME-DOMAIN NEURAL NETWORK APPROACH FOR SPEECH BANDWIDTH EXTENSION	866
<i>Xiang Hao, Northwestern Polytechnical University, China; Chenglin Xu, Nana Hou, Nanyang Technological University, Singapore; Lei Xie, Northwestern Polytechnical University, China; Eng Siong Chng, Nanyang Technological University, Singapore; Haizhou Li, National University of Singapore, Singapore</i>	
AUD-P11.12: WEIGHTED SPEECH DISTORTION LOSSES FOR NEURAL-NETWORK-BASED REAL-TIME SPEECH ENHANCEMENT	871
<i>Yangyang Xia, Carnegie Mellon University, United States; Sebastian Braun, Microsoft Research, United States; Chandan Reddy, Harishchandra Dubey, Ross Cutler, Microsoft Corporation, United States; Ivan Tashev, Microsoft Research, United States</i>	

AUD-P12: AUDIO, SPEECH AND MUSIC ANALYSIS

AUD-P12.1: SNORER DIARISATION BASED ON DEEP NEURAL NETWORK EMBEDDINGS 876

Hector E. Romero, Ning Ma, Guy J. Brown, University of Sheffield, United Kingdom

AUD-P12.2: PLAYING TECHNIQUE RECOGNITION BY JOINT TIME-FREQUENCY SCATTERING 881

Changhong Wang, Queen Mary University of London, United Kingdom; Vincent Lostanlen, New York University, United States; Emmanouil Benetos, Queen Mary University of London, United Kingdom; Elaine Chew, IRCAM, France

AUD-P12.3: PRIVACY AWARE ACOUSTIC SCENE SYNTHESIS USING DEEP SPECTRAL FEATURE INVERSION 886

Félix Gontier, Mathieu Lagrange, LS2N, France; Catherine Lavandier, Etis, Université de Cergy-Pontoise, France; Jean-François Petiot, LS2N, France

AUD-P12.4: ROBUSTNESS ASSESSMENT OF AUTOMATIC REINKE'S EDEMA DIAGNOSIS SYSTEMS 891

Mario Madruga, Yolanda Campos-Roca, Carlos J. Pérez, Universidad de Extremadura, Spain

AUD-P12.5: WHOSECOUGH: IN-THE-WILD COUGHER VERIFICATION USING MULTITASK LEARNING 896

Matt Whitehill, University of Washington, United States; Jake Garrison, Google, Inc., United States; Shwetak Patel, University of Washington, United States

AUD-P12.6: CHIRPING UP THE RIGHT TREE: INCORPORATING BIOLOGICAL TAXONOMIES INTO DEEP BIOACOUSTIC CLASSIFIERS 901

Jason Cramer, New York University, United States; Vincent Lostanlen, Cornell Lab of Ornithology, United States; Andrew Farnsworth, Cornell University, United States; Justin Salamon, Adobe, United States; Juan Pablo Bello, New York University, United States

AUD-P12.7: BEAMFORMING DESIGN FOR HIGH-RESOLUTION LOW-INTENSITY FOCUSED ULTRASOUND NEUROMODULATION 906

Boqiang Fan, Rice University, United States; Wayne Goodman, Raymond Cho, Sameer Sheth, Baylor College of Medicine, United States; Richard Bouchard, University of Texas MD Anderson Cancer Center, United States; Behnaam Aazhang, Rice University, United States

AUD-P12.8: AN ATTENTION ENHANCED MULTI-TASK MODEL FOR OBJECTIVE SPEECH ASSESSMENT IN REAL-WORLD ENVIRONMENTS 911

Xuan Dong, Donald S. Williamson, Indiana University, United States

AUD-P12.9: HUMBUG ZOONIVERSE: A CROWD-SOURCED ACOUSTIC MOSQUITO DATASET 916

Ivan Kiskin, Adam Cobb, Lawrence Wang, Stephen Roberts, University of Oxford, United Kingdom

AUD-P12.10: SUBJECTIVE QUALITY ESTIMATION USING PESQ FOR HANDS-FREE TERMINALS 921

Sachiko Kurihara, Masahiro Fukui, NTT Corporation, Japan; Suehiro Shimauchi, Kanazawa Institute of Technology, Japan; Noboru Harada, NTT Corporation, Japan

BIO-L1: BIOELECTRICAL SIGNAL PROCESSING

BIO-L1.1: CLASSIFICATION OF EPILEPTIC IEEG SIGNALS BY CNN AND DATA AUGMENTATION 926

Xuyang Zhao, Saitama Institute of Technology, Japan; Jordi Solé-Casals, University of Vic-Central University of Catalonia, Spain; Binghua Li, Zihao Huang, Nankai University, China; Andong Wang, Nanjing University of Science and Technology, China; Jianting Cao, Saitama Institute of Technology, China; Toshihisa Tanaka, Tokyo University of Agriculture and Technology, Japan; Qibin Zhao, RIKEN Center for Advanced Intelligence Project, Japan

BIO-L1.2: FRACTIONAL FOURIER TRANSFORM BASED QRS COMPLEX DETECTION IN ECG SIGNAL	931
<i>Touseef Yaqoob, Saira Aziz, Sajid Ahmed, Osama Amin, Information Technology University Lahore, Pakistan; Mohamed-Slim Alouini, King Abdullah University of Science and Technology (KAUST), United Kingdom</i>	
BIO-L1.3: CROSS-DOMAIN JOINT DICTIONARY LEARNING FOR ECG RECONSTRUCTION FROM PPG	936
<i>Xin Tian, Qiang Zhu, Yuenan Li, Min Wu, University of Maryland, College Park, United States</i>	
BIO-L1.4: AN LSTM BASED ARCHITECTURE TO RELATE SPEECH STIMULUS TO EEG	941
<i>Mohammad Jalilpour Monesi, Bernd Accou, Jair Montoya-Martinez, Tom Francart, Hugo Van Hamme, Katholieke Universiteit Leuven, Belgium</i>	
BIO-L1.5: JOINT SEMI-SUPERVISED FEATURE AUTO-WEIGHTING AND CLASSIFICATION MODEL FOR EEG-BASED CROSS-SUBJECT SLEEP QUALITY EVALUATION	946
<i>Yong Peng, Qingxi Li, Wanzeng Kong, Jianhai Zhang, Hangzhou Dianzi University, China; Bao-Liang Lu, Shanghai Jiao Tong University, China; Andrzej Cichocki, Skolkovo Institute of Science and Technology (Skoltech), Russia</i>	
BIO-L1.6: REVERSAL NO LONGER MATTERS: ATTENTION-BASED ARRHYTHMIA DETECTION WITH LEAD-REVERSAL ECG DATA	951
<i>Zheng Cao, Jialin Shi, Ji Wu, Tsinghua University, China</i>	
BIO-L2: BIOLOGICAL IMAGE ANALYSIS	
BIO-L2.1: AUGMENTING MOLECULAR IMAGES WITH VECTOR REPRESENTATIONS AS A FEATURIZATION TECHNIQUE FOR DRUG CLASSIFICATION	956
<i>Daniel de Marchi, University of North Carolina, United States; Amarjit Budhiraja, University of North Carolina - Chapel Hill, United States</i>	
BIO-L2.2: MULTI-MODAL SELF-SUPERVISED PRE-TRAINING FOR JOINT OPTIC DISC AND CUP SEGMENTATION IN EYE FUNDUS IMAGES	961
<i>Álvaro S. Hervella, Lucía Ramos, José Rouco, Jorge Novo, Marcos Ortega, Universidade da Coruña, Spain</i>	
BIO-L2.3: DENSE MAPPING OF INTRACELLULAR DIFFUSION AND DRIFT FROM SINGLE-PARTICLE TRACKING DATA ANALYSIS	966
<i>Antoine Salomon, Cesar Augusto Valades-Cruz, Inria, France; Ludovic Leconte, CNRS/Institut Curie, France; Charles Kervrann, Inria, France</i>	
BIO-L2.4: A DEEP GRADIENT BOOSTING NETWORK FOR OPTIC DISC AND CUP SEGMENTATION	971
<i>Qing Liu, Beiji Zou, Yang Zhao, Yixiong Liang, Central South University, China</i>	
BIO-L2.5: ADAPTIVE ELASTIC LOSS BASED ON PROGRESSIVE INTER-CLASS ASSOCIATION FOR CERVICAL HISTOLOGY IMAGE SEGMENTATION	976
<i>Zhu Meng, Zhicheng Zhao, Fei Su, Beijing University of Posts and Telecommunications, China; Weibao Wang, Singularity.AI Technology Co., Ltd, China</i>	
BIO-L2.6: A BIDIRECTIONAL CONTEXT PROPAGATION NETWORK FOR URINE SEDIMENT PARTICLE DETECTION IN MICROSCOPIC IMAGES	981
<i>Meng Yan, Qing Liu, Zhihua Yin, Du Wang, Yixiong Liang, Central South University, China</i>	
BIO-L3: SIGNAL PROCESSING IN BIOMETRICS	
BIO-L3.1: THE SWAX BENCHMARK: ATTACKING BIOMETRIC SYSTEMS WITH WAX FIGURES	986
<i>Rafael Henrique Vareto, Araceli Marcia Saldanha, William Robson Schwartz, Universidade Federal de Minas Gerais, Brazil</i>	

BIO-L3.2: RESTING-STATE EEG-BASED BIOMETRICS WITH SIGNALS FEATURES EXTRACTED BY MULTIVARIATE EMPIRICAL MODE DECOMPOSITION	991
<i>Matthew King-Hang Ma, Tan Lee, Chinese University of Hong Kong, Hong Kong SAR of China; Manson Cheuk-Man Fong, William Shiyuan Wang, Hong Kong Polytechnic University, Hong Kong SAR of China</i>	
BIO-L3.3: AUTO-FAS: SEARCHING LIGHTWEIGHT NETWORKS FOR FACE ANTI-SPOOFING	996
<i>Zitong Yu, University of Oulu, Finland; Yunxiao Qin, Northwestern Polytechnical University, China; Xiaqing Xu, Chenxu Zhao, Zezheng Wang, Aibee, China; Zhen Lei, Institute of Automation, Chinese Academy of Sciences, China; Guoying Zhao, University of Oulu, Finland</i>	
BIO-L3.5: DOMAIN ADAPTATION FOR GENERALIZATION OF FACE PRESENTATION ATTACK DETECTION IN MOBILE SETTINGS WITH MINIMAL INFORMATION	1001
<i>Amir Mohammadi, Sushil Bhattacharjee, Sebastien Marcel, Idiap Research Institute, Switzerland</i>	
BIO-L3.6: A LIGHTWEIGHT MULTI-LABEL SEGMENTATION NETWORK FOR MOBILE IRIS BIOMETRICS	1006
<i>Caiyong Wang, University of Chinese Academy of Sciences, China; Yunlong Wang, Institute of Automation, Chinese Academy of Sciences, China; Boqiang Xu, University of Chinese Academy of Sciences, China; Yong He, Institute of Automation, Chinese Academy of Sciences, China; Zhiwei Dong, University of Science and Technology Beijing, China; Zhenan Sun, Institute of Automation, Chinese Academy of Sciences, China</i>	
BIO-L4: BIOMEDICAL SIGNAL PROCESSING	
BIO-L4.1: MODELING BEHAVIORAL CONSISTENCY IN LARGE-SCALE WEARABLE RECORDINGS OF HUMAN BIO-BEHAVIORAL SIGNALS	1011
<i>Tiantian Feng, Signal Analysis and Interpretation Lab, University of Southern California, United States; Shrikanth Narayanan, University of Southern California, United States</i>	
BIO-L4.2: MODELING BEHAVIOR AS MUTUAL DEPENDENCY BETWEEN PHYSIOLOGICAL SIGNALS AND INDOOR LOCATION IN LARGE-SCALE WEARABLE SENSOR STUDY	1016
<i>Tiantian Feng, Brandon Booth, Signal Analysis and Interpretation Lab, University of Southern California, United States; Shrikanth Narayanan, University of Southern California, United States</i>	
BIO-L4.3: MULTICHANNEL SIGNAL CLASSIFICATION USING VECTOR AUTOREGRESSION	1021
<i>Amine Haboub, Hamza Baali, Abdesselam Bouzerdoun, Hamad Bin Khalifa University, Qatar</i>	
BIO-L4.4: EFFICIENT ALGORITHM TO IMPLEMENT SLIDING SINGULAR SPECTRUM ANALYSIS WITH APPLICATION TO BIOMEDICAL SIGNAL DENOISING	1026
<i>Muzammil Saeed, Clive Cheong Took, Stephen Alty, Royal Holloway, University of London, United Kingdom</i>	
BIO-L4.5: STRATEGIC ATTENTION LEARNING FOR MODALITY TRANSLATION	1030
<i>Jonathan Martinez, Ali Akbari, Kaan Sel, Roozbeh Jafari, Texas A&M University, United States</i>	
BIO-L4.6: SPARSE CSP ALGORITHM VIA JOINT SPATIO-TEMPORAL FILTERING	1035
<i>Aimin Jiang, Jing Shang, Weigao Cheng, Xiaofeng Liu, Hohai University, China; Hon Keung Kwan, University of Windsor, Canada; Yanping Zhu, Changzhou University, China</i>	
BIO-L5: MEDICAL IMAGE ANALYSIS	
BIO-L5.1: HUMAN-MACHINE COLLABORATION FOR MEDICAL IMAGE SEGMENTATION	1040
<i>Mahdyar Ravanbakhsh, University of Genova, Italy; Vadim Tschernezki, Felix Last, Tassilo Klein, SAP ML Research Berlin, Germany; Kayhan Batmanghelich, University of Pittsburgh, United States; Volker Tresp, Ludwig Maximilian University, Germany; Moin Nabi, SAP ML Research Berlin, Germany</i>	

BIO-L5.2: MIXUP MULTI-ATTENTION MULTI-TASKING MODEL FOR EARLY-STAGE LEUKEMIA IDENTIFICATION	1045
<i>Puneet Mathur, University of Maryland, College Park, United States; Mehak Piplani, Ramit Sawhney, Amit Jindal, Rajiv Ratn Shah, MIDAS Labs, IIT Delhi, India</i>	
BIO-L5.3: CROSS-VIEW ATTENTION NETWORK FOR BREAST CANCER SCREENING FROM MULTI-VIEW MAMMOGRAMS	1050
<i>Xuran Zhao, Luyang Yu, Xun Wang, Zhejiang Gongshang University, China</i>	
BIO-L5.4: UNET 3+: A FULL-SCALE CONNECTED UNET FOR MEDICAL IMAGE SEGMENTATION	1055
<i>Huimin Huang, Lanfen Lin, Ruofeng Tong, Zhejiang University, China; Hongjie Hu, Qiaowei Zhang, Sir Run Run Shaw Hospital, China; Yutaro Iwamoto, Xianhua Han, Yen-Wei Chen, Ritsumeikan University, Japan; Jian Wu, Zhejiang University, China</i>	
BIO-L5.5: UNSUPERVISED CONTENT-PRESERVED ADAPTATION NETWORK FOR CLASSIFICATION OF PULMONARY TEXTURES FROM DIFFERENT CT SCANNERS	1060
<i>Rui Xu, Zhen Cong, Xinchun Ye, Dalian University of Technology, China; Shoji Kido, Noriyuki Tomiyama, Osaka University, Japan</i>	
BIO-L5.6: CLASSIFY AND EXPLAIN: AN INTERPRETABLE CONVOLUTIONAL NEURAL NETWORK FOR LUNG CANCER DIAGNOSIS	1065
<i>Yaowei Li, Donghao Gu, Zhaojing Wen, Feng Jiang, Shaohui Liu, Harbin Institute of Technology, China</i>	
BIO-P1: BIOMEDICAL IMAGING AND ANALYSIS	
BIO-P1.1: ROBUST GLOBAL OPTIMIZED AFFINE REGISTRATION METHOD FOR MICROSCOPIC IMAGES OF BIOLOGICAL TISSUE	1070
<i>Yanan Lv, University of Chinese Academy of Sciences, China; Xi Chen, Chinese Academy of Sciences, China; Chang Shu, University of Chinese Academy of Sciences, China; Hua Han, Chinese Academy of Sciences, China</i>	
BIO-P1.2: EMPIRICAL SURE-GUIDED MICROSCOPY SUPER-RESOLUTION IMAGE RECONSTRUCTION FROM CONFOCAL MULTI-ARRAY DETECTORS	1075
<i>Sylvain Prigent, France-BioImaging, France; Stéphanie Dutertre, University of Rennes 1, UMS Biosit, MRic, France; Charles Kervrann, Inria Centre Rennes-Bretagne Atlantique, France</i>	
BIO-P1.3: ENCODING TEMPORAL INFORMATION FOR AUTOMATIC DEPRESSION RECOGNITION FROM FACIAL ANALYSIS	1080
<i>Wheidima Carneiro de Melo, University of Oulu, Finland; Eric Granger, École de Technologie Supérieure, Canada; Miguel Bordallo Lopez, VTT Technical Research Centre of Finland, Finland</i>	
BIO-P1.4: RETINAL VESSEL SEGMENTATION VIA A SEMANTICS AND MULTI-SCALE AGGREGATION NETWORK	1085
<i>Rui Xu, Xinchun Ye, Guiliang Jiang, Tiantian Liu, Dalian University of Technology, China; Liang Li, Satoshi Tanaka, Ritsumeikan University, Japan</i>	
BIO-P1.5: ADAPTIVE MATCHED FILTER USING NON-TARGET FREE TRAINING DATA	1090
<i>Aref Miri Rekavandi, Abd-Krim Seghouane, Robin Evans, University of Melbourne, Australia</i>	
BIO-P1.6: FEATURE DRIFT RESILIENT TRACKING OF THE CAROTID ARTERY WALL USING UNSCENTED KALMAN FILTERING WITH DATA FUSION	1095
<i>Jan Dorazil, Rene Repp, Thomas Kropfreiter, Richard Prüller, Technische Universität Wien, Czech Republic; Kamil Říha, Brno University of Technology, Czech Republic; Franz Hlawatsch, Technische Universität Wien, Austria</i>	
BIO-P1.7: TRACING NETWORK EVOLUTION USING THE PARAFAC2 MODEL	1100
<i>Marie Roald, Simula Metropolitan Center for Digital Engineering, Norway; Suchita Bhinge, Chunying Jia, University of Maryland, Baltimore County, United States; Vince Calhoun, Georgia State University, United States; Tülay Adalı, University of Maryland, Baltimore County, United States; Evrim Acar, Simula Metropolitan Center for Digital Engineering, Norway</i>	

BIO-P1.8: A MODEL-BASED DEEP NETWORK FOR MRI RECONSTRUCTION USING APPROXIMATE MESSAGE PASSING ALGORITHM	1105
<i>Xiaoyu Qiao, Jinglong Du, Lulu Wang, Zhongshi He, Chongqing University, China; Yuanyuan Jia, Chongqing Medical University, China</i>	
BIO-P1.9: ONLINE POSITRON EMISSION TOMOGRAPHY BY ONLINE PORTFOLIO SELECTION	1110
<i>Yen-Huan Li, National Taiwan University, Taiwan</i>	
BIO-P1.10: SPACE FILLING CURVES FOR MRI SAMPLING	1115
<i>Shubham Sharma, Hari K.V.S., Indian Institute of Science, India; Geert Leus, Delft University of Technology, Netherlands</i>	
BIO-P1.11: K-SPACE TRAJECTORY DESIGN FOR REDUCED MRI SCAN TIME	1120
<i>Shubham Sharma, Hari K.V.S., Indian Institute of Science, India; Geert Leus, Delft University of Technology, Netherlands</i>	
BIO-P1.12: RETHINKING RETINAL LANDMARK LOCALIZATION AS POSE ESTIMATION: NAIVE SINGLE STACKED NETWORK FOR OPTIC DISK AND FOVEA DETECTION	1125
<i>Shishira R. Maiya, Puneet Mathur, University of Maryland, College Park, United States</i>	
BIO-P2: BIOMEDICAL SIGNAL ANALYSIS	
BIO-P2.1: HIDDEN MARKOV MODELS FOR SEPSIS DETECTION IN PRETERM INFANTS	1130
<i>Antoine Honoré, Dong Liu, KTH Royal Institute of Technology, Sweden; David Forsberg, Karen Coste, Eric Herlenius, Karolinska Institutet, Sweden; Saikat Chatterjee, Mikael Skoglund, KTH Royal Institute of Technology, Sweden</i>	
BIO-P2.2: BLOOD PRESSURE ESTIMATION FROM PPG SIGNALS USING CONVOLUTIONAL NEURAL NETWORKS AND SIAMESE NETWORK	1135
<i>Oded Schlesinger, Nitai Vigderhouse, Danny Eytan, Yair Moshe, Technion - Israel Institute of Technology, Israel</i>	
BIO-P2.3: SPEECH BREATHING ESTIMATION USING DEEP LEARNING METHODS	1140
<i>Venkata Srikanth Nallanthighal, Philips Research, Eindhoven and Radboud University, Nijmegen, Netherlands; Aki Härmä, Philips Research, Eindhoven, Netherlands; Helmer Strik, Radboud University, Netherlands</i>	
BIO-P2.4: A FAST NON-CONTACT VITAL SIGNS DETECTION METHOD BASED ON REGIONAL HIDDEN MARKOV MODEL IN A 77GHZ LFM CW RADAR SYSTEM	1145
<i>Zengyang Mei, Qisong Wu, Zhengyu Hu, Jun Tao, Southeast University, China</i>	
BIO-P2.5: ROBUST LIKELIHOOD RATIO TEST USING ALPHA-DIVERGENCE	1150
<i>Aref Miri Rekavandi, Abd-Krim Seghouane, Robin Evans, University of Melbourne, Australia</i>	
BIO-P2.6: USING X-VECTORS TO AUTOMATICALLY DETECT PARKINSON'S DISEASE FROM SPEECH	1155
<i>Laureano Moro-Velazquez, Jesús Villalba, Najim Dehak, Johns Hopkins University, United States</i>	
BIO-P2.7: LEARNING A COMMON GRANGER CAUSALITY NETWORK USING A NON-CONVEX REGULARIZATION	1160
<i>Parinthorn Manomaisaowapak, Jitkomut Songsiri, Chulalongkorn University, Thailand</i>	
BIO-P2.8: SYNTHETIC DATA GENERATION THROUGH STATISTICAL EXPLOSION: IMPROVING CLASSIFICATION ACCURACY OF CORONARY ARTERY DISEASE USING PPG	1165
<i>Sakyajit Bhattacharya, Oishee Mazumder, Dibyendu Roy, Aniruddha Sinha, Avik Ghose, Tata Consultancy Services, India</i>	
BIO-P2.9: HIGH-ACCURACY CLASSIFICATION OF ATTENTION DEFICIT HYPERACTIVITY DISORDER WITH L2,1-NORM LINEAR DISCRIMINANT ANALYSIS	1170
<i>Yibin Tang, Xufei Li, Hohai University, China; Ying Chen, Columbia University, United States; Yuan Zhong, Nanjing Normal University, China; Aimin Jiang, Xiaofeng Liu, Hohai University, China</i>	

BIO-P2.10: A NEURAL NETWORK-BASED SPIKE SORTING FEATURE MAP THAT RESOLVES SPIKE OVERLAP IN THE FEATURE SPACE	1175
<i>Jasper Wouters, Katholieke Universiteit Leuven, Belgium; Fabian Kloosterman, Neuro-Electronics Research Flanders, Belgium; Alexander Bertrand, Katholieke Universiteit Leuven, Belgium</i>	
BIO-P2.11: GAIT PHASE SEGMENTATION USING WEIGHTED DYNAMIC TIME WARPING AND K-NEAREST NEIGHBORS GRAPH EMBEDDING	1180
<i>Tze-Shen Chen, Ting-Ya Lin, Y.-W. Peter Hong, National Tsing Hua University, Taiwan</i>	
BIO-P2.12: AUTOMATIC CLASSIFICATION OF VOLUMES OF WATER USING SWALLOW SOUNDS FROM CERVICAL AUSCULTATION	1185
<i>Siddharth Subramani, Achuth Rao M V, Divya Giridhar, Indian Institute of Science, India; Prasanna Suresh Hegde, Health Care Ltd Global Enterprises, India; Prasanta Kumar Ghosh, Indian Institute of Science, Bangalore, India</i>	
BIO-P3: NEURO IMAGE AND SIGNAL PROCESSING	
BIO-P3.1: CONDITIONAL DOMAIN ADVERSARIAL TRANSFER FOR ROBUST CROSS-SITE ADHD CLASSIFICATION USING FUNCTIONAL MRI	1190
<i>Ya-Lin Huang, Wan-Ting Hsieh, Hao-Chun Yang, Chi-Chun Lee, National Tsing Hua University, Taiwan</i>	
BIO-P3.2: EEG CONNECTIVITY - INFORMED COOPERATIVE ADAPTIVE LINE ENHANCER FOR RECOGNITION OF BRAIN STATE	1195
<i>Saeid Sanei, Nottingham Trent University, United Kingdom; Clive Cheong Took, Royal Holloway, University of London, United Kingdom; Delaram Jarchi, University of Essex, United Kingdom; Ales Prochazke, Institute of Chemical Engineering, Czech Republic</i>	
BIO-P3.3: ONLINE GRAPH TOPOLOGY INFERENCE WITH KERNELS FOR BRAIN CONNECTIVITY ESTIMATION	1200
<i>Mircea Moscu, Ricardo Borsoi, Cédric Richard, Université Côte d'Azur, France</i>	
BIO-P3.4: MINIMAL ADVERSARIAL PERTURBATIONS IN MOBILE HEALTH APPLICATIONS: THE EPILEPTIC BRAIN ACTIVITY CASE STUDY	1205
<i>Amir Aminifar, Uppsala University, Sweden</i>	
BIO-P3.5: DETECTING AUTISM SPECTRUM DISORDER USING TOPOLOGICAL DATA ANALYSIS	1210
<i>Shouvik Majumder, IISER Kolkata, India; Fabio Apicella, Filippo Muratori, University of Pisa, Italy; Koel Das, IISER Kolkata, India</i>	
BIO-P3.6: MULTI-VIEW BAYESIAN GENERATIVE MODEL FOR MULTI-SUBJECT FMRI DATA ON BRAIN DECODING OF VIEWED IMAGE CATEGORIES	1215
<i>Yusuke Akamatsu, Hokkaido University, Japan; Ryosuke Harakawa, Nagaoka University of Technology, Japan; Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	
BIO-P3.7: TIME-FREQUENCY ANALYSIS OF UNIMODAL SENSORY PROCESSING IN AUTISM SPECTRUM DISORDER	1220
<i>David F. D'Croz-Baron, Mary C. Baker, Tanja Karp, Texas Tech University, United States</i>	
BIO-P3.8: AUTOMATIC EPILEPTIC SEIZURE ONSET-OFFSET DETECTION BASED ON CNN IN SCALP EEG	1225
<i>Poomipat Boonyakitanont, Apiwat Lek-uthai, Jitkomut Songsiri, Chulalongkorn University, Thailand</i>	
BIO-P3.9: ENHANCE FEATURE REPRESENTATION OF ELECTROENCEPHALOGRAM FOR SEIZURE DETECTION	1230
<i>Danyang Wang, Yuchun Fang, Yifan Li, Shanghai University, China; Changfeng Chai, Changhai Hospital of Shanghai, China</i>	
BIO-P3.10: SPEECH SYNTHESIS USING EEG	1235
<i>Gautam Krishna, Co Tran, Yan Han, Mason Carnahan, Ahmed Tewfik, University of Texas at Austin, United States</i>	

BIO-P3.11: EEG FEATURE SELECTION USING ORTHOGONAL REGRESSION:	1239
APPLICATION TO EMOTION RECOGNITION	
<i>Xueyuan Xu, Fulin Wei, Zhiyuan Zhu, Jianhong Liu, Xia Wu, Beijing Normal University, China</i>	
BIO-P3.12: SCALPNET: DETECTION OF SPATIOTEMPORAL ABNORMAL INTERVALS	1244
IN EPILEPTIC EEG USING CONVOLUTIONAL NEURAL NETWORKS	
<i>Takahiko Sakai, Taku Shoji, Tokyo University of Agriculture and Technology, Japan; Noboru Yoshida, Juntendo University Nerima Hospital, Japan; Kosuke Fukumori, Yuichi Tanaka, Toshihisa Tanaka, Tokyo University of Agriculture and Technology, Japan</i>	
BIO-P4: PHYSIOLOGICAL SIGNAL PROCESSING	
BIO-P4.1: A SEMI-SUPERVISED APPROACH FOR IDENTIFYING ABNORMAL HEART	1249
SOUNDS USING VARIATIONAL AUTOENCODER	
<i>Rohan Banerjee, Avik Ghose, Tata Consultancy Services, India</i>	
BIO-P4.2: DETECTION OF S1 AND S2 LOCATIONS IN PHONOCARDIOGRAM SIGNALS	1254
USING ZERO FREQUENCY FILTER	
<i>RaviShankar Prasad, Idiap Research Institute, Switzerland; Gurkan Yilmaz, Olivier Chetelat, Swiss Center for Electronics and Microtechnology, Switzerland; Mathew Magimai.-Doss, Idiap Research Institute, Switzerland</i>	
BIO-P4.3: MENTAL FATIGUE PREDICTION FROM MULTI-CHANNEL ECOG SIGNAL	1259
<i>Lin Yao, Cornell University, United States; Jonathan Baker, Jae-Wook Ryou, Nicholas Schiff, Keith Purpura, Weill Cornell Medicine, United States; Mahsa Shoaran, Cornell University, United States</i>	
BIO-P4.4: THE EFFECT OF DATA AUGMENTATION ON CLASSIFICATION OF ATRIAL	1264
FIBRILLATION IN SHORT SINGLE-LEAD ECG SIGNALS USING DEEP NEURAL NETWORKS	
<i>Faezeh Nejati Hatamian, Fraunhofer Institute for Integrated Circuits IIS, Germany; Nishant Ravikumar, University of Leeds, United Kingdom; Sulaiman Vesal, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Felix P. Kemeth, Matthias Struck, Fraunhofer Institute for Integrated Circuits IIS, Germany; Andreas Maier, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	
BIO-P4.5: ATRIAL FIBRILLATION RISK PREDICTION FROM ELECTROCARDIOGRAM	1269
AND RELATED HEALTH DATA WITH DEEP NEURAL NETWORK	
<i>Yi-Huan Chen, University of Illinois at Chicago, United States; Aamir Husain Twing, University of Illinois Hospital, United States; Daa Badawi, University of Illinois at Chicago, United States; Joseph Danavi, Mark McCauley, University of Illinois Hospital, United States; Ahmet Enis Cetin, University of Illinois at Chicago, United States</i>	
BIO-P4.6: ADAPTIVE REGION AGGREGATION NETWORK: UNSUPERVISED DOMAIN	1274
ADAPTATION WITH ADVERSARIAL TRAINING FOR ECG DELINEATION	
<i>Ming Chen, Guijin Wang, Hui Chen, Zijian Ding, Tsinghua University, China</i>	
BIO-P4.7: MATCHING PURSUIT BASED DYNAMIC PHASE-AMPLITUDE COUPLING	1279
MEASURE	
<i>Tamanna Tabassum Khan Munia, Selin Aviyente, Michigan State University, United States</i>	
BIO-P4.8: MULTITAPER SPECTRAL GRANGER CAUSALITY WITH APPLICATION TO	1284
SSVEP	
<i>Rachele Anderson, Maria Sandsten, Lund University, Sweden</i>	
BIO-P4.9: CROSS-DOMAIN ADAPTATION FOR BIOMETRIC IDENTIFICATION USING	1289
PHOTOPLETHYSMOGRAM	
<i>Eugene Lee, Annie Ho, Yi-Ting Wang, Cheng-Han Huang, Chen-Yi Lee, National Chiao Tung University, Taiwan</i>	
BIO-P4.10: EXPLORING BIO-BEHAVIORAL SIGNAL TRAJECTORIES OF STATE	1294
ANXIETY DURING PUBLIC SPEAKING	
<i>Ehsanul Haque Nirjhar, Amir Behzadan, Theodora Chaspari, Texas A&M University, United States</i>	

BIO-P4.11: REAL-TIME HAND GESTURE RECOGNITION USING TEMPORAL MUSCLE ACTIVATION MAPS OF MULTI-CHANNEL SEMG SIGNALS	1299
<i>Ashwin De Silva, Malsha Vijini Perera, Kithmin Wickramasinghe, Asma Mohamed Naim, Thilina Dulantha Lalitharatne, Simon Lind Kappel, University of Moratuwa, Sri Lanka</i>	
BIO-P4.12: XCEPTIONTIME: INDEPENDENT TIME-WINDOW XCEPTIONTIME ARCHITECTURE FOR HAND GESTURE CLASSIFICATION	1304
<i>Elahe Rahimian, Soheil Zabihi, Concordia University, Canada; Farokh Atashzar, New York University, United States; Amir Asif, Arash Mohammadi, Concordia University, Canada</i>	
BIO-P5: BIO IMAGE AND SIGNAL PROCESSING	
BIO-P5.1: DISCOVERING CAUSALITIES FROM CARDIOTOCOGRAPHY SIGNALS USING IMPROVED CONVERGENT CROSS MAPPING WITH GAUSSIAN PROCESSES	1309
<i>Guanchao Feng, Stony Brook University, United States; J. Gerald Quirk, Stony Brook University Hospital, United States; Petar Djuric, Stony Brook University, United States</i>	
BIO-P5.2: LAI-NET: LOCAL-ANCESTRY INFERENCE WITH NEURAL NETWORKS	1314
<i>Daniel Mas Montserrat, Purdue University, United States; Carlos Bustamante, Alexander Ioannidis, Stanford University, United States</i>	
BIO-P5.3: PREDICTION OF INDIVIDUAL PROGRESSION RATE IN PARKINSON'S DISEASE USING CLINICAL MEASURES AND BIOMECHANICAL MEASURES OF GAIT AND POSTURAL STABILITY	1319
<i>Vyom Raval, University of Texas at Dallas, United States; Kevin Nguyen, Ashley Gerald, Richard Dewey, Albert Montillo, University of Texas Southwestern Medical Center, United States</i>	
BIO-P5.4: DEEP MATRIX COMPLETION ON GRAPHS: APPLICATION IN DRUG TARGET INTERACTION PREDICTION	1324
<i>Aanchal Mongia, Angshul Majumdar, Indian Institute of Technology Delhi, India</i>	
BIO-P5.5: IDENTIFICATION OF ESSENTIAL PROTEINS USING A NOVEL MULTI-OBJECTIVE OPTIMIZATION METHOD	1329
<i>Chong Wu, City University of Hong Kong, Hong Kong SAR of China; Houwang Zhang, China University of Geosciences, China; Le Zhang, Tongji University, China; Hanying Zheng, China University of Geosciences, China</i>	
BIO-P5.6: GRAPH CONVOLUTIONAL NEURAL NETWORKS TO CLASSIFY WHOLE SLIDE IMAGES	1334
<i>Roshan Konda, Hang Wu, May Wang, Georgia Institute of Technology, United States</i>	
BIO-P5.7: DEEP JAMES-STEIN NEURAL NETWORKS FOR BRAIN-COMPUTER INTERFACES	1339
<i>Marko Angjelinowski, Mohammadreza Soltani, Duke University, United States; John Choi, Bijan Pesaran, New York University, United States; Vahid Tarokh, Duke University, United States</i>	
BIO-P5.8: FORMULATING DIVERGENCE FRAMEWORK FOR MULTICLASS MOTOR IMAGERY EEG BRAIN COMPUTER INTERFACE	1344
<i>Satyam Kumar, Tharun Kumar Reddy, Vipul Arora, Laxmidhar Behera, Indian Institute of Technology Kanpur, India</i>	
BIO-P5.9: SUBJECT TRANSFER FRAMEWORK BASED ON SOURCE SELECTION AND SEMI-SUPERVISED STYLE TRANSFER MAPPING FOR SEMG PATTERN RECOGNITION	1349
<i>Suguru Kanoga, Takayuki Hoshino, Hideki Asoh, National Institute of Advanced Industrial Science and Technology (AIST), Japan</i>	
BIO-P5.10: DECODING MOVEMENT IMAGINATION AND EXECUTION FROM EEG SIGNALS USING BCI-TRANSFER LEARNING METHOD BASED ON RELATION NETWORK	1354
<i>Do-Yeun Lee, Ji-Hoon Jeong, Kyung-Hwan Shim, Seong-Whan Lee, Korea University, Korea (South)</i>	

BIO-P5.11: CLASSIFICATION OF HIGH-DIMENSIONAL MOTOR IMAGERY TASKS BASED ON AN END-TO-END ROLE ASSIGNED CONVOLUTIONAL NEURAL NETWORK	1359
<i>Byeong-Hoo Lee, Ji-Hoon Jeong, Kyung-Hwan Shim, Seong-Whan Lee, Korea University, Korea (South)</i>	
BIO-P5.12: CHANNEL SELECTION OVER RIEMANNIAN MANIFOLD WITH NON-STATIONARITY CONSIDERATION FOR BRAIN-COMPUTER INTERFACE APPLICATIONS	1364
<i>Khadijeh Sadatnejad, Aline Roc, Lea Pillette, Aurelien Appriou, Thibaut Monseigne, Fabien Lotte, INRIA sud-ouest, France</i>	
BIO-P6: BIOMEDICAL IMAGE SEGMENTATION	
BIO-P6.1: A SEGMENTATION BASED ROBUST DEEP LEARNING FRAMEWORK FOR MULTIMODAL RETINAL IMAGE REGISTRATION	1369
<i>Yiqian Wang, Junkang Zhang, Cheolhong An, Melina Cavichini, Mahima Jhingan, Manuel J. Amador-Patarroyo, Christopher P. Long, Dirk-Uwe G. Bartsch, William R. Freeman, Truong Q. Nguyen, University of California, San Diego, United States</i>	
BIO-P6.2: DENSE RESIDUAL NETWORK FOR RETINAL VESSEL SEGMENTATION	1374
<i>Changlu Guo, Márton Szemenyei, Budapest University of Technology and Economics, Hungary; Yugen Yi, Jiangxi Normal University, China; Ying Xue, Eötvös Loránd University, Hungary; Wei Zhou, Shenyang Aerospace University, China; Yangyuan Li, Budapest University of Technology and Economics, Hungary</i>	
BIO-P6.3: LIGHTWEIGHT V-NET FOR LIVER SEGMENTATION	1379
<i>Tao Lei, Wenzheng Zhou, Yuxiao Zhang, Risheng Wang, Shaanxi University of Science and Technology, China; Hongying Meng, Asoke K. Nandi, Brunel University London, United Kingdom</i>	
BIO-P6.4: ACU-NET: A 3D ATTENTION CONTEXT U-NET FOR MULTIPLE SCLEROSIS LESION SEGMENTATION	1384
<i>Chuan Hu, Guixia Kang, Beibei Hou, Yiyuan Ma, Ministry of Education Beijing University of Posts and Telecommunications, China; Fabrice Labeau, McGill University, Canada; Zichen Su, Ministry of Education Beijing University of Posts and Telecommunications, China</i>	
BIO-P6.5: EDNFC-NET: CONVOLUTIONAL NEURAL NETWORK WITH NESTED FEATURE CONCATENATION FOR NUCLEI-INSTANCE SEGMENTATION	1389
<i>Shiv Gehlot, Anubha Gupta, Indraprastha Institute of Information Technology Delhi, India; Ritu Gupta, All India Institute of Medical Sciences, New Delhi, India</i>	
BIO-P6.6: AN UNSUPERVISED RETINAL VESSEL EXTRACTION AND SEGMENTATION METHOD BASED ON A TUBE MARKED POINT PROCESS MODEL	1394
<i>Tianyu Li, Mary Comer, Purdue University, United States; Josiane Zerubia, Inria and Université Côte d'Azur, France</i>	
BIO-P6.7: KALM: KEY AREA LOCALIZATION MECHANISM FOR ABNORMALITY DETECTION IN MUSCULOSKELETAL RADIOGRAPHS	1399
<i>Wei Huang, Zhitong Xiong, Qi Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
BIO-P6.8: COMBINING CGAN AND MIL FOR HOTSPOT SEGMENTATION IN BONE SCINTIGRAPHY	1404
<i>Hang Xu, Shijie Geng, Yu Qiao, Kuan Xu, Yueyang Gu, Shanghai Jiao Tong University, China</i>	
BIO-P6.9: A NONINVASIVE METHOD TO DETECT DIABETES MELLITUS AND LUNG CANCER USING THE STACKED SPARSE AUTOENCODER	1409
<i>Qi Zhang, Jianhang Zhou, Bob Zhang, University of Macau, Macao SAR of China</i>	
BIO-P6.10: A MULTI-SCALED RECEPTIVE FIELD LEARNING APPROACH FOR MEDICAL IMAGE SEGMENTATION	1414
<i>Pengcheng Guo, Xiangdong Su, Haoran Zhang, Meng Wang, Feilong Bao, Inner Mongolia University, China</i>	
BIO-P6.11: AUTOMATIC DATA AUGMENTATION VIA DEEP REINFORCEMENT LEARNING FOR EFFECTIVE KIDNEY TUMOR SEGMENTATION	1419
<i>Tiexin Qin, Ziyuan Wang, Kelei He, Yinghuan Shi, Yang Gao, Nanjing University, China; Dinggang Shen, University of North Carolina - Chapel Hill, United States</i>	

BIO-P6.12: CROSS-STAINED SEGMENTATION FROM RENAL BIOPSY IMAGES USING MULTI-LEVEL ADVERSARIAL LEARNING	1424
<i>Ke Mei, Chuang Zhu, Beijing University of Posts and Telecommunications, China; Lei Jiang, Peking University People's Hospital, China; Jun Liu, Yuanyuan Qiao, Beijing University of Posts and Telecommunications, China</i>	
CI-L1: COMPUTATIONAL IMAGING	
CI-L1.1: BLIND MULTI-SPECTRAL IMAGE PAN-SHARPENING	1429
<i>Lantao Yu, Rice University, United States; Dehong Liu, Hassan Mansour, Petros T. Boufounos, Yanting Ma, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
CI-L1.2: A FORWARD-BACKWARD ALGORITHM FOR REWEIGHTED PROCEDURES: APPLICATION TO RADIO-ASTRONOMICAL IMAGING	1434
<i>Audrey Repetti, Yves Wiaux, Heriot-Watt University, United Kingdom</i>	
CI-L1.3: CRA: A GENERIC COMPRESSION RATIO ADAPTER FOR END-TO-END DATA-DRIVEN IMAGE COMPRESSIVE SENSING RECONSTRUCTION FRAMEWORKS	1439
<i>Zhikang Zhang, Kai Xu, Fengbo Ren, Arizona State University, United States</i>	
CI-L1.4: REVEALING HIDDEN DRAWINGS IN LEONARDO'S 'THE VIRGIN OF THE ROCKS' FROM MACRO X-RAY FLUORESCENCE SCANNING DATA THROUGH ELEMENT LINE LOCALISATION	1444
<i>Su Yan, Jun-Jie Huang, Imperial College London, United Kingdom; Nathan Daly, Catherine Higgitt, The National Gallery, United Kingdom; Pier Luigi Dragotti, Imperial College London, United Kingdom</i>	
CI-L1.5: 3D UNKNOWN VIEW TOMOGRAPHY VIA ROTATION INVARIANTS	1449
<i>Mona Zehni, Shuai Huang, Ivan Dokmanic, Zhizhen Zhao, University of Illinois at Urbana-Champaign, United States</i>	
CI-L1.6: MODELLING SEA CLUTTER IN SAR IMAGES USING LAPLACE-RICIAN DISTRIBUTION	1454
<i>Oktay Karakus, University of Bristol, United Kingdom; Ercan E. Kuruoglu, Tsinghua-Berkeley Shenzhen Institute, China; Alin Achim, University of Bristol, United Kingdom</i>	
CI-L2: COMPUTATIONAL OPTICS	
CI-L2.1: VOLUME RECONSTRUCTION FOR LIGHT FIELD MICROSCOPY	1459
<i>Herman Verinaz-Jadan, Pingfan Song, Carmel L. Howe, Amanda J. Foust, Pier Luigi Dragotti, Imperial College London, United Kingdom</i>	
CI-L2.2: DEEP EXPOSURE FUSION WITH DEGHOSTING VIA HOMOGRAPHY ESTIMATION AND ATTENTION LEARNING	1464
<i>Sheng-Yeh Chen, Yung-Yu Chuang, National Taiwan University, Taiwan</i>	
CI-L2.3: SINGLE-SHOT REAL-TIME MULTIPLE-PATH TIME-OF-FLIGHT DEPTH IMAGING FOR MULTI-APERTURE AND MACRO-PIXEL SENSORS	1469
<i>Miguel Heredia Conde, University of Siegen, Germany; Keiichiro Kagawa, Tomoya Kokado, Shoji Kawahito, Shizuoka University, Japan; Otmar Loffeld, University of Siegen, Germany</i>	
CI-L2.4: FAST OPTICAL SYSTEM IDENTIFICATION BY NUMERICAL INTERFEROMETRY	1474
<i>Sidharth Gupta, University of Illinois at Urbana-Champaign, United States; Rémi Gribonval, Inria, France; Laurent Daudet, LightOn, France; Ivan Dokmanić, University of Illinois at Urbana-Champaign, United States</i>	
CI-L2.5: FOURIER PHASE RETRIEVAL WITH ARBITRARY REFERENCE SIGNAL	1479
<i>Fahimeh Arab, M. Salman Asif, University of California, Riverside, United States</i>	

CI-L2.6: PRECONDITIONED GHOST IMAGING VIA SPARSITY CONSTRAINT	1484
<i>Zhishen Tong, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China; Jian Wang, Fudan University, China; Shensheng Han, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China</i>	
CI-P1: COMPUTATIONAL IMAGING METHOD AND APPLICATIONS	
CI-P1.1: MULTISPECTRAL FUSION OF RGB AND NIR IMAGES USING WEIGHTED LEAST SQUARES AND ALTERNATING GUIDANCE	1489
<i>Kailong Zhou, Cheolkon Jung, Xidian University, China</i>	
CI-P1.2: COLOR AND ANGULAR RECONSTRUCTION OF LIGHT FIELDS FROM INCOMPLETE-COLOR CODED PROJECTIONS	1494
<i>Hoai-Nam Nguyen, Christine Guillemot, Inria Rennes - Bretagne Atlantique, France</i>	
CI-P1.3: CROSS IMAGE CUBIC INTERPOLATOR FOR SPATIALLY VARYING EXPOSURES	1499
<i>Zhengguo Li, Jinghong Zheng, Shoulie Xie, Haiyan Shu, Institute for Infocomm Research, Singapore</i>	
CI-P1.4: DISCRIMINANT AND SPARSITY BASED LEAST SQUARES REGRESSION WITH L1 REGULARIZATION FOR FEATURE REPRESENTATION	1504
<i>Shuping Zhao, Bob Zhang, Shuyi Li, University of Macau, China</i>	
CI-P1.5: DEEP META-RELATION NETWORK FOR VISUAL FEW-SHOT LEARNING	1509
<i>Fahong Zhang, Qi Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
CI-P1.6: A SEMI-SUPERVISED RANK TRACKING ALGORITHM FOR ON-LINE UNMIXING OF HYPERSPECTRAL IMAGES	1514
<i>Ludivine Nus, Sebastian Miron, Université de Lorraine, France; Benoît Jaillais, INRA-ONIRIS, StatSC Unité de Statistique, Sensométrie, Chimiométrie, France; Said Moussaoui, Ecole Centrale Nantes, France; David Brie, Université de Lorraine, France</i>	
CI-P1.7: INVERSE MULTIPLE SCATTERING WITH PHASELESS MEASUREMENTS	1519
<i>Muhammad Asad Lodhi, Rutgers University, United States; Yangting Ma, Hassan Mansour, Petros T. Boufounos, Dehong Liu, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
CI-P1.8: MULTI-POLARIZATION INFORMATION FUSION FOR OBJECT CONTOUR DISPLAY IN PASSIVE MILLIMETER-WAVE AND TERAHERTZ SECURITY IMAGING	1524
<i>Yayun Cheng, Ziran Zhao, Yingxin Wang, Yingying Niu, Tsinghua University, China</i>	
CI-P1.9: CHARACTERIZATION OF A SNAPSHOT FOURIER TRANSFORM IMAGINGSPECTROMETER BASED ON AN ARRAY OF FABRY-PEROT INTERFEROMETERS	1529
<i>Daniele Picone, Aneline Dolet, Grenoble Images Parole Signal Automatique (GIPSA-lab), France; Silvère Gousset, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), France; Didier Voisin, Institut Géosciences de l'Environnement (IGE), France; Mauro Dalla Mura, Grenoble Images Parole Signal Automatique (GIPSA-lab), France; Etienne Le Coarer, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), France</i>	
CI-P1.10: SHADOW REMOVAL OF TEXT DOCUMENT IMAGES BY ESTIMATING LOCAL AND GLOBAL BACKGROUND COLORS	1534
<i>Jian-Ren Wang, Yung-Yu Chuang, National Taiwan University, Taiwan</i>	
DIS-L1: ARRAY-BASED ARCHITECTURES FOR ENERGY-EFFICIENT SIGNAL PROCESSING SYSTEMS	
DIS-L1.1: EXPLORING ENERGY EFFICIENT QUANTUM-RESISTANT SIGNAL PROCESSING USING ARRAY PROCESSORS	1539
<i>Hamid Nejatollahi, Sina Shahhosseini, University of California, Irvine, United States; Rosario Cammarota, Intel AI, Privacy and Security Research, United States; Nikil Dutt, University of California, Irvine, United States</i>	

DIS-L1.2: DMAZERUNNER: OPTIMIZING CONVOLUTIONS ON DATAFLOW ACCELERATORS	1544
<i>Shail Dave, Aviral Shrivastava, Arizona State University, United States; Youngbin Kim, Yonsei University, Korea (South); Sasikanth Avancha, Intel, India; Kyoungwoo Lee, Yonsei University, Korea (South)</i>	
DIS-L1.3: EXPLORATION METHODOLOGY FOR BTI-INDUCED FAILURES ON RRAM-BASED EDGE AI SYSTEMS	1549
<i>Alexandre Levisse, Marco Rios, Miguel Peon, David Atienza, Embedded Systems Laboratory (ESL) EPFL, Switzerland</i>	
DIS-L1.4: TIME-PREDICTABLE SOFTWARE-DEFINED ARCHITECTURE WITH SDF-BASED COMPILER FLOW FOR 5G BASEBAND PROCESSING	1553
<i>Vanchinathan Venkataramani, Bruno Bodin, Aditi Kulkarni, Tulika Mitra, Li-Shiuan Peh, National University of Singapore, Singapore</i>	
DIS-L1.5: ACCELERATING LINEAR ALGEBRA KERNELS ON A MASSIVELY PARALLEL RECONFIGURABLE ARCHITECTURE	1558
<i>Anuraag Soorishetty, Jian Zhou, Arizona State University, United States; Subhankar Pal, David Blaauw, Hun-Seok Kim, Trevor Mudge, Ronald Dreslinski, University of Michigan, United States; Chaitali Chakrabarti, Arizona State University, United States</i>	
DIS-L1.6: ENERGY EFFICIENT ACCELERATION OF FLOATING POINT APPLICATIONS ONTO CGRA	1563
<i>Satyajit Das, Indian Institute of Technology Palakkad, India; Rohit Prasad, Kevin J. M. Martin, Philippe Coussy, Universite Bretagne-Sud, France</i>	
DIS-P1: SIGNAL PROCESSING FOR EMERGING APPLICATIONS: MACHINE LEARNING	
DIS-P1.1: FAST AND ACCURATE EMBEDDED DCNN FOR RGB-D BASED SIGN LANGUAGE RECOGNITION	1568
<i>Ching-Chen Wang, Ching-Te Chiu, Chao-Tsung Huang, Yu-Chun Ding, Li-Wei Wang, National Tsing Hua University, Taiwan</i>	
DIS-P1.2: D2NA: DAY-TO-NIGHT ADAPTATION FOR VISION BASED PARKING MANAGEMENT SYSTEM	1573
<i>Wei-Zhong Zheng, National Chung Cheng University, Taiwan; Vu-Hoang Tran, Ho Chi Minh City University of Technology and Education, Viet Nam; Ching-Chun Huang, National Chiao Tung University, Taiwan</i>	
DIS-P1.3: ENERGAN: A GENERATIVE ADVERSARIAL NETWORK FOR ENERGY DISAGGREGATION	1578
<i>Maria Kaselimi, National Technical University of Athens, Greece; Athanasios Voulodimos, University of West Attica, Greece; Eftychios Protopapadakis, Nikolaos Doulamis, Anastasios Doulamis, National Technical University of Athens, Greece</i>	
DIS-P1.4: ENHANCING THE LABELLING OF AUDIO SAMPLES FOR AUTOMATIC INSTRUMENT CLASSIFICATION BASED ON NEURAL NETWORKS	1583
<i>Gonçalo Castel-Branco, Gabriel Falcao, Fernando Perdigão, Instituto de Telecomunicações, University of Coimbra, Portugal</i>	
DIS-P1.5: DEEP-NEURAL-NETWORK BASED FALL-BACK MECHANISM IN INTERFERENCE-AWARE RECEIVER DESIGN	1588
<i>Sha Hu, Wenquan Hu, Dzevdan Kapetanovic, Neng Wang, Huawei Sweden, Sweden</i>	
DIS-P1.6: DNN-CHIP PREDICTOR: AN ANALYTICAL PERFORMANCE PREDICTOR FOR DNN ACCELERATORS WITH VARIOUS DATAFLOWS AND HARDWARE ARCHITECTURES	1593
<i>Yang Zhao, Chaojian Li, Yue Wang, Pengfei Xu, Yongan Zhang, Yingyan Lin, Rice University, United States</i>	
DIS-P1.7: LOW-COMPLEXITY FIXED-POINT CONVOLUTIONAL NEURAL NETWORKS FOR AUTOMATIC TARGET RECOGNITION	1598
<i>Hassan Dbouk, Hanfei Geng, University of Illinois at Urbana-Champaign, United States; Craig M. Vineyard, Sandia National Laboratories, United States; Naresh R. Shanbhag, University of Illinois at Urbana-Champaign, United States</i>	

DIS-P1.8: ACCELERATING DISTRIBUTED DEEP LEARNING BY ADAPTIVE GRADIENT QUANTIZATION	1603
<i>Jinrong Guo, Institute of Information Engineering, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences, China; Wantao Liu, Institute of Information Engineering, Chinese Academy of Sciences, China; Wang Wang, Institute of Information Engineering, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences, China; Jizhong Han, Ruixuan Li, Institute of Information Engineering, Chinese Academy of Sciences, China; Yijun Lu, Alibaba Cloud Computing Co. Ltd., China; Songlin Hu, Institute of Information Engineering, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences, China</i>	
DIS-P1.9: LUPULUS: A FLEXIBLE HARDWARE ACCELERATOR FOR NEURAL NETWORKS	1608
<i>Andreas Toftegaard Kristensen, Robert Giterman, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Switzerland; Andreas Burg, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
DIS-P1.10: DEPTH ESTIMATION FROM SINGLE IMAGE THROUGH MULTI-PATH-MULTI-RATE DIVERSE FEATURE EXTRACTOR	1613
<i>Wen-Yi Lo, Ching-Te Chiu, Jie-Yu Luo, National Tsing Hua University, Taiwan</i>	
DIS-P1.11: OBJECT DETECTION WITH COLOR AND DEPTH IMAGES WITH MULTI-REDUCED REGION PROPOSAL NETWORK AND MULTI-POOLING	1618
<i>Jiou-Ai Lin, Ching-Te Chiu, Yen-Yu Cheng, National Tsing Hua University, Taiwan</i>	
DIS-P1.12: DEBLURRING AND SUPER-RESOLUTION USING DEEP GATED FUSION ATTENTION NETWORKS FOR FACE IMAGES	1623
<i>Chao-Hsun Yang, Long-Wen Chang, National Tsing Hua University, Taiwan</i>	
DIS-P2: ALGORITHM AND ARCHITECTURE CO-OPTIMIZATION	
DIS-P2.1: INDOOR HEADING DIRECTION ESTIMATION USING RF SIGNALS	1628
<i>Yusen Fan, University of Maryland, United States; Feng Zhang, Origin Wireless Inc, United States; Chenshu Wu, University of Maryland, United States; Beibei Wang, Origin Wireless Inc, United States; K. J. Ray Liu, University of Maryland, College Park, United States</i>	
DIS-P2.2: AN IMPROVED SELECTIVE ACTIVE NOISE CONTROL ALGORITHM BASED ON EMPIRICAL WAVELET TRANSFORM	1633
<i>Shulin Wen, Woon-Seng Gan, Dongyuan Shi, Nanyang Technological University, Singapore</i>	
DIS-P2.3: TOWARDS REAL-TIME, MULTI-VIEW VIDEO STEREOPSIS	1638
<i>Jianwei Ke, Alex Watras, Jae-Jun Kim, Hwei Liu, Hongrui Jiang, Yu Hen Hu, University of Wisconsin-Madison, United States</i>	
DIS-P2.4: ERNET FAMILY: HARDWARE-ORIENTED CNN MODELS FOR COMPUTATIONAL IMAGING USING BLOCK-BASED INFERENCE	1643
<i>Chao-Tsung Huang, National Tsing Hua University, Taiwan</i>	
DIS-P2.5: A DSP ACCELERATION FRAMEWORK FOR SOFTWARE-DEFINED RADIOS ON X86_64	1648
<i>Georgios Georgis, Alexios Thanos, Marcin Filo, Konstantinos Nikitopoulos, University of Surrey, United Kingdom</i>	
DIS-P2.6: FAST SINGLE-VIEW 3D OBJECT RECONSTRUCTION WITH FINE DETAILS THROUGH DILATED DOWNSAMPLE AND MULTI-PATH UPSAMPLE DEEP NEURAL NETWORK	1653
<i>Chia-Ho Hsu, Ching-Te Chiu, Chia-Yu Kuan, National Tsing Hua University, Taiwan</i>	
DIS-P2.7: PROCESSING CONVOLUTIONAL NEURAL NETWORKS ON CACHE	1658
<i>João Vieira, Nuno Roma, INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal; Gabriel Falcao, Instituto de Telecomunicações, University of Coimbra, Portugal; Pedro Tomás, INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal</i>	

DIS-P2.8: LIGHTWEIGHT HARDWARE IMPLEMENTATION OF VVC TRANSFORM	1663
BLOCK FOR ASIC DECODER	
<i>Ibrahim Farhat, VITEC, France; Wassim Hamidouche, INSA Rennes, France; Adrien Grill, VITEC, France; Daniel Menard, INSA Rennes, France; Olivier Déforges, Institut d'Electronique et de Télécommunications de Rennes / Institut National des Sciences Appliquées, France</i>	
DIS-P2.9: RGB-D BASED MULTI-MODAL DEEP LEARNING FOR FACE	1668
IDENTIFICATION	
<i>Tzu-Ying Lin, Ching-Te Chiu, Ching-Tung Tang, National Tsing Hua University, Taiwan</i>	
DIS-P2.10: A REAL TIME IMPLEMENTATION OF A BAYER DOMAIN IMAGE	1673
DEBLURRING CORE FOR OPTICAL BLUR COMPENSATION	
<i>Han-Sol Lee, Eundoo Heo, Wonseok Lee, Do-Chang Ahn, Jeonghyeon Cheon, Kyungho Kim, Kyunghwan Lee, Jeongguk Lee, Yunseok Choi, Soonkeun Chang, Samsung Electronics, Korea (South)</i>	
DIS-P2.11: SELF-ATTENTIVE SENTIMENTAL SENTENCE EMBEDDING FOR	1678
SENTIMENT ANALYSIS	
<i>Sheng-Chieh Lin, Academia Sinica, Taiwan; Wen-Yuh Su, National Chengchi University, Taiwan; Po-Chuan Chien, Academia Sinica, Taiwan; Ming-Feng Tsai, National Chengchi University, Taiwan; Chuan-Ju Wang, Academia Sinica, Taiwan</i>	
DIS-P2.12: DECIDABLE VARIABLE-RATE DATAFLOW FOR HETEROGENEOUS SIGNAL	1683
PROCESSING SYSTEMS	
<i>Yujunrong Ma, Jiahao Wu, Shuvra Bhattacharyya, University of Maryland, United States; Jani Boutellier, University of Vaasa, Finland</i>	
 DIS-P3: DESIGN AND IMPLEMENTATION OF SIGNAL PROCESSING SYSTEMS FOR WIRELESS COMMUNICATION SYSTEMS	
DIS-P3.1: BACK-TO-BACK BUTTERFLY NETWORK, AN ADAPTIVE PERMUTATION	1688
NETWORK FOR NEW COMMUNICATION STANDARDS	
<i>Hassan Harb, Cyrille Chavet, Lab-STICC, France</i>	
DIS-P3.2: 1.5GBIT/S 4.9W HYPERSPECTRAL IMAGE ENCODERS ON A LOW-POWER	1693
PARALLEL HETEROGENEOUS PROCESSING PLATFORM	
<i>Óscar Ferraz, Vitor Silva, Gabriel Falcao, Instituto de Telecomunicações, University of Coimbra, Portugal</i>	
DIS-P3.3: DESIGN OF A CONVERGENCE-AWARE BASED EXPECTATION	1698
PROPAGATION ALGORITHM FOR UPLINK MIMO SCMA SYSTEMS	
<i>Jih-Yang Lin, Pei-Yun Tsai, National Central University, Taiwan</i>	
DIS-P3.4: BIPARTITE BELIEF PROPAGATION POLAR DECODING WITH	1703
BIT-FLIPPING	
<i>Zihao Gong, Yifei Shen, Houren Ji, Southeast University, China; Wenqing Song, Nanjing University, China; Zaichen Zhang, Xiaohu You, Chuan Zhang, Southeast University, China</i>	
DIS-P3.5: LOW-COMPLEXITY LSTM-ASSISTED BIT-FLIPPING ALGORITHM FOR	1708
SUCCESSIVE CANCELLATION LIST POLAR DECODER	
<i>Chun-Hsiang Chen, Chieh-Fang Teng, An-Yeu Wu, National Taiwan University, Taiwan</i>	
DIS-P3.6: ADAPTIVE NORMALIZATION FOR FORECASTING LIMIT ORDER BOOK	1713
DATA USING CONVOLUTIONAL NEURAL NETWORKS	
<i>Nikolaos Passalis, Anastasios Tefas, Aristotle University of Thessaloniki, Greece; Juho Kannianen, Moncef Gabbouj, Tampere University, Finland; Alexandros Iosifidis, Aarhus University, Denmark</i>	
DIS-P3.7: GREEDY HYBRID RATE ADAPTATION IN DYNAMIC WIRELESS	1718
COMMUNICATION ENVIRONMENT	
<i>Yapeng Zhao, Shanghai University, China; Kai Kang, Hua Qian, Shanghai Advanced Research Institute, Chinese Academy of Sciences, China; Xiliang Luo, ShanghaiTech University, China; Yanliang Jin, Shanghai University, China</i>	

DIS-P3.8: A WIFI-BASED PASSIVE FALL DETECTION SYSTEM.....	1723
<i>Yuqian Hu, Feng Zhang, Chenshu Wu, Beibei Wang, K. J. Ray Liu, University of Maryland, College Park, United States</i>	
DIS-P3.9: PROGRAMMABLE DATAFLOW ACCELERATORS: A 5G OFDM MODULATION/DEMODULATION CASE STUDY	1728
<i>Yun Wu, Peng Wang, John McAllister, Queen's University Belfast, United Kingdom</i>	
DIS-P3.10: SIMPLIFIED DYNAMIC SC-FLIP POLAR DECODING.....	1733
<i>Furkan Ercan, Thibaud Tonnellier, Nghia Doan, Warren J. Gross, McGill University, Canada</i>	
DIS-P3.11: REAL-TIME, UNIVERSAL, AND ROBUST ADVERSARIAL ATTACKS AGAINST SPEAKER RECOGNITION SYSTEMS	1738
<i>Yi Xie, Cong Shi, Rutgers University, United States; Zhuohang Li, Jian Liu, University of Tennessee, Knoxville, United States; Yingying Chen, Bo Yuan, Rutgers University, United States</i>	
DIS-P3.12: AN ODORANT ENCODING MACHINE FOR SAMPLING, RECONSTRUCTION AND ROBUST REPRESENTATION OF ODORANT IDENTITY	1743
<i>Aurel A. Lazar, Tingkai Liu, Chung-Heng Yeh, Columbia University, United States</i>	
DIS-P4: DESIGN AND IMPLEMENTATION OF EMERGING SIGNAL PROCESSING SYSTEMS	
DIS-P4.1: FIR FILTER DESIGN AND IMPLEMENTATION FOR PHASE-BASED PROCESSING	1748
<i>Shih-Yao Huang, Wei-Chih Chen, Chao-Tsung Huang, National Tsing Hua University, Taiwan</i>	
DIS-P4.2: FIXED-POINT OPTIMIZATION OF TRANSFORMER NEURAL NETWORK	1753
<i>Yoonho Boo, Wonyong Sung, Seoul National University, Korea (South)</i>	
DIS-P4.3: A FIFO BASED ACCELERATOR FOR CONVOLUTIONAL NEURAL NETWORKS	1758
<i>Vineet Panchbhaiyye, Tokunbo Ogunfunmi, Santa Clara University, United States</i>	
DIS-P4.4: SOFT-OUTPUT FINITE ALPHABET EQUALIZATION FOR MMWAVE MASSIVE MIMO	1763
<i>Oscar Castañeda, Cornell Tech, United States; Sven Jacobsson, Ericsson Research, Sweden; Giuseppe Durisi, Chalmers University of Technology, Sweden; Tom Goldstein, University of Maryland, United States; Christoph Studer, Cornell Tech, United States</i>	
DIS-P4.5: DIVERSITY AND SPARSITY: A NEW PERSPECTIVE ON INDEX TRACKING	1768
<i>Yu Zheng, Southwestern University of Finance and Economics, China; Timothy M. Hospedales, Yongxin Yang, University of Edinburgh, United Kingdom</i>	
DIS-P4.6: SPARSE BEAMSPACE EQUALIZATION FOR MASSIVE MU-MIMO MMWAVE SYSTEMS	1773
<i>Seyed Hadi Mirfarshbafan, Christoph Studer, Cornell Tech, United States</i>	
DIS-P4.7: THRESHOLD-ADJUSTED ORB STRATEGIES WITH GENETIC ALGORITHM AND PROTECTIVE CLOSING STRATEGY ON TAIWAN FUTURES MARKET	1778
<i>Jia-Hao Syu, National Taiwan University, Taiwan; Mu-En Wu, National Taipei University of Technology, Taiwan; Chun-Hao Chen, Tamkang University, Taiwan; Jan-Ming Ho, Academia Sinica, Taiwan</i>	
DIS-P4.8: CAN EVERY ANALOG SYSTEM BE SIMULATED ON A DIGITAL COMPUTER?	1783
<i>Holger Boche, Volker Pohl, Technische Universität München, Germany</i>	
DIS-P4.9: LOW-COMPLEXITY COMPRESSED ALIGNMENT-AIDED COMPRESSIVE ANALYSIS FOR REAL-TIME ELECTROCARDIOGRAPHY TELEMONITORING	1788
<i>Yo-Woei Pua, Ching-Yao Chou, An-Yeu Wu, National Taiwan University, Taiwan</i>	

DIS-P4.10: REDUCED-COMPLEXITY SINGULAR VALUE DECOMPOSITION FOR TUCKER DECOMPOSITION: ALGORITHM AND HARDWARE	1793
<i>Xiaofeng Hu, Chunhua Deng, Bo Yuan, Rutgers University, United States</i>	
DIS-P4.11: AN EARLY TERMINATION SCHEME FOR SUCCESSIVE CANCELLATION LIST DECODING OF POLAR CODES	1798
<i>Huang-Chang Lee, Chang Gung University, Taiwan; Yu-Sheng Pao, Cheng-Yi Chi, Hsin-Yu Lee, Yeong-Luh Ueng, Tsing Hua University, Taiwan</i>	
DIS-P4.12: LOW-LATENCY LIGHTWEIGHT STREAMING SPEECH RECOGNITION WITH 8-BIT QUANTIZED SIMPLE GATED CONVOLUTIONAL NEURAL NETWORKS	1803
<i>Jinhwan Park, Xue Qian, Youngmin Jo, Wonyong Sung, Seoul National University, Korea (South)</i>	
 IVMSP-L1: INVERSE PROBLEMS IN IMAGE/VIDEO PROCESSING I	
IVMSP-L1.1: SHAPE FROM BANDWIDTH: CENTRAL PROJECTION CASE	1808
<i>Golnoosh Elhami, Adam Scholefield, Martin Vetterli, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
IVMSP-L1.2: SEQUENTIAL DEEP UNROLLING WITH FLOW PRIORS FOR ROBUST VIDEO DERAINING	1813
<i>Xinwei Xue, Ying Ding, Pan Mu, Long Ma, Risheng Liu, Xin Fan, Dalian University of Technology, China</i>	
IVMSP-L1.3: A FAST AND ACCURATE SUPER-RESOLUTION NETWORK USING PROGRESSIVE RESIDUAL LEARNING	1818
<i>Hong Liu, Zhisheng Lu, Wei Shi, Peking University Shenzhen Graduate School, China; Juanhui Tu, Tencent, China</i>	
IVMSP-L1.4: REV-AE: A LEARNED FRAME SET FOR IMAGE RECONSTRUCTION	1823
<i>Shaohui Li, Ziyang Zheng, Wenrui Dai, Junni Zou, Hongkai Xiong, Shanghai Jiao Tong University, China</i>	
IVMSP-L1.5: DECOMPOSED CYCLEGAN FOR SINGLE IMAGE DERAINING WITH UNPAIRED DATA	1828
<i>Kewen Han, Xinguang Xiang, Nanjing University of Science and Technology, China</i>	
IVMSP-L1.6: SLICENET: SLICE-WISE 3D SHAPES RECONSTRUCTION FROM SINGLE IMAGE	1833
<i>Yunjie Wu, Zhengxing Sun, Youcheng Song, Nanjing University, China; Yunhan Sun, Jinlong Shi, Jiangsu University of Science and Technology, China</i>	
 IVMSP-L2: IMAGE/VIDEO ANALYSIS II	
IVMSP-L2.1: SIGHT TO SOUND: AN END-TO-END APPROACH FOR VISUAL PIANO TRANSCRIPTION	1838
<i>A. Sophia Koepke, Olivia Wiles, University of Oxford, United Kingdom; Yael Moses, The Interdisciplinary Centre, Israel; Andrew Zisserman, University of Oxford, United Kingdom</i>	
IVMSP-L2.2: EXOCENTRIC TO EGOCENTRIC IMAGE GENERATION VIA PARALLEL GENERATIVE ADVERSARIAL NETWORK	1843
<i>Gaowen Liu, Texas State University, United States; Hao Tang, University of Trento, Italy; Hugo Latapie, Cisco, United States; Yan Yan, Texas State University, United States</i>	
IVMSP-L2.3: FOCUS ON SEMANTIC CONSISTENCY FOR CROSS-DOMAIN CROWD UNDERSTANDING	1848
<i>Tao Han, Junyu Gao, Yuan Yuan, Qi Wang, Northwestern Polytechnical University, China</i>	
IVMSP-L2.4: IMPROVED REAL-TIME VISUAL TRACKING VIA ADVERSARIAL LEARNING	1853
<i>Haoliang Zhong, Xiyu Yan, Yong Jiang, Shu-Tao Xia, Tsinghua University, China</i>	

IVMSP-L2.5: SPATIAL-TEMPORAL FEATURE AGGREGATION NETWORK FOR VIDEO OBJECT DETECTION	1858
<i>Zhu Chen, Weihai Li, Chi Fei, Bin Liu, Nenghai Yu, University of Science and Technology of China, China</i>	
IVMSP-L3: IMAGE EMERGING TOPICS	
IVMSP-L3.1: USING PANORAMIC VIDEOS FOR MULTI-PERSON LOCALIZATION AND TRACKING IN A 3D PANORAMIC COORDINATE	1863
<i>Fan Yang, RIKEN, Center for Advanced Intelligence Project (AIP) & NARA Institute of Science and Technology, Japan; Feiran Li, Osaka University, Japan; Yang Wu, Kyoto University, Japan; Sakriani Sakti, Satoshi Nakamura, RIKEN, Center for Advanced Intelligence Project (AIP) & NARA Institute of Science and Technology, Japan</i>	
IVMSP-L3.2: POSITION CONSTRAINT LOSS FOR FASHION LANDMARK ESTIMATION	1868
<i>Hong Liu, Meijia Song, Wei Shi, Xia Li, Peking University Shenzhen Graduate School, China</i>	
IVMSP-L3.3: RECEPTIVE FIELD PYRAMID NETWORK FOR OBJECT DETECTION	1873
<i>Faming Wu, Andy J Ma, Yangshan Pan, Yuan Gao, Xiaowei Yan, Sun Yat-Sen University, China</i>	
IVMSP-L3.4: ROBUST VISUAL TRACKING WITH CONTEXT-BASED ACTIVE OCCLUSION RECOGNITION	1878
<i>Yueyang Gu, Yu Qiao, Kuan Xu, Hang Xu, Xingqi Fang, Shanghai Jiao Tong University, China</i>	
IVMSP-L3.5: LEVERAGING ORDINAL REGRESSION WITH SOFT LABELS FOR 3D HEAD POSE ESTIMATION FROM POINT SETS	1883
<i>Shihua Xiao, Nan Sang, Xupeng Wang, Xiangtian Ma, University of Electronic Science and Technology of China, China</i>	
IVMSP-L4: MACHINE LEARNING FOR IMAGE/VIDEO PROCESSING III	
IVMSP-L4.1: SOLVING MISSING-ANNOTATION OBJECT DETECTION WITH BACKGROUND RECALIBRATION LOSS	1888
<i>Han Zhang, Fangyi Chen, Zhiqiang Shen, Carnegie Mellon University, United States; Qiqi Hao, Beihang University, China; Chenchen Zhu, Marios Savvides, Carnegie Mellon University, United States</i>	
IVMSP-L4.2: FACE FEATURE RECOVERY VIA TEMPORAL FUSION FOR PERSON SEARCH	1893
<i>Cheng-Yu Fan, Chao-Peng Liu, Kuan-Chun Wang, Jiun-Hao Jhan, Yu-Chiang Frank Wang, National Taiwan University, Taiwan; Jun-Cheng Chen, Academia Sinica, Taiwan</i>	
IVMSP-L4.3: EDGEFOOL: AN ADVERSARIAL IMAGE ENHANCEMENT FILTER	1898
<i>Ali Shahin Shamsabadi, Changjae Oh, Andrea Cavallaro, Queen Mary University of London, United Kingdom</i>	
IVMSP-L4.4: FACIAL FEATURE EMBEDDED CYCLEGAN FOR VIS-NIR TRANSLATION	1903
<i>Huijiao Wang, Haijian Zhang, Lei Yu, Wuhan University, China; Li Wang, Xulei Yang, Agency for Science, Technology and Research (A*STAR), Singapore</i>	
IVMSP-L4.5: DEEP IMAGE DEBLURRING USING LOCAL CORRELATION BLOCK	1908
<i>Wei Su, Yuan Yuan, Qi Wang, Northwestern Polytechnical University, China</i>	
IVMSP-L4.6: GLOBAL STRUCTURE GRAPH GUIDED FINE-GRAINED VEHICLE RECOGNITION	1913
<i>Chuanming Wang, Huiyuan Fu, Huadong Ma, Beijing University of Posts and Telecommunications, China</i>	
IVMSP-L5: IMAGE/VIDEO STORAGE, AND RETRIEVAL	
IVMSP-L5.1: TRIPLET LOSS FEATURE AGGREGATION FOR SCALABLE HASH	1918
<i>Wei Jia, Li Li, Zhu Li, University of Missouri Kansas City, United States; Shuai Zhao, Shan Liu, Tencent, United States</i>	

IVMSP-L5.2: HDMFH: HYPERGRAPH BASED DISCRETE MATRIX FACTORIZATION 1923 HASHING FOR MULTIMODAL RETRIEVAL	1923
<i>Jing Gao, Wenjun Zhang, Zhikui Chen, Fangming Zhong, Dalian University of Technology, China</i>	
IVMSP-L5.3: MULTI-SCALE DEEP FEATURE FUSION FOR VEHICLE 1928 RE-IDENTIFICATION	1928
<i>Yiting Cheng, Chuanfa Zhang, Kangzheng Gu, Lizhe Qi, Zhongxue Gan, Wenqiang Zhang, Fudan University, China</i>	
IVMSP-L5.4: CROWDSOURCING-BASED RANKING AGGREGATION FOR PERSON 1933 RE-IDENTIFICATION	1933
<i>Yinxue Yu, Chao Liang, Weijian Ruan, Longxiang Jiang, Wuhan University, China</i>	
IVMSP-L5.5: DEEP MULTI-REGION HASHING 1938	1938
<i>Quan Zhou, Shandong University, China; Xiushan Nie, Shandong Jianzhu University, China; Yang Shi, Xingbo Liu, Yilong Yin, Shandong University, China</i>	
IVMSP-L5.6: SEMANTIC AUGMENTATION HASHING FOR ZERO-SHOT IMAGE 1943 RETRIEVAL	1943
<i>Fangming Zhong, Zhikui Chen, Dalian University of Technology, China; Geyong Min, University of Exeter, United Kingdom; Feng Xia, Dalian University of Technology, China</i>	
IVMSP-L6: IMAGE/VIDEO SYNTHESIS, RENDERING AND VISUALIZATION	
IVMSP-L6.1: END-TO-END GENERATION OF TALKING FACES FROM NOISY 1948 SPEECH	1948
<i>Sefik Emre Eskimez, Ross K. Maddox, Chenliang Xu, Zhiyao Duan, University of Rochester, United States</i>	
IVMSP-L6.2: UNSUPERVISED IMAGE-TO-IMAGE TRANSLATION VIA FAIR 1953 REPRESENTATION OF GENDER BIAS	1953
<i>Sunhee Hwang, Hyeran Byun, Yonsei University, Korea (South)</i>	
IVMSP-L6.3: VIDEO FRAME INTERPOLATION VIA EXCEPTIONAL MOTION-AWARE 1958 SYNTHESIS	1958
<i>Minho Park, Sangmin Lee, Yong Man Ro, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
IVMSP-L6.4: LOOK GLOBALLY, AGE LOCALLY: FACE AGING WITH AN ATTENTION 1963 MECHANISM	1963
<i>Haiping Zhu, Zhizhong Huang, Hongming Shan, Junping Zhang, School of Computer Science, Fudan University, China</i>	
IVMSP-L6.5: DESIGN-GAN: CROSS-CATEGORY FASHION TRANSLATION DRIVEN 1968 BY LANDMARK ATTENTION	1968
<i>Yining Lang, Alibaba and Beijing Institute of Technology, China; Yuan He, Alibaba, China; Jianfeng Dong, Zhejiang Gongshang University and Alibaba-Zhejiang University Joint Institute of Frontier Technologies, China; Fan Yang, Hui Xue, Alibaba, China</i>	
IVMSP-L6.6: INTENSITY-IMAGE RECONSTRUCTION FOR EVENT CAMERAS USING 1973 CONVOLUTIONAL NEURAL NETWORK	1973
<i>Yongwei Chen, Weitong Chen, Xixin Cao, Qianting Hua, Peking University, China</i>	
IVMSP-L7: POINT CLOUD AND DEPTH PROCESSING	
IVMSP-L7.1: COLOUR COMPRESSION OF PLENOPTIC POINT CLOUDS USING 1978 RAHT-KLT WITH PRIOR COLOUR CLUSTERING AND SPECULAR/DIFFUSE COMPONENT SEPARATION	1978
<i>Maja Krivokuća, Christine Guillemot, INRIA Rennes, France</i>	

IVMSP-L7.2: SUPER-RESOLUTION OF 3D COLOR POINT CLOUDS VIA FAST GRAPH TOTAL VARIATION	1983
<i>Chinthaka Dinesh, Simon Fraser University, Canada; Gene Cheung, York University, Canada; Ivan V. Bajić, Simon Fraser University, Canada</i>	
IVMSP-L7.3: DEEP MONOCULAR VIDEO DEPTH ESTIMATION USING TEMPORAL ATTENTION	1988
<i>Haoyu Ren, Mostafa El-khamy, Jungwon Lee, Samsung Semiconductor, Inc., United States</i>	
IVMSP-L7.4: ROBUST FULL-FOV DEPTH ESTIMATION IN TELE-WIDE CAMERA SYSTEM	1993
<i>Kai Guo, Seongwook Song, Soonkeun Chang, Tae-ui Kim, Seungmin Han, Irina Kim, Samsung Electronics, Korea (South)</i>	
IVMSP-L7.5: MANET: MULTI-SCALE AGGREGATED NETWORK FOR LIGHT FIELD DEPTH ESTIMATION	1998
<i>Yan Li, Université Libre De Bruxelles,, Belgium; Lu Zhang, INSA de Rennes, France; Qiong Wang, Zhejiang University of Technology, China; Gauthier Lafruit, Université Libre De Bruxelles, Belgium</i>	
IVMSP-L7.6: EPI-NEIGHBORHOOD DISTRIBUTION BASED LIGHT FIELD DEPTH ESTIMATION	2003
<i>Junke Li, Xin Jin, Tsinghua University, China</i>	
IVMSP-L8: MULTI-SCALE AND WAVELET PROCESSING	
IVMSP-L8.1: STOCHASTIC MULTI-SCALE AGGREGATION NETWORK FOR CROWD COUNTING	2008
<i>Mingjie Wang, Hao Cai, Memorial University of Newfoundland, University of Guelph, Canada; Jun Zhou, Dalian University of Technology, China; Minglun Gong, University of Guelph, Canada</i>	
IVMSP-L8.2: MDR-SURV: A MULTI-SCALE DEEP LEARNING-BASED RADIOMICS FOR SURVIVAL PREDICTION IN PULMONARY MALIGNANCIES	2013
<i>Parnian Afshar, Concordia University, Canada; Anastasia Oikonomou, Konstantinos N. Plataniotis, University of Toronto, Canada; Arash Mohammadi, Concordia University, Canada</i>	
IVMSP-L8.3: LEARNING A GENERIC ADAPTIVE WAVELET SHRINKAGE FUNCTION FOR DENOISING	2018
<i>Tobias Alt, Joachim Weickert, Saarland University, Germany</i>	
IVMSP-L8.4: MULTI-SCALE RESIDUAL NETWORK FOR IMAGE CLASSIFICATION	2023
<i>Xian Zhong, Oubo Gong, Wuhan University of Technology, China; Wenxin Huang, Wuhan University, China; Jingling Yuan, Wuhan University of Technology, China; Bo Ma, University of Florida, United States; Ryan Wen Liu, Wuhan University of Technology, China</i>	
IVMSP-L8.5: DEEP MULTI-SCALE GABOR WAVELET NETWORK FOR IMAGE RESTORATION	2028
<i>Hang Dong, Xinyi Zhang, Yu Guo, Fei Wang, Xi'an Jiaotong University, China</i>	
IVMSP-L8.6: RESIDUAL ATTENTION NETWORK FOR WAVELET DOMAIN SUPER-RESOLUTION	2033
<i>Jing Liu, Yuan Xie, Haichuan Song, Wang Yuan, Lizhuang Ma, School of Software Engineering, East China Normal University, China</i>	
IVMSP-L9: IMAGE/VIDEO CODING II	
IVMSP-L9.1: AN ADAPTIVE LINEAR ESTIMATOR BASED APPROACH TO BI-DIRECTIONAL MOTION COMPENSATED PREDICTION	2038
<i>Bohan Li, University of California, Santa Barbara, United States; Jingning Han, Google LLC, United States; Kenneth Rose, University of California, Santa Barbara, United States</i>	

IVMSP-L9.2: SPHERICAL VIDEO CODING WITH GEOMETRY AND REGION ADAPTIVE TRANSFORM DOMAIN TEMPORAL PREDICTION	2043
<i>Bharath Vishwanath, Kenneth Rose, University of California, Santa Barbara, United States</i>	
IVMSP-L9.3: VERSATILE VIDEO CODING AND SUPER-RESOLUTION FOR EFFICIENT DELIVERY OF 8K VIDEO WITH 4K BACKWARD-COMPATIBILITY	2048
<i>Charles Bonneau, IRT b<>com, France; Wassim Hamidouche, Institut d'Electronique et de Télécommunications de Rennes / Institut National des Sciences Appliquées, France; Jean-François Travers, TDF, France; Olivier Déforges, Institut d'Electronique et de Télécommunications de Rennes / Institut National des Sciences Appliquées, France</i>	
IVMSP-L9.4: ALTERNATIVE HALF-SAMPLE INTERPOLATION FILTERS FOR VERSATILE VIDEO CODING	2053
<i>Anastasia Henkel, Ivan Zupancic, Benjamin Bross, Martin Winken, Heiko Schwarz, Detlev Marpe, Thomas Wiegand, Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, Germany</i>	
IVMSP-L9.5: JUST NOTICEABLE DISTORTION BASED PERCEPTUALLY LOSSLESS INTRA CODING	2058
<i>Xuelin Shen, City University of Hong Kong, Hong Kong SAR of China; Xinfeng Zhang, University of Chinese Academy of Sciences, China; Shiqi Wang, Sam Kwong, City University of Hong Kong, Hong Kong SAR of China; Guopu Zhu, Chinese Academy of Sciences, China</i>	
IVMSP-L9.6: EFFICIENT DEEP LEARNING-BASED LOSSY IMAGE COMPRESSION VIA ASYMMETRIC AUTOENCODER AND PRUNING	2063
<i>Jun-Hyuk Kim, Jun-Ho Choi, Yonsei University, Korea (South); Jaehyuk Chang, NAVER WEBTOON Corp., Korea (South); Jong-Seok Lee, Yonsei University, Korea (South)</i>	
IVMSP-L10: IMAGE/VIDEO PROCESSING III	
IVMSP-L10.1: DERIVING COMPACT FEATURE REPRESENTATIONS VIA ANNEALED CONTRACTION	2068
<i>Muhammad Shah, Bhiksha Raj, Carnegie Mellon University, United States</i>	
IVMSP-L10.2: FAST CLUSTERING WITH CO-CLUSTERING VIA DISCRETE NON-NEGATIVE MATRIX FACTORIZATION FOR IMAGE IDENTIFICATION	2073
<i>Feiping Nie, Shenfei Pei, Rong Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
IVMSP-L10.3: COMPRESSIVE ADAPTIVE BILATERAL FILTERING	2078
<i>Pravin Nair, Ruturaj Gavaskar, Kunal Narayan Chaudhury, Indian Institute of Science, India</i>	
IVMSP-L10.4: ATTENTION MECHANISM ENHANCED KERNEL PREDICTION NETWORKS FOR DENOISING OF BURST IMAGES	2083
<i>Bin Zhang, Southeast University, China; Shenyao Jin, Jiangsu Industrial Technology Research Institute, China; Yili Xia, Yongming Huang, Southeast University, China; Zixiang Xiong, Texas A&M University, United States</i>	
IVMSP-L10.5: IMAGE RESTORATION VIA DATA-DEPENDENT PROXIMAL AVERAGED OPTIMIZATION	2088
<i>Pan Mu, Jian Chen, Risheng Liu, Wei Zhong, Xin Fan, Zhongxuan Luo, Dalian University of Technology, China</i>	
IVMSP-L10.6: MULTI-WAY MULTI-VIEW DEEP AUTOENCODER FOR IMAGE FEATURE LEARNING WITH MULTI-LEVEL GRAPH REGULARIZATION	2093
<i>Zheng Fang, Zhejiang University, China; Sen Zhou, Netease Inc., China; Xi Li, Zhejiang university, China; Haoqi Zhu, Netease Inc., China</i>	

IVMSP-P1: IMAGE/VIDEO REPRESENTATION

IVMSP-P1.1: EXPOSURE INTERPOLATION VIA HYBRID LEARNING	2098
<i>Chaobing Zheng, Wuhan University of Science and Technology, China; Zhengguo Li, Institute for Infocomm Research, Singapore; Yi Yang, Shiqian Wu, Wuhan University of Science and Technology, China</i>	

IVMSP-P1.2: LEARNING SPATIO-TEMPORAL REPRESENTATIONS WITH TEMPORAL SQUEEZE POOLING	2103
<i>Guoxi Huang, Adrian Bors, University of York, United Kingdom</i>	
IVMSP-P1.3: FINE-GRAINED GIANT PANDA IDENTIFICATION	2108
<i>Rizhi Ding, Le Wang, Xi'an Jiaotong University, China; QiLin Zhang, HERE Technologies, United States; Zhenxing Niu, Alibaba Group, China; Nanning Zheng, Xi'an Jiaotong University, China; Gang Hua, Wormpex AI Research, United States</i>	
IVMSP-P1.4: LEARNING FROM DANCES: POSE-INVARIANT RE-IDENTIFICATION FOR MULTI-PERSON TRACKING	2113
<i>HSuan-I Ho, ETH Zürich, Switzerland; Minho Shim, Independent, Korea (South); Dongyoon Wee, NAVER Corporation, Korea (South)</i>	
IVMSP-P1.5: LEARNING FRACTIONAL ORTHOGONAL LATENT CONSISTENT FEATURES FOR FACE HALLUCINATION AND RECOGNITION	2118
<i>Yun-Hao Yuan, Jin Li, Yun Li, Jipeng Qiang, Bin Li, Yangzhou University, China</i>	
IVMSP-P1.6: SPARSE MODELING ON DISTRIBUTED ENCRYPTION DATA	2123
<i>Yukihiro Bandoh, Takayuki Nakachi, NTT, Japan; Hitoshi Kiya, Tokyo Metropolitan University, Japan</i>	
IVMSP-P1.7: S-DOD-CNN: DOUBLY INJECTING SPATIALLY-PRESERVED OBJECT INFORMATION FOR EVENT RECOGNITION	2128
<i>Hyungtae Lee, Sungmin Eum, Booz Allen Hamilton Inc., United States; Heesung Kwon, U.S. Army Research Laboratory, United States</i>	
IVMSP-P1.8: ANGULAR DISCRIMINATIVE DEEP FEATURE LEARNING FOR FACE VERIFICATION	2133
<i>Bowen Wu, Midea Corporate Research Center, China; Huaming Wu, Tianjin University, China</i>	
IVMSP-P1.9: 3D DEFORMATION SIGNATURE FOR DYNAMIC FACE RECOGNITION	2138
<i>Abd El Rahman Shabayek, Djamila Aouada, University of Luxembourg, Luxembourg; Kseniya Cherenkova, Gleb Gusev, Artec 3D, Luxembourg; Björn Ottersten, University of Luxembourg, Luxembourg</i>	
IVMSP-P1.10: ASR IS ALL YOU NEED: CROSS-MODAL DISTILLATION FOR LIP READING	2143
<i>Triantafyllos Afouras, University of Oxford, United Kingdom; Joon Son Chung, University of Oxford and Naver Corporation, United Kingdom; Andrew Zisserman, University of Oxford, United Kingdom</i>	
IVMSP-P1.11: COLOR STABILIZATION FOR MULTI-CAMERA LIGHT-FIELD IMAGING	2148
<i>Olivier Vu Thanh, INP Grenoble, France; Trevor Canham, Javier Vazquez-Corral, Universitat Pompeu Fabra, Spain; Raquel Gil-Rodríguez, Justus-Leibig Universität, Germany; Marcelo Bertalmío, Universitat Pompeu Fabra, Spain</i>	
IVMSP-P1.12: LEARNING SPATIO-TEMPORAL CONVOLUTIONAL NETWORK FOR REAL-TIME OBJECT TRACKING	2153
<i>Hanzao Chen, Xiaofen Xing, Xiangmin Xu, South China University of Technology, China</i>	
IVMSP-P2: IMAGE/VIDEO CODING I	
IVMSP-P2.1: LEARNED LOSSLESS IMAGE COMPRESSION WITH A HYPERPRIOR AND DISCRETIZED GAUSSIAN MIXTURE LIKELIHOODS	2158
<i>Zhengxue Cheng, Heming Sun, Masaru Takeuchi, Jiro Katto, Waseda University, Japan</i>	
IVMSP-P2.2: VARIABLE BITRATE IMAGE COMPRESSION WITH QUALITY SCALING FACTORS	2163
<i>Tong Chen, Zhan Ma, Nanjing University, China</i>	
IVMSP-P2.3: BINARY PROBABILITY MODEL FOR LEARNING BASED IMAGE COMPRESSION	2168
<i>Théo Ladune, Pierrick Philippe, Orange, France; Wassim Hamidouche, Lu Zhang, INSA Rennes, France; Olivier Déforges, Institut d'Electronique et de Télécommunications de Rennes / Institut National des Sciences Appliquées, France</i>	

IVMSP-P2.4: IMPROVED PROBABILITY MODELLING FOR EXCEPTION HANDLING IN LOSSLESS SCREEN CONTENT CODING	2173
<i>Tilo Strutz, Leipzig University of Telecommunications, Germany</i>	
IVMSP-P2.5: SPATIALLY ADAPTIVE INTRA MODE PRE-SELECTION FOR ERP 360 VIDEO CODING	2178
<i>Iago Storch, Bruno Zatt, Luciano Agostini, Guilherme Corrêa, Federal University of Pelotas, Brazil; Luis A. da Silva Cruz, University of Coimbra, Portugal; Daniel Palomino, Federal University of Pelotas, Brazil</i>	
IVMSP-P2.6: SEMI-REGULAR GEOMETRIC KERNEL ENCODING & RECONSTRUCTION FOR VIDEO COMPRESSION	2183
<i>Xiaochong Jiang, Zhengzhou University, China; Cheng Yang, Gene Cheung, York University, Canada; Seishi Takamura, NTT Corporation, Japan</i>	
IVMSP-P2.7: LEVERAGING CUBOIDS FOR BETTER MOTION MODELING IN HIGH EFFICIENCY VIDEO CODING	2188
<i>Ashek Ahmmed, Charles Sturt University, Australia; Manzur Murshed, Federation University, Australia; Manoranjan Paul, Charles Sturt University, Australia</i>	
IVMSP-P2.9: ADVERSARIAL VIDEO COMPRESSION GUIDED BY SOFT EDGE DETECTION	2193
<i>Sungsoo Kim, Jin Soo Park, University of Texas at Austin, United States; Christos Bampis, Netflix Inc., United States; Jaeseong Lee, Mia Markey, Alexandros Dimakis, Alan Bovik, University of Texas at Austin, United States</i>	
IVMSP-P2.10: COMPRESSING FLOW FIELDS WITH EDGE-AWARE HOMOGENEOUS DIFFUSION INPAINTING	2198
<i>Ferdinand Jost, Pascal Peter, Joachim Weickert, Saarland University, Germany</i>	
IVMSP-P2.11: ADAPTIVE RESOLUTION CHANGE USING UNCODED AREAS AND DICTIONARY LEARNING-BASED SUPER-RESOLUTION IN VERSATILE VIDEO CODING	2203
<i>Jens Schneider, Johannes Sauer, Christian Rohlfing, RWTH Aachen University, Germany</i>	
IVMSP-P2.12: RDE-MOGA: AUTOMATIC SELECTION OF RATE-DISTORTION-ENERGY CONTROL POINTS FOR VIDEO ENCODERS USING MULTI-OBJECTIVE GENETIC ALGORITHM	2208
<i>Italo Machado, Marilton de Aguiar, Marcelo Porto, Guilherme Corrêa, Daniel Palomino, Bruno Zatt, Federal University of Pelotas, Brazil</i>	
IVMSP-P3: MACHINE LEARNING FOR IMAGE/VIDEO PROCESSING I	
IVMSP-P3.1: A CONNECTED AUTO-ENCODERS BASED APPROACH FOR IMAGE SEPARATION WITH SIDE INFORMATION: WITH APPLICATIONS TO ART INVESTIGATION	2213
<i>Wei Pu, University College London, United Kingdom; Barak Sober, Duke University, United States; Nathan Daly, Catherine Higgitt, National Gallery, United Kingdom; Ingrid Daubechies, Duke University, United States; Miguel Rodrigues, University College London, United Kingdom</i>	
IVMSP-P3.2: SELF-SUPERVISED ADVERSARIAL TRAINING	2218
<i>Kejiang Chen, University of Science and Technology of China, China; Yuefeng Chen, Alibaba group, China; Hang Zhou, University of Science and Technology of China, China; Xiaofeng Mao, Yuhong Li, Yuan He, Hui Xue, Alibaba group, China; Weiming Zhang, NengHai Yu, University of Science and Technology of China, China</i>	
IVMSP-P3.3: GRAY-SCALE IMAGE COLORIZATION USING CYCLE-CONSISTENT GENERATIVE ADVERSARIAL NETWORKS WITH RESIDUAL STRUCTURE ENHANCER	2223
<i>Mohammad Mahdi Johari, Hamid Behroozi, Sharif University of Technology, Iran</i>	
IVMSP-P3.4: ALL YOU NEED IS A SECOND LOOK: TOWARDS TIGHTER ARBITRARY SHAPE TEXT DETECTION	2228
<i>Meng Cao, Yuexian Zou, Peking University, China</i>	

IVMSP-P3.5: COMPARE LEARNING: BI-ATTENTION NETWORK FOR FEW-SHOT LEARNING	2233
<i>Li Ke, Meng Pan, Weigao Wen, Dong Li, Alibaba Group, China</i>	
IVMSP-P3.6: ARNET: ATTENTION-BASED REFINEMENT NETWORK FOR FEW-SHOT SEMANTIC SEGMENTATION	2238
<i>Rusheng Li, Hanhui Liu, Yuesheng Zhu, Zhiqiang Bai, Shen Zhen Graduate School, Peking University, China</i>	
IVMSP-P3.7: LIGHTDET: A LIGHTWEIGHT AND ACCURATE OBJECT DETECTION NETWORK	2243
<i>Qiankun Tang, Jie Li, Institute of Computing Technology, Chinese Academy of Sciences, China; Zhiping Shi, Capital Normal University, China; Yu Hu, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
IVMSP-P3.8: SELF-SUPERVISED DEEP LEARNING FOR FISHEYE IMAGE RECTIFICATION	2248
<i>Chun-Hao Chao, Pin-Lun Hsu, Hung-Yi Lee, Yu-Chiang Frank Wang, National Taiwan University, Taiwan</i>	
IVMSP-P3.9: SKETCHPPNET: A JOINT PIXEL AND POINT CONVOLUTIONAL NEURAL NETWORK FOR LOW RESOLUTION SKETCH IMAGE RECOGNITION	2253
<i>Xianyi Zhu, Yi Xiao, Yan Zheng, Guanghua Tan, Shizhe Zhou, Hunan University, China</i>	
IVMSP-P3.10: ALL IN ONE NETWORK FOR DRIVER ATTENTION MONITORING	2258
<i>Dawei Yang, Xinlei Li, Fudan University, China; Xiaotian Dai, University of York, United Kingdom; Rui Zhang, Lizhe Qi, Wenqiang Zhang, Fudan University, China; Zhe Jiang, University of York, United Kingdom</i>	
IVMSP-P3.11: UNSUPERVISED DOMAIN ADAPTATION FOR SEMANTIC SEGMENTATION WITH SYMMETRIC ADAPTATION CONSISTENCY	2263
<i>Zongyao Li, Ren Togo, Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	
IVMSP-P3.12: IQ-STAN: IMAGE QUALITY GUIDED SPATIO-TEMPORAL ATTENTION NETWORK FOR LICENSE PLATE RECOGNITION	2268
<i>Cong Zhang, Qi Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
IVMSP-P4: IMAGE/VIDEO ANALYSIS I	
IVMSP-P4.1: WEAKLY SUPERVISED SEMANTIC SEGMENTATION FOR REMOTE SENSING HYPERSPECTRAL IMAGING	2273
<i>Eloi Moliner, Luis Salgueiro Romero, Veronica Vilaplana, Universitat Politecnica de Catalunya, Spain</i>	
IVMSP-P4.2: SOCIAL DATA ASSISTED MULTI-MODAL VIDEO ANALYSIS FOR SALIENCY DETECTION	2278
<i>Jiangyue Xia, Jingqi Tian, Jiankai Xing, Jiawen Cheng, Jun Zhang, Jiangtao Wen, Tsinghua University, China; Zhengguang Li, Jian Lou, Alibaba Group, China</i>	
IVMSP-P4.3: VIEW-ANGLE INVARIANT OBJECT MONITORING WITHOUT IMAGE REGISTRATION	2283
<i>Xin Zhang, Chunlei Huo, Chunhong Pan, Institute of Automation, Chinese Academy of Sciences, University of Chinese Academy of Sciences, China</i>	
IVMSP-P4.4: HIERARCHICAL SEQUENCE REPRESENTATION WITH GRAPH NETWORK	2288
<i>Da Chen, Xiang Wu, Alibaba Group, China; Jianfeng Dong, Zhejiang Gongshang University, China; Yuan He, Hui Xue, Feng Mao, Alibaba Group, China</i>	
IVMSP-P4.5: MULTI IMAGE DEPTH FROM DEFOCUS NETWORK WITH BOUNDARY CUE FOR DUAL APERTURE CAMERA	2293
<i>Gwangmo Song, Yumee Kim, Kukjin Chun, Kyoung Mu Lee, Seoul National University, Korea (South)</i>	

IVMSP-P4.6: HEIGHT AND WEIGHT ESTIMATION FROM UNCONSTRAINED IMAGES	2298
<i>Can Yilmaz Altinigne, Dorina Thanou, Radhakrishna Achanta, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
IVMSP-P4.7: SAMPLING STRATEGIES FOR GAN SYNTHETIC DATA	2303
<i>Binod Bhattarai, Seungryul Baek, Rumeysa Bodur, Tae-Kyun Kim, Imperial College London, United Kingdom</i>	
IVMSP-P4.8: AUGLABEL: EXPLOITING WORD REPRESENTATIONS TO AUGMENT LABELS FOR FACE ATTRIBUTE CLASSIFICATION	2308
<i>Binod Bhattarai, Rumeysa Bodur, Tae-Kyun Kim, Imperial College London, United Kingdom</i>	
IVMSP-P4.9: MULTI-TASK CENTER-OF-PRESSURE METRICS ESTIMATION FROM SKELETON USING GRAPH CONVOLUTIONAL NETWORK	2313
<i>Chen Du, Sarah Graham, Shiwei Jin, Colin Depp, Truong Q. Nguyen, University of California, San Diego, United States</i>	
IVMSP-P4.10: REGRESSION BEFORE CLASSIFICATION FOR TEMPORAL ACTION DETECTION	2318
<i>Cece Jin, Tao Zhang, Weijie Kong, Peking University Shenzhen Graduate School, China; Thomas H. Li, Peking University, China; Ge Li, Peking University Shenzhen Graduate School, China</i>	
IVMSP-P4.11: MULTI-TASK LEARNING IN AUTONOMOUS DRIVING SCENARIOS VIA ADAPTIVE FEATURE REFINEMENT NETWORKS	2323
<i>Mingliang Zhai, Xuezhi Xiang, Ning Lv, Harbin Engineering University, China; Abdulmotaleb El Saddik, University of Ottawa, Canada</i>	
IVMSP-P4.12: A REAL-TIME DEEP NETWORK FOR CROWD COUNTING	2328
<i>Xiaowen Shi, Xin Li, Caili Wu, East China Normal University, China; Shuchen Kong, Videt Tech Ltd., China; Jing Yang, Liang He, East China Normal University, China</i>	
IVMSP-P5: IMAGE/VIDEO INTERPRETATION AND UNDERSTANDING	
IVMSP-P5.1: DRIFT DETECTION AND CORRECTION POST-TRACKING	2333
<i>Tarek Ghoniemy, Maria A. Amer, Concordia University, Canada</i>	
IVMSP-P5.2: INTERPRETABLE SELF-ATTENTION TEMPORAL REASONING FOR DRIVING BEHAVIOR UNDERSTANDING	2338
<i>Yi-Chieh Liu, Yung-An Hsieh, Min-Hung Chen, Chao-Han Huck Yang, Georgia Institute of Technology, United States; Jesper Tegner, King Abdullah University of Science and Technology (KAUST), United Arab Emirates; Yi-Chang James Tsai, Georgia Institute of Technology, United States</i>	
IVMSP-P5.3: NON-UNIFORM VIDEO TIME-LAPSE METHOD BASED ON MOTION SCENARIO AND STABILIZATION CONSTRAINT	2343
<i>Kai Guo, Nakhoon Kim, Duckchan Seo, Irina Kim, Soonkeun Chang, Dong-Ki Min, Sukhwan Lim, Samsung Electronics, Korea (South)</i>	
IVMSP-P5.4: KEY ACTION AND JOINT CTC-ATTENTION BASED SIGN LANGUAGE RECOGNITION	2348
<i>Haibo Li, Liqing Gao, Ruize Han, Liang Wan, Wei Feng, Tianjin University, China</i>	
IVMSP-P5.5: LEARNING GEOMETRIC FEATURES WITH DUAL-STREAM CNN FOR 3D ACTION RECOGNITION	2353
<i>Thien Huynh-The, Kumoh National Institute of Technology, Korea (South); Cam-Hao Hua, Kyung Hee University, Korea (South); Nguyen Anh Tu, Nazarbayev University, Kazakhstan; Dong-Seong Kim, Kumoh National Institute of Technology, Korea (South)</i>	
IVMSP-P5.6: A DEEP LEARNING APPROACH TO OBJECT AFFORDANCE SEGMENTATION	2358
<i>Spyridon Thermos, University of Thessaly, Greece; Petros Daras, Centre for Research and Technology Hellas, Greece; Gerasimos Potamianos, University of Thessaly, Greece</i>	

IVMSP-P5.7: MULTI-VIEW SHAPE ESTIMATION OF TRANSPARENT CONTAINERS.....	2363
<i>Alessio Xompero, Ricardo Sanchez-Matilla, Queen Mary University of London, United Kingdom; Apostolos Modas, Pascal Frossard, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Andrea Cavallaro, Queen Mary University of London, United Kingdom</i>	
IVMSP-P5.8: RETHINKING TEMPORAL-RELATED SAMPLE FOR HUMAN ACTION RECOGNITION	2368
<i>Jinpeng Wang, Shiren Li, Sun Yat-Sen University, China; Zhikui Duan, Foshan University, China; Zhihao Yuan, Sun Yat-Sen University, China</i>	
IVMSP-P5.9: FDDWNET: A LIGHTWEIGHT CONVOLUTIONAL NEURAL NETWORK FOR REAL-TIME SEMANTIC SEGMENTATION	2373
<i>Jia Liu, Quan Zhou, Yong Qiang, Bin Kang, Xiaofu Wu, Baoyu Zheng, Nanjing University of Posts and Telecommunications, China</i>	
IVMSP-P5.10: COMPLEX PAIRWISE ACTIVITY ANALYSIS VIA INSTANCE LEVEL EVOLUTION REASONING	2378
<i>Sudipta Paul, University of California, Riverside, United States; Carlos Torres, TwoSixLabs, LLC, United States; Shivkumar Chandrasekaran, Mayachitra, Inc, United States; Amit K. Roy-Chowdhury, University of California, Riverside, United States</i>	
IVMSP-P5.11: SCENE TEXT RECOGNITION WITH TEMPORAL CONVOLUTIONAL ENCODER	2383
<i>Xiangcheng Du, Tianlong Ma, East China Normal University, China; Yingbin Zheng, Hao Ye, Videt Tech Ltd., China; Xingjiao Wu, Liang He, East China Normal University, China</i>	
IVMSP-P5.12: ENHANCED ACTION TUBELET DETECTOR FOR SPATIO-TEMPORAL VIDEO ACTION DETECTION	2388
<i>Yutang Wu, Hanli Wang, Shuheng Wang, Qinyu Li, Tongji University, China</i>	
IVMSP-P6: MACHINE LEARNING FOR IMAGE/VIDEO PROCESSING II	
IVMSP-P6.1: SECURE FACE RECOGNITION IN EDGE AND CLOUD NETWORKS: FROM THE ENSEMBLE LEARNING PERSPECTIVE	2393
<i>Yitu Wang, Takayuki Nakachi, Nippon Telegraph and Telephone Corporation, Japan</i>	
IVMSP-P6.2: LOW COMPLEXITY SINGLE IMAGE SUPER-RESOLUTION WITH CHANNEL SPLITTING AND FUSION NETWORK	2398
<i>Minqiang Zou, Jie Tang, Gangshan Wu, Nanjing University, China</i>	
IVMSP-P6.3: LEARNING SPECTRAL-SPATIAL PRIOR VIA 3DDNCNN FOR HYPERSPECTRAL IMAGE DECONVOLUTION	2403
<i>Xiuheng Wang, Jie Chen, Northwestern Polytechnical University, China; Cédric Richard, Université de la Cote d'Azur, France; David Brie, Université de Lorraine, France</i>	
IVMSP-P6.4: DYNAMICALLY MODULATED DEEP METRIC LEARNING FOR VISUAL SEARCH	2408
<i>Dipu Manandhar, Nanyang Technological University, Singapore; Muhammet Bastan, Amazon, Inc., United States; Kim-Hui Yap, Nanyang Technological University, Singapore</i>	
IVMSP-P6.5: DEEP RESIDUAL NETWORK FOR MSFA RAW IMAGE DENOISING	2413
<i>Zhihong Pan, Baopu Li, Baidu USA, United States; Hsuchun Cheng, Baidu Shenzhen R&D, China; Yingze Bao, Baidu USA, United States</i>	
IVMSP-P6.6: MSPNET: MULTI-SUPERVISED PARALLEL NETWORK FOR CROWD COUNTING	2418
<i>Bo Wei, Yuan Yuan, Qi Wang, Northwestern Polytechnical University, China</i>	

IVMSP-P6.7: VIDEO QUESTION GENERATION VIA SEMANTIC RICH CROSS-MODAL SELF-ATTENTION NETWORKS LEARNING	2423
<i>Yu-Siang Wang, University of Toronto, Canada; Hung-Ting Su, Chen-Hsi Chang, Zhe-Yu Liu, Winston H. Hsu, National Taiwan University, Taiwan</i>	
IVMSP-P6.8: BLIND HYPERSPECTRAL UNMIXING USING DUAL BRANCH DEEP AUTOENCODER WITH ORTHOGONAL SPARSE PRIOR	2428
<i>Zeyang Dou, Kun Gao, Xiaodian Zhang, Hong Wang, Junwei Wang, Beijing Institute of Technology, China</i>	
IVMSP-P6.9: CLASSIFICATION OF DEPTH AND SURFACE EDGES WITH DEEP FEATURES	2433
<i>Zhenhao Li, Xiaolin Wu, Shanghai Jiao Tong University, China</i>	
IVMSP-P6.10: LEARNING TO CHARACTERIZE ADVERSARIAL SUBSPACES	2438
<i>Xiaofeng Mao, Yuefeng Chen, Yuhong Li, Yuan He, Hui Xue, Alibaba Group, China</i>	
IVMSP-P6.11: VIDEO DEBLURRING VIA 3D CNN AND FOURIER ACCUMULATION LEARNING	2443
<i>Fan Yang, Liang Xiao, Jingxiang Yang, Nanjing University of Science and Technology, China</i>	
IVMSP-P6.12: ENHANCED NON-LOCAL CASCADING NETWORK WITH ATTENTION MECHANISM FOR HYPERSPECTRAL IMAGE DENOISING	2448
<i>Hanwen Ma, Ganchao Liu, Yuan Yuan, Northwestern Polytechnical University, China</i>	
IVMSP-P7: IMAGE/VIDEO PROCESSING I	
IVMSP-P7.1: QUANTIZED TENSOR ROBUST PRINCIPAL COMPONENT ANALYSIS	2453
<i>Anastasia Aidini, Grigorios Tsagkatakis, Panagiotis Tsakalides, Foundation for Research and Technology-Hellas (FORTH), Greece</i>	
IVMSP-P7.2: A NEW PERSPECTIVE FOR FLEXIBLE FEATURE GATHERING IN SCENE TEXT RECOGNITION VIA CHARACTER ANCHOR POOLING	2458
<i>Shangbang Long, Yushuo Guan, Kaigui Bian, Peking University, China; Cong Yao, Megvii (Face++) Technology Inc, China</i>	
IVMSP-P7.3: HYBRID ACTIVE CONTOUR DRIVEN BY DOUBLE-WEIGHTED SIGNED PRESSURE FORCE FOR IMAGE SEGMENTATION	2463
<i>Xingyu Fu, Bin Fang, Mingliang Zhou, Jiajun Li, Chongqing University, China</i>	
IVMSP-P7.4: NEURAL CODING STRATEGIES FOR EVENT-BASED VISION DATA	2468
<i>Shane Harrigan, Sonya Coleman, Dermot Kerr, Pratheepan Yogarajah, Ulster University, United Kingdom; Zheng Fang, Chengdong Wu, Northeastern University, China</i>	
IVMSP-P7.5: CAMERA CONFIGURATION DESIGN IN COOPERATIVE ACTIVE VISUAL 3D RECONSTRUCTION: A STATISTICAL APPROACH	2473
<i>Qier An, Yuan Shen, Tsinghua University, China</i>	
IVMSP-P7.6: HAND-3D-STUDIO: A NEW MULTI-VIEW SYSTEM FOR 3D HAND RECONSTRUCTION	2478
<i>Zhengyi Zhao, Tianyao Wang, Siyu Xia, Yangang Wang, Southeast University, China</i>	
IVMSP-P7.7: LEARNING ENDMEMBER DYNAMICS IN MULTITEMPORAL HYPERSPECTRAL DATA USING A STATE-SPACE MODEL FORMULATION	2483
<i>Lucas Drumetz, IMT Atlantique, France; Mauro Dalla Mura, Grenoble INP - GIPSA-lab, France; Guillaume Tochon, LRDE EPITA, France; Ronan Fablet, IMT Atlantique, France</i>	
IVMSP-P7.8: LEARNING EATING ENVIRONMENTS THROUGH SCENE CLUSTERING	2488
<i>Sri Kalyan Yarlagadda, Sriram Baireddy, David Güera, Purdue University, United States; Carol J. Boushey, University of Hawaii, United States; Deborah A. Kerr, Curtin University, Australia; Fengqing Zhu, Purdue University, United States</i>	

IVMSP-P8: INVERSE PROBLEMS IN IMAGE/VIDEO PROCESSING II

IVMSP-P8.1: A HYBRID STRUCTURAL SPARSE ERROR MODEL FOR IMAGE DEBLOCKING 2493

Zhiyuan Zha, Nanyang Technological University, Singapore; Xin Yuan, Nokia Bell Labs, United States; Jiantao Zhou, University of Macau, China; Ce Zhu, University of Electronic Science and Technology of China, China; Bihan Wen, Nanyang Technological University, Singapore

IVMSP-P8.2: REFLECTANCE-GUIDED, CONTRAST-ACCUMULATED HISTOGRAM EQUALIZATION 2498

Xiaomeng Wu, Takahito Kawanishi, Kunio Kashino, NTT Corporation, Japan

IVMSP-P8.3: BILATERAL RECURRENT NETWORK FOR SINGLE IMAGE DERAINING 2503

Wei Shang, Pengfei Zhu, Dongwei Ren, Hong Shi, Tianjin University, China

IVMSP-P8.4: SRZOO: AN INTEGRATED REPOSITORY FOR SUPER-RESOLUTION USING DEEP LEARNING 2508

Jun-Ho Choi, Jun-Hyuk Kim, Jong-Seok Lee, Yonsei University, Korea (South)

IVMSP-P8.5: SUB-DIP: OPTIMIZATION ON A SUBSPACE WITH DEEP IMAGE PRIOR REGULARIZATION AND APPLICATION TO SUPERRESOLUTION 2513

Alexander Sagel, fortiss - The Research Institute of the Free State of Bavaria, Germany; Aline Roumy, Christine Guillemot, Inria, France

IVMSP-P8.6: PARSING MAP GUIDED MULTI-SCALE ATTENTION NETWORK FOR FACE HALLUCINATION 2518

Chenyang Wang, Zhiwei Zhong, Junjun Jiang, Deming Zhai, Xianming Liu, Harbin Institute of Technology, China

IVMSP-P8.7: A VARIATIONAL BAYESIAN APPROACH FOR MULTICHANNEL THROUGH-WALL RADAR IMAGING WITH LOW-RANK AND SPARSE PRIORS 2523

Van Ha Tang, Le Quy Don Technical University, Viet Nam; Abdesselam Bouzerdoun, Son Lam Phung, University of Wollongong, Australia

IVMSP-P8.8: SEMANTICGAN: GENERATIVE ADVERSARIAL NETWORKS FOR SEMANTIC IMAGE TO PHOTO-REALISTIC IMAGE TRANSLATION 2528

Junling Liu, Yuxian Zou, Dongming Yang, Peking University, China

IVMSP-P8.9: LEARNING BLIND DENOISING NETWORK FOR NOISY IMAGE DEBLURRING 2533

Meiya Chen, Yi Chang, Shuning Cao, Luxin Yan, Huazhong University of Science and Technology, China

IVMSP-P8.10: PIXEL-LEVEL SELF-PACED LEARNING FOR SUPER-RESOLUTION 2538

Wei Lin, Junyu Gao, Qi Wang, Xuelong Li, Northwestern Polytechnical University, China

IVMSP-P8.11: A RECURSIVE EDGE DETECTOR FOR COLOR FILTER ARRAY IMAGE 2543

Baptiste Magnier, IMT Mines ALES, France; Arezki Aberkane, Nicolas Gorrity, Audensiel, France

IVMSP-P8.12: IMAGE DE-RAINING VIA RDL: WHEN REWEIGHTED CONVOLUTIONAL SPARSE CODING MEETS DEEP LEARNING 2548

Jingwei He, Lei Yu, Wen Yang, Wuhan University, China

IVMSP-P9: IMAGE/VIDEO ANALYSIS III

IVMSP-P9.1: CS-R-FCN: CROSS-SUPERVISED LEARNING FOR LARGE-SCALE OBJECT DETECTION 2553

Ye Guo, Yali Li, Shengjin Wang, Tsinghua University, China

IVMSP-P9.2: DILATED CONVOLUTIONAL NEURAL NETWORKS FOR PANORAMIC IMAGE SALIENCY PREDICTION	2558
<i>Feng Dai, Youqiang Zhang, Yike Ma, Institute of Computing Technology, Chinese Academy of Sciences, China; Hongliang Li, University of Chinese Academy of Sciences, China; Qiang Zhao, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
IVMSP-P9.3: FINE-GRAINED ACTION RECOGNITION ON A NOVEL BASKETBALL DATASET	2563
<i>Xiaofan Gu, Xinwei Xue, Feng Wang, East China Normal University, China</i>	
IVMSP-P9.4: ATTENTION GUIDED REGION DIVISION FOR CROWD COUNTING	2568
<i>Xiaoqi Pan, Hong Mo, Zhong Zhou, Wei Wu, Beihang University, China</i>	
IVMSP-P9.5: SUPERPIXEL SEGMENTATION VIA CONVOLUTIONAL NEURAL NETWORKS WITH REGULARIZED INFORMATION MAXIMIZATION	2573
<i>Tepei Suzuki, DENSO IT Laboratory, Inc., Japan</i>	
IVMSP-P9.6: STACKED POOLING FOR BOOSTING SCALE INVARIANCE OF CROWD COUNTING	2578
<i>Siyu Huang, Baidu Research, China; Xi Li, Zhejiang University, China; Zhi-Qi Cheng, Carnegie Mellon University, United States; Zhongfei Zhang, State University of New York at Binghamton, United States; Alexander Hauptmann, Carnegie Mellon University, United States</i>	
IVMSP-P9.7: GFNET: A LIGHTWEIGHT GROUP FRAME NETWORK FOR EFFICIENT HUMAN ACTION RECOGNITION	2583
<i>Hong Liu, Linlin Zhang, Lisi Guan, Peking University Shenzhen Graduate School, China; Mengyuan Liu, Tencent AI Lab, China</i>	
IVMSP-P9.8: ROIMIX: PROPOSAL-FUSION AMONG MULTIPLE IMAGES FOR UNDERWATER OBJECT DETECTION	2588
<i>Wei-Hong Lin, Jia-Xing Zhong, Peking University Shenzhen Graduate School, China; Shan Liu, Tencent America, United States; Thomas H. Li, Peking University, China; Ge Li, Peking University Shenzhen Graduate School, China</i>	
IVMSP-P9.9: TREE OF SHAPES CUT FOR MATERIAL SEGMENTATION GUIDED BY A DESIGN	2593
<i>Julien Baderot, Michel Desvignes, Laurent Condat, Mauro Dalla Mura, Univ. Grenoble Alpes, CNRS, Grenoble INP, France</i>	
IVMSP-P9.10: DEEP FLOW COLLABORATIVE NETWORK FOR ONLINE VISUAL TRACKING	2598
<i>Peidong Liu, Xiyu Yan, Yong Jiang, Shu-Tao Xia, Tsinghua University, China</i>	
IVMSP-P9.11: SALIENT OBJECT DETECTION BASED ON IMAGE BIT-MAP	2603
<i>Bangqi Cao, University of Electronic Science and Technology of China, China; Xiandong Meng, Hong Kong University of Science and Technology, China; Shuyuan Zhu, Bing Zeng, University of Electronic Science and Technology of China, China</i>	
IVMSP-P9.12: A NOVEL SALIENCY-DRIVEN OIL TANK DETECTION METHOD FOR SYNTHETIC APERTURE RADAR IMAGES	2608
<i>Libao Zhang, Congyang Liu, Beijing Normal University, China</i>	
IVMSP-P10: INVERSE PROBLEMS IN IMAGE/VIDEO PROCESSING III	
IVMSP-P10.1: VIDEO FRAME INTERPOLATION VIA RESIDUE REFINEMENT	2613
<i>Haopeng Li, Yuan Yuan, Qi Wang, Northwestern Polytechnical University, China</i>	
IVMSP-P10.2: ATTENTION-GUIDED DERAINING NETWORK VIA STAGE-WISE LEARNING	2618
<i>Kui Jiang, Zhongyuan Wang, Peng Yi, Wuhan University, China; Chen Chen, University of North Carolina - Charlotte, United States; Yuhong Yang, Xin Tian, Wuhan University, China; Junjun Jiang, Harbin Institute of Technology, China</i>	

IVMSP-P10.3: ATTENTION-MASK DENSE MERGER (ATTENDENSE) DEEP HDR FOR GHOST REMOVAL	2623
<i>Kareem Metwaly, Vishal Monga, Pennsylvania State University, United States</i>	
IVMSP-P10.4: Y-NET: MULTI-SCALE FEATURE AGGREGATION NETWORK WITH WAVELET STRUCTURE SIMILARITY LOSS FUNCTION FOR SINGLE IMAGE DEHAZING	2628
<i>Hao-Hsiang Yang, ASUS Intelligent Cloud Services, Taiwan; Chao-Han Huck Yang, Yi-Chang James Tsai, Georgia Institute of Technology, United States</i>	
IVMSP-P10.5: IMAGE SUPER-RESOLUTION USING RESIDUAL GLOBAL CONTEXT NETWORK	2633
<i>Kuangye Liu, Zhen Han, Junkui Chen, Chunlei Liu, Jun Chen, Zhongyuan Wang, Wuhan University, China</i>	
IVMSP-P10.6: PRINCIPLE-INSPIRED MULTI-SCALE AGGREGATION NETWORK FOR EXTREMELY LOW-LIGHT IMAGE ENHANCEMENT	2638
<i>Jiaao Zhang, Risheng Liu, Long Ma, Wei Zhong, Xin Fan, Zhongxuan Luo, Dalian University of Technology, China</i>	
IVMSP-P10.7: NON-LOCAL NESTED RESIDUAL ATTENTION NETWORK FOR STEREO IMAGE SUPER-RESOLUTION	2643
<i>Wangduo Xie, Jian Zhang, Zhisheng Lu, Meng Cao, Yong Zhao, Shenzhen Graduate School of Peking University, China</i>	
IVMSP-P10.8: OPENDENOISING: AN EXTENSIBLE BENCHMARK FOR BUILDING COMPARATIVE STUDIES OF IMAGE DENOISERS	2648
<i>Florian Lemarchand, Eduardo Fernandes Montesuma, Maxime Pelcat, Institut d'Électronique et de Télécommunications de Rennes, France; Erwan Nogues, DGA-MI, France</i>	
IVMSP-P10.9: SDTCN: SIMILARITY DRIVEN TRANSMISSION COMPUTING NETWORK FOR IMAGE DEHAZING	2653
<i>Libao Zhang, Shan Wang, Xiaohan Wang, Beijing Normal University, China</i>	
IVMSP-P10.10: JOINT ENHANCEMENT AND DENOISING OF LOW LIGHT IMAGES VIA JND TRANSFORM	2658
<i>Long Yu, Haonan Su, Cheolkon Jung, Xidian University, China</i>	
IVMSP-P10.11: ADVERSARIAL TEXT IMAGE SUPER-RESOLUTION USING SINKHORN DISTANCE	2663
<i>Cong Geng, Li Chen, Xiaoyun Zhang, Zhiyong Gao, Shanghai Jiao Tong University, China</i>	
IVMSP-P10.12: ADRN: ATTENTION-BASED DEEP RESIDUAL NETWORK FOR HYPERSPECTRAL IMAGE DENOISING	2668
<i>Yongsen Zhao, Deming Zhai, Junjun Jiang, Xianming Liu, Harbin Institute of Technology, China</i>	
IVMSP-P11: IMAGE/VIDEO PROCESSING II	
IVMSP-P11.1: WEAKLY SUPERVISED SEGMENTATION GUIDED HAND POSE ESTIMATION DURING INTERACTION WITH UNKNOWN OBJECTS	2673
<i>Cairong Zhang, Guijin Wang, Tsinghua University, China; Xinghao Chen, Huawei, China; Pengwei Xie, Tsinghua University, China; Toshihiko Yamasaki, University of Tokyo, Japan</i>	
IVMSP-P11.2: SPARSE DIRECTED GRAPH LEARNING FOR HEAD MOVEMENT PREDICTION IN 360 VIDEO STREAMING	2678
<i>Xue Zhang, Gene Cheung, York University, Canada; Patrick Le Callet, Université de Nantes, France; Jack Z. G. Tan, KanDao Technology Co. Ltd, China</i>	
IVMSP-P11.3: TRACKING TO IMPROVE DETECTION QUALITY IN LIDAR FOR AUTONOMOUS DRIVING	2683
<i>Jennifer Tang, Massachusetts Institute of Technology, United States; Atulya Yellepeddi, Sefa Demirtas, Christopher Barber, Analog Devices, Inc., United States</i>	

IVMSP-P11.4: CARTOON-TEXTURE DECOMPOSITION-BASED VARIATIONAL PANSHARPENING	2688
<i>Yuerong Chen, Mengliang Zhang, Song Li, Zhongyuan Wang, Xin Tian, Wuhan University, China</i>	
IVMSP-P11.5: AN ALTERNATIVE SIGNATURE DESIGN USING L1 PRINCIPAL COMPONENTS FOR SPREAD-SPECTRUM STEGANOGRAPHY	2693
<i>Colleen Bailey, University of North Texas, United States; Shubham Chamadia, Massachusetts General Hospital, United States; Dimitris Pados, Florida Atlantic University, United States</i>	
IVMSP-P11.6: PRIVACY-PRESERVING PATTERN RECOGNITION USING ENCRYPTED SPARSE REPRESENTATIONS IN L0 NORM MINIMIZATION	2697
<i>Takayuki Nakachi, Yitu Wang, Nippon Telegraph and Telephone Corporation, Japan; Hitoshi Kiya, Tokyo Metropolitan University, Japan</i>	
IVMSP-P11.7: FLEXIBLY-TUNABLE BITCUBE-BASED PERCEPTUAL ENCRYPTION WITHIN JPEG COMPRESSION	2702
<i>Kosuke Shimizu, Taizo Suzuki, University of Tsukuba, Japan</i>	
IVMSP-P11.8: GYROSCOPE AIDED VIDEO STABILIZATION USING NONLINEAR REGRESSION ON SPECIAL ORTHOGONAL GROUP	2707
<i>Xiao Hu, Daniel Olesen, Per Knudsen, Technical University of Denmark, Denmark</i>	
IVMSP-P12: PERCEPTION AND QUALITY MODELS	
IVMSP-P12.1: BBAND INDEX: A NO-REFERENCE BANDING ARTIFACT PREDICTOR	2712
<i>Zhengzhong Tu, University of Texas at Austin, United States; Jessie Lin, Yilin Wang, Balu Adsumilli, Google, Inc., United States; Alan Bovik, University of Texas at Austin, United States</i>	
IVMSP-P12.2: LQAID: LOCALIZED QUALITY AWARE IMAGE DENOISING USING DEEP CONVOLUTIONAL NEURAL NETWORKS	2717
<i>Sathya Veera Reddy Dendi, Chander Dev, Narayan Kothari, Sumohana S. Channappayya, Indian Institute of Technology Hyderabad, India</i>	
IVMSP-P12.3: WEAKLY SUPERVISED CROWD-WISE ATTENTION FOR ROBUST CROWD COUNTING	2722
<i>Xiyu Kong, Muming Zhao, Hao Zhou, Chongyang Zhang, Shanghai Jiao Tong University, China</i>	
IVMSP-P12.4: XPSNR: A LOW-COMPLEXITY EXTENSION OF THE PERCEPTUALLY WEIGHTED PEAK SIGNAL-TO-NOISE RATIO FOR HIGH-RESOLUTION VIDEO QUALITY ASSESSMENT	2727
<i>Christian Helmrich, Mischa Siekmann, Sören Becker, Sebastian Bosse, Detlev Marpe, Thomas Wiegand, Fraunhofer Heinrich-Hertz-Institute, Germany</i>	
IVMSP-P12.5: NON-EXPERTS OR EXPERTS? STATISTICAL ANALYSES OF MOS USING DSIS METHOD	2732
<i>Yasuko Sugito, NHK, Japan; Marcelo Bertalmío, Universitat Pompeu Fabra, Spain</i>	
IVMSP-P12.6: FULL REFERENCE VIDEO QUALITY MEASURES IMPROVEMENT USING NEURAL NETWORKS	2737
<i>Lohic Fotio Tiotso, Antonio Servetti, Enrico Masala, Politecnico di Torino, Italy</i>	
IVMSP-P12.7: LEARNING MULTI-SCALE ATTENTIVE FEATURES FOR SERIES PHOTO SELECTION	2742
<i>Jin Huang, Shandong University, China; Chaoran Cui, Chunyun Zhang, Shandong University of Finance and Economics, China; Zhen Shen, Jun Yu, Yilong Yin, Shandong University, China</i>	
IVMSP-P12.8: SPATIO-TEMPORAL AND GEOMETRY CONSTRAINED NETWORK FOR AUTOMOBILE VISUAL ODOMETRY	2747
<i>Hong Liu, Peng Wei, Weibo Huang, Guoliang Hua, Peking University, China; Fanyang Meng, Peng Cheng Laboratory, China</i>	

IVMSP-P12.9: A COMPREHENSIVE FRAMEWORK FOR 2D-JND EXTENSION TO 360-DEG IMAGES	2752
<i>Sami Jaballah, Amegh Bhavsar, Chaker Larabi, Université de Poitiers, France</i>	
IVMSP-P12.10: COMPOSITE DYNAMIC TEXTURE SYNTHESIS USING HIERARCHICAL LINEAR DYNAMICAL SYSTEM	2757
<i>Rishabh Singh, Shujian Yu, Jose Principe, University of Florida, United States</i>	
IFS-L1: MULTIMEDIA FORENSICS	
IFS-L1.1: STEGANOGRAPHY AND ITS DETECTION IN JPEG IMAGES OBTAINED WITH THE “TRUNC” QUANTIZER	2762
<i>Jan Butora, Jessica Fridrich, Binghamton University, United States</i>	
IFS-L1.2: JPEG STEGANOGRAPHY WITH SIDE INFORMATION FROM THE PROCESSING PIPELINE	2767
<i>Quentin Giboulot, Rémi Cogranne, Troyes University of Technology, France; Patrick Bas, French National Centre for Scientific Research (CNRS), France</i>	
IFS-L1.3: SELECTION-CHANNEL-AWARE REVERSE JPEG COMPATIBILITY FOR HIGHLY RELIABLE STEGANALYSIS OF JPEG IMAGES	2772
<i>Rémi Cogranne, Troyes University of Technology, France</i>	
IFS-L1.4: EMET: EMBEDDINGS FROM MULTILINGUAL-ENCODER TRANSFORMER FOR FAKE NEWS DETECTION	2777
<i>Stephane Schwarz, Antônio Theóphilo, Anderson Rocha, University of Campinas, Brazil</i>	
IFS-L1.5: DEPTH MAP FINGERPRINTING AND SPLICING DETECTION	2782
<i>Falko Matern, Christian Riess, Marc Stamminger, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	
IFS-L1.6: A FRAMEWORK FOR PARAMETERS ESTIMATION OF IMAGE OPERATOR CHAIN	2787
<i>Xin Liao, Zihang Huang, Hunan University, China</i>	
IFS-L2: PRIVACY, BIOMETRICS AND INFORMATION SECURITY	
IFS-L2.1: PRIVACY-PRESERVING PHISHING WEB PAGE CLASSIFICATION VIA FULLY HOMOMORPHIC ENCRYPTION	2792
<i>Edward Chou, Stanford University, United States; Arun Gururajan, Kim Laine, Nitin Kumar Goel, Anna Bertiger, Jack W. Stokes, Microsoft Corporation, United States</i>	
IFS-L2.2: PRIVACY-PRESERVING IMAGE SHARING VIA SPARSIFYING LAYERS ON CONVOLUTIONAL GROUPS	2797
<i>Sohrab Ferdowsi, Behrooz Razeghi, Taras Holotyak, University of Geneva, Switzerland; Flavio Calmon, Harvard University, Switzerland; Slava Voloshynovskiy, University of Geneva, Switzerland</i>	
IFS-L2.3: EVALUATING VOICE CONVERSION-BASED PRIVACY PROTECTION AGAINST INFORMED ATTACKERS	2802
<i>Brij Mohan Lal Srivastava, Nathalie Vauquier, Md Sahidullah, Aurélien Bellet, Inria, France; Marc Tommasi, Université de Lille, France; Emmanuel Vincent, Inria, France</i>	
IFS-L2.4: LOW-COMPLEXITY AND RELIABLE TRANSFORMS FOR PHYSICAL UNCLONABLE FUNCTIONS	2807
<i>Onur Günlü, Rafael F. Schaefer, Technische Universität Berlin, Germany</i>	
IFS-L2.5: ADVERSARIAL DETECTION OF COUNTERFEITED PRINTABLE GRAPHICAL CODES: TOWARDS “ADVERSARIAL GAMES” IN PHYSICAL WORLD	2812
<i>Olga Taran, Slavi Bonev, Taras Holotyak, Slava Voloshynovskiy, University of Geneva, Switzerland</i>	

IFS-L2.6: PHYLOGENETIC MINIMUM SPANNING TREE RECONSTRUCTION USING AUTOENCODERS	2817
<i>Riccardo Castelletto, Simone Milani, University of Padova, Italy; Paolo Bestagini, Politecnico di Milano, Italy</i>	
IFS-P1: INFORMATION HIDING, BIOMETRICS AND SECURITY	
IFS-P1.1: FCEM: A NOVEL FAST CORRELATION EXTRACT MODEL FOR REAL TIME STEGANALYSIS OF VOIP STREAM VIA MULTI-HEAD ATTENTION	2822
<i>Hao Yang, ZhongLiang Yang, Yongjian Bao, Sheng Liu, YongFeng Huang, Tsinghua University, China</i>	
IFS-P1.2: APPROACHING OPTIMAL EMBEDDING IN AUDIO STEGANOGRAPHY WITH GAN	2827
<i>Jianhua Yang, Huilin Zheng, Xiangui Kang, School of Data and Computer Science, Sun Yat-Sen University, Guangzhou, China; Yun-Qing Shi, New Jersey Institute of Technology, United States</i>	
IFS-P1.3: MULTI-STAGE RESIDUAL HIDING FOR IMAGE-INTO-AUDIO STEGANOGRAPHY	2832
<i>Wenxue Cui, Shaohui Liu, Feng Jiang, Harbin Institute of Technology, China; Yongliang Liu, Alibaba Group, China; Debin Zhao, Harbin Institute of Technology, China</i>	
IFS-P1.4: PATCH-LEVEL SELECTION AND BREADTH-FIRST PREDICTION STRATEGY FOR REVERSIBLE DATA HIDING	2837
<i>Hanzhou Wu, Shanghai University, China</i>	
IFS-P1.5: DIGITAL WATERMARKING FOR PROTECTING AUDIO CLASSIFICATION DATASETS	2842
<i>Wansoo Kim, Kyogu Lee, Seoul National University, Korea (South)</i>	
IFS-P1.6: SALIENCY-BASED IMAGE CONTRAST ENHANCEMENT WITH REVERSIBLE DATA HIDING	2847
<i>Shilong Yang, South China University of Technology, China</i>	
IFS-P1.7: UNSEEN FACE PRESENTATION ATTACK DETECTION WITH HYPERSPHERE LOSS	2852
<i>Zhi Li, Haoliang Li, Kwok-Yan Lam, Alex Chichung Kot, Nanyang Technological University, Singapore</i>	
IFS-P1.8: TEXCEPTION: A CHARACTER/WORD-LEVEL DEEP LEARNING MODEL FOR PHISHING URL DETECTION	2857
<i>Farid Tajaddodianfar, Jack W. Stokes, Arun Gururajan, Microsoft, United States</i>	
IFS-P1.9: CELL-PHONE CLASSIFICATION: A CONVOLUTIONAL NEURAL NETWORK APPROACH EXPLOITING ELECTROMAGNETIC EMANATIONS	2862
<i>Baki Berkay Yilmaz, Elvan Mert Ugurlu, Milos Prvulovic, Alenka Zajic, Georgia Institute of Technology, United States</i>	
IFS-P1.10: QUALITY-OF-SERVICE PREDICTION FOR PHYSICAL-LAYER SECURITY VIA SECRECY MAPS	2867
<i>Miguel A. Gutierrez-Estevez, Zoran Utkovski, Patrick Agostini, Daniel Schäufole, Fraunhofer Heinrich-Hertz-Institute, Germany; Matthias Frey, Igor Bjelakovic, Technische Universität Berlin, Germany; Slawomir Stanczak, Fraunhofer Heinrich-Hertz-Institute, Germany</i>	
IFS-P1.11: SECURE IDENTIFICATION FOR GAUSSIAN CHANNELS	2872
<i>Wafa Labidi, Christian Deppe, Holger Boche, Technische Universität München, Germany</i>	

IFS-P2: ANONYMIZATION, SECURITY AND PRIVACY

IFS-P2.1: ANTI-JAMMING ROUTING FOR INTERNET OF SATELLITES: A 2877 REINFORCEMENT LEARNING APPROACH

Chen Han, Aijun Liu, Army Engineering University, China; Liangyu Huo, Beihang University, China; Haichao Wang, Xiaohu Liang, Army Engineering University, China

IFS-P2.2: ELECTRO-MAGNETIC SIDE-CHANNEL ATTACK THROUGH LEARNED 2882 DENOISING AND CLASSIFICATION

Florian Lemarchand, Institut d'Électronique et de Télécommunications de Rennes, France; Cyril Marlin, Florent Montreuil, Erwan Nogues, DGA-MI, France; Maxime Pelcat, Institut d'Électronique et de Télécommunications de Rennes, France

IFS-P2.3: DETECTION OF MALICIOUS VBSCRIPT USING STATIC AND DYNAMIC 2887 ANALYSIS WITH RECURRENT DEEP LEARNING

Jack W. Stokes, Microsoft Corporation, United States; Rakshit Agrawal, University of California, Santa Cruz, United States; Geoff McDonald, Microsoft Corporation, Canada

IFS-P2.4: DYNAMIC ATTACK SCORING USING DISTRIBUTED LOCAL DETECTORS..... 2892

Zahra Zohrevand, Uwe Glässer, Simon Fraser University, Canada

IFS-P2.5: HIJACKING TRACKER: A POWERFUL ADVERSARIAL ATTACK ON VISUAL 2897 TRACKING

Xiyu Yan, Tsinghua University, China; Xuesong Chen, Shenzhen Graduate School of Peking University, China; Yong Jiang, Shu-Tao Xia, Tsinghua University, China; Yong Zhao, Shenzhen Graduate School of Peking University, China; Feng Zheng, Southern University of Science and Technology, China

IFS-P2.6: ADVMS: A MULTI-SOURCE MULTI-COST DEFENSE AGAINST 2902 ADVERSARIAL ATTACKS

Xiao Wang, Boston University, United States; Siyue Wang, Northeastern University, United States; Pin-Yu Chen, IBM Research, United States; Xue Lin, Northeastern University, United States; Peter Chin, Boston University, United States

IFS-P2.7: CLASSIFYING ANOMALIES FOR NETWORK SECURITY 2907

Emily Do, Massachusetts Institute Of Technology, United States; Vijay Gadepally, Lincoln Laboratory/Massachusetts Institute of Technology, United States

IFS-P2.8: A SWITCHING TRANSMISSION GAME WITH LATENCY AS THE USER'S 2912 COMMUNICATION UTILITY

Andrey Garnaev, Athina Petropulu, Wade Trappe, Rutgers University, United States; H. Vincent Poor, Princeton University, United States

IFS-P2.9: AN EFFICIENT METHODOLOGY TO DE-ANONYMIZE THE 5G-NEW 2917 RADIO PHYSICAL DOWNLINK CONTROL CHANNEL

Benjamin Gardner, John Roth, Naval Postgraduate School, United States

IFS-P2.10: JOINT LEARNING OF ASSIGNMENT AND REPRESENTATION FOR 2922 BIOMETRIC GROUP MEMBERSHIP

Marzieh Gheisari, Teddy Furon, Inria, France; Laurent Amsaleg, IRISA, France

IFS-P2.11: PRIVATE FL-GAN: DIFFERENTIAL PRIVACY SYNTHETIC DATA 2927 GENERATION BASED ON FEDERATED LEARNING

Bangzhou Xin, Wei Yang, Yangyang Geng, Sheng Chen, University of Science and Technology of China, China; Shaowei Wang, Tencent Games, China; Liusheng Huang, University of Science and Technology of China, China

IFS-P3: MULTIMEDIA FORENSICS AND BIOMETRICS

IFS-P3.1: AUGMENTATION DATA SYNTHESIS VIA GANS: BOOSTING LATENT 2932 FINGERPRINT RECONSTRUCTION

Ying Xu, Tsinghua University, China; Yi Wang, Chinese University of Hong Kong, China; Jiajun Liang, Megvii Technology, China; Yong Jiang, Tsinghua University, China

IFS-P3.2: LEARNING TO FOOL THE SPEAKER RECOGNITION	2937
<i>Jiguo Li, Xinfeng Zhang, Chinese Academy of Sciences, China; Chuanmin Jia, Peking University, China; Jizheng Xu, Li Zhang, Yue Wang, ByteDance, China; Siwei Ma, Wen Gao, Peking University, China</i>	
IFS-P3.3: TS-FEN: PROBING FEATURE SELECTION STRATEGY FOR FACE ANTI-SPOOFING	2942
<i>Dongmei Peng, Jing Xiao, Rong Zhu, Ge Gao, Wuhan University, China</i>	
IFS-P3.4: IMPROVING CROSS-DATASET PERFORMANCE OF FACE PRESENTATION ATTACK DETECTION SYSTEMS USING FACE RECOGNITION DATASETS	2947
<i>Amir Mohammadi, Sushil Bhattacharjee, Sebastien Marcel, Idiap Research Institute, Switzerland</i>	
IFS-P3.5: SSTNET: DETECTING MANIPULATED FACES THROUGH SPATIAL, STEGANALYSIS AND TEMPORAL FEATURES	2952
<i>Xi Wu, Zhen Xie, YuTao Gao, Yu Xiao, Alibaba Group, China</i>	
IFS-P3.6: MULTIMODAL VIOLENCE DETECTION IN VIDEOS	2957
<i>Bruno Peixoto, Bahram Lavi, University of Campinas, Brazil; Paolo Bestagini, Politecnico di Milano, Italy; Zanoni Dias, Anderson Rocha, University of Campinas, Brazil</i>	
IFS-P3.7: OPEN SET VIDEO CAMERA MODEL VERIFICATION	2962
<i>Owen Mayer, Brian Hosler, Matthew Stamm, Drexel University, United States</i>	
IFS-P3.8: MULTI-PATCH AGGREGATION MODELS FOR RESAMPLING DETECTION	2967
<i>Mohit Lamba, Kaushik Mitra, Indian Institute of Technology Madras, India</i>	
IFS-P3.9: IMPROVING THE CHRONOLOGICAL SORTING OF IMAGES THROUGH OCCLUSION: A STUDY ON THE NOTRE-DAME CATHEDRAL FIRE	2972
<i>Rafael Padilha, Fernanda Alcântara Andaló, Anderson Rocha, University of Campinas, Brazil</i>	
IFS-P3.10: EFFECTIVENESS OF RANDOM DEEP FEATURE SELECTION FOR SECURING IMAGE MANIPULATION DETECTORS AGAINST ADVERSARIAL EXAMPLES	2977
<i>Mauro Barni, Ehsan Nowroozi, Benedetta Tondi, University of Siena, Italy; Bowen Zhang, Xidian University, China</i>	
IFS-P3.11: A DENSE U-NET WITH CROSS-LAYER INTERSECTION FOR DETECTION AND LOCALIZATION OF IMAGE FORGERY	2982
<i>Rongyu Zhang, Jiangqun Ni, Sun Yat-Sen University, China</i>	
 IDSP-L1: SIGNAL PROCESSING FOR EMERGING INDUSTRY APPLICATIONS	
IDSP-L1.1: FAST START-UP ALGORITHM FOR ADAPTIVE NOISE CANCELLERS WITH NOVEL SNR ESTIMATION AND STEPSIZE CONTROL	2987
<i>Akihiko Sugiyama, Yahoo Japan Corporation, Japan</i>	
IDSP-L1.2: ROBUST AND COMPUTATIONALLY-EFFICIENT ANOMALY DETECTION USING POWERS-OF-TWO NETWORKS	2992
<i>Usama Muneeb, Erdem Koyuncu, University of Illinois at Chicago, United States; Yasaman Keshtkarjahromi, Seagate Technology LLC, United States; Hulya Seferoglu, University of Illinois at Chicago, United States; Mehmet Fatih Erden, Seagate Technology LLC, United States; Ahmet Enis Cetin, University of Illinois at Chicago, United States</i>	
IDSP-L1.3: SEMI-SUPERVISED OPTIMAL TRANSPORT METHODS FOR DETECTING ANOMALIES	2997
<i>Amina Alaoui-Belghiti, Hensoldt Nexeya, France; Sylvain Chevallier, Eric Monacelli, LISV - UVSQ, France; Guillaume Bao, Eric Azabou, Garches Neuro-Physio-Lab, France</i>	
IDSP-L1.4: LEARNING TO ESTIMATE DRIVER DROWSINESS FROM CAR ACCELERATION SENSORS USING WEAKLY LABELED DATA	3002
<i>Takayuki Katsuki, Kun Zhao, Takayuki Yoshizumi, IBM Japan, Ltd, Japan</i>	

IDSP-L1.5: DAMAGE-SENSITIVE AND DOMAIN-INVARIANT FEATURE EXTRACTION 3007
FOR VEHICLE-VIBRATION-BASED BRIDGE HEALTH MONITORING

Jingxiao Liu, Stanford University, United States; Bingqing Chen, Carnegie Mellon University, United States; Siheng Chen, Mitsubishi Electric Research Laboratories (MERL), United States; Mario Berges, Jacobo Bielak, Carnegie Mellon University, United States; HaeYoung Noh, Stanford University, United States

IDSP-L1.6: ON ROBUST VARIANCE FILTERING AND CHANGE OF VARIANCE 3012
DETECTION

Qingsong Wen, Alibaba Group U.S., United States; Zhengzhi Ma, University of Southern California, United States; Liang Sun, Alibaba Group U.S., United States

IDSP-L2: INDUSTRY SESSION ON LARGE-SCALE DISTRIBUTED LEARNING STRATEGIES

IDSP-L2.1: LOW-RANK GRADIENT APPROXIMATION FOR MEMORY-EFFICIENT 3017
ON-DEVICE TRAINING OF DEEP NEURAL NETWORK

Mary Gooneratne, Duke University, United States; Khe Chai Sim, Petr Zadrazil, Andreas Kabel, Francoise Beaufays, Giovanni Motta, Google, United States

IDSP-L2.2: IMPROVING EFFICIENCY IN LARGE-SCALE DECENTRALIZED 3022
DISTRIBUTED TRAINING

Wei Zhang, Xiaodong Cui, Abdullah Kayi, IBM, United States; Mingrui Liu, University of Iowa, United States; Ulrich Finkler, Brian Kingsbury, George Saon, Youssef Mroueh, Alper Buyuktosunoglu, Payel Das, David Kung, Michael Picheny, IBM, United States

IDSP-L2.3: PARALLELIZING ADAM OPTIMIZER WITH BLOCKWISE MODEL-UPDATE 3027
FILTERING

Kai Chen, Microsoft Research Asia, China; Haisong Ding, University of Science and Technology of China, China; Qiang Huo, Microsoft Research Asia, China

IDSP-P1: EMERGING SIGNAL PROCESSING APPLICATIONS

IDSP-P1.1: JOINT TRAINING OF DEEP NEURAL NETWORKS FOR MULTI-CHANNEL 3032
DEREVERBERATION AND SPEECH SOURCE SEPARATION

Masahito Togami, LINE Corporation, Japan

IDSP-P1.2: STRUCTURAL SPARSIFICATION FOR FAR-FIELD SPEAKER 3037
RECOGNITION WITH INTEL GNA

Jingchi Zhang, Duke University, United States; Jonathan Huang, Michael Deisher, Intel Corporation, United States; Hai Li, Yiran Chen, Duke University, United States

IDSP-P1.3: ENVIRONMENT-AWARE RECONFIGURABLE NOISE SUPPRESSION..... 3042

Jun Yang, Joshua Bingham, Facebook, United States

IDSP-P1.4: FULLY-NEURAL APPROACH TO HEAVY VEHICLE DETECTION ON 3047
BRIDGES USING A SINGLE STRAIN SENSOR

Takaya Kawakatsu, Kenro Aihara, Atsuhiko Takasu, Jun Adachi, National Institute of Informatics, Japan

IDSP-P1.5: MULTICHANNEL SIGNAL PROCESSING FOR ROAD SURFACE 3052
IDENTIFICATION

Gonzalo Safont, Addisson Salazar, Universitat Politècnica de València, Spain; Alberto Rodriguez, Universidad Miguel Hernández de Elche, Spain; Luis Vergara, Universitat Politècnica de València, Spain

IDSP-P1.6: A MONTE CARLO SEARCH-BASED TRIPLET SAMPLING METHOD FOR 3057
LEARNING DISENTANGLED REPRESENTATION OF IMPULSIVE NOISE ON STEERING GEAR

Seok-Jun Bu, Namu Park, Yonsei University, Korea (South); Gue-Hwan Nam, Jae-Yong Seo, Hyundai Mobis, Korea (South); Sung-Bae Cho, Yonsei University, Korea (South)

IDSP-P1.7: STOCHASTIC GEOMETRY PLANNING OF ELECTRIC VEHICLES CHARGING STATIONS	3062
<i>Rachad Atat, Texas A&M University at Qatar, Qatar; Muhammad Ismail, Tennessee Technological University, United States; Erchin Serpedin, Texas A&M University at Qatar, Qatar</i>	
IDSP-P1.8: DISCRIMINANT GENERATIVE ADVERSARIAL NETWORKS WITH ITS APPLICATION TO EQUIPMENT HEALTH CLASSIFICATION	3067
<i>Shuai Zheng, Chetan Gupta, Hitachi America Ltd, United States</i>	
IDSP-P1.9: POWER OPTIMIZATION USING EMBEDDED AUTOMATIC GAIN CONTROL ALGORITHM WITH PHOTOPLETHYSMOGRAPHY SIGNAL QUALITY CLASSIFICATION	3072
<i>Foroohar Foroozan, Di Xue, Ken Fang, Analog Devices, Inc., United States; James Wu, University of Toronto, Canada</i>	
IDSP-P1.10: A GENERAL DIFFICULTY CONTROL ALGORITHM FOR PROOF-OF-WORK BASED BLOCKCHAINS	3077
<i>Shulai Zhang, Shanghai Jiao Tong University, China; Xiaoli Ma, Georgia Institute of Technology, United States</i>	
IDSP-P1.11: A NEW APPLICATION OF ULTRASOUND SIGNAL PROCESSING FOR ARCHAEOLOGICAL CERAMIC CLASSIFICATION	3082
<i>Addisson Salazar, Gonzalo Safont, Luis Vergara, Universitat Politècnica de València, Spain</i>	
MLSP-L1: ADVERSARIAL MACHINE LEARNING	
MLSP-L1.1: HEADLESS HORSEMAN: ADVERSARIAL ATTACKS ON TRANSFER LEARNING MODELS	3087
<i>Ahmed Abdelkader, Michael Curry, Liam Fowl, Tom Goldstein, Avi Schwarzschild, Manli Shu, University of Maryland, United States; Christoph Studer, Cornell Tech, United States; Chen Zhu, University of Maryland, United States</i>	
MLSP-L1.2: DETECTING ADVERSARIAL ATTACKS IN TIME-SERIES DATA.....	3092
<i>Mubarak Abdu-Aguye, Walid Gomaa, Egypt-Japan University of Science and Technology, Egypt; Yasushi Makihara, Yasushi Yagi, Osaka University, Japan</i>	
MLSP-L1.3: DETECTION OF ADVERSARIAL ATTACKS AND CHARACTERIZATION OF ADVERSARIAL SUBSPACE	3097
<i>Mohammad Esmaeilpour, Patrick Cardinal, Alessandro Lameiras Koerich, École de Technologie Supérieure, Canada</i>	
MLSP-L1.4: ADVERSARIAL EXAMPLE DETECTION BY CLASSIFICATION FOR DEEP SPEECH RECOGNITION	3102
<i>Saeid Samizade, Zheng-Hua Tan, Aalborg University, Denmark; Chao Shen, Xiaohong Guan, Xi'an Jiaotong University, China</i>	
MLSP-L1.5: CHARACTERIZING SPEECH ADVERSARIAL EXAMPLES USING SELF-ATTENTION U-NET ENHANCEMENT	3107
<i>Chao-Han Huck Yang, Jun Qi, Georgia Institute of Technology, United States; Pin-Yu Chen, IBM Research, United States; Xiaoli Ma, Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
MLSP-L1.6: ACTION-MANIPULATION ATTACKS ON STOCHASTIC BANDITS.....	3112
<i>Guanlin Liu, Lifeng Lai, University of California, Davis, United States</i>	
MLSP-L2: OPTIMIZATION ALGORITHMS I	
MLSP-L2.1: PRIMAL-DUAL STOCHASTIC SUBGRADIENT METHOD FOR LOG-DETERMINANT OPTIMIZATION	3117
<i>Songwei Wu, Hang Yu, Justin Dauwels, Nanyang Technological University, Singapore</i>	
MLSP-L2.2: NEURAL NETWORK TRAINING WITH APPROXIMATE LOGARITHMIC COMPUTATIONS	3122
<i>Arnab Sanyal, Peter Beerel, Keith Chugg, University of Southern California, United States</i>	

MLSP-L2.3: AUTOMATIC AND SIMULTANEOUS ADJUSTMENT OF LEARNING RATE 3127 AND MOMENTUM FOR STOCHASTIC GRADIENT-BASED OPTIMIZATION METHODS <i>Tomer Lancewicki, Selcuk Kopru, eBay, United States</i>	3127
MLSP-L2.4: A STUDY OF GENERALIZATION OF STOCHASTIC MIRROR DESCENT 3132 ALGORITHMS ON OVERPARAMETERIZED NONLINEAR MODELS <i>Navid Azizan, Sahin Lale, Babak Hassibi, California Institute of Technology, United States</i>	3132
MLSP-L2.5: ON DISTRIBUTED STOCHASTIC GRADIENT DESCENT FOR 3137 NONCONVEX FUNCTIONS IN THE PRESENCE OF BYZANTINES <i>Saikiran Bulusu, Prashant Khanduri, Pranay Sharma, Pramod Varshney, Syracuse University, United States</i>	3137
MLSP-L2.6: PRECONDITIONING ADMM FOR FAST DECENTRALIZED 3142 OPTIMIZATION <i>Meng Ma, Georgios B. Giannakis, University of Minnesota, United States</i>	3142
MLSP-L3: OPTIMIZATION ALGORITHMS II	
MLSP-L3.1: EXTRAPOLATED ALTERNATING ALGORITHMS FOR APPROXIMATE 3147 CANONICAL POLYADIC DECOMPOSITION <i>Andersen Man Shun Ang, Université de Mons, Belgium; Jeremy E. Cohen, CNRS, France; Le Thi Khanh Hien, Nicolas Gillis, Université de Mons, Belgium</i>	3147
MLSP-L3.2: SCALABLE KERNEL LEARNING VIA THE DISCRIMINANT INFORMATION 3152 <i>Mert Al, Zejiang Hou, Sun-Yuan Kung, Princeton University, United States</i>	3152
MLSP-L3.3: ARSM GRADIENT ESTIMATOR FOR SUPERVISED LEARNING TO RANK 3157 <i>Siamak Zamani Dadaneh, Shahin Boluki, Texas A&M University, United States; Mingyuan Zhou, University of Texas at Austin, United States; Xiaoning Qian, Texas A&M University, United States</i>	3157
MLSP-L3.4: SOLVING NON-CONVEX NON-DIFFERENTIABLE MIN-MAX GAMES 3162 USING PROXIMAL GRADIENT METHOD <i>Babak Barazandeh, Meisam Razaviyayn, University of Southern California, United States</i>	3162
MLSP-L3.5: A FAST AND ACCURATE FREQUENT DIRECTIONS ALGORITHM FOR 3167 LOW RANK APPROXIMATION VIA BLOCK KRYLOV ITERATION <i>Qianxin Yi, Chenhao Wang, Xiuwu Liao, Yao Wang, Xi'an Jiaotong University, China</i>	3167
MLSP-L3.6: STOCHASTIC ADMM FOR BYZANTINE-ROBUST DISTRIBUTED 3172 LEARNING <i>Feng Lin, Qing Ling, Sun Yat-Sen University, China; Weiyu Li, Zhiwei Xiong, University of Science and Technology of China, China</i>	3172
MLSP-L4: GENERATIVE ADVERSARIAL NETWORKS	
MLSP-L4.1: UNIFIED SIGNAL COMPRESSION USING GENERATIVE ADVERSARIAL 3177 NETWORKS <i>Bowen Liu, Ang Cao, Hun-Seok Kim, University of Michigan, United States</i>	3177
MLSP-L4.2: WIND: WASSERSTEIN INCEPTION DISTANCE FOR EVALUATING 3182 GENERATIVE ADVERSARIAL NETWORK PERFORMANCE <i>Panagiotis Dimitrakopoulos, Giorgos Sfikas, Christophoros Nikou, University of Ioannina, Greece</i>	3182
MLSP-L4.3: TRACE NORM GENERATIVE ADVERSARIAL NETWORKS FOR SENSOR 3187 GENERATION AND FEATURE EXTRACTION <i>Shuai Zheng, Chetan Gupta, Hitachi America Ltd, United States</i>	3187

MLSP-L4.4: MAHALANOBIS DISTANCE BASED ADVERSARIAL NETWORK FOR 3192
ANOMALY DETECTION

Yubo Hou, Zhenghua Chen, Min Wu, Chuan-Sheng Foo, Xiaoli Li, Institute for Infocomm Research, Singapore; Raed Shubair, Massachusetts Institute of Technology, United States

MLSP-L4.5: COMMUTING CONDITIONAL GANS FOR MULTI-MODAL FUSION 3197

Siddharth Roheda, Hamid Krim, North Carolina State University, United States; Benjamin S. Riggan, University of Nebraska-Lincoln, United States

MLSP-L4.6: SEQUENCE-TO-SUBSEQUENCE LEARNING WITH CONDITIONAL GAN 3202
FOR POWER DISAGGREGATION

Yungang Pan, Ke Liu, Zhaoyan Shen, Xiaojun Cai, Zhiping Jia, Shandong University, China

MLSP-L5: NEURAL NETWORKS APPLICATIONS I

MLSP-L5.1: A BIN ENCODING TRAINING OF A SPIKING NEURAL NETWORK BASED 3207
VOICE ACTIVITY DETECTION

Giorgia Dellaferrera, Flavio Martinelli, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Milos Cernak, Logitech Europe, Switzerland

MLSP-L5.2: ECG HEARTBEAT CLASSIFICATION BASED ON MULTI-SCALE WAVELET 3212
CONVOLUTIONAL NEURAL NETWORKS

Lahcen El Bouny, Mohammed Khalil, Abdellah Adib, Hassan II University Of Casablanca, Morocco

MLSP-L5.3: SELF-SUPERVISED LEARNING FOR ECG-BASED EMOTION 3217
RECOGNITION

Pritam Sarkar, Ali Etemad, Queen's University, Canada

MLSP-L5.4: EXPRESSION-GUIDED EEG REPRESENTATION LEARNING FOR 3222
EMOTION RECOGNITION

Soheil Rayatdoost, David Rudrauf, University of Geneva, Switzerland; Mohammad Soleymani, University of Southern California, United States

MLSP-L5.5: ATTENTION DRIVEN FUSION FOR MULTI-MODAL EMOTION 3227
RECOGNITION

Darshana Priyasad, Tharindu Fernando, Simon Denman, Sridha Sridharan, Clinton Fookes, Queensland University of Technology, Australia

MLSP-L5.6: LEARNING THE SPATIO-TEMPORAL DYNAMICS OF PHYSICAL 3232
PROCESSES FROM PARTIAL OBSERVATIONS

Ibrahim Ayed, Sorbonne Université, Theresis Lab Thales, France; Emmanuel de Bézenac, Arthur Pajot, Sorbonne Université, France; Patrick Gallinari, Sorbonne Université / Criteo AI Lab, France

MLSP-L6: SPARSITY AWARE PROCESSING AND LEARNING

MLSP-L6.1: OPTIMAL LAPLACIAN REGULARIZATION FOR SPARSE SPECTRAL 3237
COMMUNITY DETECTION

Lorenzo Dall'Amico, Romain Couillet, Nicolas Tremblay, GIPSA lab - Grenoble INP, France

MLSP-L6.2: ANOMALY DETECTION IN MIXED TIME-SERIES USING A 3242
CONVOLUTIONAL SPARSE REPRESENTATION WITH APPLICATION TO SPACECRAFT
HEALTH MONITORING

Barbara Pilastre, TêSA, France; Gustavo Silva, Pontifica Universidad Catolica del Peru, Peru; Loïc Boussouf, Airbus Defence and Space, France; Stéphane D'Esquivan, CNES, France; Paul Rodriguez, Pontifica Universidad Catolica del Peru, Peru; Jean-Yves Tournet, ENSEIHT-IRIT/TêSA, France

MLSP-L6.3: VARIATIONAL STUDENT: LEARNING COMPACT AND SPARSE NETWORKS IN KNOWLEDGE DISTILLATION FRAMEWORK	3247
<i>Srinidhi Hegde, Ranjitha Prasad, Ramya Hebbalaguppe, TCS Research, India; Vishwajeet Kumar, IIT Kharagpur, India</i>	
MLSP-L6.4: LOW RANK ACTIVATIONS FOR TENSOR-BASED CONVOLUTIONAL SPARSE CODING	3252
<i>Pierre Humbert, Julien Audiffren, CMLA - École normale supérieure Paris-Saclay, France; Laurent Oudre, L2TI Université Paris 13, France; Nicolas Vayatis, CMLA - École normale supérieure Paris-Saclay, France</i>	
MLSP-L7: MACHINE LEARNING APPLICATIONS III	
MLSP-L7.1: ENERGY DISAGGREGATION USING FRACTIONAL CALCULUS	3257
<i>Pascal Schirmer, Iosif Mporas, University of Hertfordshire, United Kingdom</i>	
MLSP-L7.2: DYNA-BOLT: DOMAIN ADAPTIVE BINARY FACTORIZATION OF CURRENT WAVEFORMS FOR ENERGY DISAGGREGATION	3262
<i>Bingqing Chen, Jingxiao Liu, Carnegie Mellon University, United States; Henning Lange, University of Washington, United States; Mario Berges, Carnegie Mellon University, United States</i>	
MLSP-L7.4: UNSUPERVISED STYLE AND CONTENT SEPARATION BY MINIMIZING MUTUAL INFORMATION FOR SPEECH SYNTHESIS	3267
<i>Ting-Yao Hu, Carnegie Mellon University, United States; Ashish Shrivastava, Oncel Tuzel, Chandra Dhir, Apple, United States</i>	
MLSP-L7.5: IMPROVING SINGING VOICE SEPARATION WITH THE WAVE-U-NET USING MINIMUM HYPERSPHERICAL ENERGY	3272
<i>Joaquin Perez-Lapillo, Oleksandr Galkin, Tillman Weyde, City, University of London, United Kingdom</i>	
MLSP-L7.6: SINGING VOICE CONVERSION WITH DISENTANGLED REPRESENTATIONS OF SINGER AND VOCAL TECHNIQUE USING VARIATIONAL AUTOENCODERS	3277
<i>Yin-Jyun Luo, Singapore University of Technology and Design, Singapore; Chin-Cheng Hsu, University of Southern California, United States; Kat Agres, Agency for Science, Technology and Research (A*STAR), Singapore; Dorien Herremans, Singapore University of Technology and Design, Singapore</i>	
MLSP-L8: TENSOR-BASED SIGNAL PROCESSING	
MLSP-L8.1: ONLINE TENSOR COMPLETION AND FREE SUBMODULE TRACKING WITH THE T-SVD	3282
<i>Kyle Gilman, Laura Balzano, University of Michigan, United States</i>	
MLSP-L8.2: EXPLOITING COMMUTATIVITY CONDITION FOR CP DECOMPOSITION VIA APPROXIMATE SIMULTANEOUS DIAGONALIZATION	3287
<i>Riku Akema, Masao Yamagishi, Isao Yamada, Tokyo Institute of Technology, Japan</i>	
MLSP-L8.3: A NOVEL RANK SELECTION SCHEME IN TENSOR RING DECOMPOSITION BASED ON REINFORCEMENT LEARNING FOR DEEP NEURAL NETWORKS	3292
<i>Zhiyu Cheng, Baopu Li, Baidu USA, United States; Yanwen Fan, Baidu, China; Yingze Bao, Baidu USA, United States</i>	
MLSP-L8.5: ESTIMATING STRUCTURAL MISSING VALUES VIA LOW-TUBAL-RANK TENSOR COMPLETION	3297
<i>Hailin Wang, Feng Zhang, Jianjun Wang, Southwest University, China; Yao Wang, Xi'an Jiaotong University, China</i>	
MLSP-L8.6: LOW-TUBAL-RANK TENSOR RECOVERY FROM ONE-BIT MEASUREMENTS	3302
<i>Jingyao Hou, Feng Zhang, Southwest University, China; Yao Wang, Xi'an Jiaotong University, China; Jianjun Wang, Southwest University, China</i>	

MLSP-L9: AUTOENCODERS

MLSP-L9.1: CONTINUAL LEARNING THROUGH ONE-CLASS CLASSIFICATION 3307 USING VAE

Felix Wiewel, Andreas Brendle, Bin Yang, University of Stuttgart, Germany

MLSP-L9.2: ESTIMATION OF POST-NONLINEAR CAUSAL MODELS USING 3312 AUTOENCODING STRUCTURE

Kento Uemura, Fujitsu Laboratories Ltd., Japan; Shohei Shimizu, Shiga University, Japan

MLSP-L9.3: FROM SYMBOLS TO SIGNALS: SYMBOLIC VARIATIONAL 3317 AUTOENCODERS

Chinmaya Devaraj, University of Maryland, United States; Aritra Chowdhury, Arpit Jain, James Kubricht, Tu Peter, Alberto Santamaria-Pang, GE Research, United States

MLSP-L9.4: GRAPH AUTO-ENCODER FOR GRAPH SIGNAL DENOISING 3322

Tien Huu Do, Minh Duc Nguyen, Nikos Deligiannis, Vrije Universiteit Brussel, Belgium

MLSP-L9.5: A PRIORI ESTIMATES OF THE GENERALIZATION ERROR FOR 3327 AUTOENCODERS

Zehao Dou, Peking University, China; Weinan E, Chao Ma, Princeton University, United States

MLSP-L10: DEEP NEURAL NETWORK STRUCTURES

MLSP-L10.1: GFCN: A NEW GRAPH CONVOLUTIONAL NETWORK BASED ON 3332 PARALLEL FLOWS

Feng Ji, Jielong Yang, Qiang Zhang, Wee Peng Tay, Nanyang Technological University, Singapore

MLSP-L10.2: DEPTHWISE-STFT BASED SEPARABLE CONVOLUTIONAL NEURAL 3337 NETWORKS

Sudhakar Kumawat, Shanmuganathan Raman, Indian Institute of Technology Gandhinagar, India

MLSP-L10.3: SEMI-IMPLICIT STOCHASTIC RECURRENT NEURAL NETWORKS 3342

Ehsan Hajiramezanali, Arman Hasanzadeh, Nick Duffield, Krishna Narayanan, Texas A&M University, United States; Mingyuan Zhou, University of Texas at Austin, United States; Xiaoning Qian, Texas A&M University, United States

MLSP-L10.4: FEEDBACK RECURRENT AUTOENCODER 3347

Yang Yang, Guillaume Sautière, Jongha Ryu, Taco Cohen, Qualcomm Inc., United States

MLSP-L10.5: INDYLTMS: INDEPENDENTLY RECURRENT LSTMS 3352

Pedro Gonnet, Thomas Deselaers, Google Research, Switzerland

MLSP-L10.6: NEURAL ATTENTIVE MULTIVIEW MACHINES 3357

Oren Barkan, Ori Katz, Noam Koenigstein, Microsoft, Israel

MLSP-L11: ATTENTION NETWORKS

MLSP-L11.1: ATTENTIVE MODALITY HOPPING MECHANISM FOR SPEECH 3362 EMOTION RECOGNITION

Seunghyun Yoon, Seoul National University, Korea (South); Subhadeep Dey, Idiap Research Institute, Swaziland; Hwanhee Lee, Kyomin Jung, Seoul National University, Korea (South)

MLSP-L11.2: FACIAL EMOTION RECOGNITION USING LIGHT FIELD IMAGES 3367 WITH DEEP ATTENTION-BASED BIDIRECTIONAL LSTM

Alireza Sepas-Moghaddam, Ali Etemad, Queen's University, Canada; Fernando Pereira, Paulo Lobato Correia, Instituto Superior Técnico, Universidade de Lisboa, Portugal

MLSP-L11.3: A REGULARIZED ATTENTION MECHANISM FOR GRAPH ATTENTION NETWORKS	3372
<i>Uday Shankar Shanthamallu, Arizona State University, United States; Jayaraman J Thiagarajan, Lawrence Livermore National Laboratory, United States; Andreas Spanias, Arizona State University, United States</i>	
MLSP-L11.4: ATTENTIVE ITEM2VEC: NEURAL ATTENTIVE USER REPRESENTATIONS	3377
<i>Oren Barkan, Microsoft, Israel; Avi Caciularu, Bar-Ilan University, Israel; Ori Katz, Noam Koenigstein, Microsoft, Israel</i>	
MLSP-L11.5: AUDIO SOUND DETERMINATION USING FEATURE SPACE ATTENTION BASED CONVOLUTION RECURRENT NEURAL NETWORK	3382
<i>Xianjun Xia, Tencent, China; Jingjing Pan, China University of Mining and Technology, China; Yannan Wang, Tencent, China</i>	
MLSP-L11.6: SPATIAL ATTENTIONAL BILINEAR 3D CONVOLUTIONAL NETWORK FOR VIDEO-BASED AUTISM SPECTRUM DISORDER DETECTION	3387
<i>Kangbo Sun, Lin Li, Lianqiang Li, Ningyu He, Jie Zhu, Shanghai Jiao Tong University, China</i>	
MLSP-L12: SEQUENTIAL LEARNING	
MLSP-L12.1: LINEAR THOMPSON SAMPLING UNDER UNKNOWN LINEAR CONSTRAINTS	3392
<i>Ahmadreza Moradipari, Mahnoosh Alizadeh, Christos Thrampoulidis, UC Santa Barbara, United States</i>	
MLSP-L12.2: OVERLAPPED STATE HIDDEN SEMI-MARKOV MODEL FOR GROUPED MULTIPLE SEQUENCES	3397
<i>Hiromi Narimatsu, University of Electro-Communications / NTT Communication Science Laboratories, Japan; Hiroyuki Kasai, Waseda University, Japan</i>	
MLSP-L12.3: ONLINE COMMUNITY DETECTION BY SPECTRAL CUSUM	3402
<i>Minghe Zhang, Liyan Xie, Yao Xie, Georgia Institute of Technology, United States</i>	
MLSP-L12.4: ENHANCED ADVERSARIAL STRATEGICALLY-TIMED ATTACKS AGAINST DEEP REINFORCEMENT LEARNING	3407
<i>Chao-Han Huck Yang, Jun Qi, Georgia Institute of Technology, United States; Pin-Yu Chen, IBM Research, United States; Yi Ouyang, Preferred Network America, United States; I-Te Danny Hung, Columbia University, United States; Chin-Hui Lee, Xiaoli Ma, Georgia Institute of Technology, United States</i>	
MLSP-L12.5: PREFERENCE-AWARE MASK FOR SESSION-BASED RECOMMENDATION WITH BIDIRECTIONAL TRANSFORMER	3412
<i>Yuanxing Zhang, Pengyu Zhao, Yushuo Guan, Peking University, China; Lin Chen, Yale University, China; Kaigui Bian, Lingyang Song, Bin Cui, Xiaoming Li, Peking University, China</i>	
MLSP-P1: DICTIONARY LEARNING, REPRESENTATION LEARNING AND MATRIX COMPLETION	
MLSP-P1.1: LOW MUTUAL AND AVERAGE COHERENCE DICTIONARY LEARNING USING CONVEX APPROXIMATION	3417
<i>Javad Parsa, Sharif University of Technology, Iran; Mostafa Sadeghi, Inria Grenoble Rhône-Alpes, France; Massoud Babaie-Zadeh, Sharif University of Technology, Iran; Christian Jutten, GIPSA-Lab, France</i>	
MLSP-P1.2: ROBUST ONLINE MATRIX COMPLETION WITH GAUSSIAN MIXTURE MODEL	3422
<i>Chunsheng Liu, National University of Defense Technology, China; Chunlei Chen, Weifang University, China; Hong Shan, Bin Wang, National University of Defense Technology, China</i>	
MLSP-P1.3: DEEP NEURAL NETWORK BASED MATRIX COMPLETION FOR INTERNET OF THINGS NETWORK LOCALIZATION	3427
<i>Sunwoo Kim, Luong Trung Nguyen, Byonghyo Shim, Seoul National University, Korea (South)</i>	

MLSP-P1.4: BRINGING IN THE OUTLIERS: A SPARSE SUBSPACE CLUSTERING APPROACH TO LEARN A DICTIONARY OF MOUSE ULTRASONIC VOCALIZATIONS	3432
<i>Jiaxi Wang, Karel Mundnich, Allison Knoll, Pat Levitt, Shrikanth Narayanan, University of Southern California, United States</i>	
MLSP-P1.5: ONE-BIT COMPRESSED SENSING USING GENERATIVE MODELS	3437
<i>Geethu Joseph, Swatantra Kafle, Pramod Varshney, Syracuse University, United States</i>	
MLSP-P1.6: HYBRID DEEP-SEMANTIC MATRIX FACTORIZATION FOR TAG-AWARE PERSONALIZED RECOMMENDATION	3442
<i>Zhenghua Xu, Di Yuan, Hebei University of Technology, China; Thomas Lukasiewicz, University of Oxford, United Kingdom; Cheng Chen, China Academy of Electronics and Information Technology, China; Yishu Miao, University of Oxford, United Kingdom; Guizhi Xu, Hebei University of Technology, China</i>	
MLSP-P1.7: SUPERVISED ENCODING FOR DISCRETE REPRESENTATION LEARNING	3447
<i>Cat Le, Duke University, United States; Yi Zhou, University of Utah, United States; Jie Ding, University of Minnesota, United States; Vahid Tarokh, Duke University, United States</i>	
MLSP-P1.8: LEARNING DATA REPRESENTATION AND EMOTION ASSESSMENT FROM PHYSIOLOGICAL DATA	3452
<i>Miguel Joaquim, Rita Maçorano, Francisca Canais, Rafael Ramos, Universidade de Lisboa, Portugal; Ana Fred, Instituto Superior Técnico, Universidade de Lisboa, Portugal; Marco Torrado, Hugo Ferreira, Universidade de Lisboa, Portugal</i>	
MLSP-P1.9: FEATURE SELECTION UNDER ORTHOGONAL REGRESSION WITH REDUNDANCY MINIMIZING	3457
<i>Xueyuan Xu, Xia Wu, Beijing Normal University, China</i>	
MLSP-P1.10: THE PICASSO ALGORITHM FOR BAYESIAN LOCALIZATION VIA PAIRED COMPARISONS IN A UNION OF SUBSPACES MODEL	3462
<i>Gregory Canal, Marissa Connor, Jihui Jin, Namrata Nadagouda, Matthew O'Shaughnessy, Christopher Rozell, Mark Davenport, Georgia Institute of Technology, United States</i>	
MLSP-P1.11: LEARNING SEMI-SUPERVISED ANONYMIZED REPRESENTATIONS BY MUTUAL INFORMATION	3467
<i>Clement Feutry, Pablo Piantanida, CentraleSupélec-CNRS-Universite Paris Sud, France; Pierre Duhamel, CNRS-CentraleSupélec-Universite Paris Sud, France</i>	
MLSP-P1.12: LEARNING LOCAL STRUCTURE OF REPRESENTATIVE POINTS FOR POINT CLOUD CLASSIFICATION AND SEMANTIC SEGMENTATION	3472
<i>Xincheng Li, Yanwei Pang, Yuefeng Wu, Yazhao Li, Tianjin University, China</i>	
MLSP-P2: APPLICATIONS IN SPEECH AND AUDIO	
MLSP-P2.1: TOWARDS BLIND QUALITY ASSESSMENT OF CONCERT AUDIO RECORDINGS USING DEEP NEURAL NETWORKS	3477
<i>Nikonas Simou, University of Crete, Greece; Yannis Mastorakis, Nikolaos Stefanakis, Foundation for Research and Technology-Hellas (FORTH), Greece</i>	
MLSP-P2.3: MULTI-LABEL SOUND EVENT RETRIEVAL USING A DEEP LEARNING-BASED SIAMESE STRUCTURE WITH A PAIRWISE PRESENCE MATRIX	3482
<i>Jianyu Fan, Simon Fraser University, Canada; Eric Nichols, Daniel Tompkins, Microsoft, United States; Ana Elisa Méndez Méndez, New York University, United States; Benjamin Elizalde, Carnegie Mellon University, United States; Philippe Pasquier, Simon Fraser University, Canada</i>	
MLSP-P2.4: SPEECH-DRIVEN FACIAL ANIMATION USING POLYNOMIAL FUSION OF FEATURES	3487
<i>Triantafyllos Kefalas, Konstantinos Vougioukas, Yannis Panagakis, Imperial College London, United Kingdom; Stavros Petridis, Jean Kossaifi, Maja Pantic, Imperial College London and Samsung AI Centre Cambridge, United Kingdom</i>	

MLSP-P2.5: SED-MDD: TOWARDS SENTENCE DEPENDENT END-TO-END	3492
MISPRONUNCIATION DETECTION AND DIAGNOSIS	
<i>Yiqing Feng, Guanyu Fu, Qingcai Chen, Kai Chen, Harbin Institute of Technology, China</i>	
MLSP-P2.6: GENERATIVE PRE-TRAINING FOR SPEECH WITH AUTOREGRESSIVE	3497
PREDICTIVE CODING	
<i>Yu-An Chung, James Glass, Massachusetts Institute of Technology, United States</i>	
MLSP-P2.7: STARGAN FOR EMOTIONAL SPEECH CONVERSION: VALIDATED BY	3502
DATA AUGMENTATION OF END-TO-END EMOTION RECOGNITION	
<i>Georgios Rizos, Imperial College London, United Kingdom; Alice Baird, University of Augsburg, Germany; Max Elliott, Björn Schuller, Imperial College London, United Kingdom</i>	
MLSP-P2.8: MULTIMODAL TRANSFORMER FUSION FOR CONTINUOUS EMOTION	3507
RECOGNITION	
<i>Jian Huang, Jianhua Tao, Bin Liu, Zheng Lian, Mingyue Niu, Institute of Automation, Chinese Academy of Sciences, China</i>	
MLSP-P2.9: HKA: A HIERARCHICAL KNOWLEDGE ATTENTION MECHANISM FOR	3512
MULTI-TURN DIALOGUE SYSTEM	
<i>Jian Song, Kailai Zhang, Xuesi Zhou, Ji Wu, Tsinghua University, China</i>	
MLSP-P2.10: SUBMODULAR RANK AGGREGATION ON SCORE-BASED	3517
PERMUTATIONS FOR DISTRIBUTED AUTOMATIC SPEECH RECOGNITION	
<i>Jun Qi, Chao-Han Huck Yang, Georgia Institute of Technology, United States; Javier Tejedor, Universidad San Pablo-CEU, CEU Universities, Spain</i>	
MLSP-P2.11: BRIDGING MIXTURE DENSITY NETWORKS WITH META-LEARNING	3522
FOR AUTOMATIC SPEAKER IDENTIFICATION	
<i>Ruirui Li, Jyun-Yu Jiang, University of California, Los Angeles, United States; Xian Wu, University of Notre Dame, United States; Hongda Mao, Chu-Cheng Hsieh, Amazon, Inc., United States; Wei Wang, University of California, Los Angeles, United States</i>	
MLSP-P2.12: PITCH ESTIMATION VIA SELF-SUPERVISION	3527
<i>Beat Gfeller, Christian Frank, Dominik Roblek, Matt Sharifi, Marco Tagliasacchi, Mihajlo Velimirovic, Google, Switzerland</i>	
MLSP-P3: REINFORCEMENT AND SEQUENTIAL LEARNING	
MLSP-P3.1: HIERARCHICAL CACHING VIA DEEP REINFORCEMENT LEARNING	3532
<i>Alireza Sadeghi, Gang Wang, Georgios B. Giannakis, University of Minnesota, United States</i>	
MLSP-P3.2: LEARNING NETWORK REPRESENTATION THROUGH	3537
REINFORCEMENT LEARNING	
<i>Siqi Shen, Yongquan Fu, National University of Defense Technology, China; Adele Lu Jia, China Agricultural University, China; Huayou Su, Qinglin Wang, Chengsong Wang, Yong Dou, National University of Defense Technology, China</i>	
MLSP-P3.3: ATTENTION-BASED CURIOSITY-DRIVEN EXPLORATION IN DEEP	3542
REINFORCEMENT LEARNING	
<i>Patrik Reizinger, Márton Szemenyei, Budapest University of Technology and Economics, Hungary</i>	
MLSP-P3.4: STABILIZING MULTI-AGENT DEEP REINFORCEMENT LEARNING BY	3547
IMPLICITLY ESTIMATING OTHER AGENTS' BEHAVIORS	
<i>Yue Jin, Tsinghua University, China; Shuangqing Wei, Louisiana State University, United States; Jian Yuan, Xudong Zhang, Chao Wang, Tsinghua University, China</i>	
MLSP-P3.5: QOS-AWARE FLOW CONTROL FOR POWER-EFFICIENT DATA CENTER	3552
NETWORKS WITH DEEP REINFORCEMENT LEARNING	
<i>Penghao Sun, National Digital Switching System Engineering & Technological R&D Center, China; Zehua Guo, Beijing Institute of Technology, China; Sen Liu, Julong Lan, Yuxiang Hu, Central South University, China</i>	

MLSP-P3.6: IMPROVING THE SCALABILITY OF DEEP REINFORCEMENT LEARNING-BASED ROUTING WITH CONTROL ON PARTIAL NODES	3557
<i>Penghao Sun, Julong Lan, National Digital Switching System Engineering & Technological R&D Center, China; Zehua Guo, Beijing Institute of Technology, China; Yang Xu, Fudan University, China; Yuxiang Hu, National Digital Switching System Engineering & Technological R&D Center, China</i>	
MLSP-P3.7: GENERALIZED LINEAR BANDITS WITH SAFETY CONSTRAINTS	3562
<i>Sanae Amani, Mahnoosh Alizadeh, Christos Thrampoulidis, University of California, Santa Barbara, United States</i>	
MLSP-P3.8: FROM VIDEO GAME TO REAL ROBOT: THE TRANSFER BETWEEN ACTION SPACES	3567
<i>Janne Karttunen, Karelics Oy, Finland; Anssi Kanervisto, University of Eastern Finland, Finland; Ville Kyrki, Aalto University, Finland; Ville Hautamäki, University of Eastern Finland, Finland</i>	
MLSP-P3.9: CORRELATED MULTI-ARMED BANDITS WITH A LATENT RANDOM SOURCE	3572
<i>Samarth Gupta, Gauri Joshi, Osman Yagan, Carnegie Mellon University, United States</i>	
MLSP-P3.10: ADAPTIVE SEQUENTIAL INTERPOLATOR USING ACTIVE LEARNING FOR EFFICIENT EMULATION OF COMPLEX SYSTEMS	3577
<i>Luca Martino, Universidad Rey Juan Carlos, Spain; Daniel Heestermans Svendsen, Universitat de Valencia, Spain; Jorge Vicent, Universitat of Valencia and Magellium Company in Geoinformation and Image Processing, France; Gustau Camps-Valls, Universitat de Valencia, Spain</i>	
MLSP-P3.11: CONTINUAL LEARNING FOR INFINITE HIERARCHICAL CHANGE-POINT DETECTION	3582
<i>Pablo Moreno-Muñoz, David Ramírez, Antonio Artés-Rodríguez, Universidad Carlos III de Madrid, Spain</i>	
MLSP-P4: ADVERSARIAL ATTACKS AND FAST ALGORITHMS	
MLSP-P4.2: COST AWARE ADVERSARIAL LEARNING	3587
<i>Shashini De Silva, Jinsub Kim, Raviv Raich, Oregon State University, United States</i>	
MLSP-P4.3: ON DIVERGENCE APPROXIMATIONS FOR UNSUPERVISED TRAINING OF DEEP DENOISERS BASED ON STEIN'S UNBIASED RISK ESTIMATOR	3592
<i>Shakarim Soltanayev, Ulsan National Institute of Science and Technology, Korea (South); Raja Giryes, Tel Aviv University, Israel; Se Young Chun, Ulsan National Institute of Science and Technology, Korea (South); Yonina Eldar, Weizmann Institute of Science, Israel</i>	
MLSP-P4.4: VARIABLE METRIC PROXIMAL GRADIENT METHOD WITH DIAGONAL BARZILAI-BORWEIN STEPSIZE	3597
<i>Youngsuk Park, Stanford university, United States; Saurabh Dhar, LG Silicon Valley Lab, United States; Stephen Boyd, Stanford university, United States; Mohak Shah, LG Silicon Valley Lab, United States</i>	
MLSP-P4.5: REVISIT OF ESTIMATE SEQUENCE FOR ACCELERATED GRADIENT METHOD	3602
<i>Bingcong Li, University of minnesota, United States; Mario Coutino, Delft University of Technology, Netherlands; Georgios B. Giannakis, University of minnesota, United States</i>	
MLSP-P4.6: A GENERALIZATION OF PRINCIPAL COMPONENT ANALYSIS	3607
<i>Samuele Battaglino, Erdem Koyuncu, University of Illinois at Chicago, United States</i>	
MLSP-P4.7: AN EASY-TO-IMPLEMENT FRAMEWORK OF FAST SUBSPACE CLUSTERING FOR BIG DATA SETS	3612
<i>Linghang Meng, Yuchen Jiao, Yuantao Gu, Tsinghua University, China</i>	
MLSP-P4.8: INVESTIGATING GENERALIZATION IN NEURAL NETWORKS UNDER OPTIMALLY EVOLVED TRAINING PERTURBATIONS	3617
<i>Subhajit Chaudhury, Toshihiko Yamasaki, University of Tokyo, Japan</i>	

MLSP-P4.9: HETEROGENEOUS DOMAIN GENERALIZATION VIA DOMAIN MIXUP	3622
<i>Yufei Wang, University of Electronic Science and Technology of China, China; Haoliang Li, Alex Chichung Kot, Nanyang Technological University, Singapore</i>	
MLSP-P4.10: PRESERVATION OF ANOMALOUS SUBGROUPS ON VARIATIONAL AUTOENCODER TRANSFORMED DATA	3627
<i>Samuel C. Maina, Reginald E. Bryant, William Ogallo, IBM Research, Kenya; Robert-Florian Samoilescu, University Politehnica of Bucharest, Romania; Aisha Walcott-Bryant, Skyler Speakman, Celia Cintas, Kush R. Varshney, Komminist Weldemariam, IBM Research, Kenya</i>	
MLSP-P4.11: LEARN-BY-CALIBRATING: USING CALIBRATION AS A TRAINING OBJECTIVE	3632
<i>Jayaraman J. Thiagarajan, Lawrence Livermore National Labs, United States; Bindya Venkatesh, Arizona State University, United States; Deepta Rajan, IBM Research, United States</i>	
MLSP-P5: APPLICATIONS IN VIDEO AND IMAGE PROCESSING I	
MLSP-P5.1: ESRGAN+ : FURTHER IMPROVING ENHANCED SUPER-RESOLUTION GENERATIVE ADVERSARIAL NETWORK	3637
<i>Nathanaël Carraz Rakotonirina, Andry Rasoanaivo, Université d'Antananarivo, Madagascar</i>	
MLSP-P5.2: ATTENTIVE CUTMIX: AN ENHANCED DATA AUGMENTATION APPROACH FOR DEEP LEARNING BASED IMAGE CLASSIFICATION	3642
<i>Devesh Walawalkar, Zhiqiang Shen, Zechun Liu, Marios Savvides, Carnegie Mellon University, United States</i>	
MLSP-P5.3: EFFICIENT IMAGE SUPER RESOLUTION VIA CHANNEL DISCRIMINATIVE DEEP NEURAL NETWORK PRUNING	3647
<i>Zejiang Hou, Sun-Yuan Kung, Princeton University, United States</i>	
MLSP-P5.4: MULTI-RESOLUTION OVERLAPPING STRIPES NETWORK FOR PERSON RE-IDENTIFICATION	3652
<i>Arda Efe Okay, University of Miami, United States; Manal AlGhamdi, Umm AlQura University, Saudi Arabia; Robert Westendorp, FORTINET Technologies (Canada) ULC, Canada; Mohamed Abdel-Mottaleb, University of Miami, United States</i>	
MLSP-P5.5: PERSON IDENTIFICATION USING DEEP CONVOLUTIONAL NEURAL NETWORKS ON SHORT-TERM SIGNALS FROM WEARABLE SENSORS	3657
<i>George Retsinas, Panagiotis P. Filntisis, Niki Efthymiou, Emmanouil Theodosis, Athanasia Zlatintsi, Petros Maragos, National Technical University of Athens, Greece</i>	
MLSP-P5.6: LOCAL-GLOBAL FEATURE FOR VIDEO-BASED ONE-SHOT PERSON RE-IDENTIFICATION	3662
<i>Chao Zhao, Zhenyu Zhang, Jian Yang, Yan Yan, Nanjing University of Science and Technology, China</i>	
MLSP-P5.7: GLOBAL AND LOCAL DISCRIMINATIVE PATCHES EXPLOITING FOR ACTION RECOGNITION	3667
<i>Jintao Wu, Wu Luo, Weiwei Liu, Chongyang Zhang, Shanghai Jiao Tong University, China</i>	
MLSP-P5.9: DISENTANGLING CONTROLLABLE OBJECT THROUGH VIDEO PREDICTION IMPROVES VISUAL REINFORCEMENT LEARNING	3672
<i>Yuanyi Zhong, Alexander Schwing, Jian Peng, University of Illinois at Urbana-Champaign, United States</i>	
MLSP-P5.10: DYNAMIC VARIATIONAL AUTOENCODERS FOR VISUAL PROCESS MODELING	3677
<i>Alexander Sagel, Hao Shen, fortiss - The Research Institute of the Free State of Bavaria, Germany</i>	
MLSP-P5.11: A NOVEL TWO-PATHWAY ENCODER-DECODER NETWORK FOR 3D FACE RECONSTRUCTION	3682
<i>Xianfeng Li, Zichun Weng, Juntao Liang, Lei Cai, Youjun Xiang, Yuli Fu, South China University of Technology, China</i>	

MLSP-P5.12: RATE ASSIGNMENT IN 360-DEGREE VIDEO TILED STREAMING USING RANDOM FOREST REGRESSION	3687
<i>Robert Skupin, Kai Bitterschulte, Yago Sanchez, Cornelius Hellge, Thomas Schierl, Fraunhofer Heinrich-Hertz-Institute, Germany</i>	
MLSP-P6: PATTERN RECOGNITION AND MACHINE LEARNING	
MLSP-P6.1: IMPROVING CONVERGENT CROSS MAPPING FOR CAUSAL DISCOVERY WITH GAUSSIAN PROCESSES	3692
<i>Guanchao Feng, Stony Brook University, United States; Kezi Yu, Yunlong Wang, Yilian Yuan, IQVIA, United States; Petar Djuric, Stony Brook University, United States</i>	
MLSP-P6.2: LABEL REUSE FOR EFFICIENT SEMI-SUPERVISED LEARNING	3697
<i>Tsung-Hung Hsieh, Jun-Cheng Chen, Chu-Song Chen, Academia Sinica, Taiwan</i>	
MLSP-P6.3: DECENTRALIZED OPTIMIZATION WITH NON-IDENTICAL SAMPLING IN PRESENCE OF STRAGGLERS	3702
<i>Tharindu Adikari, Stark Draper, University of Toronto, Canada</i>	
MLSP-P6.4: CONTENT VS CONTEXT: HOW ABOUT “WALKING HAND-IN-HAND” FOR IMAGE CLUSTERING?	3707
<i>Shizhe Hu, Zhenquan Hou, Zhengzheng Lou, Yangdong Ye, Zhengzhou University, China</i>	
MLSP-P6.5: FIXED SMOOTH CONVOLUTIONAL LAYER FOR AVOIDING CHECKERBOARD ARTIFACTS IN CNNs	3712
<i>Yuma Kinoshita, Hitoshi Kiya, Tokyo Metropolitan University, Japan</i>	
MLSP-P6.6: THIS DATASET DOES NOT EXIST: TRAINING MODELS FROM GENERATED IMAGES	3717
<i>Victor Besnier, Sorbonne University, France; Himalaya Jain, Andrei Bursuc, Valeo AI, France; Matthieu Cord, Valeo AI, Sorbonne University, France; Patrick Pérez, Valeo AI, France</i>	
MLSP-P6.7: LET-SNE: A HYBRID APPROACH TO DATA EMBEDDING AND VISUALIZATION OF HYPERSPECTRAL IMAGERY	3722
<i>Megh Shukla, Mercedes-Benz Research and Development India Pvt. Ltd., India; Biplab Banerjee, Krishna Mohan Buddhiraju, Indian Institute of Technology Bombay, India</i>	
MLSP-P6.8: ADVERSARIAL MIXUP SYNTHESIS TRAINING FOR UNSUPERVISED DOMAIN ADAPTATION	3727
<i>Yuhua Tang, Zhipeng Lin, Haotian Wang, Liyang Xu, National University of Defense Technology, China</i>	
MLSP-P6.9: RATE-INVARIANT AUTOENCODING OF TIME-SERIES	3732
<i>Kaushik Koneripalli, Suhas Lohit, Arizona State University, United States; Rushil Anirudh, Lawrence Livermore National Laboratory, United States; Pavan Turaga, Arizona State University, United States</i>	
MLSP-P6.10: SELF-PACED PROBABILISTIC PRINCIPAL COMPONENT ANALYSIS FOR DATA WITH OUTLIERS	3737
<i>Bowen Zhao, Xi Xiao, Wanpeng Zhang, Tsinghua University, China; Bin Zhang, Peng Cheng Laboratory, China; Guojun Gan, University of Connecticut, United States; Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-P6.11: CORRDROP: CORRELATION BASED DROPOUT FOR CONVOLUTIONAL NEURAL NETWORKS	3742
<i>Yuyuan Zeng, Tao Dai, Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-P6.12: WITCHCRAFT: EFFICIENT PGD ATTACKS WITH RANDOM STEP SIZE	3747
<i>Ping-Yeh Chiang, University of Maryland, Taiwan; Jonas Geiping, University of Siegen, Germany; Micah Goldblum, Tom Goldstein, Renkun Ni, Steven Reich, Ali Shafahi, University of Maryland, United States</i>	

MLSP-P7: MACHINE LEARNING APPLICATIONS I

MLSP-P7.1: THE FIFTHNET CHROMA EXTRACTOR.....	3752
<i>Ken O'Hanlon, Mark Sandler, Queen Mary University of London, United Kingdom</i>	
MLSP-P7.2: ROBUST MARINE BUOY PLACEMENT FOR SHIP DETECTION USING DROPOUT K-MEANS	3757
<i>Yuting Ng, João M. Pereira, Duke University, United States; Denis Garagic, BAE Systems FAST Labs, United States; Vahid Tarokh, Duke University, United States</i>	
MLSP-P7.3: ON-THE-FLY FEATURE SELECTION AND CLASSIFICATION WITH APPLICATION TO CIVIC ENGAGEMENT PLATFORMS	3762
<i>Yasitha Warahena Liyanage, Daphney-Stavroula Zois, Charalampos Chelmis, University at Albany, State University of New York, United States</i>	
MLSP-P7.4: GLOBAL TRAFFIC STATE RECOVERY VIA LOCAL OBSERVATIONS WITH GENERATIVE ADVERSARIAL NETWORKS	3767
<i>Mingcheng He, Shanghai Jiao Tong University, China; Xiliang Luo, Zixin Wang, Fuqian Yang, ShanghaiTech University, China; Hua Qian, Shanghai Advanced Research Institute, Chinese Academy of Sciences, China; Cunqing Hua, Shanghai Jiao Tong University, China</i>	
MLSP-P7.5: FORECASTING SPARSE TRAFFIC CONGESTION PATTERNS USING MESSAGE-PASSING RNNs	3772
<i>Shiva Iyer, Ulzee An, Lakshminarayanan Subramanian, New York University, United States</i>	
MLSP-P7.6: ENERGY DISAGGREGATION FROM LOW SAMPLING FREQUENCY MEASUREMENTS USING MULTI-LAYER ZERO CROSSING RATE	3777
<i>Pascal Schirmer, Iosif Mporas, University of Hertfordshire, United Kingdom</i>	
MLSP-P7.7: DECODING 5G-NR COMMUNICATIONS VIA DEEP LEARNING	3782
<i>Pol Henarejos, Miguel Ángel Vázquez, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain</i>	
MLSP-P7.8: BODY MOVEMENT GENERATION FOR EXPRESSIVE VIOLIN PERFORMANCE APPLYING NEURAL NETWORKS	3787
<i>Jun-Wei Liu, Hung-Yi Lin, Taipei Municipal Jianguo High School, Taiwan; Yu-Fen Huang, Hsuan-Kai Kao, Li Su, Academia Sinica, Taiwan</i>	
MLSP-P7.9: SEQUENTIAL VESSEL TRAJECTORY IDENTIFICATION USING TRUNCATED VITERBI ALGORITHM	3792
<i>Zheng Dong, University of Science and Technology of China, China; Yifei Yang, Tsinghua University, China; Yao Xie, Georgia Institute of Technology, United States</i>	
MLSP-P7.10: A PROTOTYPICAL TRIPLET LOSS FOR COVER DETECTION	3797
<i>Guillaume Doras, Sacem, France; Geoffroy Peeters, Telecom Paris, France</i>	
MLSP-P7.11: AUTOMOTIVE RADAR SIGNAL INTERFERENCE MITIGATION USING RNN WITH SELF ATTENTION	3802
<i>Jiwoo Mun, Seokhyeon Ha, Jungwoo Lee, Seoul National University, Korea (South)</i>	
MLSP-P7.12: A LARGE-SCALE DEEP ARCHITECTURE FOR PERSONALIZED GROCERY BASKET RECOMMENDATIONS	3807
<i>Aditya Mantha, Yokila Arora, Shubham Gupta, Praveenkumar Kanumala, Zhiwei Liu, Stephen Guo, Kannan Achan, Walmart Labs, United States</i>	

MLSP-P8: MACHINE LEARNING APPLICATIONS II

MLSP-P8.1: BLIND BOUNDED SOURCE SEPARATION USING NEURAL NETWORKS WITH LOCAL LEARNING RULES	3812
<i>Alper Erdogan, Koc University, Turkey; Cengiz Pehlevan, Harvard University, United States</i>	

MLSP-P8.2: MODELING PIECE-WISE STATIONARY TIME SERIES	3817
<i>Daoping Wu, Suhas Gundimeda, Shaoshuai Mou, Christopher Quinn, Purdue University, United States</i>	
MLSP-P8.3: MULTIVARIATE TROPICAL REGRESSION AND PIECEWISE-LINEAR SURFACE FITTING	3822
<i>Petros Maragos, National Technical University of Athens, Greece; Emmanouil Theodosis, Harvard University, United States</i>	
MLSP-P8.4: REVEALING BACKDOORS, POST-TRAINING, IN DNN CLASSIFIERS VIA NOVEL INFERENCE ON OPTIMIZED PERTURBATIONS INDUCING GROUP MISCLASSIFICATION	3827
<i>Zhen Xiang, Pennsylvania State University, United States; David Miller, Anomalee, Inc., United States; George Kesidis, Pennsylvania State University, United States</i>	
MLSP-P8.5: CLASSIFYING PARTIALLY LABELED NETWORKED DATA VIA LOGISTIC NETWORK LASSO	3832
<i>Nguyen Tran, Henrik Ambos, Alexander Jung, Aalto University, Finland</i>	
MLSP-P8.6: NEURAL TIME WARPING FOR MULTIPLE SEQUENCE ALIGNMENT.....	3837
<i>Keisuke Kawano, Takuro Kutsuna, Satoshi Koide, Toyota Central R&D Labs. Inc., Japan</i>	
MLSP-P8.7: LANCE: EFFICIENT LOW-PRECISION QUANTIZED WINOGRAD CONVOLUTION FOR NEURAL NETWORKS BASED ON GRAPHICS PROCESSING UNITS	3842
<i>Guangli Li, Lei Liu, Xueying Wang, Institute of Computing Technology, Chinese Academy of Sciences, China; Xiu Ma, Jilin University, China; Xiaobing Feng, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
MLSP-P8.8: MEDIA CLASSIFICATION WITH BAYESIAN OPTIMIZATION AND VAPNIK-CHERVONENKIS (VC) BOUNDS	3847
<i>Sunil Bharitkar, HP Inc., United States</i>	
MLSP-P8.9: BATMAN: BAYESIAN TARGET MODELLING FOR ACTIVE INFERENCE	3852
<i>Magnus T. Koudahl, Eindhoven University of Technology, Netherlands; Bert de Vries, Eindhoven University of Technology and GN Hearing, Netherlands</i>	
MLSP-P8.10: DEEP LEARNING ABILITIES TO CLASSIFY INTRICATE VARIATIONS IN TEMPORAL DYNAMICS OF MULTIVARIATE TIME SERIES	3857
<i>Pierre Liotet, Ecole normale supérieure Paris-Saclay, France; Patrice Abry, Ecole Normale Supérieure de Lyon, France; Roberto Leonarduzzi, Ecole Normale Supérieure, France; Marc Senneret, Laurent Jaffrès, GERAL Perrin, Vivienne Investissement, France</i>	
MLSP-P8.11: ASSIMILATION-BASED LEARNING OF CHAOTIC DYNAMICAL SYSTEMS FROM NOISY AND PARTIAL DATA	3862
<i>Duong Nguyen, Said Ouala, Lucas Drumetz, Ronan Fablet, IMT Atlantique, Lab-STICC, France</i>	
MLSP-P8.12: GATED MULTI-LAYER CONVOLUTIONAL FEATURE EXTRACTION NETWORK FOR ROBUST PEDESTRIAN DETECTION	3867
<i>Tianrui Liu, Jun-Jie Huang, Tianhong Dai, Guangyu Ren, Tania Stathaki, Imperial College London, United Kingdom</i>	
MLSP-P9: GRAPHICAL, KERNEL AND TENSOR METHODS	
MLSP-P9.1: KERNEL RIDGE REGRESSION WITH AUTOCORRELATION PRIOR: OPTIMAL MODEL AND CROSS-VALIDATION	3872
<i>Akira Tanaka, Hideyuki Imai, Hokkaido University, Japan</i>	
MLSP-P9.2: GENERALIZED KERNEL-BASED DYNAMIC MODE DECOMPOSITION	3877
<i>Patrick Héas, Cédric Herzet, Inria & Irmir, Univ. Rennes, France; Benoit Combès, Inria & Iria, Univ. Rennes, France</i>	
MLSP-P9.3: AN ONLINE KERNEL SCALAR QUANTIZATION SCHEME FOR SIGNAL CLASSIFICATION	3882
<i>Jing Guo, Purdue University, United States; Raghu Raj, U.S. Naval Research Laboratory, United States; David Love, Purdue University, United States</i>	

MLSP-P9.4: SELF-DRIVEN GRAPH VOLTERRA MODELS FOR HIGHER-ORDER LINK PREDICTION	3887
<i>Mario Coutino, Delft University of Technology, Netherlands; Georgios V. Karanikolas, University of Minnesota, United States; Geert Leus, Delft University of Technology, Netherlands; Georgios B. Giannakis, University of Minnesota, United States</i>	
MLSP-P9.5: GRAPH CONSTRUCTION FROM DATA BY NON-NEGATIVE KERNEL REGRESSION	3892
<i>Sarath Shekkizhar, Antonio Ortega, University of Southern California, United States</i>	
MLSP-P9.6: STRUCTURED CITATION TREND PREDICTION USING GRAPH NEURAL NETWORKS	3897
<i>Daniel Cummings, Marcel Nassar, Intel, United States</i>	
MLSP-P9.7: REVISITING FAST SPECTRAL CLUSTERING WITH ANCHOR GRAPH	3902
<i>Cheng-Long Wang, Feiping Nie, Rong Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
MLSP-P9.8: A GRAPH NETWORK MODEL FOR DISTRIBUTED LEARNING WITH LIMITED BANDWIDTH LINKS AND PRIVACY CONSTRAINTS	3907
<i>Juan Parras, Santiago Zazo, Universidad Politécnica de Madrid, Spain</i>	
MLSP-P9.9: GRAPH REGULARIZED TENSOR TRAIN DECOMPOSITION	3912
<i>Seyyid Emre Sofuoglu, Selin Aviyente, Michigan State University, United States</i>	
MLSP-P9.10: WEIGHTED KRYLOV-LEVENBERG-MARQUARDT METHOD FOR CANONICAL POLYADIC TENSOR DECOMPOSITION	3917
<i>Petr Tichavsky, Academy of Sciences of the Czech Republic, Czech Republic; Anh-Huy Phan, Andrzej Cichocki, Skolkovo Institute of Science and Technology (Skoltech), Russia</i>	
MLSP-P9.11: LOW-COMPLEXITY LEVENBERG-MARQUARDT ALGORITHM FOR TENSOR CANONICAL POLYADIC DECOMPOSITION	3922
<i>Kejun Huang, University of Florida, United States; Xiao Fu, Oregon State University, United States</i>	
MLSP-P9.12: A MOMENT-BASED APPROACH FOR GUARANTEED TENSOR DECOMPOSITION	3927
<i>Arthur Marmin, Université Paris-Saclay, CentraleSupélec, Inria, France; Marc Castella, CNRS, Télécom SudParis, Institut Polytechnique de Paris, France; Jean-Christophe Pesquet, Université Paris-Saclay, CentraleSupélec, Inria, France</i>	
MLSP-P10: LEARNING METHODS	
MLSP-P10.1: LEARNING DIVERSE SUB-POLICIES VIA A TASK-AGNOSTIC REGULARIZATION ON ACTION DISTRIBUTIONS.	3932
<i>Liangyu Huo, Zulin Wang, Mai Xu, Beihang University, China; Yuhang Song, University of Oxford, United Kingdom</i>	
MLSP-P10.2: FEDERATED LEARNING WITH MUTUALLY COOPERATING DEVICES: A CONSENSUS APPROACH TOWARDS SERVER-LESS MODEL OPTIMIZATION	3937
<i>Stefano Savazzi, Consiglio Nazionale delle Ricerche CNR-IEIT, Italy; Monica Nicoli, Politecnico di Milano, Italy; Vittorio Rampa, Sanaz Kianoush, Consiglio Nazionale delle Ricerche CNR-IEIT, Italy</i>	
MLSP-P10.3: NO-REGRET NON-CONVEX ONLINE META-LEARNING	3942
<i>Zhenxun Zhuang, Boston University, United States; Yunlong Wang, Kezi Yu, IQVIA Inc., United States; Songtao Lu, IBM, United States</i>	
MLSP-P10.4: ASYNCHRONOUS DECENTRALIZED LEARNING OF A NEURAL NETWORK	3947
<i>Xinyue Liang, Alireza M. Javid, Mikael Skoglund, Saikat Chatterjee, KTH Royal Institute of Technology, Sweden</i>	
MLSP-P10.5: LEARNING PERCEPTION AND PLANNING WITH DEEP ACTIVE INFERENCE	3952
<i>Ozan Çatal, Tim Verbelen, Johannes Nauta, Cedric De Boom, Bart Dhoedt, Ghent University - imec, Belgium</i>	

MLSP-P10.6: PROJECTION FREE DYNAMIC ONLINE LEARNING	3957
<i>Deepak Singh Kalhan, Indian Institute of Technology Kanpur, India; Amrit Singh Bedi, Alec Koppel, U.S. Army Research Laboratory, United States; Ketan Rajawat, Abhishek Kumar Gupta, Adrish Banerjee, Indian Institute of Technology Kanpur, India</i>	
MLSP-P10.7: LEARNING PARTIAL DIFFERENTIAL EQUATIONS FROM DATA USING NEURAL NETWORKS	3962
<i>Ali Hasan, João M. Pereira, Robert Ravier, Sina Farsiu, Vahid Tarokh, Duke University, United States</i>	
MLSP-P10.8: ACTIVE LEARNING WITH UNSUPERVISED ENSEMBLES OF CLASSIFIERS	3967
<i>Panagiotis Traganitis, University of Minnesota, United States; Dimitrios Berberidis, Carnegie Mellon University, United States; Georgios B. Giannakis, University of Minnesota, United States</i>	
MLSP-P10.9: NASIL : NEURAL ARCHITECTURE SEARCH WITH IMITATION LEARNING	3972
<i>Farzaneh S. Fard, Arash Rad, Vikrant Singh Tomar, Fluent.ai, Canada</i>	
MLSP-P10.10: MULTI-VIEW CLUSTERING VIA MIXED EMBEDDING APPROXIMATION	3977
<i>Danyang Wu, Feiping Nie, Rong Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
MLSP-P10.11: SIGNAL CLUSTERING WITH CLASS-INDEPENDENT SEGMENTATION	3982
<i>Stefano Gasperini, Magdalini Paschali, Technische Universität München, Germany; Carsten Hopke, David Wittmann, Airbus Defence and Space GmbH, Germany; Nassir Navab, Technische Universität München, Germany</i>	
MLSP-P11: NEURAL NETWORKS AND PATTERN RECOGNITION	
MLSP-P11.1: MANGO: A PYTHON LIBRARY FOR PARALLEL HYPERPARAMETER TUNING	3987
<i>Sandeep Singh Sandha, University of California, Los Angeles, United States; Mohit Aggarwal, Igor Fedorov, Arm, United States; Mani Srivastava, University of California, Los Angeles, United States</i>	
MLSP-P11.2: ANYTIME MINIBATCH WITH DELAYED GRADIENTS: SYSTEM PERFORMANCE AND CONVERGENCE ANALYSIS	3992
<i>Haider Al-Lawati, Stark Draper, University of Toronto, Canada</i>	
MLSP-P11.3: ON EXPONENTIALLY CONSISTENCY OF LINKAGE-BASED HIERARCHICAL CLUSTERING ALGORITHM USING KOLMOGROV-SMIRNOV DISTANCE	3997
<i>Tiexing Wang, Yang Liu, Biao Chen, Syracuse University, United States</i>	
MLSP-P11.5: A NEURAL NETWORK BASED ON FIRST PRINCIPLES.....	4002
<i>Paul Baggenstoss, Fraunhofer FKIE, Germany</i>	
MLSP-P11.6: AL2: PROGRESSIVE ACTIVATION LOSS FOR LEARNING GENERAL REPRESENTATIONS IN CLASSIFICATION NEURAL NETWORKS	4007
<i>Majed El Helou, Frederike Dümbgen, Sabine Süsstrunk, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
MLSP-P11.7: LABEL PROPAGATION ADAPTIVE RESONANCE THEORY FOR SEMI-SUPERVISED CONTINUOUS LEARNING	4012
<i>Taehyeong Kim, Injune Hwang, Gi-Cheon Kang, Won-Seok Choi, Hyunseo Kim, Byoung-Tak Zhang, Seoul National University, Korea (South)</i>	
MLSP-P11.8: A PROBABILISTIC SCHEME FOR REPRESENTATION LEARNING WITH RADIAL TRANSFORM IMAGES	4017
<i>Hojjat Salehinejad, Shahrokh Valaee, University of Toronto, Canada</i>	
MLSP-P11.9: PERCEPTION-DISTORTION TRADE-OFF WITH RESTRICTED BOLTZMANN MACHINES	4022
<i>Chris Cannella, Duke University, United States; Jie Ding, University of Minnesota, United States; Mohammadreza Soltani, Duke University, United States; Yi Zhou, University of Utah, United States; Vahid Tarokh, Duke University, United States</i>	

MLSP-P11.10: AN EFFICIENT ALTERNATIVE TO NETWORK PRUNING THROUGH ENSEMBLE LEARNING	4027
<i>Martin Pöllot, Rui Zhang, André Kaup, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	
MLSP-P11.11: A NOVEL PRUNING APPROACH FOR BAGGING ENSEMBLE REGRESSION BASED ON SPARSE REPRESENTATION	4032
<i>Amir Ehsan Khorashadi-Zadeh, Massoud Babaie-Zadeh, Sharif University of Technology, Iran; Christian Jutten, University Grenoble Alpes, France</i>	
MLSP-P11.12: K-AUTOENCODERS DEEP CLUSTERING	4037
<i>Yaniv Opoichinsky, Shlomo E. Chazan, Sharon Gannot, Jacob Goldberger, Bar-Ilan University, Israel</i>	
MLSP-P12: APPLICATIONS IN VIDEO AND IMAGE PROCESSING II	
MLSP-P12.1: MOGA: SEARCHING BEYOND MOBILENETV3	4042
<i>Xiangxiang Chu, Bo Zhang, Ruijun Xu, Xiaomi, China</i>	
MLSP-P12.2: META METRIC LEARNING FOR HIGHLY IMBALANCED AERIAL SCENE CLASSIFICATION	4047
<i>Jian Guan, Jiabei Liu, Jianguo Sun, Harbin Engineering University, China; Pengming Feng, State Key Laboratory of Space-Ground Integrated Information Technology, China; Tong Shuai, CETC Key Laboratory of Aerospace Information Applications, China; Wenwu Wang, University of Surrey, United Kingdom</i>	
MLSP-P12.3: SYNTHETIC CROWD AND PEDESTRIAN GENERATOR FOR DEEP LEARNING PROBLEMS	4052
<i>A Khadka, P Remagnino, V Argyriou, Kingston University, United Kingdom</i>	
MLSP-P12.4: TOSO: STUDENT’S-T DISTRIBUTION AIDED ONE-STAGE ORIENTATION TARGET DETECTION IN REMOTE SENSING IMAGES	4057
<i>Pengming Feng, State Key Laboratory of Space-Ground Integrated Information Technology, China; Youtian Lin, Jian Guan, Harbin Engineering University, China; Guangjun He, Huifeng Shi, State Key Laboratory of Space-Ground Integrated Information Technology, China; Jonathon Chambers, University of Leicester, United Kingdom</i>	
MLSP-P12.5: IMPROVING DEEP LEARNING CLASSIFICATION OF JPEG2000 IMAGES OVER BANDLIMITED NETWORKS	4062
<i>Lahiru D. Chamain, Zhi Ding, University of California, Davis, United States</i>	
MLSP-P12.6: AUGMENTED GRAD-CAM: HEAT-MAPS SUPER RESOLUTION THROUGH AUGMENTATION	4067
<i>Pietro Morbidelli, Politecnico di Milano, Italy; Diego Carrera, Beatrice Rossi, Pasqualina Fragneto, STMicroelectronics, Italy; Giacomo Boracchi, Politecnico di Milano, Italy</i>	
MLSP-P12.7: BBA-NET: A BI-BRANCH ATTENTION NETWORK FOR CROWD COUNTING	4072
<i>Yi Hou, National Engineering Laboratory for Video Technology, Peking University, China; Chengyang Li, Key Lab of Petroleum Data Mining, China University of Petroleum (Beijing), China; Fan Yang, Cong Ma, National Engineering Laboratory for Video Technology, Peking University, China; Liping Zhu, Key Lab of Petroleum Data Mining, China University of Petroleum (Beijing), China; Yuan Li, Huizhu Jia, Xiaodong Xie, National Engineering Laboratory for Video Technology, Peking University, China</i>	
MLSP-P12.8: DEEP METRIC LEARNING BASED ON CENTER-RANKED LOSS FOR GAIT RECOGNITION	4077
<i>Jingran Su, Yang Zhao, Xuelong Li, Northwestern Polytechnical University, China</i>	
MLSP-P12.9: CHANNEL ATTENTION BASED GENERATIVE NETWORK FOR ROBUST VISUAL TRACKING	4082
<i>Ying Hu, Hanyu Xuan, Jian Yang, Yan Yan, Nanjing University of Science and Technology, China</i>	

MLSP-P12.10: CROSS-VAE: TOWARDS DISENTANGLING EXPRESSION FROM IDENTITY FOR HUMAN FACES	4087
<i>Haozhe Wu, Jia Jia, Tsinghua University, China; Lingxi Xie, Huawei Noah's Ark Lab, China; Guojun Qi, Futurewei Technologies, China; Yuanchun Shi, Tsinghua University, China; Qi Tian, Huawei Noah's Ark Lab, China</i>	
MLSP-P12.11: ENHANCE PART-BASED MODEL FOR PERSON RE-IDENTIFICATION WITH FUSED MULTI-SCALE FEATURES	4092
<i>Xipeng Lin, Yubin Yang, Zhonghan Niu, Nanjing University, China</i>	
MLSP-P12.12: TEXT-TO-IMAGE SYNTHESIS METHOD EVALUATION BASED ON VISUAL PATTERNS	4097
<i>William Lund Sommer, Alexandros Iosifidis, Aarhus University, Denmark</i>	
 MLSP-P13: NEURAL NETWORKS APPLICATIONS II	
MLSP-P13.1: DETECTION OF MILD DYSPNEA FROM PAIRS OF SPEECH RECORDINGS	4102
<i>Sander Boelders, Eindhoven University of Technology, Netherlands; Venkata Srikanth Nallanthighal, Philips Research and Radboud University, Netherlands; Vlado Menkovski, Eindhoven University of Technology, Netherlands; Aki Härmä, Philips Research, Netherlands</i>	
MLSP-P13.2: A HYBRID MODEL FOR BIPOLAR DISORDER CLASSIFICATION FROM VISUAL INFORMATION	4107
<i>Niloufar Abaei, Hussein Al Osman, University of Ottawa, Canada</i>	
MLSP-P13.3: AUTOMATIC EVENT DETECTION OF REM SLEEP WITHOUT ATONIA FROM POLYSOMNOGRAPHY SIGNALS USING DEEP NEURAL NETWORKS	4112
<i>Phillip Wallis, Daniel Yaeger, Alexander Kain, Xubo Song, Oregon Health & Science University, United States; Miranda Lim, Oregon Health & Science University / Veterans Affairs Portland Health Care System, United States</i>	
MLSP-P13.4: A DEEP LEARNING ARCHITECTURE FOR EPILEPTIC SEIZURE CLASSIFICATION BASED ON OBJECT AND ACTION RECOGNITION	4117
<i>Tamás Karácsony, INESC TEC - Institute for Systems and Computer Engineering, Technology and Science, Portugal; Anna Mira Loesch-Biffar, Christian Vollmar, Soheyl Noachtar, University of Munich, Germany; Joao Paulo Silva Cunha, INESC TEC - Institute for Systems and Computer Engineering, Technology and Science, Portugal</i>	
MLSP-P13.5: TRANSFORMING SEISMOCARDIOGRAMS INTO ELECTROCARDIOGRAMS BY APPLYING CONVOLUTIONAL AUTOENCODERS	4122
<i>Marian Haescher, Florian Höpfner, Wencke Chodan, Fraunhofer Gesellschaft, Germany; Dimitri Kraft, Universität Rostock, Germany; Mario Aehnelt, Fraunhofer Gesellschaft, Germany; Bodo Urban, Universität Rostock, Germany</i>	
MLSP-P13.6: IMPROVED NEAREST NEIGHBOR DENSITY-BASED CLUSTERING TECHNIQUES WITH APPLICATION TO HYPERSPECTRAL IMAGES	4127
<i>Claude Cariou, Kacem Chehdi, Univ Rennes, CNRS, France; Steven Le Moan, Massey University, New Zealand</i>	
MLSP-P13.7: OBJECT SURFACE ESTIMATION FROM RADAR IMAGES	4132
<i>Oded Bialer, David Shapiro, Amnon Jonas, General Motors, Israel</i>	
MLSP-P13.8: COUNTING DENSE OBJECTS IN REMOTE SENSING IMAGES	4137
<i>Guangshuai Gao, Qingjie Liu, Yunhong Wang, Beihang University, China</i>	
MLSP-P13.9: HPRNN: A HIERARCHICAL SEQUENCE PREDICTION MODEL FOR LONG-TERM WEATHER RADAR ECHO EXTRAPOLATION	4142
<i>Jinrui Jing, Qian Li, Xuan Peng, Qiang Ma, Shaoen Tang, National University of Defense Technology, China</i>	
MLSP-P13.10: ACCURATE 6D OBJECT POSE ESTIMATION BY POSE CONDITIONED MESH RECONSTRUCTION	4147
<i>Pedro Castro, Anil Armagan, Tae-Kyun Kim, Imperial College London, United Kingdom</i>	

MLSP-P13.11: CPWC: CONTEXTUAL POINT WISE CONVOLUTION FOR OBJECT RECOGNITION	4152
<i>Pratik Mazumder, Pravendra Singh, Vinay Namboodiri, Indian Institute of Technology Kanpur, India</i>	
MLSP-P13.12: ELECTRIC ANALOG CIRCUIT DESIGN WITH HYPERNETWORKS AND A DIFFERENTIAL SIMULATOR	4157
<i>Michael Rotman, Lior Wolf, Tel Aviv University, Israel</i>	
MLSP-P14: TOPICS IN MACHINE LEARNING	
MLSP-P14.1: MULTI-TASK LEARNING VIA SA-FPN AND EJ-HEAD	4162
<i>Feng Ni, Peking University, China; Zhipeng Luo, DeepBlue Technology (Shanghai) Co.,Ltd, China; Xixin Cao, Peking University, China; Zhenyu Xu, Yuehan Yao, DeepBlue Technology (Shanghai) Co.,Ltd, China</i>	
MLSP-P14.2: DIFFERENTIABLE BRANCHING IN DEEP NETWORKS FOR FAST INFERENCE	4167
<i>Simone Scardapane, Danilo Comminiello, Michele Scarpiniti, Enzo Baccarelli, Aurelio Uncini, Sapienza University of Rome, Italy</i>	
MLSP-P14.3: MULTI-STEP ONLINE UNSUPERVISED DOMAIN ADAPTATION	4172
<i>J. H. Moon, Debasmit Das, C. S. George Lee, Purdue University, United States</i>	
MLSP-P14.4: SELF-ADAPTIVE FEATURE FOOL	4177
<i>Xinyi Liu, Yang Bai, Shu-Tao Xia, Yong Jiang, Tsinghua University, China</i>	
MLSP-P14.5: MULTI-MOTIFGAN (MMGAN): MOTIF-TARGETED GRAPH GENERATION AND PREDICTION	4182
<i>Anuththari Gamage, Eli Chien, Jianhao Peng, Olgica Milenkovic, University of Illinois at Urbana–Champaign, United States</i>	
MLSP-P14.6: FEDERATED CLASSIFICATION WITH LOW COMPLEXITY REPRODUCING KERNEL HILBERT SPACE REPRESENTATIONS	4187
<i>Maria Peifer, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
MLSP-P14.7: MAXPOLYNOMIAL DIVISION WITH APPLICATION TO NEURAL NETWORK SIMPLIFICATION	4192
<i>Georgios Smyrnis, Petros Maragos, George Retsinas, National Technical University of Athens, Greece</i>	
MLSP-P14.8: BALANCED BINARY NEURAL NETWORKS WITH GATED RESIDUAL	4197
<i>Mingzhu Shen, Xianglong Liu, Ruihao Gong, Beihang University, China; Kai Han, University of Chinese Academy of Sciences, China</i>	
MLSP-P14.9: A GEOMETRIC APPROACH FOR UNSUPERVISED SIMILARITY LEARNING	4202
<i>Ujjal K. R. Dutta, Chandra Sekhar C, Indian Institute of Technology Madras, India</i>	
MLSP-P14.10: GRADIENT DELAY ANALYSIS IN ASYNCHRONOUS DISTRIBUTED OPTIMIZATION	4207
<i>Haider Al-Lawati, Stark Draper, University of Toronto, Canada</i>	
MLSP-P14.11: SEQUENTIAL IOT DATA AUGMENTATION USING GENERATIVE ADVERSARIAL NETWORKS	4212
<i>Maximilian Ernst Tschuchnig, Cornelia Ferner, Stefan Wegenkittl, Salzburg University of Applied Sciences, Austria</i>	
MLSP-P14.12: ROBUST RANK CONSTRAINED SPARSE LEARNING: A GRAPH-BASED METHOD FOR CLUSTERING	4217
<i>Ran Liu, Mulin Chen, Qi Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	

MLSP-P15: NEURAL NETWORK ALGORITHMS

MLSP-P15.1: EFFICIENT DECOUPLED NEURAL ARCHITECTURE SEARCH BY 4222 STRUCTURE AND OPERATION SAMPLING

Heung-Chang Lee, Do-Guk Kim, Hana Institute of Technology, Korea (South); Bohyung Han, Seoul National University, Korea (South)

MLSP-P15.2: WEIGHT SHARING AND DEEP LEARNING FOR SPECTRAL DATA 4227

Jacob Søgaard Larsen, Line Clemmensen, Technical University of Denmark, Denmark

MLSP-P15.3: COMPLEX TRANSFORMER: A FRAMEWORK FOR MODELING 4232 COMPLEX-VALUED SEQUENCE

Muqiao Yang, Martin Q. Ma, Dongyu Li, Yao-Hung Hubert Tsai, Ruslan Salakhutdinov, Carnegie Mellon University, United States

MLSP-P15.4: HIGH-DIMENSIONAL NEURAL FEATURE USING RECTIFIED LINEAR 4237 UNIT AND RANDOM MATRIX INSTANCE

Alireza M. Javid, Arun Venkitaraman, Mikael Skoglund, Saikat Chatterjee, KTH Royal Institute of Technology, Sweden

MLSP-P15.5: PROJECTED WEIGHT REGULARIZATION TO IMPROVE NEURAL 4242 NETWORK GENERALIZATION

Guoqiang Zhang, university of Technology Sydney, Australia; Niwa Kenta, NTT Media Intelligence Laboratories, Japan; W. Bastiaan Kleijn, Victoria University of Wellington, New Zealand

MLSP-P15.7: DEEP CLUSTERING FOR DOMAIN ADAPTATION 4247

Boyan Gao, Yongxin Yang, Henry Gouk, Timothy M. Hospedales, University of Edinburgh, United Kingdom

MLSP-P15.8: DEEP CLUSTERING WITH CONCRETE K-MEANS 4252

Boyan Gao, Yongxin Yang, Henry Gouk, Timothy M. Hospedales, University of Edinburgh, United Kingdom

MLSP-P15.9: POLARIZING FRONT ENDS FOR ROBUST CNNs 4257

Can Bakiskan, Soorya Gopalakrishnan, Metehan Cekic, Upamanyu Madhow, Ramtin Pedarsani, University of California, Santa Barbara, United States

MLSP-P15.10: ADAPTIVE DISTRIBUTED STOCHASTIC GRADIENT DESCENT FOR 4262 MINIMIZING DELAY IN THE PRESENCE OF STRAGGLERS

Serge Kas Hanna, Rawad Bitar, Rutgers University, United States; Parimal Parag, Indian Institute of Science, India; Venkat Dasari, U.S. Army Research Laboratory, India; Salim El Rouayheb, Rutgers University, United States

MLSP-P15.11: A MODEL OF DOUBLE DESCENT FOR HIGH-DIMENSIONAL 4267 LOGISTIC REGRESSION

Zeyu Deng, University of California, Santa Barbara, United States; Abba Kammoun, King Abdullah University of Science and Technology (KAUST), Saudi Arabia; Christos Thrampoulidis, University of California, Santa Barbara, United States

MLSP-P16: NEURAL NETWORKS APPLICATIONS III

MLSP-P16.1: EFFICIENT SCENE TEXT DETECTION WITH TEXTUAL ATTENTION 4272 TOWER

Liang Zhang, Yufei Liu, Xidian University, China; Hang Xiao, OrionStar Ltd., China; Lu Yang, Guangming Zhu, Xidian University, China; Syed Afaq Shah, Murdoch University, Australia; Mohammed Bennamoun, University of Western Australia, Australia; Peiyi Shen, Xidian University, China

MLSP-P16.2: A HYBRID APPROACH FOR THERMOGRAPHIC IMAGING WITH DEEP 4277 LEARNING

Péter Kovács, Johannes Kepler University Linz, Austria; Bernhard Lehner, Silicon Austria Labs, Austria; Gregor Thummerer, Günther Mayr, University of Applied Sciences Upper Austria, Austria; Peter Burgholzer, Research Center for Non Destructive Testing (RECENDT), Austria; Mario Huemer, Johannes Kepler University Linz, Austria

MLSP-P16.3: KNOWLEDGE ENHANCED LATENT RELEVANCE MINING FOR QUESTION ANSWERING	4282
<i>Dong Wang, Tsinghua Shenzhen International Graduate School, Tsinghua University, China; Ying Shen, Sun Yat-Sen University, China; Hai-Tao Zheng, Tsinghua Shenzhen International Graduate School, Tsinghua University, China</i>	
MLSP-P16.4: MULTI-LABEL CONSISTENT CONVOLUTIONAL TRANSFORM LEARNING: APPLICATION TO NON-INTRUSIVE LOAD MONITORING	4287
<i>Shikha Singh, Jyoti Maggu, Angshul Majumdar, Indraprastha Institute of Information Technology Delhi, India; Emilie Chouzenoux, Inria Saclay, OPIS, Center for Visual Computing, France; Giovanni Chierchia, Université Paris Est, ESIEE, France</i>	
MLSP-P16.5: RESILIENT DISTRIBUTED RECOVERY OF LARGE FIELDS	4292
<i>Yuan Chen, Soumya Kar, José Moura, Carnegie Mellon University, United States</i>	
MLSP-P16.6: TRAINING LSTM FOR UNSUPERVISED ANOMALY DETECTION WITHOUT A PRIORI KNOWLEDGE	4297
<i>Yann Cherdo, Paul de Kerret, Renaud Pawlak, Mantu, France</i>	
MLSP-P16.7: UNSUPERVISED PERSON RE-IDENTIFICATION USING MULTI-BRANCH FEATURE COMPENSATION NETWORK AND LINK-BASED CLUSTER DISSIMILARITY METRIC	4302
<i>Lin Pan, Gege Qi, Biao Guo, Yuesheng Zhu, Peking University, China</i>	
MLSP-P16.8: DEEP-SST-EDDIES: A DEEP LEARNING FRAMEWORK TO DETECT OCEANIC EDDIES IN SEA SURFACE TEMPERATURE IMAGES	4307
<i>Evangelos Moschos, École Polytechnique, France; Olivier Schwander, Sorbonne Université, France; Alexandre Stegner, École Polytechnique, France; Patrick Gallinari, Sorbonne Université / Criteo AI Lab, France</i>	
MLSP-P16.9: INTERPRETABILITY-GUIDED CONVOLUTIONAL NEURAL NETWORKS FOR SEISMIC FAULT SEGMENTATION	4312
<i>Zhining Liu, Cheng Zhou, Guangmin Hu, University of Electronic Science and Technology of China, China; Chengyun Song, Chongqing University of Technology, China</i>	
MLSP-P16.10: TOWARDS HIGH-PERFORMANCE OBJECT DETECTION: TASK-SPECIFIC DESIGN CONSIDERING CLASSIFICATION AND LOCALIZATION SEPARATION	4317
<i>Jung Uk Kim, Korea Advanced Institute of Science and Technology (KAIST), Korea (South); Seong Tae Kim, Technische Universität München, Germany; Eun Sung Kim, Korea Advanced Institute of Science and Technology (KAIST), Korea (South); Sang-Keun Moon, Korea Electric Power Corporation (KEPCO) Research Institute, Korea (South); Yong Man Ro, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
MLSP-P16.11: ANOMALY DETECTION FOR TIME SERIES USING VAE-LSTM HYBRID MODEL	4322
<i>Shuyu Lin, University of Oxford, United Kingdom; Ronald Clark, Imperial College London, United Kingdom; Robert Birke, Sandro Schoenborn, ABB Future Labs, Switzerland; Niki Trigoni, Stephen Roberts, University of Oxford, United Kingdom</i>	
MLSP-P16.12: HYDRANET: A REAL-TIME WAVEFORM SEPARATION NETWORK	4327
<i>Esbern Torgard Kaspersen, Aalborg University, Denmark; Tsampikos Kounalakis, Danish Technological Institute, Denmark; Cumhur Erkut, Aalborg University, Denmark</i>	
MMSP-L1: SIGNAL PROCESSING FOR MULTIMEDIA APPLICATIONS II	
MMSP-L1.1: STORING DIGITAL DATA INTO DNA: A COMPARATIVE STUDY OF QUATERNARY CODE CONSTRUCTION	4332
<i>Melpomeni Dimopoulou, Marc Antonini, Université Côte d'Azur, CNRS, I3S, France; Pascal Barbry, Université Côte d'Azur, CNRS, IPMC, France; Raja Appuswamy, EURECOM, France</i>	
MMSP-L1.2: A NEW MULTIHYPOTHESIS PREDICTION SCHEME FOR COMPRESSED VIDEO SENSING RECONSTRUCTION	4337
<i>Shuai Zheng, Xidian University, China; Xiao-Ping Zhang, Ryerson University, Canada; Jian Chen, Yonghong Kuo, Xidian University, China</i>	

MMSP-L1.3: BIT ALLOCATION FOR MULTI-TASK COLLABORATIVE INTELLIGENCE.....	4342
<i>Saeed Ranjbar Alvar, Ivan V. Bajić, Simon Fraser University, Canada</i>	
MMSP-L1.4: MOTION FEEDBACK DESIGN FOR VIDEO FRAME INTERPOLATION	4347
<i>Mengshun Hu, Wuhan University, China; Liang Liao, national institute of informatics, Japan; Jing Xiao, Wuhan University and Suzhou Institute of Wuhan University, China; Lin Gu, Shin'ichi Satoh, national institute of informatics, Japan</i>	
MMSP-L1.5: TRILINGUAL SEMANTIC EMBEDDINGS OF VISUALLY GROUNDED	4352
SPEECH WITH SELF-ATTENTION MECHANISMS	
<i>Yasunori Ohishi, Akisato Kimura, Takahito Kawanishi, Kunio Kashino, NTT Corporation, Japan; David Harwath, James Glass, Massachusetts Institute of Technology, United States</i>	
MMSP-L1.6: TOWARDS POSE-INVARIANT LIP-READING.....	4357
<i>Shiyang Cheng, Samsung, United Kingdom; Pingchuan Ma, Imperial College London, United Kingdom; Georgios Tzimiropoulos, University of Nottingham and Samsung, United Kingdom; Stavros Petridis, Imperial College London and Samsung, United Kingdom; Adrian Bulat, Samsung, United Kingdom; Jie Shen, Maja Pantic, Imperial College London and Samsung, United Kingdom</i>	
MMSP-L2: DEEP LEARNING FOR MULTIMEDIA PROCESSING AND ANALYSIS II	
MMSP-L2.1: A SIAMESE CONTENT-ATTENTIVE GRAPH CONVOLUTIONAL	4362
NETWORK FOR PERSONALITY RECOGNITION USING PHYSIOLOGY	
<i>Hao-Chun Yang, Chi-Chun Lee, National Tsing Hua University, Taiwan</i>	
MMSP-L2.2: SELF-SUPERVISED LEARNING FOR AUDIO-VISUAL SPEAKER	4367
DIARIZATION	
<i>Yifan Ding, University of Central Florida, United States; Yong Xu, Shi-Xiong Zhang, Tencent AI Lab, United States; Yahuan Cong, Beijing University of Posts and Telecommunications, United States; Liqiang Wang, University of Central Florida, United States</i>	
MMSP-L2.3: WHAT MAKES THE SOUND?: A DUAL-MODALITY INTERACTING	4372
NETWORK FOR AUDIO-VISUAL EVENT LOCALIZATION	
<i>Janani Ramaswamy, Indian Institute of Technology Madras, India</i>	
MMSP-L2.4: ATTENTIONAL FUSED TEMPORAL TRANSFORMATION NETWORK FOR	4377
VIDEO ACTION RECOGNITION	
<i>Ke Yang, National University of Defense Technology, China; Zhiyuan Wang, Huadong Dai, Tianlong Shen, National Innovation Institute of Defense Technology, China; Peng Qiao, Xin Niu, Jie Jiang, Dongsheng Li, Yong Dou, National University of Defense Technology, China</i>	
MMSP-L2.5: DEEP PRODUCT QUANTIZATION MODULE FOR EFFICIENT IMAGE	4382
RETRIEVAL	
<i>Meihan Liu, Yongxing Dai, Yan Bai, Ling-Yu Duan, Peking University, China</i>	
MMSP-L2.6: THE OPEN BRANDS DATASET: UNIFIED BRAND DETECTION AND	4387
RECOGNITION AT SCALE	
<i>Xuan Jin, Wei Su, Rong Zhang, Yuan He, Hui Xue, Alibaba Group, China</i>	
MMSP-P1: SIGNAL PROCESSING FOR MULTIMEDIA APPLICATIONS I	
MMSP-P1.1: SPECTROGRAM ANALYSIS VIA SELF-ATTENTION FOR REALIZING	4392
CROSS-MODEL VISUAL-AUDIO GENERATION	
<i>Huadong Tan, Guang Wu, Pengcheng Zhao, Yanxiang Chen, Hefei University of Technology, China</i>	
MMSP-P1.2: DGAN: DISENTANGLED REPRESENTATION LEARNING FOR	4397
ANISOTROPIC BRDF RECONSTRUCTION	
<i>Zhongyun Hu, Xue Wang, Qing Wang, Northwestern Polytechnical University, China</i>	

MMSP-P1.3: APB2FACE: AUDIO-GUIDED FACE REENACTMENT WITH AUXILIARY POSE AND BLINK SIGNALS	4402
<i>Jiangning Zhang, Liang Liu, Zhejiang University, China; Zhucun Xue, Wuhan University, China; Yong Liu, Zhejiang University, China</i>	
MMSP-P1.4: MOTION DYNAMICS IMPROVE SPEAKER-INDEPENDENT LIPREADING	4407
<i>Matteo Riva, Dalle Molle Institute for Artificial Intelligence (IDSIA) / Università degli Studi di Milano-Bicocca, Switzerland; Michael Wand, Jürgen Schmidhuber, Dalle Molle Institute for Artificial Intelligence (IDSIA), Switzerland</i>	
MMSP-P1.5: MULTI-LAYER CONTENT INTERACTION THROUGH QUATERNION PRODUCT FOR VISUAL QUESTION ANSWERING	4412
<i>Lei Shi, Beijing University of Posts and Telecommunications, China; Shijie Geng, Rutgers University, China; Kai Shuang, Beijing University of Posts and Telecommunications, China; Chiori Hori, Mitsubishi Electric Research Laboratories (MERL), China; Songxiang Liu, Chinese University of Hong Kong, China; Peng Gao, Mitsubishi Electric Research Laboratories (MERL), China; Sen Su, Beijing University of Posts and Telecommunications, China</i>	
MMSP-P1.6: LINEAR MODEL-BASED INTRA PREDICTION IN VVC TEST MODEL	4417
<i>Ramin Ghaznavi-Youvalari, Nokia Technologies, Finland</i>	
MMSP-P1.7: INTRA FRAME RATE CONTROL FOR VERSATILE VIDEO CODING WITH QUADRATIC RATE-DISTORTION MODELLING	4422
<i>Yi Chen, Sam Kwong, City University of Hong Kong, Hong Kong SAR of China; Mingliang Zhou, Chongqing University, China; Shiqi Wang, City University of Hong Kong, Hong Kong SAR of China; Guopu Zhu, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; Yi Wang, Southern University of Science and Technology, China</i>	
MMSP-P1.8: PERFORMANCE COMPARISON OF LOSSLESS COMPRESSION STRATEGIES FOR DYNAMIC VISION SENSOR DATA	4427
<i>Khurram Iqbal, Nabeel Khan, Maria G. Martini, Kingston University, United Kingdom</i>	
MMSP-P1.9: ENCODER-RECURRENT DECODER NETWORK FOR SINGLE IMAGE DEHAZING	4432
<i>An Dang, Toan Vu, Jia-Ching Wang, National Central University, Taiwan</i>	
MMSP-P1.10: DENOISING OF EVENT-BASED SENSORS WITH SPATIAL-TEMPORAL CORRELATION	4437
<i>Jinjian Wu, Chuanwei Ma, School of Artificial Intelligence, Xidian University, China; Xiaojie Yu, Xidian University, China; Guangming Shi, School of Artificial Intelligence, Xidian University, China</i>	
MMSP-P2: DEEP LEARNING FOR MULTIMEDIA PROCESSING AND ANALYSIS I	
MMSP-P2.1: A VISUAL-PILOT DEEP FUSION FOR TARGET SPEECH SEPARATION IN MULTI-TALKER NOISY ENVIRONMENT	4442
<i>Yun Li, Zhang Liu, Yueyue Na, Ziteng Wang, Biao Tian, Qiang Fu, Alibaba Group, United States</i>	
MMSP-P2.2: C3DVQA: FULL-REFERENCE VIDEO QUALITY ASSESSMENT WITH 3D CONVOLUTIONAL NEURAL NETWORK	4447
<i>Munan Xu, Junming Chen, Peking University Shenzhen Graduate School, China; Haiqiang Wang, Shan Liu, Tencent, China; Ge Li, Zhiqiang Bai, Peking University Shenzhen Graduate School, China</i>	
MMSP-P2.3: EXPLORING ENTITY-LEVEL SPATIAL RELATIONSHIPS FOR IMAGE-TEXT MATCHING	4452
<i>Yaxian Xia, Lun Huang, Peking University, China; Wenmin Wang, Peking University; Macau University of Science and Technology, China; Xiao-Yong Wei, Peng Cheng Laboratory, China; Jie Chen, Peking University; Peng Cheng Laboratory, China</i>	
MMSP-P2.4: A DEEP MULTIMODAL APPROACH FOR MAP IMAGE CLASSIFICATION	4457
<i>Tomoya Sawada, Marie Katsurai, Doshisha University, Japan</i>	

MMSP-P2.5: SELECTIVE CONVOLUTIONAL NETWORK: AN EFFICIENT OBJECT DETECTOR WITH IGNORING BACKGROUND	4462
<i>Hefei Ling, Yangyang Qin, Li Zhang, Yuxuan Shi, Ping Li, Huazhong University of Science and Technology, China</i>	
MMSP-P2.6: BACK-AND-FORTH PREDICTION FOR DEEP TENSOR COMPRESSION	4467
<i>Hyomin Choi, Robert A. Cohen, Ivan V. Bajić, Simon Fraser University, Canada</i>	
MMSP-P2.7: EFFECTIVE PIPELINE FOR COMPRESSING DEEP OBJECT DETECTORS	4472
<i>Yiwu Yao, Peking University, China; Zheng Fang, Zhejiang University, China; Bin Dong, Sen Zhou, R&D Center, NetEase Inc, China</i>	
MMSP-P2.8: GATED MECHANISM FOR ATTENTION BASED MULTIMODAL SENTIMENT ANALYSIS	4477
<i>Ayush Kumar, Jithendra Vepa, Observe.AI, India</i>	
MMSP-P2.9: MULTITASK LEARNING AND MULTISTAGE FUSION FOR DIMENSIONAL AUDIOVISUAL EMOTION RECOGNITION	4482
<i>Bagus Tris Atmaja, Masato Akagi, Japan Advanced Institute of Science and Technology, Japan</i>	
MMSP-P2.10: OBJECT DETECTION AND 3D ESTIMATION VIA AN FMCW RADAR USING A FULLY CONVOLUTIONAL NETWORK	4487
<i>Guoqiang Zhang, University of Technology Sydney, Australia; Haopeng Li, Fabian Wenger, Qamcom Research and Technology AB, Sweden</i>	
MMSP-P3: MULTIMEDIA SIGNAL PROCESSING	
MMSP-P3.1: AVA ACTIVE SPEAKER: AN AUDIO-VISUAL DATASET FOR ACTIVE SPEAKER DETECTION	4492
<i>Joseph Roth, Sourish Chaudhuri, Ondrej Klejch, Radhika Marvin, Andrew Gallagher, Liat Kaver, Sharadh Ramaswamy, Arkadiusz Stopczynski, Cordelia Schmid, Zhonghua Xi, Caroline Pantofaru, Google, Inc., United States</i>	
MMSP-P3.2: SUPERVISED DEEP HASHING FOR EFFICIENT AUDIO EVENT RETRIEVAL	4497
<i>Arindam Jati, University of Southern California, United States; Dimitra Emmanouilidou, Microsoft Research, United States</i>	
MMSP-P3.3: AN LSTM-BASED DYNAMIC CHORD PROGRESSION GENERATION SYSTEM FOR INTERACTIVE MUSIC PERFORMANCE	4502
<i>Christos Garoufis, Athanasia Zlatintsi, Petros Maragos, National Technical University of Athens, Greece</i>	
MMSP-P3.5: ENSEMBLE NETWORK FOR RANKING IMAGES BASED ON VISUAL APPEAL	4507
<i>Sachin Singh, Indian Institute of Technology Kanpur, India; Victor Sanchez, Tanaya Guha, University of Warwick, United Kingdom</i>	
MMSP-P3.6: TRAPEZOIDAL SEGMENT SEQUENCING: A NOVEL APPROACH FOR FUSION OF HUMAN-PRODUCED CONTINUOUS ANNOTATIONS	4512
<i>Brandon Booth, Shrikanth Narayanan, University of Southern California, United States</i>	
MMSP-P3.7: SEQUENCE-TO-SEQUENCE LABANOTATION GENERATION BASED ON MOTION CAPTURE DATA	4517
<i>Min Li, Zhenjiang Miao, Cong Ma, Beijing Jiaotong University, China</i>	
MMSP-P3.8: POSE REFINEMENT: BRIDGING THE GAP BETWEEN UNSUPERVISED LEARNING AND GEOMETRIC METHODS FOR VISUAL ODOMETRY	4522
<i>Lanqing Zhang, Ge Li, Peking University Shenzhen Graduate School, China; Thomas H. Li, Peking University, China</i>	

MMSP-P3.9: MULTIMODAL ACTIVE SPEAKER DETECTION AND VIRTUAL CINEMATOGRAPHY FOR VIDEO CONFERENCING	4527
<i>Ross Cutler, Microsoft, United States; Ramin Mehran, Zillow, United States; Sam Johnson, Facebook, United States; Cha Zhang, Microsoft, United States; Adam Kirk, Oliver Whyte, Omnivor, United States; Adarsh Kowdle, perceptiveIO, United States</i>	
MMSP-P3.10: A NEW VARIATIONAL METHOD FOR DEEP SUPERVISED SEMANTIC IMAGE HASHING	4532
<i>Furen Zhuang, Pierre Moulin, University of Illinois at Urbana-Champaign, United States</i>	
SAM-L1: DIRECTION OF ARRIVAL ESTIMATION	
SAM-L1.1: DOA ESTIMATION IN SYSTEMS WITH NONLINEARITIES FOR MMWAVE COMMUNICATIONS	4537
<i>Aditya Sant, Bhaskar D. Rao, University of California, San Diego, United States</i>	
SAM-L1.2: WIDEBAND DIRECTION OF ARRIVAL ESTIMATION WITH SPARSE LINEAR ARRAYS	4542
<i>Feiyu Wang, Delft University of Technology, Netherlands; Zhi Tian, George Mason University, United States; Jun Fang, University of Electronic Science and Technology of China, China; Geert Leus, Delft University of Technology, Netherlands</i>	
SAM-L1.3: FOURTH ORDER CUMULANT BASED ACTIVE DIRECTION OF ARRIVAL ESTIMATION USING COPRIME ARRAYS	4547
<i>Zhe Fu, Pascal Charge, Yide Wang, University of Nantes, France</i>	
SAM-L1.4: ON REGULARIZATION PARAMETER FOR L0-SPARSE COVARIANCE FITTING BASED DOA ESTIMATION	4552
<i>Alice Delmer, Anne Ferreol, Thales / ENS Paris-Saclay, France; Pascal Larzabal, Universite Paris-Sud, France</i>	
SAM-L1.5: EFFECTIVE APPROXIMATE MAXIMUM LIKELIHOOD ESTIMATION OF ANGLES OF ARRIVAL FOR NON-COHERENT SUB-ARRAYS	4557
<i>Tom Tirer, Tel Aviv University, Israel; Oded Bialer, General Motors, Israel</i>	
SAM-L1.6: TWO-DIMENSIONAL DOA ESTIMATION FOR COPRIME PLANAR ARRAY: A COARRAY TENSOR-BASED SOLUTION	4562
<i>Hang Zheng, Chengwei Zhou, Zhejiang University, China; Yujie Gu, Temple University, China; Zhiguo Shi, Zhejiang University, China</i>	
SAM-L2: MIMO SYSTEMS AND MIMO RADAR	
SAM-L2.1: MULTI-CONSTRAINT SPECTRAL CO-DESIGN FOR COLOCATED MIMO RADAR AND MIMO COMMUNICATIONS	4567
<i>Sayed Hossein Dokhanchi, Bhavani Shankar M. R., Kumar Vijay Mishra, Björn Ottersten, University of Luxembourg, Luxembourg</i>	
SAM-L2.2: TENSOR DECOMPOSITION-BASED BEAMSPACE ESPRIT ALGORITHM FOR MULTIDIMENSIONAL HARMONIC RETRIEVAL	4572
<i>Fuxi Wen, Chalmers University of Technology, Sweden; Hing Cheung So, City University of Hong Kong, Hong Kong SAR of China; Henk Wymeersch, Chalmers University of Technology, Sweden</i>	
SAM-L2.3: INFORMATION THEORETIC APPROACH FOR WAVEFORM DESIGN IN COEXISTING MIMO RADAR AND MIMO COMMUNICATIONS	4577
<i>Mohammad Alaee-Kerahroodi, Bhavani Shankar M. R., Kumar Vijay Mishra, Björn Ottersten, University of Luxembourg, Luxembourg</i>	
SAM-L2.4: TRANSMIT BEAMPATTERN SHAPING VIA WAVEFORM DESIGN IN COGNITIVE MIMO RADAR	4582
<i>Ehsan Raei, Mohammad Alaee-Kerahroodi, Bhavani Shankar M. R., Björn Ottersten, University of Luxembourg, Luxembourg</i>	

SAM-L2.5: MULTILINEAR GENERALIZED SINGULAR VALUE DECOMPOSITION 4587
(ML-GSVD) WITH APPLICATION TO COORDINATED BEAMFORMING IN MULTI-USER MIMO
SYSTEMS

Liana Khamidullina, Ilmenau University of Technology, Germany; André L. F. de Almeida, Federal University of Ceará, Brazil; Martin Haardt, Ilmenau University of Technology, Germany

SAM-L3: SPARSE ARRAYS AND SPARSE SENSING

SAM-L3.1: SPARSE LOW-REDUNDANCY LINEAR ARRAY WITH UNIFORM SUM 4592
CO-ARRAY

Robin Rajamäki, Visa Koivunen, Aalto University, Finland

SAM-L3.2: COMPRESSED SENSING BASED CHANNEL ESTIMATION AND 4597
OPEN-LOOP TRAINING DESIGN FOR HYBRID ANALOG-DIGITAL MASSIVE MIMO SYSTEMS

Khaled Ardah, Bruno Sokal, Communications Research Laboratory (CRL), Ilmenau University of Technology, Germany; André L. F. de Almeida, Wireless Telecom Research Group (GTEL), Federal University of Ceará, Brazil; Martin Haardt, Communications Research Laboratory (CRL), Ilmenau University of Technology, Germany

SAM-L3.3: DISPERSIVE GRID-FREE ORTHOGONAL MATCHING PURSUIT FOR 4602
MODAL ESTIMATION IN OCEAN ACOUSTICS

Thomas Paviet-Salomon, Clément Dorffer, ENSTA Bretagne/Lab-STICC (UMR 6285), France; Julien Bonnel, Woods Hole Oceanographic Institution, United States; Barbara Nicolas, CNRS/Creatis (UMR 5220), France; Thierry Chonavel, IMT Atlantique/Lab-STICC (UMR 6285), France; Angélique Dremeau, ENSTA Bretagne/Lab-STICC (UMR 6285), France

SAM-L3.4: GREEDY SPARSE ARRAY DESIGN FOR OPTIMAL LOCALIZATION UNDER 4607
SPATIALLY PRIORITIZED SOURCE DISTRIBUTION

Yotam Gershon, Yaakov Buchris, Israel Cohen, Technion - Israel Institute of Technology, Israel

SAM-L3.5: COMPRESSIVE 2-D OFF-GRID DOA ESTIMATION FOR PROPELLER 4612
CAVITATION LOCALIZATION

Yongsung Park, Peter Gerstoft, University of California, San Diego, United States

SAM-L3.6: THE COMPRESSED NESTED ARRAY FOR UNDERDETERMINED DOA 4617
ESTIMATION BY FOURTH-ORDER DIFFERENCE COARRAY

Yan Zhou, Yanyan Li, Lin Wang, Cai Wen, Weike Nie, Northwest University, China

SAM-L4: LEARNING MODELS AND METHODS FOR MULTI-SENSOR SYSTEMS

SAM-L4.1: MODEL ORDER SELECTION IN DOA SCENARIOS VIA CROSS-ENTROPY 4622
BASED MACHINE LEARNING TECHNIQUES

Andreas Barthelme, Reinhard Wiesmayr, Wolfgang Utschick, Technical University Munich, Germany

SAM-L4.2: UNSUPERVISED CHANGE DETECTION FOR MULTIMODAL REMOTE 4627
SENSING IMAGES VIA COUPLED DICTIONARY LEARNING AND SPARSE CODING

Vinicius Ferraris, University of São Paulo, Brazil; Nicolas Dobigeon, Yanna Cavalcanti, Thomas Oberlin, Marie Chabert, University of Toulouse, France

SAM-L4.3: FAST DIRECTION-OF-ARRIVAL ESTIMATION OF MULTIPLE TARGETS 4632
USING DEEP LEARNING AND SPARSE ARRAYS

Georgios K. Papageorgiou, Mathini Sellathurai, Heriot-Watt University, United Kingdom

SAM-L4.4: LEARNING BASED RECONFIGURABLE SUB-NYQUIST SAMPLING 4637
FRAMEWORK FOR ULTRA-WIDEBAND ANGULAR SENSING

Himani Joshi, Indian Institute of Technology Delhi, India; Mohammad Alaee-Kerahroodi, University of Luxembourg, Luxembourg; Achanna A Kumar, TCS Innovations Lab, India; Bhavani Shankar M. R., University of Luxembourg, Luxembourg; Sumit J Darak, Indian Institute of Technology Delhi, India

SAM-L4.5: RAW WAVEFORM BASED END-TO-END DEEP CONVOLUTIONAL NETWORK FOR SPATIAL LOCALIZATION OF MULTIPLE ACOUSTIC SOURCES	4642
<i>Harshavardhan Sundar, Amazon, Inc., United States; Weiran Wang, Salesforce Research, United States; Ming Sun, Chao Wang, Amazon, Inc., United States</i>	
SAM-L4.6: DNN-BASED MASK ESTIMATION INTEGRATING SPECTRAL AND SPATIAL FEATURES FOR ROBUST BEAMFORMING	4647
<i>Chengyun Deng, Hui Song, Yi Zhang, Yongtao Sha, Xiangang Li, Didi Chuxing, China</i>	
SAM-P1: RADAR AND ACOUSTIC ARRAY PROCESSING	
SAM-P1.2: RAY SEPARATION AND SOURCE DEPTH ESTIMATION BASED ON SOUND PRESSURE FIELD TRANSFORMATION	4652
<i>Runyu Wei, Xiaochuan Ma, Xuan Li, Institute of Acoustics, Chinese Academy of Sciences, China</i>	
SAM-P1.3: REGULARIZED BEAMFORMER FOR THE SPHERICAL MICROPHONE ARRAY TO COPE WITH THE WHITE NOISE AMPLIFICATION	4657
<i>Lei Wang, Idiap Research Institute, Switzerland; Jie Zhu, Shanghai Jiao Tong University, China</i>	
SAM-P1.4: INTERPOLATION AND RANGE EXTRAPOLATION OF SOUND SOURCE DIRECTIVITY BASED ON A SPHERICAL WAVE PROPAGATION MODEL	4662
<i>Jens Ahrens, Chalmers University of Technology, Sweden; Stefan Bilbao, University of Edinburgh, United Kingdom</i>	
SAM-P1.5: POLARIZATION PARAMETERS ESTIMATION WITH SCALAR SENSOR ARRAYS	4667
<i>Minghui Dai, Xiaofeng Ma, Nanjing University of Science and Technology, China; Wei Liu, University of Sheffield, United Kingdom; Weixing Sheng, Nanjing University of Science and Technology, China</i>	
SAM-P1.6: DNN-BASED DISTRIBUTED MULTICHANNEL MASK ESTIMATION FOR SPEECH ENHANCEMENT IN MICROPHONE ARRAYS	4672
<i>Nicolas Furnon, Romain Serizel, Irina Illina, Université de Lorraine, France; Slim Essid, Télécom ParisTech, France</i>	
SAM-P1.7: ASYMPTOTICALLY OPTIMAL BLIND CALIBRATION OF ACOUSTIC VECTOR SENSOR UNIFORM LINEAR ARRAYS	4677
<i>Amir Weiss, Boaz Nadler, Weizmann Institute of Science, Israel; Arie Yeredor, Tel Aviv University, Israel</i>	
SAM-P1.8: OPTIMIZED SENSOR SELECTION FOR JOINT RADAR-COMMUNICATION SYSTEMS	4682
<i>Ammar Ahmed, Shuimei Zhang, Yimin D. Zhang, Temple University, United States</i>	
SAM-P1.9: FREQUENCY DIVERSE ARRAY RADAR: A CLOSED-FORM SOLUTION TO DESIGN WEIGHTS FOR DESIRED BEAMPATTERN	4687
<i>Muhammad Zubair, Sajid Ahmed, Information Technology University Lahore, Pakistan; Mohamed-Slim Alouini, King Abdullah University of Science and Technology (KAUST), United Kingdom</i>	
SAM-P1.10: ROBUST CFAR RADAR DETECTION USING A K-NEAREST NEIGHBORS RULE	4692
<i>Angelo Coluccia, Alessio Fascista, Giuseppe Ricci, University of Salento, Italy</i>	
SAM-P1.11: CRAMER-RAO BOUND ON DOA ESTIMATION OF FINITE BANDWIDTH SIGNALS USING A MOVING SENSOR	4697
<i>Aakash Arora, Bhavani Shankar Mysore R, Björn Ottersten, University of Luxembourg, Luxembourg</i>	
SAM-P1.12: THEORETICAL ANALYSIS OF MULTI-CARRIER AGILE PHASED ARRAY RADAR	4702
<i>Tianyao Huang, Tsinghua University, China; Nir Shlezinger, Weizmann Institute of Science, Israel; Xingyu Xu, Dingyou Ma, Yimin Liu, Tsinghua University, China; Yonina Eldar, Weizmann Institute of Science, Israel</i>	

SAM-P2: BEAMFORMING, RELAYING AND SOURCE SEPARATION

SAM-P2.1: CONVOLUTIONAL BEAMSPACE FOR ARRAY SIGNAL PROCESSING..... 4707

P. P. Vaidyanathan, Po-Chih Chen, California Institute of Technology, United States

SAM-P2.2: EFFICIENT ESTIMATION OF MIXING MATRIX USING A TWO-SENSOR ARRAY 4712

Qinmengying Yan, Siyu Sun, Haijian Zhang, Guang Hua, Wuhan University, China

SAM-P2.3: RIEMANNIAN GEOMETRY AND CRAMÉR-RAO BOUND FOR BLIND SEPARATION OF GAUSSIAN SOURCES 4717

Florent Bouchard, Univ. Savoie Mont Blanc, France; Arnaud Breloy, Univ. Paris Nanterre, France; Alexandre Renaux, Univ. Paris Sud, France; Guillaume Ginolhac, Univ. Savoie Mont Blanc, France

SAM-P2.4: BEAMFORMED FEATURE FOR LEARNING-BASED DUAL-CHANNEL SPEECH SEPARATION 4722

Hao Li, Xueliang Zhang, Guanglai Gao, Inner Mongolia University, China

SAM-P2.5: TRANSMIT BEAMFORMING DESIGN WITH RECEIVED-INTERFERENCE POWER CONSTRAINTS: THE ZERO-FORCING RELAXATION 4727

Eva Lagunas, University of Luxembourg, Luxembourg; Ana Isabel Pérez-Neira, Miguel Angel Lagunas, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Universitat Politècnica de Catalunya (UPC), Spain; Miguel Ángel Vázquez, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain

SAM-P2.6: FOREGROUND SIGNATURE EXTRACTION FOR AN INTIMATE MIXING MODEL IN HYPERSPECTRAL IMAGE CLASSIFICATION 4732

Jarrold Hollis, Raviv Raich, Jinsub Kim, Oregon State University, United States; Barak Fishbain, Shai Kandler, Technion - Israel Institute of Technology, Israel

SAM-P2.7: PIXEL-WISE LINEAR/NONLINEAR NONNEGATIVE MATRIX FACTORIZATION FOR UNMIXING OF HYPERSPECTRAL DATA 4737

Fei Zhu, Tianjin University, China; Paul Honeine, Universite de Rouen Normandie, France; Jie Chen, Northwestern Polytechnical University, China

SAM-P2.8: BEAM ELIMINATION BASED ON SEQUENTIALLY ESTIMATED A POSTERIORI PROBABILITIES OF WINNING 4742

Mostafa Khalili Marandi, Wolfgang Rave, Gerhard Fettweis, Technische Universität Dresden, Germany

SAM-P2.9: TWO-ELEMENT BIOMIMETIC ANTENNA ARRAY DESIGN AND PERFORMANCE 4747

Richard Kozick, Bucknell University, United States; Fikadu Dagefu, Brian Sadler, U.S. Army Research Laboratory, United States

SAM-P2.10: DISTRIBUTED EQUALIZATION AND POWER ALLOCATION FOR MULTI-CARRIER BIDIRECTIONAL FILTER-AND-FORWARD RELAY NETWORKS 4752

Sharareh KianiHarchegani, Shahram ShahbazPanahi, Min Dong, University of Ontario Institute of Technology, Canada; Gary Boudreau, Ericsson Canada, Canada

SAM-P2.11: UPSCALING VECTOR APPROXIMATE MESSAGE PASSING 4757

Nikolajs Skuratovs, Michael Davies, University of Edinburgh, United Kingdom

SAM-P3: SPARSITY, SUPER-RESOLUTION AND IMAGING

SAM-P3.1: ATOMIC NORM BASED LOCALIZATION OF FAR-FIELD AND NEAR-FIELD SIGNALS WITH GENERALIZED SYMMETRIC ARRAYS 4762

Xiaohuan Wu, Nanjing University of Posts and Telecommunications, China; Wei-Ping Zhu, Concordia University, Canada; Jun Yan, Nanjing University of Posts and Telecommunications, China

SAM-P3.2: A NOVEL MOVING SPARSE ARRAY GEOMETRY WITH INCREASED DEGREES OF FREEDOM	4767
<i>Shuang Li, Chongqing University of Technology, China; Xiao-Ping Zhang, Ryerson University, Canada</i>	
SAM-P3.3: CLUTTER IDENTIFICATION BASED ON SPARSE RECOVERY AND L1-TYPE PROBABILISTIC DISTANCE MEASURES	4772
<i>Yuansheng Zhu, University of Pittsburgh, United States; Yijian Xiang, Washington University in St. Louis, United States; Satyabrata Sen, Oak Ridge National Laboratory, United States; Elise Dagois, University of Pittsburgh, United States; Arye Nehorai, Washington University in St. Louis, United States; Murat Akcakaya, University of Pittsburgh, United States</i>	
SAM-P3.4: ADAPTIVE SUBSPACE DETECTORS FOR OFF-GRID MISMATCHED TARGETS	4777
<i>Jonathan Bosse, Olivier Rabaste, Jean-Philippe Ovarlez, ONERA, France</i>	
SAM-P3.5: A METHOD FOR MILLIMETER-WAVE IMAGING OF CONCEALED OBJECTS VIA DE-ALIASING	4781
<i>Weiwei Wang, Kehu Yang, Xidian University, China</i>	
SAM-P3.6: A FAST SPARSE COVARIANCE-BASED FITTING METHOD FOR DOA ESTIMATION VIA NON-NEGATIVE LEAST SQUARES	4786
<i>Chundi Zheng, Huihui Chen, Aiguo Wang, Foshan University, China</i>	
SAM-P3.7: EXTENDED CYCLIC COORDINATE DESCENT FOR ROBUST ROW-SPARSE SIGNAL RECONSTRUCTION IN THE PRESENCE OF OUTLIERS	4791
<i>Huiping Huang, Technische Universität Darmstadt, Germany; Hing Cheung So, City University of Hong Kong, Hong Kong SAR of China; Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany</i>	
SAM-P3.8: LOW-RANK TOEPLITZ MATRIX ESTIMATION VIA RANDOM ULTRA-SPARSE RULERS	4796
<i>Hannah Lawrence, Flatiron Institute, United States; Jerry Li, Microsoft Research, United States; Cameron Musco, University of Massachusetts, Amherst, United States; Christopher Musco, NYU Tandon School of Engineering, United States</i>	
SAM-P3.9: URTIS: A SMALL 3D IMAGING SONAR SENSOR FOR ROBOTIC APPLICATIONS	4801
<i>Thomas Verellen, Robin Kerstens, Dennis Laurijssen, Jan Steckel, University of Antwerp, Belgium</i>	
SAM-P3.10: A PARTIAL RELAXATION DOA ESTIMATOR BASED ON ORTHOGONAL MATCHING PURSUIT	4806
<i>Minh Trinh-Hoang, Technische Universität Darmstadt, Germany; Wing-Kin Ma, Chinese University of Hong Kong, Hong Kong SAR of China; Marius Pesavento, Technische Universität Darmstadt, Germany</i>	
SAM-P3.11: VARIABLE PROJECTION FOR MULTIPLE FREQUENCY ESTIMATION	4811
<i>Yuneisy E. Garcia Guzman, Péter Kovács, Mario Huemer, Johannes Kepler University Linz, Austria</i>	
SAM-P3.12: FUSIONNDVI: A NOVEL FUSION METHOD FOR NDVI IN REMOTE SENSING	4816
<i>Mengliang Zhang, Wuhan University, China; Ziping Zhao, Hong Kong University of Science and Technology, Hong Kong SAR of China; Yuerong Chen, Zhongyuan Wang, Xin Tian, Wuhan University, China</i>	
SAM-P4: ROBUSTNESS, DECOMPOSITIONS, CALIBRATION AND BOUNDS	
SAM-P4.1: ROBUST MUSIC ESTIMATION UNDER ARRAY RESPONSE UNCERTAINTY	4821
<i>Ahmad Bazzi, CEVA, France; Dirk Slock, EURECOM, France</i>	
SAM-P4.2: L1-NORM HIGHER-ORDER ORTHOGONAL ITERATIONS FOR ROBUST TENSOR ANALYSIS	4826
<i>Dimitris Chachlakis, Rochester Institute of Technology, United States; Ashley Prater-Bennette, AFRL, United States; Panos Markopoulos, Rochester Institute of Technology, United States</i>	

SAM-P4.3: SENSOR SELECTION FOR MODEL-FREE SOURCE LOCALIZATION: WHERE LESS IS MORE	4831
<i>Ehsan Tohidi, EURECOM, France; Junting Chen, Chinese University of Hong Kong, China; David Gesbert, EURECOM, France</i>	
SAM-P4.4: ANOMALY DETECTION WITH TRAINING DATA IN HYPERSPECTRAL IMAGERY	4836
<i>Jun Liu, Yutong Feng, University of Science and Technology of China, China; Weijian Liu, Wuhan Electronic Information Institute, China; Danilo Orlando, Università degli Studi “Niccolò Cusano”, Italy; Hongbin Li, Stevens Institute of Technology, United States</i>	
SAM-P4.5: LEAST-SQUARES DOA ESTIMATION WITH AN INFORMED PHASE UNWRAPPING AND FULL BANDWIDTH ROBUSTNESS	4841
<i>Alexander Bohlender, Ghent University - imec, Belgium; Ann Spriet, Wouter Tirry, NXP Semiconductors, Belgium; Nilesch Madhu, Ghent University - imec, Belgium</i>	
SAM-P4.8: JOINT BLIND CALIBRATION AND TIME-DELAY ESTIMATION FOR MULTIBAND RANGING	4846
<i>Tarik Kazaz, Mario Coutino, Gerard Janssen, Alle-Jan van der Veen, Delft University of Technology, Netherlands</i>	
SAM-P4.9: UPGRADE METHODS FOR STRATIFIED SENSOR NETWORK SELF-CALIBRATION	4851
<i>Martin Larsson, Gabrielle Flood, Magnus Oskarsson, Karl Åström, Lund University, Sweden</i>	
SAM-P4.10: AUDIO-VISUAL CALIBRATION WITH POLYNOMIAL REGRESSION FOR 2-D PROJECTION USING SVD-PHAT	4856
<i>Francois Grondin, Hao Tang, James Glass, Massachusetts Institute of Technology, United States</i>	
SAM-P4.12: WEIGHTED NULL VECTOR INITIALIZATION AND ITS APPLICATION TO PHASE RETRIEVAL	4861
<i>Kaihui Liu, Dongguan University of Technology, China; Lingling Li, Shanghai Jiao Tong University, China; Liangtian Wan, Dalian University of Technology, China</i>	
 SAM-P5: LOCALISATION AND TRACKING	
SAM-P5.3: LOW-COMPLEXITY ACCURATE MMWAVE POSITIONING FOR SINGLE-ANTENNA USERS BASED ON ANGLE-OF-DEPARTURE AND ADAPTIVE BEAMFORMING	4866
<i>Alessio Fascista, Angelo Coluccia, University of Salento, Italy; Henk Wymeersch, Chalmers University, Sweden; Gonzalo Seco-Granados, Universitat Autònoma de Barcelona, Spain</i>	
SAM-P5.4: ACCURATE LOCALIZATION OF AUV IN MOTION BY EXPLICIT SOLUTION USING TIME DELAYS	4871
<i>Tianyi Jia, Northwestern Polytechnical University, China; K. C. Ho, University of Missouri, United States; Haiyan Wang, Xiaohong Shen, Northwestern Polytechnical University, China</i>	
SAM-P5.5: DRSS-BASED LOCALISATION USING WEIGHTED INSTRUMENTAL VARIABLES AND SELECTIVE POWER MEASUREMENT	4876
<i>Jun Li, Kutluyil Dogancay, Ngoc Hung Nguyen, Yee Wei Law, University of South Australia, Australia</i>	
SAM-P5.6: A SIMPLE AND EFFICIENT ITERATIVE METHOD FOR TOA LOCALIZATION	4881
<i>Yanbin Zou, Shantou University, China; Huaping Liu, Oregon State University, United States</i>	
SAM-P5.7: DISTRIBUTED TRACKING AND CIRCUMNAVIGATION USING BEARING MEASUREMENTS	4885
<i>Anjaly Parayil, Jemin George, U.S. Army Research Laboratory, United States</i>	

SAM-P5.8: JOINT MULTITARGET TRACKING AND DYNAMIC NETWORK LOCALIZATION IN THE UNDERWATER DOMAIN	4890
<i>Rico Mendrzik, Hamburg University of Technology, Germany; Mattia Brambilla, Politecnico di Milano, Italy; Clemens Allmann, Fraunhofer FKIE, Germany; Monica Nicoli, Politecnico di Milano, Italy; Wolfgang Koch, Fraunhofer FKIE, Germany; Gerhard Bauch, Hamburg University of Technology, Germany; Kevin LePage, Paolo Braca, NATO STO Centre for Maritime Research and Experimentation, Italy</i>	
SAM-P5.9: ROBUST TDOA INDOOR TRACKING USING CONSTRAINED MEASUREMENT FILTERING AND GRID-BASED FILTERING	4895
<i>Rui Huang, Jun Tao, Southeast University, China; Le Yang, University of Canterbury, New Zealand; Yanbo Xue, Kanzhun Technology, China; Qisong Wu, Southeast University, China</i>	
SAM-P5.10: EXTENDED OBJECT TRACKING USING HIERARCHICAL TRUNCATION MEASUREMENT MODEL WITH AUTOMOTIVE RADAR	4900
<i>Yuxuan Xia, Chalmers University of Technology, Sweden; Pu Wang, Karl Berntorp, Toshiaki Koike-Akino, Hassan Mansour, Milutin Pajovic, Petros T. Boufounos, Philip V. Orlik, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SAM-P5.11: DOA TRACKING VIA SIGNAL-SUBSPACE PROJECTOR UPDATE	4905
<i>Jie Zhuang, Tianhan Tan, Daolin Chen, Jiancheng Kang, University of Electronic Science and Technology of China, China</i>	
SAM-P6: DETECTION, ESTIMATION AND CLASSIFICATION	
SAM-P6.2: PARAMETER ESTIMATION OF IN-CITY FRONTAL RAINFALL PROPAGATION	4910
<i>Mor Hadar, Tel Aviv University, Israel; Jonatan Ostrometzky, Columbia University, United States; Hagit Messer, Tel Aviv University, Israel</i>	
SAM-P6.3: ML AND EM ESTIMATION OF SAMPLING INTERVALS OF SENSOR DEVICES	4915
<i>Ryouichi Nishimura, Yôiti Suzuki, National Institute of Information and Communications Technology (NICT), Japan</i>	
SAM-P6.4: ASYMPTOTIC STOCHASTIC ANALYSIS OF PARTIALLY RELAXED DML	4920
<i>David Schenck, Technische Universität Darmstadt, Germany; Xavier Mestre, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain; Marius Pesavento, Technische Universität Darmstadt, Germany</i>	
SAM-P6.5: THEORETICAL PERFORMANCE BOUND OF UPLINK CHANNEL ESTIMATION ACCURACY IN MASSIVE MIMO	4925
<i>Alexander Osinsky, Andrey Ivanov, Dmitry Yarotsky, Skolkovo Institute of Science and Technology (Skoltech), Russia</i>	
SAM-P6.6: SIGNAL-AWARE BROADBAND DOA ESTIMATION USING ATTENTION MECHANISMS	4930
<i>Wolfgang Mack, University Erlangen-Nuremberg, Germany; Ullas Bharadwaj, Soumitro Chakrabarty, Fraunhofer, Germany; Emanuel A. P. Habets, University Erlangen-Nuremberg, Germany</i>	
SAM-P6.7: STATIC VISUAL SPATIAL PRIORS FOR DOA ESTIMATION	4935
<i>Pawel Swietojanski, University of New South Wales, Australia; Ondrej Miksik, Microsoft, Switzerland</i>	
SAM-P6.8: MIRRORED ARRAYS FOR DIRECTION-OF-ARRIVAL ESTIMATION	4940
<i>Dong Zhu, Gang Li, Tsinghua University, China; Xiao-Ping Zhang, Ryerson University, Canada</i>	
SAM-P6.9: TIME DIFFERENCE OF ARRIVAL ESTIMATION FROM FREQUENCY-SLIDING GENERALIZED CROSS-CORRELATIONS USING CONVOLUTIONAL NEURAL NETWORKS	4945
<i>Luca Comanducci, Politecnico di Milano, Italy; Maximo Cobos, Universitat de València, Spain; Fabio Antonacci, Augusto Sarti, Politecnico di Milano, Italy</i>	
SAM-P6.10: GROUP-UTILITY METRIC FOR EFFICIENT SENSOR SELECTION AND REMOVAL IN LCMV BEAMFORMERS	4950
<i>Abhijith Mundanad Narayanan, Alexander Bertrand, Katholieke Universiteit Leuven, Belgium</i>	

SAM-P6.11: ACCURATE SEMIDEFINITE RELAXATION METHOD FOR 3-D RIGID BODY LOCALIZATION USING AOA	4955
<i>Gang Wang, Ningbo University, China; K. C. Ho, University of Missouri, United States</i>	
SAM-P6.12: CRAMÉR-RAO BOUNDS FOR FLAW LOCALIZATION IN SUBSAMPLED MULTISTATIC MULTICHANNEL ULTRASOUND NDT DATA	4960
<i>Eduardo Pérez, Technische Universität Ilmenau, Germany; Jan Kirchhof, Fraunhofer Institute for Nondestructive Testing IZFP, Germany; Sebastian Semper, Technische Universität Ilmenau, Germany; Fabian Krieg, Florian Römer, Fraunhofer Institute for Nondestructive Testing IZFP, Germany</i>	
SPCOM-L1: NETWORKS AND RESOURCE ALLOCATION	
SPCOM-L1.1: AGE OF INFORMATION WITH FINITE HORIZON AND PARTIAL UPDATES	4965
<i>David Ramirez, Princeton University, United States; Elza Erkip, New York University, United States; H. Vincent Poor, Princeton University, United States</i>	
SPCOM-L1.2: ROBUST ONLINE MIRROR SADDLE-POINT METHOD FOR CONSTRAINED RESOURCE ALLOCATION	4970
<i>Ezra Tampubolon, Holger Boche, Technische Universität München, Germany</i>	
SPCOM-L1.3: REAL-TIME TASK OFFLOADING FOR LARGE-SCALE MOBILE EDGE COMPUTING	4975
<i>Yizhen Xu, Peng Cheng, University of Sydney, Australia; Zhuo Chen, Ming Ding, Csiro, Australia; Yonghui Li, Branka Vucetic, University of Sydney, Australia</i>	
SPCOM-L1.4: SIMPLE CACHING SCHEMES FOR NON-HOMOGENEOUS MISO CACHE-AIDED COMMUNICATION VIA CONVEXITY	4980
<i>Itzik Bergel, Bar-Ilan University, Israel; Soheil Mohajer, University of Minnesota, United States</i>	
SPCOM-L1.5: DYNAMIC RESOURCE OPTIMIZATION AND ALTITUDE SELECTION IN UAV-BASED MULTI-ACCESS EDGE COMPUTING	4985
<i>Francesca Costanzo, Paolo Di Lorenzo, Sergio Barbarossa, Sapienza University of Rome, Italy</i>	
SPCOM-L1.6: JOINT RESOURCE ALLOCATION AND ROUTING FOR SERVICE FUNCTION CHAINING WITH IN-SUBNETWORK PROCESSING	4990
<i>Navid Reyhanian, University of Minnesota, United States; Hamid Farmanbar, Huawei, Canada; Soheil Mohajer, University of Minnesota, United States; Zhi-Quan Luo, Shenzhen Research Institute of Big Data, Chinese University of Hong Kong, Shenzhen, China</i>	
SPCOM-L2: CHANNEL ESTIMATION	
SPCOM-L2.1: ONLINE CHANNEL ESTIMATION FOR HYBRID BEAMFORMING ARCHITECTURES	4995
<i>Jochen Fink, Renato L. G. Cavalcante, Slawomir Stanczak, Fraunhofer Heinrich-Hertz-Institute, Germany</i>	
SPCOM-L2.2: AN OPTIMAL CHANNEL ESTIMATION SCHEME FOR INTELLIGENT REFLECTING SURFACES BASED ON A MINIMUM VARIANCE UNBIASED ESTIMATOR	5000
<i>Tobias Lindstrøm Jensen, Elisabeth De Carvalho, Aalborg University, Denmark</i>	
SPCOM-L2.3: LOW-RANK MMWAVE MIMO CHANNEL ESTIMATION IN ONE-BIT RECEIVERS	5005
<i>Nitin Jonathan Myers, Kayla N. Tran, Robert W. Heath Jr., University of Texas at Austin, United States</i>	
SPCOM-L2.4: CHANNEL CHARTING: AN EUCLIDEAN DISTANCE MATRIX COMPLETION PERSPECTIVE	5010
<i>Patrick Agostini, Zoran Utkovski, Slawomir Stanczak, Fraunhofer Heinrich-Hertz-Institute, Germany</i>	

SPCOM-L2.5: MMSE-BASED CHANNEL ESTIMATION FOR HYBRID BEAMFORMING MASSIVE MIMO WITH CORRELATED CHANNELS	5015
<i>Javad Mirzaei, Foad Sohrobi, Raviraj Adve, University of Toronto, Canada; Shahram ShahbazPanahi, Ontario Tech University, Canada</i>	
SPCOM-P1: MACHINE LEARNING FOR COMMUNICATIONS I	
SPCOM-P1.1: COMPLEX TRAINABLE ISTA FOR LINEAR AND NONLINEAR INVERSE PROBLEMS	5020
<i>Satoshi Takabe, Tadashi Wadayama, Nagoya Institute of Technology, Japan; Yonina Eldar, Weizmann Institute of Science, Israel</i>	
SPCOM-P1.2: CONDITIONAL MUTUAL INFORMATION NEURAL ESTIMATOR	5025
<i>Sina Molavipour, Germán Bassi, Mikael Skoglund, KTH Royal Institute of Technology, Sweden</i>	
SPCOM-P1.3: Q-LEARNING BASED PREDICTIVE RELAY SELECTION FOR OPTIMAL RELAY BEAMFORMING	5030
<i>Anastasios Dimas, Rutgers University, United States; Konstantinos Diamantaras, International Hellenic University, Greece; Athina Petropulu, Rutgers University, United States</i>	
SPCOM-P1.4: PEER TO PEER OFFLOADING WITH DELAYED FEEDBACK: AN ADVERSARY BANDIT APPROACH	5035
<i>Miao Yang, Hongbin Zhu, ShanghaiTech University, China; Haifeng Wang, Shanghai Institute of Microsystem and Information Technology, China; Yevgeni Koucheryavy, Tampere University, Finland; Konstantin Samouylov, Peoples' Friendship University of Russia, Russia; Hua Qian, Shanghai Advanced Research Institute, Chinese Academy of Sciences, China</i>	
SPCOM-P1.5: TRANSFERABLE POLICIES FOR LARGE SCALE WIRELESS NETWORKS WITH GRAPH NEURAL NETWORKS	5040
<i>Mark Eisen, Intel Corporation, United States; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPCOM-P1.6: A ZERO-TH-ORDER LEARNING ALGORITHM FOR ERGODIC OPTIMIZATION OF WIRELESS SYSTEMS WITH NO MODELS AND NO GRADIENTS	5045
<i>Dionysios Kalogerias, University of Pennsylvania, United States; Mark Eisen, Intel Corporation, United States; George Pappas, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPCOM-P1.7: JOINT SPARSE RECOVERY USING DEEP UNFOLDING WITH APPLICATION TO MASSIVE RANDOM ACCESS	5050
<i>Anand P. Sabulal, Srikrishna Bhashyam, Indian Institute of Technology Madras, India</i>	
SPCOM-P1.8: LEARNING-BASED CONTENT CACHING AND USER CLUSTERING: A DEEP DETERMINISTIC POLICY GRADIENT APPROACH	5055
<i>Kun-Lin Chan, Feng-Tsun Chien, National Chiao Tung University, Taiwan</i>	
SPCOM-P1.9: LEARNING-AIDED CONTENT PLACEMENT IN CACHING-ENABLED FOG COMPUTING SYSTEMS USING THOMPSON SAMPLING	5060
<i>Junge Zhu, Xi Huang, Ziyu Shao, ShanghaiTech University, China</i>	
SPCOM-P1.10: JOINT CODING AND MODULATION IN THE ULTRA-SHORT BLOCKLENGTH REGIME FOR BERNOULLI-GAUSSIAN IMPULSIVE NOISE CHANNELS USING AUTOENCODERS	5065
<i>Kirty Vedula, Randy Paffenroth, D. Richard Brown III, Worcester Polytechnic Institute, United States</i>	
SPCOM-P1.11: DEEP JOINT SOURCE-CHANNEL CODING FOR WIRELESS IMAGE RETRIEVAL	5070
<i>Mikolaj Jankowski, Deniz Gündüz, Krystian Mikolajczyk, Imperial College London, United Kingdom</i>	
SPCOM-P1.12: META-LEARNING TO COMMUNICATE: FAST END-TO-END TRAINING FOR FADING CHANNELS	5075
<i>Sangwoo Park, Korea Advanced Institute of Science and Technology (KAIST), Korea (South); Osvaldo Simeone, King's College London, Italy; Joonhyuk Kang, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	

SPCOM-P2: MODULATION, DETECTION AND DECODING

SPCOM-P2.1: COMPLEXITY REDUCTION METHODS FOR INDEX MODULATION 5080 BASED DUAL-FUNCTION RADAR COMMUNICATION SYSTEMS

Tianyao Huang, Tsinghua University, China; Nir Shlezinger, Weizmann Institute of Science, Israel; Xingyu Xu, Yimin Liu, Tsinghua University, China; Yonina Eldar, Weizmann Institute of Science, Israel

SPCOM-P2.2: EQUALIZATION OF OFDM WAVEFORMS WITH INSUFFICIENT 5085 CYCLIC PREFIX

David Gregoratti, Xavier Mestre, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain

SPCOM-P2.3: FASTER-THAN-NYQUIST SIGNALING VIA SPATIOTEMPORAL 5090 SYMBOL-LEVEL PRECODING FOR MULTI-USER MISO REDUNDANT TRANSMISSIONS

Wallace Alves Martins, University of Luxembourg & Federal University of Rio de Janeiro, Luxembourg; Danilo Spano, Symeon Chatzinotas, Björn Ottersten, University of Luxembourg, Luxembourg

SPCOM-P2.4: OPTIMIZED SINGLE CARRIER TRANSCEIVER FOR FUTURE 5095 SUB-TERAHERTZ APPLICATIONS

Simon Bicaïs, Jean-Baptiste Doré, CEA Leti, Minatec Campus, France; Grégory Gougeon, Yoann Corre, Siradel, France

SPCOM-P2.5: POWER SPECTRUM OPTIMIZATION FOR CAPACITY OF THE 5100 EXTENDED SPECTRUM HYBRID FIBER COAX NETWORK

Rainer Strobelt, Thushara Hewavithana, Intel, Germany

SPCOM-P2.6: A LOW-LATENCY SUCCESSIVE CANCELLATION HYBRID DECODER 5105 FOR CONVOLUTIONAL POLAR CODES

Yu Wang, Shikai Qiu, Lirui Chen, Qinglin Wang, Yang Zhang, Cang Liu, Zuocheng Xing, National University of Defense Technology, China

SPCOM-P2.7: NEAR CAPACITY RCQD CONSTELLATIONS FOR PAPR REDUCTION OF 5110 OFDM SYSTEMS

Tarak Arbi, ENSTA Paris, France; Imen Nasr, SUP'COM, Tunisia; Benoit Geller, ENSTA Paris, France

SPCOM-P2.8: FULLY PIPELINED ITERATION UNROLLED DECODERS THE ROAD 5115 TO TB/S TURBO DECODING

Stefan Weithoffer, Rami Klaimi, Charbel Abdel Nour, IMT Atlantique, France; Norbert Wehn, Technical University of Kaiserslautern, Germany; Catherine Douillard, IMT Atlantique, France

SPCOM-P2.9: ZERO-CROSSING PRECODING WITH MAXIMUM DISTANCE TO THE 5120 DECISION THRESHOLD FOR CHANNELS WITH 1-BIT QUANTIZATION AND OVERSAMPLING

Diana M. V. Melo, Lukas T. N. Landau, Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil

SPCOM-P2.10: ACHIEVING FULLY-DIGITAL PERFORMANCE BY HYBRID 5125 ANALOG/DIGITAL BEAMFORMING IN WIDE-BAND MASSIVE-MIMO SYSTEMS

Alireza Morsali, Benoit Champagne, McGill University, Canada

SPCOM-P2.11: ENERGY-EFFICIENT BIT ALLOCATION FOR RESOLUTION-ADAPTIVE 5130 ADC IN MULTIUSER LARGE-SCALE MIMO SYSTEMS: GLOBAL OPTIMALITY

Kien-Giang Nguyen, Quang-Doanh Vu, University of Oulu, Finland; Le-Nam Tran, University College Dublin, Ireland; Markku Juntti, University of Oulu, Finland

SPCOM-P2.12: GENERALIZED SPATIAL MODULATION FOR WIRELESS TERABITS 5135 SYSTEMS UNDER SUB-THZ CHANNEL WITH RF IMPAIRMENTS

Majed Saad, IETR-CentraleSupélec, France; Faouzi Bader, IETR-CentraleSupélec and ISEP, France; Ali Chamas Al Ghouwayel, Hussein Hijazi, Lebanese International University, Lebanon; Nizar Bouhel, Jacques Palicot, IETR-CentraleSupélec, France

SPCOM-P3: MIMO AND MULTI-ANTENNA SYSTEMS

SPCOM-P3.1: EFFICIENT TECHNIQUES FOR IN-BAND SYSTEM INFORMATION 5140 BROADCAST IN MULTI-CELL MASSIVE MIMO

Jinu Jayachandran, Kamal Biswas, Saif Khan Mohammed, Indian Institute of Technology Delhi, India; Erik G. Larsson, Linköping University, Sweden

SPCOM-P3.2: OPTIMAL DESIGN OF ENERGY-EFFICIENT CELL-FREE MASSIVE 5145 MIMO: JOINT POWER ALLOCATION AND LOAD BALANCING

Trinh Van Chien, Emil Björnson, Erik G. Larsson, Linköping University, Sweden

SPCOM-P3.3: LARGE-SCALE FADING PRECODING FOR MAXIMIZING THE 5150 PRODUCT OF SINRS

Özlem Tugfe Demir, Emil Björnson, Linköping University, Sweden

SPCOM-P3.4: PROXIMAL DISTANCE ALGORITHM FOR NONCONVEX QCQP WITH 5155 BEAMFORMING APPLICATIONS

Qiang Li, University of Electronic Science and Technology of China, China; Yatao Liu, Mingjie Shao, Wing-Kin Ma, Chinese University of Hong Kong, Hong Kong SAR of China

SPCOM-P3.5: CLOUD-DRIVEN MULTI-WAY MULTIPLE-ANTENNA RELAY 5160 SYSTEMS: BEST-USER-LINK SELECTION AND JOINT MMSE DETECTION

Flavio L. Duarte, Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil

SPCOM-P3.6: A COMPLEXITY EFFICIENT DMT-OPTIMAL TREE PRUNING BASED 5165 SPHERE DECODING

Mohammad Neinavaie, Aalto University, Finland; Mostafa Derakhtian, Shiraz University, Iran; Sergiy A. Vorobyov, Aalto University, Finland

SPCOM-P3.7: A MODEL-FREE APPROACH TO DISTRIBUTED TRANSMIT 5170 BEAMFORMING

Jemin George, CCDC Army Research Laboratory, United States; Cemal Yilmaz, North Carolina State University, United States; Anjaly Parayil, CCDC Army Research Laboratory, United States; Aranya Chakraborty, North Carolina State University, United States

SPCOM-P3.8: INTELLIGENT REFLECTING SURFACE FOR MASSIVE DEVICE 5175 CONNECTIVITY: JOINT ACTIVITY DETECTION AND CHANNEL ESTIMATION

Shuhao Xia, Yuanming Shi, ShanghaiTech University, China

SPCOM-P3.9: CHANNEL COVARIANCE ESTIMATION IN MULTIUSER MASSIVE 5180 MIMO SYSTEMS WITH AN APPROACH BASED ON INFINITE DIMENSIONAL HILBERT SPACES

Renato L. G. Cavalcante, Slawomir Stanczak, Fraunhofer Heinrich-Hertz-Institute / TU Berlin, Germany

SPCOM-P3.10: ELIMINATING OUT-OF-CELL INTERFERENCE IN CELLULAR 5185 MASSIVE MIMO WITH A SINGLE ADDITIONAL TRANSCEIVER

Uri Erez, Tel Aviv University, Israel; Amir Leshem, Bar-Ilan University, Israel

SPCOM-P3.11: FAVORABLE PROPAGATION AND LINEAR MULTIUSER DETECTION 5190 FOR DISTRIBUTED ANTENNA SYSTEMS

Roya Gholami, EURECOM, France; Laura Cottatellucci, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Dirk Slock, EURECOM, France

SPCOM-P3.12: DISTRIBUTED NON-ORTHOGONAL PILOT DESIGN FOR 5195 MULTI-CELL MASSIVE MIMO SYSTEMS

Yue Wu, Tsinghua University, China; Shaodan Ma, University of Macau, China; Yuantao Gu, Tsinghua University, China

SPCOM-P4: DESIGN AND IMPLEMENTATION OF COMMUNICATION SYSTEMS

SPCOM-P4.1: DISTRIBUTED DETECTION OF SPARSE SIGNALS WITH 1-BIT DATA IN TWO-LEVEL TWO-DEGREE TREE-STRUCTURED SENSOR NETWORKS 5200

Chengxi Li, Gang Li, Tsinghua University, China; Pramod Varshney, Syracuse University, United States

SPCOM-P4.2: OBJECTIVE BAYESIAN DETECTION UNDER SPATIALLY CORRELATED GAUSSIAN OBSERVATIONS FOR MULTI-ANTENNA COGNITIVE RADIO NETWORK 5205

Mohannad H. Al-Ali, Basrah University, Iraq; K. C. Ho, University of Missouri, United States

SPCOM-P4.3: A GATED HYPERNET DECODER FOR POLAR CODES 5210

Eliya Nachmani, Lior Wolf, Tel Aviv University, Facebook, Israel

SPCOM-P4.4: WEIGHTED GRADIENT CODING WITH LEVERAGE SCORE SAMPLING 5215

Neophytos Charalambides, University of Michigan, United States; Mert Pilanci, Stanford University, United States; Alfred Hero, University of Michigan, United States

SPCOM-P4.5: LOW-COMPLEXITY 5G SLAM WITH CKF-PHD FILTER 5220

Hyowon Kim, Hanyang University, Korea (South); Karl Granström, Chalmers University of Technology, Sweden; Sunwoo Kim, Hanyang University, Korea (South); Henk Wymeersch, Chalmers University of Technology, Sweden

SPCOM-P4.6: THE EFFECT OF POWER ALLOCATION ON VISIBLE LIGHT COMMUNICATION USING COMMERCIAL PHOSPHOR-CONVERTED LED LAMP FOR INDIRECT ILLUMINATION 5225

Alexis Dowhuszko, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain; Mehmet Ilter, Paulo Pinho, Jyri Hämäläinen, Aalto University, Finland

SPCOM-P4.7: ROBUST TRANSMISSION OVER CHANNELS WITH CHANNEL UNCERTAINTY: AN ALGORITHMIC PERSPECTIVE 5230

Holger Boche, Technische Universität München, Germany; Rafael F. Schaefer, Technische Universität Berlin, Germany; H. Vincent Poor, Princeton University, United States

SPCOM-P4.8: DEEP JOINT SOURCE-CHANNEL CODING OF IMAGES WITH FEEDBACK 5235

David Burth Kurka, Deniz Gündüz, Imperial College London, United Kingdom

SPCOM-P4.9: A LEARNING APPROACH TO COOPERATIVE COMMUNICATION SYSTEM DESIGN 5240

Yuxin Lu, Hong Kong University of Science and Technology, Hong Kong SAR of China; Peng Cheng, University of Sydney, Australia; Zhuo Chen, Commonwealth Scientific and Industrial Research Organisation, Australia; Wai Ho Mow, Hong Kong University of Science and Technology, Hong Kong SAR of China; Yonghui Li, University of Sydney, Australia

SPCOM-P4.10: A STACKED-AUTOENCODER BASED END-TO-END LEARNING FRAMEWORK FOR DECODE-AND-FORWARD RELAY NETWORKS 5245

Ankit Gupta, Mathini Sellathurai, Heriot-Watt University, United Kingdom

SPCOM-P4.11: A NEW SAMPLING SCHEME FOR DISTRIBUTED BLIND SPECTRUM SENSING USING ENERGY DETECTORS 5250

Tsang-Yi Wang, National Sun Yat-sen University, Taiwan; Feng-Tsun Chien, Chi-Kai Hsieh, National Chiao Tung University, Taiwan

SPCOM-P5: COMMUNICATION SIGNAL ANALYSIS AND OPTIMIZATION

SPCOM-P5.1: ON THROUGHPUT OF MILLIMETER WAVE MIMO SYSTEMS WITH LOW RESOLUTION ADCS 5255

Abbas Khalili, New York University, United States; Shahram Shahsavari, University of Waterloo, Canada; Farhad Shirani, Elza Erkip, New York University, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel

SPCOM-P5.2: RELIABLE AND SECURE TRANSMISSION FOR FUTURE NETWORKS	5260
<i>Yingbo Hua, University of California, Riverside, United States</i>	
SPCOM-P5.3: ON POLAR CODING FOR FINITE BLOCKLENGTH SECRET KEY	5265
GENERATION OVER WIRELESS CHANNELS	
<i>Henri Hentilä, Aalto University, Finland; Yanina Shkel, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Visa Koivunen, Aalto University, Finland; H. Vincent Poor, Princeton University, United States</i>	
SPCOM-P5.4: AN ENHANCED DECODING ALGORITHM FOR CODED COMPRESSED	5270
SENSING	
<i>Vamsi Amalladinne, Jean-Francois Chamberland, Krishna Narayanan, Texas A&M University, United States</i>	
SPCOM-P5.5: OPTIMAL WINDOW DESIGN FOR W-OFDM.....	5275
<i>Khawar Hussain, Roberto Lopez-Valcarce, University of Vigo, Spain</i>	
SPCOM-P5.6: COMPUTABILITY OF THE PEAK VALUE OF BANDLIMITED SIGNALS	5280
<i>Holger Boche, Ullrich Mönich, Technische Universität München, Germany</i>	
SPCOM-P5.7: JOINT SCHEDULING AND BEAMFORMING FOR DELAY SENSITIVE	5285
TRAFFIC WITH PRIORITIES AND DEADLINES	
<i>Ido Hadar, Amir Leshem, Bar-Ilan University, Israel</i>	
SPCOM-P5.11: ROBUST HYBRID PRECODING FOR INTERFERENCE	5290
EXPLOITATION IN MASSIVE MIMO SYSTEMS	
<i>Ganapati Hegde, Technische Universität Darmstadt, Germany; Christos Masouros, University College London, United Kingdom; Marius Pesavento, Technische Universität Darmstadt, Germany</i>	
SPTM-L1: ESTIMATION THEORY AND METHODS I	
SPTM-L1.1: STATE-SPACE GAUSSIAN PROCESS FOR DRIFT ESTIMATION IN	5295
STOCHASTIC DIFFERENTIAL EQUATIONS	
<i>Zheng Zhao, Filip Tronarp, Aalto University, Finland; Roland Hostettler, Uppsala University, Sweden; Simo Särkkä, Aalto University, Finland</i>	
SPTM-L1.2: COMPUTING HILBERT TRANSFORM AND SPECTRAL FACTORIZATION	5300
FOR SIGNAL SPACES OF SMOOTH FUNCTIONS	
<i>Holger Boche, Volker Pohl, Technische Universität München, Germany</i>	
SPTM-L1.3: M-ESTIMATORS OF SCATTER WITH EIGENVALUE SHRINKAGE.....	5305
<i>Esa Ollila, Aalto University, Finland; Daniel Palomar, Hong Kong University of Science and Technology, Hong Kong SAR of China; Frédéric Pascal, CentraleSupélec, France</i>	
SPTM-L1.4: A MULTITAPER REASSIGNED SPECTROGRAM FOR INCREASED	5310
TIME-FREQUENCY LOCALIZATION PRECISION	
<i>Maria Sandsten, Isabella Reinhold, Rachele Anderson, Lund University, Sweden</i>	
SPTM-L1.5: STOCHASTIC ML ESTIMATION FOR HYPERSPECTRAL UNMIXING	5315
UNDER ENDMEMBER VARIABILITY AND NONLINEAR MODELS	
<i>Yuening Li, Ruiyuan Wu, Wing-Kin Ma, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPTM-L1.6: ROBUST PHASE RETRIEVAL WITH OUTLIERS	5320
<i>Xue Jiang, Shanghai Jiao Tong University, China; Hing Cheung So, City University of Hong Kong, Hong Kong SAR of China; Xingzhao Liu, Shanghai Jiao Tong University, China</i>	
SPTM-L2: GRAPH REPRESENTATIONS AND ANALYSIS	
SPTM-L2.1: NODE-ASYNCHRONOUS SPECTRAL CLUSTERING ON DIRECTED	5325
GRAPHS	
<i>Oguzhan Teke, P. P. Vaidyanathan, California Institute of Technology, United States</i>	

SPTM-L2.2: ESTIMATING CENTRALITY BLINDLY FROM LOW-PASS FILTERED GRAPH SIGNALS	5330
<i>Yiran He, Hoi To Wai, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPTM-L2.3: BLIND INFERENCE OF CENTRALITY RANKINGS FROM GRAPH SIGNALS	5335
<i>T. Mitchell Roddenberry, Santiago Segarra, Rice University, United States</i>	
SPTM-L2.4: A LOW-DIMENSIONALITY METHOD FOR DATA-DRIVEN GRAPH LEARNING	5340
<i>Ljubisa Stankovic, Milos Dakovic, University of Montenegro, Montenegro; Danilo P. Mandic, Imperial College London, United Kingdom; Milos Brajovic, University of Montenegro, Montenegro; Bruno Scalzo-Dees, Anthony G. Constantinides, Imperial College London, United Kingdom</i>	
SPTM-L2.5: METRIC REPRESENTATIONS OF NETWORKS: A UNIQUENESS RESULT	5345
<i>Santiago Segarra, T. Mitchell Roddenberry, Rice University, United States; Facundo Memoli, Ohio State University, United States; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-L2.6: ON THE STABILITY OF POLYNOMIAL SPECTRAL GRAPH FILTERS	5350
<i>Henry Kenlay, University of Oxford, United Kingdom; Dorina Thanou, Swiss Data Science Center, United Kingdom; Xiaowen Dong, University of Oxford, United Kingdom</i>	
SPTM-L3: ESTIMATION AND DETECTION	
SPTM-L3.1: ON CRAMÉR-RAO LOWER BOUNDS WITH RANDOM EQUALITY CONSTRAINTS	5355
<i>Clémence Prévost, Université de Lorraine, France; Eric Chaumette, Université de Toulouse, France; Konstantin Usevich, David Brie, Université de Lorraine, France; Pierre Comon, Univ. Grenoble Alpes, France</i>	
SPTM-L3.2: ON HARMONIC APPROXIMATIONS OF INHARMONIC SIGNALS	5360
<i>Filip Elvander, Lund University, Sweden; Jie Ding, Harbin Engineering University, China; Andreas Jakobsson, Lund University, Sweden</i>	
SPTM-L3.3: A GENERAL TEST FOR THE LINEAR STRUCTURE OF COVARIANCE MATRICES OF GAUSSIAN POPULATIONS	5365
<i>Yu-Hang Xiao, Paderborn University, Germany; David Ramírez, University Carlos III of Madrid, Spain; Peter Schreier, Paderborn University, Germany</i>	
SPTM-L3.4: SEQUENTIAL JOINT DETECTION AND ESTIMATION WITH AN APPLICATION TO JOINT SYMBOL DECODING AND NOISE POWER ESTIMATION	5370
<i>Dominik Reinhard, Technische Universität Darmstadt, Germany; Michael Fauß, Princeton University, United States; Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany</i>	
SPTM-L3.5: A LINEAR TIME PARTITIONING ALGORITHM FOR FREQUENCY WEIGHTED IMPURITY FUNCTIONS	5375
<i>Thuan Nguyen, Thinh Nguyen, Oregon State University, United States</i>	
SPTM-L3.6: FINITE SAMPLE DEVIATION AND VARIANCE BOUNDS FOR FIRST ORDER AUTOREGRESSIVE PROCESSES	5380
<i>Rodrigo González, Cristian R. Rojas, KTH Royal Institute of Technology, Sweden</i>	
SPTM-L4: OPTIMIZATION TECHNIQUES I	
SPTM-L4.1: BALANCING RATES AND VARIANCE VIA ADAPTIVE BATCH-SIZES IN FIRST-ORDER STOCHASTIC OPTIMIZATION	5385
<i>Zhan Gao, University of Pennsylvania, United States; Alec Koppel, U.S. Army Research Laboratory, United States; Alejandro Ribeiro, University of Pennsylvania, United States</i>	

SPTM-L4.2: A GREEDY SPARSE APPROXIMATION ALGORITHM BASED ON L1-NORM	5390
SELECTION RULES	
<i>Ramzi Ben mhenni, Sébastien Bourguignon, Jérôme Idier, Ecole Centrale de Nantes, France</i>	
SPTM-L4.3: EXACT SPARSE NONNEGATIVE LEAST SQUARES	5395
<i>Nicolas Nadisic, Arnaud Vandaele, Nicolas Gillis, University of Mons, Belgium; Jeremy Cohen, CNRS, Université de Rennes, Inria, IRISA., France</i>	
SPTM-L4.4: EPIGRAPHICAL REFORMULATION FOR NON-PROXIMABLE MIXED	5400
NORMS	
<i>Seisuke Kyochi, University of Kitakyushu, Japan; Shunsuke Ono, Tokyo Institute of Technology, Japan; Ivan Selesnick, New York University, United States</i>	
SPTM-L4.5: FORWARD-BACKWARD SPLITTING FOR OPTIMAL TRANSPORT BASED	5405
PROBLEMS	
<i>Guillermo Ortiz-Jiménez, Mireille El Gheche, Effrosyni Simou, Hermina Petric Maretic, Pascal Frossard, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-L4.6: SSGD: SPARSITY-PROMOTING STOCHASTIC GRADIENT DESCENT	5410
ALGORITHM FOR UNBIASED DNN PRUNING	
<i>Ching-Hua Lee, University of California, San Diego, United States; Igor Fedorov, ARM, United States; Bhaskar D. Rao, Harinath Garudadri, University of California, San Diego, United States</i>	
SPTM-L5: SIGNAL PROCESSING EMERGING TOPICS	
SPTM-L5.1: LOW-RANK TENSOR RING MODEL FOR COMPLETING MISSING	5415
VISUAL DATA	
<i>M. Salman Asif, University of California, Riverside, United States; Ashley Prater-Bennette, Air Force Research Laboratory, United States</i>	
SPTM-L5.2: SEQUENTIAL SEMI-ORTHOGONAL MULTI-LEVEL NMF WITH	5420
NEGATIVE RESIDUAL REDUCTION FOR NETWORK EMBEDDING	
<i>Riku Hashimoto, University of Electro-Communications, Japan; Hiroyuki Kasai, Waseda University, Japan</i>	
SPTM-L5.3: A FAST PROXIMAL POINT ALGORITHM FOR GENERALIZED GRAPH	5425
LAPLACIAN LEARNING	
<i>Zengde Deng, Anthony Man-Cho So, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPTM-L5.4: RECONSTRUCTION OF FRI SIGNALS USING DEEP NEURAL	5430
NETWORK APPROACHES	
<i>Vincent C. H. Leung, Jun-Jie Huang, Pier Luigi Dragotti, Imperial College London, United Kingdom</i>	
SPTM-L5.5: ADAPTIVE PREDICTION OF FINANCIAL TIME-SERIES FOR	5435
DECISION-MAKING USING A TENSORIAL AGGREGATION APPROACH	
<i>Betania Campello, Leonardo Duarte, João Romano, University of Campinas, Brazil</i>	
SPTM-L6: TRACKING AND ADAPTIVE SIGNAL PROCESSING	
SPTM-L6.1: DATA SELECTION KERNEL CONJUGATE GRADIENT ALGORITHM.....	5440
<i>Paulo Diniz, Jonathas Ferreira, Marcele Kuhfuss, Federal University of Rio de Janeiro, Brazil; Tadeu Ferreira, Fluminense Federal University, Brazil</i>	
SPTM-L6.2: NORMALIZED LEAST-MEAN-SQUARE ALGORITHMS WITH MINIMAX	5445
CONCAVE PENALTY	
<i>Hiroyuki Kaneko, Masahiro Yukawa, Keio University, Japan</i>	

SPTM-L6.3: STEEPENING SQUARED ERROR FUNCTION FACILITATES ONLINE ADAPTATION OF GAUSSIAN SCALES	5450
<i>Masa-aki Takizawa, Masahiro Yukawa, Keio University, Japan</i>	
SPTM-L6.4: INDOOR ALTITUDE ESTIMATION OF UNMANNED AERIAL VEHICLES USING A BANK OF KALMAN FILTERS	5455
<i>Liu Yang, Hechuan Wang, Yousef El-Laham, Stony Brook University, United States; José Ignacio Lamas Fonte, David Trillo Pérez, Avansig S. L., Spain; Mónica F. Bugallo, Stony Brook University, United States</i>	
SPTM-L6.5: UNDERWATER TRACKING BASED ON THE SUM-PRODUCT ALGORITHM ENHANCED BY A NEURAL NETWORK DETECTIONS CLASSIFIER	5460
<i>Giovanni Soldi, Domenico Gaglione, Giovanni De Magistris, Paolo Braca, Pietro Stinco, Gabriele Ferri, Alessandra Tesei, Kevin Le Page, NATO STO Centre for Maritime Research and Experimentation, Italy</i>	
SPTM-L6.6: FEATURE AFFINE PROJECTION ALGORITHMS	5465
<i>Hamed Yazdanpanah, University of São Paulo, Brazil</i>	
 SPTM-L7: BAYESIAN SIGNAL PROCESSING II	
SPTM-L7.1: APPROXIMATE BAYESIAN COMPUTATION WITH THE SLICED-WASSERSTEIN DISTANCE	5470
<i>Kimia Nadjahi, Telecom Paris, France; Valentin De Bortoli, Alain Durmus, Ecole normale supérieure Paris-Saclay, France; Roland Badeau, Telecom Paris, France; Umut Simsekli, Telecom Paris and University of Oxford, France</i>	
SPTM-L7.2: ENHANCED MIXTURE POPULATION MONTE CARLO VIA STOCHASTIC OPTIMIZATION AND MARKOV CHAIN MONTE CARLO SAMPLING	5475
<i>Yousef El-Laham, Petar Djuric, Mónica F. Bugallo, Stony Brook University, United States</i>	
SPTM-L7.3: BETTER SAFE THAN SORRY: RISK-AWARE NONLINEAR BAYESIAN ESTIMATION	5480
<i>Dionysios Kalogerias, Luiz Chamon, George Pappas, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-L7.4: PARTICLE FILTERING ON THE COMPLEX STIEFEL MANIFOLD WITH APPLICATION TO SUBSPACE TRACKING	5485
<i>Claudio Bordin, Universidade Federal do ABC, Brazil; Marcelo Bruno, Instituto Tecnológico de Aeronáutica, Brazil</i>	
SPTM-L7.5: BAYESIAN MULTIPLE CHANGE-POINT DETECTION WITH LIMITED COMMUNICATION	5490
<i>Topi Halme, Eyal Nitzan, Aalto University, Finland; H. Vincent Poor, Princeton University, United States; Visa Koivunen, Aalto University, Finland</i>	
SPTM-L7.6: WHAT DID YOUR ADVERSARY BELIEVE? OPTIMAL FILTERING AND SMOOTHING IN COUNTER-ADVERSARIAL AUTONOMOUS SYSTEMS	5495
<i>Robert Mattila, Inês Lourenço, KTH Royal Institute of Technology, Sweden; Vikram Krishnamurthy, Cornell University, United States; Cristian R. Rojas, Bo Wahlberg, KTH Royal Institute of Technology, Sweden</i>	
 SPTM-L8: SPARSITY-AWARE PROCESSING II	
SPTM-L8.1: ROBUST PARAMETER ESTIMATION OF CONTAMINATED DAMPED EXPONENTIALS	5500
<i>Youye Xie, Colorado School of Mines, United States; Dehong Liu, Hassan Mansour, Petros T. Boufounos, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SPTM-L8.2: COMPUTATION OF “BEST” INTERPOLANTS IN THE LP SENSE	5505
<i>Pakshal Bohra, Michael Unser, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	

SPTM-L8.4: FAST BLOCK-SPARSE ESTIMATION FOR VECTOR NETWORKS.....	5510
<i>Zuogong Yue, University of New South Wales, Australia; Padmavathi Sundaram, Harvard Medical School, United States; Victor Solo, University of New South Wales, Australia</i>	
SPTM-L8.5: RELATIVE COST BASED MODEL SELECTION FOR SPARSE HIGH-DIMENSIONAL LINEAR REGRESSION MODELS	5515
<i>Prakash B. Gohain, Magnus Jansson, KTH Royal Institute of Technology, Sweden</i>	
SPTM-L8.6: CUMULANT SLICE RECONSTRUCTION FROM COMPRESSIVE MEASUREMENTS AND ITS APPLICATION TO LINE SPECTRUM ESTIMATION	5520
<i>Yanbo Wang, Zhi Tian, George Mason University, United States</i>	
 SPTM-P1: ADAPTATION AND LEARNING OVER GRAPHS	
SPTM-P1.1: ADAPTATION AND LEARNING IN MULTI-TASK DECISION SYSTEMS	5525
<i>Stefano Marano, university of salerno, Italy; Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-P1.2: GRAPH METRIC LEARNING VIA GERSHGORIN DISC ALIGNMENT	5530
<i>Cheng Yang, Gene Cheung, York University, Canada; Wei Hu, Peking University, China</i>	
SPTM-P1.3: LEARNING GRAPH INFLUENCE FROM SOCIAL INTERACTIONS.....	5535
<i>Vincenzo Matta, University of Salerno, Italy; Virginia Bordignon, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Augusto Santos, [None], Portugal; Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-P1.4: SOCIAL LEARNING WITH PARTIAL INFORMATION SHARING	5540
<i>Virginia Bordignon, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Vincenzo Matta, University of Salerno, Italy; Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-P1.5: NON-PARAMETRIC COMMUNITY CHANGE-POINTS DETECTION IN STREAMING GRAPH SIGNALS	5545
<i>André Ferrari, Cédric Richard, Université Côte d'Azur, France</i>	
SPTM-P1.6: SPATIAL GATING STRATEGIES FOR GRAPH RECURRENT NEURAL NETWORKS	5550
<i>Luana Ruiz, Fernando Gama, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-P1.7: LEARNING CONNECTIVITY AND HIGHER-ORDER INTERACTIONS IN RADIAL DISTRIBUTION GRIDS	5555
<i>Qiuling Yang, Beijing Institute of Technology, China; Mario Coutino, Delft University of Technology, Netherlands; Gang Wang, Georgios B. Giannakis, University of Minnesota, United States; Geert Leus, Delft University of Technology, Netherlands</i>	
SPTM-P1.8: SEMI-SUPERVISED LEARNING OF PROCESSES OVER MULTI-RELATIONAL GRAPHS	5560
<i>Qin Lu, Vassilis N. Ioannidis, Georgios B. Giannakis, University of Minnesota, United States</i>	
SPTM-P1.9: RECURSIVE PREDICTION OF GRAPH SIGNALS WITH INCOMING NODES	5565
<i>Arun Venkitaraman, Saikat Chatterjee, Bo Wahlberg, KTH Royal Institute of Technology, Sweden</i>	
SPTM-P1.10: LEARNING SIGNED GRAPHS FROM DATA.....	5570
<i>Gerald Matz, Thomas Dittrich, Technische Universität Wien, Austria</i>	
SPTM-P1.11: FORECASTING MULTI-DIMENSIONAL PROCESSES OVER GRAPHS	5575
<i>Alberto Natali, Elvin Isufi, Geert Leus, Delft University of Technology, Netherlands</i>	

SPTM-P2: SAMPLING THEORY, ANALYSIS AND METHODS

SPTM-P2.1: DISTRIBUTED QUANTIZATION FOR SPARSE TIME SEQUENCES 5580

Alejandro Cohen, Massachusetts Institute of Technology, United States; Nir Shlezinger, Weizmann Institute of Science, Israel; Salman Salamatian, Massachusetts Institute of Technology, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel; Muriel Medard, Massachusetts Institute of Technology, United States

SPTM-P2.2: A TIME-BASED SAMPLING FRAMEWORK FOR 5585 **FINITE-RATE-OF-INNOVATION SIGNALS**

Sunil Rudresh, Abijith Jagannath Kamath, Chandra Sekhar Seelamantula, Indian Institute of Science, India

SPTM-P2.3: EFFECTIVE APPROXIMATION OF BANDLIMITED SIGNALS AND THEIR 5590 **SAMPLES**

Holger Boche, Ullrich Mönich, Technische Universität München, Germany

SPTM-P2.4: RECEIVER DESIGN AND AGC OPTIMIZATION WITH SELF 5595 **INTERFERENCE INDUCED SATURATION**

Chandan Sheemar, Dirk Slock, EURECOM, France

SPTM-P2.5: D-SLAM: DIFFUSION SOURCE LOCALIZATION AND TRAJECTORY 5600 **MAPPING**

Roxana Alexandru, Imperial College London, United Kingdom; Thierry Blu, Chinese University of Hong Kong, Hong Kong SAR of China; Pier Luigi Dragotti, Imperial College London, United Kingdom

SPTM-P2.6: TRIGGERLESS RANDOM INTERLEAVED SAMPLING 5605

Marek Rupniewski, Warsaw University of Technology, Poland

SPTM-P2.7: THE FRACTIONAL QUATERNION FOURIER NUMBER TRANSFORM 5610

Luiz da Silva Jr., José de Oliveira Neto, Juliano Lima, Federal University of Pernambuco, Brazil

SPTM-P2.8: SHORT AND SQUEEZED: ACCELERATING THE COMPUTATION OF 5615 **ANTISPARSE REPRESENTATIONS WITH SAFE SQUEEZING**

Clément Elvira, Cédric Herzet, Univ Rennes, Inria, CNRS, IRISA, France

SPTM-P2.9: DECENTRALIZED EXPECTED CONSISTENT SIGNAL RECOVERY FOR 5620 **QUANTIZATION MEASUREMENTS**

Chang-Jen Wang, National Chiao Tung University, Taiwan; Chao-Kai Wen, National Sun Yat-sen University, Taiwan; Shang-Ho Tsai, National Chiao Tung University, Taiwan; Shi Jin, Southeast University, China

SPTM-P2.11: LIE GROUP STATE ESTIMATION VIA OPTIMAL TRANSPORT 5625

Zhichao Wang, Victor Solo, University of New South Wales, Australia

SPTM-P3: SIGNAL AND INFORMATION PROCESSING OVER GRAPHS

SPTM-P3.1: SMOOTHING GRAPH SIGNALS VIA RANDOM SPANNING FORESTS 5630

Yusuf Yigit Pilavci, University Grenoble-Alpes, Grenoble-INP, France; Pierre-Olivier Amblard, Simon Barthélémy, Nicolas Tremblay, CNRS, France

SPTM-P3.2: DIAGONALIZABLE SHIFT AND FILTERS FOR DIRECTED GRAPHS BASED 5635 **ON THE JORDAN-CHEVALLEY DECOMPOSITION**

Panagiotis Misiakos, National Technical University of Athens, Greece; Chris Wendler, Markus Püschel, ETH Zurich, Switzerland

SPTM-P3.3: GAUSSIAN PROCESSES OVER GRAPHS 5640

Arun Venkitaraman, Saikat Chatterjee, Peter Handel, KTH Royal Institute of Technology, Sweden

SPTM-P3.4: BLIND SOURCE SEPARATION OF GRAPH SIGNALS 5645

Jari Miettinen, Sergiy A. Vorobyov, Esa Ollila, Aalto University, Finland

SPTM-P3.5: GRAPHICAL EVOLUTIONARY GAME THEORETIC ANALYSIS OF SUPER	5650
USERS IN INFORMATION DIFFUSION	
<i>Yuejiang Li, Tsinghua University, China; Yaxin Li, Michigan State University, United States; Hong Hu, H. Vicky Zhao, Tsinghua University, China; Yan Chen, University of Electronic Science and Technology of China, China</i>	
SPTM-P3.6: GRADIENT-BASED ALGORITHM WITH SPATIAL REGULARIZATION FOR	5655
OPTIMAL SENSOR PLACEMENT	
<i>Fateme Ghayem, Bertrand Rivet, University of Grenoble, France; Rodrigo Cabral Farias, Univ. Cote d'Azur, France; Christian Jutten, University of Grenoble, France</i>	
SPTM-P3.7: THE GRAPHON FOURIER TRANSFORM	5660
<i>Luana Ruiz, Luiz F. O. Chamon, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-P3.8: LEARNING PRODUCT GRAPHS FROM MULTIDOMAIN SIGNALS	5665
<i>Sai Kiran Kadambari, Sundeep Prabhakar Chepuri, Indian Institute of Science, India</i>	
SPTM-P3.9: GRAPH VERTEX SAMPLING WITH ARBITRARY GRAPH SIGNAL	5670
HILBERT SPACES	
<i>Benjamin Girault, Antonio Ortega, Shrikanth Narayanan, University of Southern California, United States</i>	
SPTM-P3.10: ESTIMATION OF INFORMATION IN PARALLEL GAUSSIAN CHANNELS	5675
VIA MODEL ORDER SELECTION	
<i>Carlos Alejandro Lopez, Ferran de Cabrera, Jaume Riba, Technical University of Catalonia, Spain</i>	
SPTM-P3.11: GENERALIZED GRAPH SPECTRAL SAMPLING WITH STOCHASTIC	5680
PRIORS	
<i>Junya Hara, Yuichi Tanaka, Tokyo University of Agriculture and Technology, Japan; Yonina Eldar, Weizmann Institute of Science, Israel</i>	
 SPTM-P4: SPARSITY-AWARE PROCESSING I	
SPTM-P4.1: ANOMALYDAE: DUAL AUTOENCODER FOR ANOMALY DETECTION ON	5685
ATTRIBUTED NETWORKS	
<i>Haoyi Fan, Fengbin Zhang, Harbin University of Science and Technology, China; Zuoyong Li, Minjiang University, China</i>	
SPTM-P4.2: ON THE DEGREES OF FREEDOM IN TOTAL VARIATION	5690
MINIMIZATION	
<i>Feng Xue, National Key Laboratory of Science and Technology on Test Physics and Numerical Mathematics, China; Thierry Blu, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPTM-P4.3: ATOMIC NORM DENOISING IN BLIND TWO-DIMENSIONAL	5695
SUPER-RESOLUTION	
<i>Mohamed A. Suliman, Wei Dai, Imperial College London, United Kingdom</i>	
SPTM-P4.4: DYNAMIC CHANNEL PRUNING FOR CORRELATION FILTER BASED	5700
OBJECT TRACKING	
<i>Goutam Yelluru Gopal, Maria A. Amer, Concordia University, Canada</i>	
SPTM-P4.5: POSITIVE SEMIDEFINITE MATRIX FACTORIZATION: A LINK TO PHASE	5705
RETRIEVAL AND A BLOCK GRADIENT ALGORITHM	
<i>Dana Lahat, Cédric Févotte, IRT, Université de Toulouse, CNRS, France</i>	
SPTM-P4.6: REALIZABILITY OF PLANAR POINT EMBEDDINGS FROM ANGLE	5710
MEASUREMENTS	
<i>Frederike Dümbsen, Majed El Helou, Adam Scholefield, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-P4.7: SPARSE RECOVERY WITH NON-LINEAR FOURIER FEATURES	5715
<i>Ayca Ozcelikkale, Uppsala University, Sweden</i>	

SPTM-P4.8: EFFICIENT SUPER-RESOLUTION TWO-DIMENSIONAL HARMONIC 5720
RETRIEVAL VIA ENHANCED LOW-RANK STRUCTURED COVARIANCE RECONSTRUCTION

Yue Wang, George Mason University, United States; Yu Zhang, Nanjing University of Aeronautics and Astronautics, China; Zhi Tian, George Mason University, United States; Geert Leus, Delft University of Technology, Netherlands; Gong Zhang, Nanjing University of Aeronautics and Astronautics, China

SPTM-P4.9: EFFECT OF UNDERSAMPLING ON NON-NEGATIVE BLIND 5725
DECONVOLUTION WITH AUTOREGRESSIVE FILTERS

Pulak Sarangi, Mehmet Can Hucumenoglu, Piya Pal, University of California, San Diego, United States

SPTM-P4.10: MANIFOLD GRADIENT DESCENT SOLVES MULTI-CHANNEL SPARSE 5730
BLIND DECONVOLUTION PROVABLY AND EFFICIENTLY

Laixi Shi, Yuejie Chi, Carnegie Mellon University, United States

SPTM-P5: OPTIMIZATION TECHNIQUES II

SPTM-P5.1: SPARSE BRANCH AND BOUND FOR EXACT OPTIMIZATION OF 5735
L0-NORM PENALIZED LEAST SQUARES

Ramzi Ben Mhenni, Sébastien Bourguignon, Ecole Centrale de Nantes, France; Marcel Mongeau, Ecole Nationale de l'Aviation Civile, Université de Toulouse, France; Jordan Ninin, École nationale supérieure de techniques avancées Bretagne, France; Carfantan Hervé, Université Toulouse III Paul Sabatier, France

SPTM-P5.2: A PROXIMAL DUAL CONSENSUS METHOD FOR LINEARLY COUPLED 5740
MULTI-AGENT NON-CONVEX OPTIMIZATION

Jiawei Zhang, Songyang Ge, Tsung-Hui Chang, Zhi-Quan Luo, Chinese University of Hong Kong, Shenzhen, China

SPTM-P5.3: A PENALTY ALTERNATING DIRECTION METHOD OF MULTIPLIERS 5745
FOR DECENTRALIZED COMPOSITE OPTIMIZATION

Jiaojiao Zhang, Anthony Man-Cho So, Chinese University of Hong Kong, China; Qing Ling, Sun Yat-Sen University, China

SPTM-P5.4: WIRTINGER FLOW ALGORITHMS FOR PHASE RETRIEVAL FROM 5750
BINARY MEASUREMENTS

Vinith Kishore, Chandra Sekhar Seelamantula, Indian Institute of Science, Bangalore, India

SPTM-P5.5: DECENTRALIZED MIN-MAX OPTIMIZATION: FORMULATIONS, 5755
ALGORITHMS AND APPLICATIONS IN NETWORK POISONING ATTACK

Ioannis Tsaknakis, Mingyi Hong, University of Minnesota Twin Cities, United States; Sijia Liu, IBM Research, United States

SPTM-P5.6: AN EFFICIENT AUGMENTED LAGRANGIAN-BASED METHOD FOR 5760
LINEAR EQUALITY-CONSTRAINED LASSO

Zengde Deng, Chinese University of Hong Kong, Hong Kong SAR of China; Man-Chung Yue, Hong Kong Polytechnic University, Hong Kong SAR of China; Anthony Man-Cho So, Chinese University of Hong Kong, Hong Kong SAR of China

SPTM-P5.7: CONTROL OF LINEAR DYNAMICAL SYSTEMS USING SPARSE INPUTS 5765

Chandrasekhar Sriram, Geethu Joseph, Chandra R. Murthy, Indian Institute of Science, India

SPTM-P5.8: DECENTRALIZED STOCHASTIC NON-CONVEX OPTIMIZATION OVER 5770
WEAKLY CONNECTED TIME-VARYING DIGRAPHS

Songtao Lu, Chai Wah Wu, IBM, United States

**SPTM-P6: SAMPLING, MULTIRATE SIGNAL PROCESSING AND DIGITAL SIGNAL
PROCESSING**

SPTM-P6.1: PACO AND PACO-DCT: PATCH CONSENSUS AND ITS APPLICATION TO 5775
INPAINTING

Ignacio Ramirez, Ignacio Hounie, Universidad de la República, Uruguay

SPTM-P6.2: IMAGE RECOVERY FROM ROTATIONAL AND TRANSLATIONAL INVARIANTS	5780
<i>Nicholas Marshall, Ti-Yen Lan, Princeton University, United States; Tamir Bendory, Tel Aviv University, Israel; Amit Singer, Princeton University, United States</i>	
SPTM-P6.3: OPTIMAL WINDOW DESIGN FOR JOINT SPATIAL-SPECTRAL DOMAIN FILTERING OF SIGNALS ON THE SPHERE	5785
<i>Adeem Aslam, Zubair Khalid, Lahore University of Management Sciences, Pakistan</i>	
SPTM-P6.4: FILTERING OUT TIME-FREQUENCY AREAS USING GABOR MULTIPLIERS	5790
<i>Ama Marina Kreme, Valentin Emiya, Caroline Chaux, Bruno Torr�sani, Aix-Marseille Universit�, France</i>	
SPTM-P6.5: β-NMF AND SPARSITY PROMOTING REGULARIZATIONS FOR COMPLEX MIXTURE UNMIXING. APPLICATION TO 2D HSQC NMR.	5795
<i>Afef Cherni, Sandrine Anthoine, Caroline Chaux, Aix-Marseille Univ, CNRS, Centrale Marseille, I2M, France</i>	
SPTM-P6.6: FIR FILTERING OF DISCONTINUOUS SIGNALS: A RANDOM-STRATIFIED SAMPLING APPROACH	5800
<i>Hikmat Darawsheh, Andrzej Tarczynski, University of Westminster, United Kingdom</i>	
SPTM-P6.7: MESSAGE TRANSMISSION THROUGH UNDERSPREAD TIME-VARYING LINEAR CHANNELS	5805
<i>Alihan Kaplan, Technische Universit�t M�nchen, Germany; Dae Gwan Lee, Catholic University of Eichst�tt-Ingolstadt, Germany; Volker Pohl, Technische Universit�t M�nchen, Germany</i>	
SPTM-P6.8: THE DISCRETE STOCKWELL TRANSFORMS FOR INFINITE-LENGTH SIGNALS AND THEIR REAL-TIME IMPLEMENTATIONS	5810
<i>Yusong Yan, Beijing Institute of Technology, China; Hongmei Zhu, York University, Canada</i>	
SPTM-P6.9: LOW-RANK APPROXIMATION OF MATRICES VIA A RANK-REVEALING FACTORIZATION WITH RANDOMIZATION	5815
<i>Maboud Kaloorazi, Jie Chen, Northwestern Polytechnical University, China</i>	
SPTM-P6.10: TIME-SCALE SYNTHESIS FOR LOCALLY STATIONARY SIGNALS.	5820
<i>Adrien Meynard, Duke University, United States; Bruno Torr�sani, Aix-Marseille Universit�, France</i>	
SPTM-P6.11: MAXIMALLY ENERGY-CONCENTRATED DIFFERENTIAL WINDOW FOR PHASE-AWARE SIGNAL PROCESSING USING INSTANTANEOUS FREQUENCY	5825
<i>Tsubasa Kusano, Kohei Yatabe, Yasuhiro Oikawa, Waseda University, Japan</i>	
SPTM-P6.12: ON THE USE OF R�NYI ENTROPY FOR OPTIMAL WINDOW SIZE COMPUTATION IN THE SHORT-TIME FOURIER TRANSFORM	5830
<i>Sylvain Meignen, University Grenoble Alpes, France; Marcelo A. Colominas, CONICET, Argentina; Duong-Hung Pham, University of Toulouse, France</i>	
SPTM-P7: BAYESIAN SIGNAL PROCESSING I	
SPTM-P7.1: DATA-DRIVEN MODEL SET DESIGN FOR MODEL AVERAGED PARTICLE FILTER	5835
<i>Bin Liu, Nanjing University of Posts and Telecommunications, China</i>	
SPTM-P7.2: GRAPHEM: EM ALGORITHM FOR BLIND KALMAN FILTERING UNDER GRAPHICAL SPARSITY CONSTRAINTS	5840
<i>Emilie Chouzenoux, CVN, CentraleSup�lec, INRIA Saclay, France; Victor Elvira, University of Edinburgh, United Kingdom</i>	
SPTM-P7.3: ON DESIGN OF OPTIMAL SMART METER PRIVACY CONTROL STRATEGY AGAINST ADVERSARIAL MAP DETECTION	5845
<i>Ramana Reddy Avula, Tobias Oechtering, KTH Royal Institute of Technology, Sweden</i>	

SPTM-P7.4: APPROXIMATE INFERENCE BY KULLBACK-LEIBLER TENSOR BELIEF	5850
PROPAGATION	
<i>Patrick W.A. Wijnings, Sander Stuijk, Bert de Vries, Henk Corporaal, Eindhoven University of Technology, Netherlands</i>	
SPTM-P7.5: A PARTICLE GIBBS SAMPLING APPROACH TO TOPOLOGY INFERENCE	5855
IN GENE REGULATORY NETWORKS	
<i>Marija Iloska, Youssef El-Laham, Mónica F. Bugallo, Stony Brook University, United States</i>	
SPTM-P7.6: PARTICLE FILTER WITH REJECTION CONTROL AND UNBIASED	5860
ESTIMATOR OF THE MARGINAL LIKELIHOOD	
<i>Jan Kudlicka, Uppsala University, Sweden; Lawrence M. Murray, Uber AI, United States; Thomas B. Schön, Uppsala University, Sweden; Fredrik Lindsten, Linköping University, Sweden</i>	
SPTM-P7.7: PARTICLE GROUP METROPOLIS METHODS FOR TRACKING THE	5865
LEAF AREA INDEX	
<i>Luca Martino, Universidad Rey Juan Carlos, Spain; Victor Elvira, University of Edinburgh, United Kingdom; Gustau Camps-Valls, Universitat de Valencia, Spain</i>	
SPTM-P7.8: UNSUPERVISED VARIATIONAL BAYESIAN KALMAN FILTERING FOR	5870
LARGE-DIMENSIONAL GAUSSIAN SYSTEMS	
<i>Boujemaa Ait-El-Fquih, King Abdullah University of Science and Technology (KAUST), Saudi Arabia; Thomas Rodet, Ecole Normale Supérieure de Cachan, France; Ibrahim Hoteit, King Abdullah University of Science and Technology (KAUST), Saudi Arabia</i>	
SPTM-P7.9: LEVENBERG-MARQUARDT AND LINE-SEARCH EXTENDED KALMAN	5875
SMOOTHERS	
<i>Simo Särkkä, Aalto University, Finland; Lennart Svensson, Chalmers University of Technology, Sweden</i>	
SPTM-P7.10: LAPLACE STATE SPACE FILTER WITH EXACT INFERENCE AND	5880
MOMENT MATCHING	
<i>Julian Neri, Philippe Depalle, McGill University, Canada; Roland Badeau, Telecom Paris, France</i>	
SPTM-P7.11: PROBABILISTIC FILTER AND SMOOTHER FOR VARIATIONAL	5885
INFERENCE OF BAYESIAN LINEAR DYNAMICAL SYSTEMS	
<i>Julian Neri, McGill University, Canada; Roland Badeau, Telecom Paris, France; Philippe Depalle, McGill University, Canada</i>	
SPTM-P7.12: OPTIMUM KERNEL PARTICLE FILTER FOR ASYMMETRIC LAPLACE	5890
NOISE	
<i>Ulrika Andersson, Simon Godsill, University of Cambridge, United Kingdom</i>	
 SPTM-P8: SIGNAL PROCESSING OVER NETWORKS	
SPTM-P8.2: CONVEX OPTIMISATION-BASED PRIVACY-PRESERVING	5895
DISTRIBUTED AVERAGE CONSENSUS IN WIRELESS SENSOR NETWORKS	
<i>Qiongxiu Li, Aalborg university, Denmark; Richard Heusdens, Delft University of Technology, Netherlands; Mads Græsbøll Christensen, Aalborg university, Denmark</i>	
SPTM-P8.3: PROXIMAL MULTITASK LEARNING OVER DISTRIBUTED NETWORKS	5900
WITH JOINTLY SPARSE STRUCTURE	
<i>Danqi Jin, Jie Chen, Northwestern Polytechnical University, China; Cédric Richard, Université de la Cote d'Azur, France; Jingdong Chen, Northwestern Polytechnical University, China</i>	
SPTM-P8.4: OPTIMAL SAMPLING RATE AND BANDWIDTH OF BANDLIMITED	5905
SIGNALS - AN ALGORITHMIC PERSPECTIVE	
<i>Holger Boche, Ullrich Mönich, Technische Universität München, Germany</i>	

SPTM-P8.5: RESILIENT TO BYZANTINE ATTACKS FINITE-SUM OPTIMIZATION OVER NETWORKS	5910
<i>Zhaoxian Wu, Qing Ling, Sun Yat-Sen University, China; Tianyi Chen, Rensselaer Polytechnic Institute, United States; Georgios B. Giannakis, University of Minnesota, United States</i>	
SPTM-P8.6: EXPLOITING SPARSITY FOR ROBUST SENSOR NETWORK LOCALIZATION IN MIXED LOS/NLOS ENVIRONMENTS	5915
<i>Di Jin, Technische Universität Darmstadt, Germany; Feng Yin, Chinese University of Hong Kong, China; Michael Fauß, Princeton University, United States; Michael Muma, Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany</i>	
SPTM-P8.7: A LOW-COMPLEXITY MAP DETECTOR FOR DISTRIBUTED NETWORKS	5920
<i>Allan Feitosa, Vítor Nascimento, Cássio Lopes, Universidade de São Paulo, Brazil</i>	
SPTM-P8.8: QUICKEST CHANGE DETECTION IN ANONYMOUS HETEROGENEOUS SENSOR NETWORKS	5925
<i>Zhongchang Sun, Shaofeng Zou, University at Buffalo, State University of New York, United States; Qunwei Li, Ant Financial Services Group, China</i>	
SPTM-P8.9: OPTIMAL POWER FLOW USING GRAPH NEURAL NETWORKS.....	5930
<i>Damian Owerko, Fernando Gama, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-P8.10: BYZANTINE-ROBUST DECENTRALIZED STOCHASTIC OPTIMIZATION	5935
<i>Jie Peng, Qing Ling, Sun Yat-Sen University, China</i>	
SPTM-P8.11: FEDERATED TRUTH INFERENCE OVER DISTRIBUTED CROWDSOURCING PLATFORMS	5940
<i>Ming-Hsun Yang, National Chiao Tung University, Taiwan; Gin-Hao Liu, Y.-W. Peter Hong, National Tsing Hua University, Taiwan</i>	
SPTM-P8.12: CLOCK SYNCHRONIZATION OVER NETWORKS USING SAWTOOTH MODELS	5945
<i>Pol del Aguila Pla, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Lissy Pellaco, KTH Royal Institute of Technology, Sweden; Satyam Dwivedi, Ericsson Research, Sweden; Peter Handel, Joakim Jaldén, KTH Royal Institute of Technology, Sweden</i>	
SPTM-P9: ESTIMATION THEORY AND METHODS II	
SPTM-P9.1: AN ANALYTICAL SOLUTION TO JACOBSEN ESTIMATOR FOR WINDOWED SIGNALS	5950
<i>Takahiro Murakami, Meiji University, Japan; Wenwu Wang, University of Surrey, United Kingdom</i>	
SPTM-P9.2: REGULARIZED PARTIAL PHASE SYNCHRONY INDEX APPLIED TO DYNAMICAL FUNCTIONAL CONNECTIVITY ESTIMATION	5955
<i>Gaëtan Frusque, Ecole Normal Supérieure de Lyon, France; Julien Jung, Hospice Civil de Lyon, Neuroscience Hospital & INSERM, France; Pierre Borgnat, CNRS, France; Paulo Gonçalves, Inria, France</i>	
SPTM-P9.3: THE MATCHED REASSIGNED CROSS-SPECTROGRAM FOR PHASE ESTIMATION	5960
<i>Maria Sandsten, Rachele Anderson, Isabella Reinhold, Johan Brynolfsson, Lund University, Sweden</i>	
SPTM-P9.4: LINE SPECTRAL ESTIMATION WITH PALINDROMIC KERNELS	5965
<i>Dieter Verbeke, Ivan Markovsky, Vrije Universiteit Brussel, Belgium</i>	
SPTM-P9.5: LATENT FUSED LASSO.....	5969
<i>Yining Feng, Ivan Selesnick, New York University, United States</i>	
SPTM-P9.6: ADVERSARIAL ATTACKS ON DEEP UNFOLDED NETWORKS FOR SPARSE CODING	5974
<i>Yulu Wang, Kailun Wu, Changshui Zhang, Tsinghua University, China</i>	

SPTM-P9.7: RIEMANNIAN FRAMEWORK FOR ROBUST COVARIANCE MATRIX ESTIMATION IN SPIKED MODELS	5979
<i>Florent Bouchard, Univ. Savoie Mont Blanc, France; Arnaud Breloy, Univ. Paris Nanterre, France; Guillaume Ginolhac, Univ. Savoie Mont Blanc, France; Frédéric Pascal, CentraleSupélec, Univ. Paris-Saclay, France</i>	
SPTM-P9.8: ROBUST MATRIX COMPLETION VIA LP-GREEDY PURSUITS	5984
<i>Xue Jiang, Shanghai Jiao Tong University, China; Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany; Xingzhao Liu, Shanghai Jiao Tong University, China</i>	
SPTM-P9.10: SEPARABLE OPTIMIZATION FOR JOINT BLIND DECONVOLUTION AND DEMIXING	5989
<i>Dana Weitzner, Raja Giryas, Tel Aviv University, Israel</i>	
SPTM-P9.11: MISSPECIFIED CRAMER-RAO BOUND FOR DELAY ESTIMATION WITH A MISMATCHED WAVEFORM: A CASE STUDY	5994
<i>Florian Roemer, Fraunhofer Institute for Nondestructive Testing IZFP, Germany</i>	
SPTM-P10: DETECTION AND CLASSIFICATION	
SPTM-P10.1: PRIVACY-AWARE QUICKEST CHANGE DETECTION	5999
<i>Tze Siong Lau, Wee Peng Tay, Nanyang Technological University, Singapore</i>	
SPTM-P10.2: SOURCE ENUMERATION VIA TOEPLITZ MATRIX COMPLETION	6004
<i>Vaibhav Garg, Pere Giménez-Febrer, University of Cantabria, Spain; Alba Pagès-Zamora, Universitat Politècnica de Catalunya, Spain; Ignacio Santamaria, University of Cantabria, Spain</i>	
SPTM-P10.3: SEQUENTIAL METHODS FOR DETECTING A CHANGE IN THE DISTRIBUTION OF AN EPISODIC PROCESS	6009
<i>Taposh Banerjee, Edmond Adib, Ahmad Taha, Eugene John, University of Texas at San Antonio, United States</i>	
SPTM-P10.4: DISTRIBUTION OF THE PRODUCT OF A COMPLEX GAUSSIAN MATRIX AND VECTOR AND ITS SUM WITH A COMPLEX GAUSSIAN VECTOR	6014
<i>Wanxin Shi, Yang Li, Qian He, University of Electronic Science and Technology of China, China</i>	
SPTM-P10.5: PRINCIPAL ANGLE DETECTOR FOR SUBSPACE SIGNAL WITH STRUCTURED UNKNOWN INTERFERENCE	6019
<i>Xingyu Xu, Yuchen Jiao, Yuantao Gu, Tsinghua University, China</i>	
SPTM-P10.6: A ROBUST SPEAKER CLUSTERING METHOD BASED ON DISCRETE TIED VARIATIONAL AUTOENCODER	6024
<i>Chen Feng, Jianzong Wang, Tongxu Li, Junqing Peng, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
SPTM-P10.7: TRACK-BEFORE-DETECT FOR SUB-NYQUIST RADAR	6029
<i>Siqi Na, Tianyao Huang, Yimin Liu, Xiqin Wang, Tsinghua University, China</i>	
SPTM-P10.8: OPTIMAL TRANSPORT BASED CHANGE POINT DETECTION AND TIME SERIES SEGMENT CLUSTERING	6034
<i>Kevin Cheng, Shuchin Aeron, Michael Hughes, Tufts University, United States; Erika Hussey, CCDC-Soldier Center, United States; Eric Miller, Tufts University, United States</i>	
SPTM-P10.9: MULTI-VIEW WASSERSTEIN DISCRIMINANT ANALYSIS WITH ENTROPIC REGULARIZED WASSERSTEIN DISTANCE	6039
<i>Hiroyuki Kasai, Waseda University, Japan</i>	
SPTM-P10.10: LARGE-SCALE TIME SERIES CLUSTERING WITH K-ARS	6044
<i>Zuogong Yue, Victor Solo, University of New South Wales, Australia</i>	
SPTM-P10.11: DETERMINISTIC FEATURE DECOUPLING BY SURFING INVARIANCE MANIFOLDS	6049
<i>Eduardo Martinez-Enriquez, Javier Portilla, Consejo Superior de Investigaciones Científicas, Spain</i>	

SPTM-P10.12: UNSUPERVISED AUTO-ENCODING MULTIPLE-OBJECT TRACKER	6054
FOR CONSTRAINT-CONSISTENT COMBINATORIAL PROBLEM	
<i>Yuta Kawachi, Teppei Suzuki, DENSO IT Laboratory, Inc., Japan</i>	
 SPE-L1: END-TO-END SPEECH RECOGNITION I: STREAMING	
SPE-L1.1: A STREAMING ON-DEVICE END-TO-END MODEL SURPASSING	6059
SERVER-SIDE CONVENTIONAL MODEL QUALITY AND LATENCY	
<i>Tara Sainath, Yanzhang He, Bo Li, Arun Narayanan, Ruoming Pang, Antoine Bruguier, Shuo-yiin Chang, Wei Li, Raziel Alvarez, Zhifeng Chen, Chung-cheng Chiu, David Garcia, Alex Gruenstein, Ke Hu, Minho Jin, Anjuli Kannan, Qiao Liang, Ian McGraw, Cal Peyser, Rohit Prabhavalkar, Golan Pundak, David Rybach, Yuan Shangguan, Yash Sheth, Trevor Strohman, Mirko Visontai, Yonghui Wu, Yu Zhang, Ding Zhao, Google, Inc., United States</i>	
SPE-L1.2: MINIMUM LATENCY TRAINING STRATEGIES FOR STREAMING	6064
SEQUENCE-TO-SEQUENCE ASR	
<i>Hirofumi Inaguma, Kyoto University, Japan; Yashesh Gaur, Liang Lu, Jinyu Li, Yifan Gong, Microsoft Corporation, Japan</i>	
SPE-L1.3: TOWARDS FAST AND ACCURATE STREAMING END-TO-END ASR.....	6069
<i>Bo Li, Shuo-Yiin Chang, Tara Sainath, Ruoming Pang, Yanzhang He, Trevor Strohman, Yonghui Wu, Google, Inc., United States</i>	
SPE-L1.4: STREAMING AUTOMATIC SPEECH RECOGNITION WITH THE	6074
TRANSFORMER MODEL	
<i>Niko Moritz, Takaaki Hori, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SPE-L1.5: CIF: CONTINUOUS INTEGRATE-AND-FIRE FOR END-TO-END SPEECH	6079
RECOGNITION	
<i>Linhao Dong, Bo Xu, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-L1.6: TRANSFORMER-BASED ONLINE CTC/ATTENTION END-TO-END SPEECH	6084
RECOGNITION ARCHITECTURE	
<i>Haoran Miao, Gaofeng Cheng, Changfeng Gao, Pengyuan Zhang, Yonghong Yan, Key Laboratory of Speech Acoustics and Content Understanding, China</i>	
 SPE-L2: LANGUAGE DISORDERS	
SPE-L2.1: DETECTING MULTIPLE SPEECH DISFLUENCIES USING A DEEP	6089
RESIDUAL NETWORK WITH BIDIRECTIONAL LONG SHORT-TERM MEMORY	
<i>Tedd Kourkounakis, Amirhossein Hajavi, Ali Etemad, Queen's University, Canada</i>	
SPE-L2.2: EXPLORING APPROPRIATE ACOUSTIC AND LANGUAGE MODELLING	6094
CHOICES FOR CONTINUOUS DYSARTHIC SPEECH RECOGNITION	
<i>Zhengjun Yue, Feifei Xiong, Heidi Christensen, Jon Barker, university of sheffield, United Kingdom</i>	
SPE-L2.3: SYNTHETIC SPEECH REFERENCES FOR AUTOMATIC PATHOLOGICAL	6099
SPEECH INTELLIGIBILITY ASSESSMENT	
<i>Parvaneh Janbakhshi, Ina Kodrasi, Hervé Bourlard, Idiap Research Institute, Switzerland</i>	
SPE-L2.4: TWO-STEP ACOUSTIC MODEL ADAPTATION FOR DYSARTHIC SPEECH	6104
RECOGNITION	
<i>Ryoichi Takashima, Tetsuya Takiguchi, Yasuo Ariki, Kobe University, Japan</i>	
SPE-L2.5: DYSARTHIC SPEECH RECOGNITION WITH LATTICE-FREE MMI.....	6109
<i>Enno Hermann, Mathew Magimai.-Doss, Idiap Research Institute, Switzerland</i>	
SPE-L2.6: IMPROVED SPEAKER INDEPENDENT DYSARTHRIA INTELLIGIBILITY	6114
CLASSIFICATION USING DEEPSPEECH POSTERIOES	
<i>Ayush Tripathi, Swapnil Bhosale, Sunil Kumar Koppurapu, Tata Consultancy Services, India</i>	

SPE-L3: END-TO-END SPEECH RECOGNITION II: NEW MODELS

SPE-L3.1: JOINT PHONEME-GRAPHEME MODEL FOR END-TO-END SPEECH RECOGNITION 6119

Yotaro Kubo, Michiel Bacchiani, Google, Japan

SPE-L3.2: QUARTZNET: DEEP AUTOMATIC SPEECH RECOGNITION WITH 1D TIME-CHANNEL SEPARABLE CONVOLUTIONS 6124

Samuel Kriman, University of Illinois at Urbana-Champaign, United States; Stanislav Beliaev, University of Saint Petersburg, Russia; Boris Ginsburg, Jocelyn Huang, Oleksii Kuchaiev, Vitaly Lavrukhin, Ryan Leary, Jason Li, Yang Zhang, NVIDIA, United States

SPE-L3.3: END-TO-END MULTI-TALKER OVERLAPPING SPEECH RECOGNITION..... 6129

Anshuman Tripathi, Han Lu, Hasim Sak, Google, United States

SPE-L3.4: END-TO-END MULTI-SPEAKER SPEECH RECOGNITION WITH TRANSFORMER 6134

Xuankai Chang, Johns Hopkins University, United States; Wangyou Zhang, Yanmin Qian, Shanghai Jiao Tong University, China; Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States; Shinji Watanabe, Johns Hopkins University, United States

SPE-L3.5: HYBRID AUTOREGRESSIVE TRANSDUCER (HAT) 6139

Ehsan Variiani, David Rybach, Cyril Allauzen, Michael Riley, Google, United States

SPE-L3.6: LIGHTWEIGHT AND EFFICIENT END-TO-END SPEECH RECOGNITION USING LOW-RANK TRANSFORMER 6144

Genta Indra Winata, Samuel Cahyawijaya, Zhaojiang Lin, Zihan Liu, Pascale Fung, Hong Kong University of Science and Technology, Hong Kong SAR of China

SPE-L4: MACHINE LEARNING FOR LANGUAGE PROCESSING I

SPE-L4.1: SPOKEN LANGUAGE ACQUISITION BASED ON REINFORCEMENT LEARNING AND WORD UNIT SEGMENTATION 6149

Shengzhou Gao, Wenxin Hou, Tomohiro Tanaka, Takahiro Shinozaki, Tokyo Institute of Technology, Japan

SPE-L4.2: HOW MUCH SELF-ATTENTION DO WE NEED? TRADING ATTENTION FOR FEED-FORWARD LAYERS 6154

Kazuki Irie, Alexander Gerstenberger, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany

SPE-L4.3: LEARNING RECURRENT NEURAL NETWORK LANGUAGE MODELS WITH CONTEXT-SENSITIVE LABEL SMOOTHING FOR AUTOMATIC SPEECH RECOGNITION 6159

Minguang Song, Yunxin Zhao, University of Missouri, United States; Shaojun Wang, Mei Han, PAII Inc, United States

SPE-L4.4: SEMI-SUPERVISED LEARNING FOR TEXT CLASSIFICATION BY LAYER PARTITIONING 6164

Alexander Hanbo Li, Abhinav Sethy, Amazon, Inc., United States

SPE-L4.5: INTEGRATING DISCRETE AND NEURAL FEATURES VIA MIXED-FEATURE TRANS-DIMENSIONAL RANDOM FIELD LANGUAGE MODELS 6169

Silin Gao, Zhijian Ou, Tsinghua University, China; Wei Yang, State Grid Customer Service Center, China; Huifang Xu, China Electric Power Research Institute, China

SPE-L4.6: GATED ATTENTIVE CONVOLUTIONAL NETWORK DIALOGUE STATE TRACKER 6174

Sihong Liu, Beijing University Of Posts And Telecommunications, China; Songyan Liu, Beijing University of Posts and Telecommunications, China; Weiran Xu, Beijing University Of Posts And Telecommunications, China

SPE-L5: SPEECH SYNTHESIS AND VOICE CONVERSION I

SPE-L5.1: USING VAES AND NORMALIZING FLOWS FOR ONE-SHOT TEXT-TO-SPEECH SYNTHESIS OF EXPRESSIVE SPEECH 6179

Vatsal Aggarwal, Marius Cotescu, Nishant Prateek, Jaime Lorenzo-Trueba, Roberto Barra-Chicote, Amazon, Inc., United Kingdom

SPE-L5.2: ZERO-SHOT MULTI-SPEAKER TEXT-TO-SPEECH WITH STATE-OF-THE-ART NEURAL SPEAKER EMBEDDINGS 6184

Erica Cooper, National Institute of Informatics, Japan; Cheng-I Lai, Massachusetts Institute of Technology, United States; Yusuke Yasuda, Fuming Fang, Xin Wang, National Institute of Informatics, Japan; Nanxin Chen, Johns Hopkins University, United States; Junichi Yamagishi, National Institute of Informatics, Japan

SPE-L5.3: MELLOTRON: MULTISPEAKER EXPRESSIVE VOICE SYNTHESIS BY CONDITIONING ON RHYTHM, PITCH AND GLOBAL STYLE TOKENS 6189

Rafael Valle, Jason Li, Ryan Prenger, Bryan Catanzaro, NVIDIA, United States

SPE-L5.4: LOCATION-RELATIVE ATTENTION MECHANISMS FOR ROBUST LONG-FORM SPEECH SYNTHESIS 6194

Eric Battenberg, RJ Skerry-Ryan, Soroosh Mariooryad, Daisy Stanton, David Kao, Matt Shannon, Tom Bagby, Google, United States

SPE-L5.5: PARALLEL WAVEGAN: A FAST WAVEFORM GENERATION MODEL BASED ON GENERATIVE ADVERSARIAL NETWORKS WITH MULTI-RESOLUTION SPECTROGRAM 6199

Ryuichi Yamamoto, LINE Corporation, Japan; Eunwoo Song, Jae-Min Kim, Naver Corporation, Korea (South)

SPE-L5.6: GAUSSIAN LPCNET FOR MULTISAMPLE SPEECH SYNTHESIS 6204

Vadim Popov, Mikhail Kudinov, Tasnima Sadekova, Huawei Technologies, Russia

SPE-L6: SPEECH ENHANCEMENT II: SINGLE CHANNEL

SPE-L6.1: A COMPUTATIONALLY LIGHT ALGORITHM FOR BAYESIAN SPEECH ENHANCEMENT WITH SNR MARGINALIZATION 6209

Stefan Thaleiser, Gerald Enzner, Ruhr-Universität Bochum, Germany

SPE-L6.2: LOW-LATENCY SINGLE CHANNEL SPEECH ENHANCEMENT USING U-NET CONVOLUTIONAL NEURAL NETWORKS 6214

Ahmet E. Bulut, Center for Robust Speech Systems, University of Texas at Dallas, United States; Kazuhito Koishida, Microsoft Corporation, United States

SPE-L6.3: A CROSS-TASK TRANSFER LEARNING APPROACH TO ADAPTING DEEP SPEECH ENHANCEMENT MODELS TO UNSEEN BACKGROUND NOISE USING PAIRED SENONE CLASSIFIERS 6219

Sicheng Wang, Wei Li, Georgia Institute of Technology, United States; Sabato Marco Siniscalchi, Kore University of Enna, Italy; Chin-Hui Lee, Georgia Institute of Technology, United States

SPE-L6.4: MONAURAL SPEECH ENHANCEMENT USING INTRA-SPECTRAL RECURRENT LAYERS IN THE MAGNITUDE AND PHASE RESPONSES 6224

Khandokar Md. Nayem, Donald S. Williamson, Indiana University, United States

SPE-L6.5: A MAXIMUM LIKELIHOOD APPROACH TO MULTI-OBJECTIVE LEARNING USING GENERALIZED GAUSSIAN DISTRIBUTIONS FOR DNN-BASED SPEECH ENHANCEMENT 6229

Shu-Tong Niu, Jun Du, Li Chai, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States

SPE-L6.6: PAGAN: A PHASE-ADAPTED GENERATIVE ADVERSARIAL NETWORKS FOR 6234
SPEECH ENHANCEMENT

Peishuo Li, Zihang Jiang, Shouyi Yin, Tsinghua University, China; Dandan Song, Peng Ouyang, TsingMicro Co. Ltd., China; Leibo Liu, Shaojun Wei, Tsinghua University, China

SPE-L7: SPEECH PERCEPTION AND PSYCHOACOUSTICS

SPE-L7.1: HUMANGAN: GENERATIVE ADVERSARIAL NETWORK WITH 6239
HUMAN-BASED DISCRIMINATOR AND ITS EVALUATION IN SPEECH PERCEPTION
MODELING

Kazuki Fujii, National Institute of Technology, Tokuyama College, Japan; Yuki Saito, Shinnosuke Takamichi, University of Tokyo, Japan; Yukino Baba, University of Tsukuba, Japan; Hiroshi Saruwatari, University of Tokyo, Japan

SPE-L7.2: THE PROCESSING OF MANDARIN CHINESE TONAL ALTERNATIONS IN 6244
CONTEXTS: AN EYE-TRACKING STUDY

Jung-yueh Tu, National Chengchi University, Taiwan; Yu-Fu Chien, Fudan University, China and DePaul University, United States

SPE-L7.3: ON THE IMPACT OF LANGUAGE FAMILIARITY IN TALKER CHANGE 6249
DETECTION

Neeraj Sharma, Carnegie Mellon University, United States; Venkat Krishnamohan, Sriram Ganapathy, Indian Institute of Science, India; Ahana Gangopadhyay, Washington University in St. Louis, United States; Lauren Fink, University of California, Davis, United States

SPE-L7.4: EFFECTS OF SPECTRAL TILT ON LISTENERS' PREFERENCES AND 6254
INTELLIGIBILITY

Olympia Simantiraki, University of the Basque Country, Spain; Martin Cooke, Ikerbasque (Basque Science Foundation), Spain; Yannis Pantazis, Institute of Applied and Computational Mathematics, FORTH, Greece

SPE-L7.5: EFFECT OF FRICATION DURATION AND FORMANT TRANSITIONS ON 6259
THE PERCEPTION OF FRICATIVES IN VCV UTTERANCES

K S Nataraj, Prem Chand Pandey, Hirak Dasgupta, Indian Institute of Technology Bombay, India

SPE-L8: SPEECH SYNTHESIS AND VOICE CONVERSION II

SPE-L8.1: FULLY-HIERARCHICAL FINE-GRAINED PROSODY MODELING FOR 6264
INTERPRETABLE SPEECH SYNTHESIS

Guangzhi Sun, Cambridge University, United Kingdom; Yu Zhang, Ron Weiss, Yuan Cao, Heiga Zen, Yonghui Wu, Google, United States

SPE-L8.2: TRANSFERRING NEURAL SPEECH WAVEFORM SYNTHESIZERS TO 6269
MUSICAL INSTRUMENT SOUNDS GENERATION

Yi Zhao, Xin Wang, National Institute of Informatics, Japan; Lauri Juvela, Aalto University, Finland; Junichi Yamagishi, National Institute of Informatics, Japan

SPE-L8.3: TEACHER-STUDENT TRAINING FOR ROBUST TACOTRON-BASED TTS 6274

Rui Liu, Inner Mongolia University, China; Berrak Sisman, National University of Singapore, Singapore; Jingdong Li, Feilong Bao, Guanglai Gao, Inner Mongolia University, China; Haizhou Li, National University of Singapore, Singapore

SPE-L8.4: MANY-TO-MANY VOICE CONVERSION USING CONDITIONAL 6279
CYCLE-CONSISTENT ADVERSARIAL NETWORKS

Shindong Lee, BongGu Ko, Keonnyeong Lee, In-Chul Yoo, Dongsuk Yook, Korea University, Korea (South)

SPE-L8.5: F0-CONSISTENT MANY-TO-MANY NON-PARALLEL VOICE CONVERSION 6284
VIA CONDITIONAL AUTOENCODER

Kaizhi Qian, University of Illinois at Urbana-Champaign, United States; Zeyu Jin, Adobe, United States; Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States; Gautham Mysore, Adobe, United States

SPE-L8.6: END-TO-END ACCENT CONVERSION WITHOUT USING NATIVE UTTERANCES 6289

Songxiang Liu, Disong Wang, Yuewen Cao, Chinese University of Hong Kong, China; Lifa Sun, SpeechX Limited, China; Xixin Wu, Chinese University of Hong Kong, China; Shiyin Kang, Tencent, China; Zhiyong Wu, Tsinghua University, China; Xunying Liu, Chinese University of Hong Kong, China; Dan Su, Dong Yu, Tencent, China; Helen Meng, Chinese University of Hong Kong, Hong Kong SAR of China

SPE-L9: MULTIMODAL PROCESSING OF LANGUAGE

SPE-L9.1: COGANS FOR UNSUPERVISED VISUAL SPEECH ADAPTATION TO NEW SPEAKERS 6294

Adriana Fernandez-Lopez, Pompeu Fabra University, Spain; Ali Karaali, Naomi Harte, Trinity College Dublin, Ireland; Federico M. Sukno, Pompeu Fabra University, Spain

SPE-L9.2: VISUALLY GUIDED SELF SUPERVISED LEARNING OF SPEECH REPRESENTATIONS 6299

Abhinav Shukla, Konstantinos Vougioukas, Pingchuan Ma, Stavros Petridis, Maja Pantic, Imperial College London, United Kingdom

SPE-L9.3: LOOKING ENHANCES LISTENING: RECOVERING MISSING SPEECH USING IMAGES 6304

Tejas Srinivasan, Carnegie Mellon University, United States; Ramon Sanabria, University of Edinburgh, United Kingdom; Florian Metze, Carnegie Mellon University, United States

SPE-L9.4: TOWARDS MULTILINGUAL SIGN LANGUAGE RECOGNITION 6309

Sandrine Tornay, Idiap Research Institute, Switzerland; Marzieh Razavi, Telepathy Labs GmbH, Switzerland; Mathew Magimai.-Doss, Idiap Research Institute, Switzerland

SPE-L9.5: AUTOMATIC IDENTIFICATION OF SPEAKERS FROM HEAD GESTURES IN A NARRATION 6314

Sanjeev Kadagathur Vadiraj, Achuth Rao M V, Prasanta Kumar Ghosh, Indian Institute of Science, Bangalore, India

SPE-L9.6: LIPREADING USING TEMPORAL CONVOLUTIONAL NETWORKS 6319

Brais Martinez, Samsung, United Kingdom; Pingchuan Ma, Stavros Petridis, Imperial College London, United Kingdom; Maja Pantic, Imperial College London and Samsung, United Kingdom

SPE-L10: SPEECH RECOGNITION: CONFIDENCE, ERRORS AND OOVs

SPE-L10.1: ON MODELING ASR WORD CONFIDENCE..... 6324

Woojay Jeon, Maxwell Jordan, Mahesh Krishnamoorthy, Apple, United States

SPE-L10.2: CONFIDENCE ESTIMATION FOR BLACK BOX AUTOMATIC SPEECH RECOGNITION SYSTEMS USING LATTICE RECURRENT NEURAL NETWORKS 6329

Alexandros Kastanos, University of Cambridge, United Kingdom; Anton Ragni, University of Sheffield, United Kingdom; Mark Gales, University of Cambridge, United Kingdom

SPE-L10.3: OOV RECOVERY WITH EFFICIENT 2ND PASS DECODING AND OPEN-VOCABULARY WORD-LEVEL RNNLM RESCORING FOR HYBRID ASR 6334

Xiaohui Zhang, Daniel Povey, Sanjeev Khudanpur, Johns Hopkins University, United States

SPE-L10.4: END TO END SPEECH RECOGNITION ERROR PREDICTION WITH SEQUENCE TO SEQUENCE LEARNING 6339

Prashant Serai, Adam Stiff, Eric Fosler-Lussier, Ohio State University, United States

SPE-L10.5: ASR ERROR CORRECTION AND DOMAIN ADAPTATION USING MACHINE TRANSLATION 6344

Anirudh Mani, Abridge AI, United States; Shruti Palaskar, Carnegie Mellon University, United States; Nimshi Venkat Meripo, Sandeep Konam, Abridge AI, United States; Florian Metze, Carnegie Mellon University, United States

SPE-L10.6: JOINT CONTEXTUAL MODELING FOR ASR CORRECTION AND LANGUAGE UNDERSTANDING	6349
<i>Yue Weng, Sai Sumanth Miryala, Chandra Khatri, Runze Wang, Huaixiu Zheng, Piero Molino, Mahdi Namazifar, Alexandros Papangelis, Hugh Williams, Franziska Bell, Gokhan Tur, Uber Technologies Inc, United States</i>	
SPE-L11: SPEECH SEPARATION AND EXTRACTION I: SINGLE CHANNEL	
SPE-L11.1: DEEP CASA FOR TALKER-INDEPENDENT MONAURAL SPEECH SEPARATION	6354
<i>Yuzhou Liu, Masood Delfarah, DeLiang Wang, Ohio State University, United States</i>	
SPE-L11.2: DEMYSTIFYING TASNET: A DISSECTING APPROACH	6359
<i>Jens Heitkaemper, Darius Jakobeit, Christoph Boeddeker, Lukas Drude, Reinhold Haeb-Umbach, Paderborn University, Germany</i>	
SPE-L11.3: FILTERBANK DESIGN FOR END-TO-END SPEECH SEPARATION	6364
<i>Manuel Pariente, INRIA Nancy, France; Samuele Cornell, Università Politecnica delle Marche, Italy; Antoine Deleforge, Emmanuel Vincent, INRIA Nancy, France</i>	
SPE-L11.4: INTERRUPTED AND CASCADED PERMUTATION INVARIANT TRAINING FOR SPEECH SEPARATION	6369
<i>Gene-Ping Yang, Szu-Lin Wu, Yao-Wen Mao, Hung-yi Lee, Lin-shan Lee, National Taiwan University, Taiwan</i>	
SPE-L11.5: MIXUP-BREAKDOWN: A CONSISTENCY TRAINING METHOD FOR IMPROVING GENERALIZATION OF SPEECH SEPARATION MODELS	6374
<i>Max W. Y. Lam, Jun Wang, Dan Su, Dong Yu, Tencent AI Lab, China</i>	
SPE-L11.6: AN ONLINE SPEAKER-AWARE SPEECH SEPARATION APPROACH BASED ON TIME-DOMAIN REPRESENTATION	6379
<i>Hui Wang, Yan Song, University of Science and Technology of China, China; Zeng-Xi Li, Microsoft China, China; Ian McLoughlin, School of Computing, University of Kent, United Kingdom; Li-Rong Dai, University of Science and Technology of China, China</i>	
SPE-L12: SPEECH SEPARATION AND EXTRACTION II: MULTI-CHANNEL	
SPE-L12.1: BEAM-TASNET: TIME-DOMAIN AUDIO SEPARATION NETWORK MEETS FREQUENCY-DOMAIN BEAMFORMER	6384
<i>Tsubasa Ochiai, Marc Delcroix, Rintaro Ikeshita, Keisuke Kinoshita, Tomohiro Nakatani, Shoko Araki, NTT Communication Science Laboratories, Japan</i>	
SPE-L12.2: ON END-TO-END MULTI-CHANNEL TIME DOMAIN SPEECH SEPARATION IN REVERBERANT ENVIRONMENTS	6389
<i>Jisi Zhang, University of Sheffield, United Kingdom; Catalin Zorila, Rama Doddipatla, Toshiba Cambridge Research Laboratory, United Kingdom; Jon Barker, University of Sheffield, United Kingdom</i>	
SPE-L12.3: END-TO-END MICROPHONE PERMUTATION AND NUMBER INVARIANT MULTI-CHANNEL SPEECH SEPARATION	6394
<i>Yi Luo, Columbia University, United States; Zhuo Chen, Microsoft, United States; Nima Mesgarani, Columbia University, United States; Takuya Yoshioka, Microsoft, United States</i>	
SPE-L12.4: DNN-SUPPORTED MASK-BASED CONVOLUTIONAL BEAMFORMING FOR SIMULTANEOUS DENOISING, DEREVERBERATION, AND SOURCE SEPARATION	6399
<i>Tomohiro Nakatani, NTT Corporation, Japan; Riki Takahashi, Tsukuba University, Japan; Tsubasa Ochiai, Keisuke Kinoshita, Rintaro Ikeshita, Marc Delcroix, Shoko Araki, NTT Corporation, Japan</i>	
SPE-L12.5: REAL-TIME BINAURAL SPEECH SEPARATION WITH PRESERVED SPATIAL CUES	6404
<i>Cong Han, Yi Luo, Nima Mesgarani, Columbia University, United States</i>	

SPE-L12.6: SLOGD: SPEAKER LOCATION GUIDED DEFLATION APPROACH TO SPEECH SEPARATION	6409
<i>Sunit Sivasankaran, Emmanuel Vincent, Inria-Nancy, France; Dominique Fohr, Loria, France</i>	
SPE-L13: SPEECH RECOGNITION: REPRESENTATIONS AND EMBEDDINGS	
SPE-L13.1: MULTILINGUAL ACOUSTIC WORD EMBEDDING MODELS FOR PROCESSING ZERO-RESOURCE LANGUAGES	6414
<i>Herman Kamper, Stellenbosch University, South Africa; Yevgen Matuselych, Sharon Goldwater, University of Edinburgh, United Kingdom</i>	
SPE-L13.2: MOCKINGJAY: UNSUPERVISED SPEECH REPRESENTATION LEARNING WITH DEEP BIDIRECTIONAL TRANSFORMER ENCODERS	6419
<i>Andy T. Liu, Shu-wen Yang, Po-Han Chi, Po-chun Hsu, Hung-yi Lee, National Taiwan University, Taiwan</i>	
SPE-L13.3: RECURRENT NEURAL AUDIOVISUAL WORD EMBEDDINGS FOR SYNCHRONIZED SPEECH AND REAL-TIME MRI	6424
<i>Öykü Deniz Köse, Murat Saraçlar, Boğaziçi University, Turkey</i>	
SPE-L13.4: DEEP CONTEXTUALIZED ACOUSTIC REPRESENTATIONS FOR SEMI-SUPERVISED SPEECH RECOGNITION	6429
<i>Shaoshi Ling, Yuzong Liu, Julian Salazar, Katrin Kirchhoff, Amazon, Inc., United States</i>	
SPE-L13.5: WHAT DOES A NETWORK LAYER HEAR? ANALYZING HIDDEN REPRESENTATIONS OF END-TO-END ASR THROUGH SPEECH SYNTHESIS	6434
<i>Chung-Yi Li, Pei-Chieh Yuan, Hung-Yi Lee, National Taiwan University, Taiwan</i>	
SPE-L13.6: LEARNING A SUBWORD INVENTORY JOINTLY WITH END-TO-END AUTOMATIC SPEECH RECOGNITION	6439
<i>Jennifer Drexler, James Glass, Massachusetts Institute of Technology, United States</i>	
SPE-L14: SPEAKER RECOGNITION/IDENTIFICATION/VERIFICATION	
SPE-L14.1: MULTIPLE POINTS INPUT FOR CONVOLUTIONAL NEURAL NETWORKS IN REPLAY ATTACK DETECTION	6444
<i>Sung-Hyun Yoon, Ha-Jin Yu, University of Seoul, Korea (South)</i>	
SPE-L14.2: INFORMATION MAXIMIZED VARIATIONAL DOMAIN ADVERSARIAL LEARNING FOR SPEAKER VERIFICATION	6449
<i>Youzhi Tu, Man-Wai Mak, Hong Kong Polytechnic University, Hong Kong SAR of China; Jen-Tzung Chien, National Chiao Tung University, Taiwan</i>	
SPE-L14.3: TEXT ADAPTATION FOR SPEAKER VERIFICATION WITH SPEAKER-TEXT FACTORIZED EMBEDDINGS	6454
<i>Yexin Yang, Shuai Wang, Xun Gong, Yanmin Qian, Kai Yu, Shanghai Jiao Tong University, China</i>	
SPE-L14.4: VOICEAI SYSTEMS TO NIST SRE19 EVALUATION: ROBUST SPEAKER RECOGNITION ON CONVERSATIONAL TELEPHONE SPEECH	6459
<i>Rongjin Li, Dongpeng Chen, Weibin Zhang, VoiceAI Technologies, Co. Ltd., China</i>	
SPE-L14.5: MULTI-RESOLUTION MULTI-HEAD ATTENTION IN DEEP SPEAKER EMBEDDING	6464
<i>Zhiming Wang, Kaisheng Yao, Xiaolong Li, Shuo Fang, Ant Financial Services Group, China</i>	
SPE-L14.6: WITHIN-SAMPLE VARIABILITY-INVARIANT LOSS FOR ROBUST SPEAKER RECOGNITION UNDER NOISY ENVIRONMENTS	6469
<i>Danwei Cai, Duke University, United States; Weicheng Cai, Duke Kunshan University, China; Ming Li, Duke University, United States</i>	

SPE-L15: EMOTION RECOGNITION

SPE-L15.1: SPEECH EMOTION RECOGNITION WITH DUAL-SEQUENCE LSTM 6474 ARCHITECTURE

Jianyou Wang, Michael Xue, Ryan Culhane, Enmao Diao, Duke University, United States; Jie Ding, University of Minnesota Twin Cities, United States; Vahid Tarokh, Duke University, United States

SPE-L15.2: A DIALOGICAL EMOTION DECODER FOR SPEECH EMOTION 6479 RECOGNITION IN SPOKEN DIALOG

Sung-Lin Yeh, Yun-Shao Lin, Chi-Chun Lee, National Tsing Hua University, Taiwan

SPE-L15.3: FUSION APPROACHES FOR EMOTION RECOGNITION FROM SPEECH 6484 USING ACOUSTIC AND TEXT-BASED FEATURES

Leonardo Pepino, Pablo Riera, Luciana Ferrer, Universidad de Buenos Aires-CONICET, Argentina; Agustín Gravano, Universidad de Buenos Aires, Argentina

SPE-L15.4: MULTI-TIME-SCALE CONVOLUTION FOR EMOTION RECOGNITION 6489 FROM SPEECH AUDIO SIGNALS

Eric Guizzo, Tillman Weyde, Jack Barnett Leveson, City, University of London, United Kingdom

SPE-L15.5: ORDINAL LEARNING FOR EMOTION RECOGNITION IN CUSTOMER 6494 SERVICE CALLS

Wenjing Han, Tao Jiang, Yan Li, Kuaishou Technology Corp., China; Björn Schuller, Imperial College London, United Kingdom; Huabin Ruan, Tsinghua University, China

SPE-L15.6: HGFM : A HIERARCHICAL GRAINED AND FEATURE MODEL FOR 6499 ACOUSTIC EMOTION RECOGNITION

Yunfeng Xu, Hebei University of Science and Technology, China; Hua Xu, Tsinghua University, China; Jiyun Zou, Hebei University of Science and Technology, China

SPE-L16: SPEAKER DIARIZATION

SPE-L16.1: SPEAKER DIARIZATION USING LATENT SPACE CLUSTERING IN 6504 GENERATIVE ADVERSARIAL NETWORK

Monisankha Pal, Manoj Kumar, Raghuveer Peri, Tae Jin Park, University of Southern California, United States; So Hyun Kim, Weill Cornell Medicine, United States; Catherine Lord, University of California, Los Angeles, United States; Somer Bishop, University of California, San Francisco, United States; Shrikanth Narayanan, University of Southern California, United States

SPE-L16.2: MULTIMODAL SPEAKER DIARIZATION OF REAL-WORLD MEETINGS 6509 USING D-VECTORS WITH SPATIAL FEATURES

Wonjune Kang, Brandon Roy, Massachusetts Institute of Technology, United States; Wesley Chow, Cortico, United States

SPE-L16.3: SPEAKER DIARIZATION WITH REGION PROPOSAL NETWORK 6514

Zili Huang, Shinji Watanabe, Johns Hopkins University, United States; Yusuke Fujita, Hitachi, Japan; Paola Garcia, Yiwen Shao, Daniel Povey, Sanjeev Khudanpur, Johns Hopkins University, United States

SPE-L16.4: OPTIMIZING BAYESIAN HMM BASED X-VECTOR CLUSTERING FOR 6519 THE SECOND DIHARD SPEECH DIARIZATION CHALLENGE

Mireia Diez, Lukáš Burget, Federico Landini, Brno University of Technology, Czech Republic; Shuai Wang, Shanghai Jiao Tong University, China; Honza Cernocký, Brno University of Technology, Czech Republic

SPE-L16.5: A MEMORY AUGMENTED ARCHITECTURE FOR CONTINUOUS 6524 SPEAKER IDENTIFICATION IN MEETINGS

Nikolaos Flemotomos, University of Southern California, United States; Dimitrios Dimitriadis, Microsoft, United States

SPE-L16.6: BUT SYSTEM FOR THE SECOND DIHARD SPEECH DIARIZATION 6529
CHALLENGE

Federico Landini, Brno University of Technology, Czech Republic; Shuai Wang, Shanghai Jiao Tong University, China; Mireia Diez, Lukáš Burget, Pavel Matějka, Kateřina Žmolíková, Ladislav Mošner, Anna Silnova, Oldřich Plchot, Ondřej Novotný, Hossein Zeinali, Johan Rohdin, Brno University of Technology, Czech Republic

SPE-L17: PARALINGUISTICS MODELING

SPE-L17.1: ESTIMATING THE DEGREE OF SLEEPINESS BY INTEGRATING 6534
ARTICULATORY FEATURE KNOWLEDGE IN RAW WAVEFORM BASED CNNs

Julian Fritsch, S. Pavankumar Dubagunta, Mathew Magimai.-Doss, Idiap Research Institute, Switzerland

SPE-L17.2: AUTOMATIC PREDICTION OF SUICIDAL RISK IN MILITARY COUPLES 6539
USING MULTIMODAL INTERACTION CUES FROM COUPLES CONVERSATIONS

Sandeep Nallan Chakravarthula, Md Nasir, Shao-Yen Tseng, Haoqi Li, Tae Jin Park, University of Southern California, United States; Brian Baucom, Craig J. Bryan, University of Utah, United States; Shrikanth Narayanan, Panayiotis Georgiou, University of Southern California, United States

SPE-L17.3: COMPARISON OF USER MODELS BASED ON GMM-UBM AND 6544
I-VECTORS FOR SPEECH, HANDWRITING, AND GAIT ASSESSMENT OF PARKINSON'S
DISEASE PATIENTS

Juan Camilo Vasquez-Correa, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Tobias Bocklet, Technische Hochschule, Germany; Juan Rafael Orozco-Arroyave, University of Antioquia, Colombia; Elmar Nöth, Friedrich-Alexander Universität Erlangen-Nürnberg, Colombia

SPE-L17.4: EXPLOITING VOCAL TRACT COORDINATION USING DILATED CNNs 6549
FOR DEPRESSION DETECTION IN NATURALISTIC ENVIRONMENTS

Zhaocheng Huang, Julien Epps, University of New South Wales, Australia; Dale Joachim, Sonde Health, United States

SPE-L17.5: DEEP LEARNING BASED PREDICTION OF HYPERNASALITY FOR 6554
CLINICAL APPLICATIONS

Vikram C Mathad, Arizona State University, United States; Kathy Chapman, University of Utah, United States; Julie Liss, Nancy Scherer, Visar Berisha, Arizona State University, United States

SPE-L17.6: LANGUAGE INDEPENDENT GENDER IDENTIFICATION FROM RAW 6559
WAVEFORM USING MULTI-SCALE CONVOLUTIONAL NEURAL NETWORKS

Krishna D N, Amrutha D, Sai Sumith Reddy, Anudeepa Acharya, Prabhu Aashish Garapati, Triveni B J, Youplus India, India

SPE-P1: ADVERSARIAL/DISCRIMINATIVE TRAINING AND SPOOFING FOR SPEAKER
RECOGNITION

SPE-P1.1: DEFENSE AGAINST ADVERSARIAL ATTACKS ON SPOOFING 6564
COUNTERMEASURES OF ASV

Haibin Wu, National Taiwan University, China; Songxiang Liu, Helen Meng, Chinese University of Hong Kong, China; Hung-yi Lee, National Taiwan University, Taiwan

SPE-P1.2: TEXT-INDEPENDENT SPEAKER VERIFICATION WITH ADVERSARIAL 6569
LEARNING ON SHORT UTTERANCES

Kai Liu, Huan Zhou, Huawei Technologies Co Ltd, China

SPE-P1.3: CHANNEL INVARIANT SPEAKER EMBEDDING LEARNING WITH JOINT 6574
MULTI-TASK AND ADVERSARIAL TRAINING

Zhengyang Chen, Shuai Wang, Yanmin Qian, Kai Yu, Shanghai Jiao Tong University, China

SPE-P1.4: ADVERSARIAL ATTACKS ON GMM I-VECTOR BASED SPEAKER 6579
VERIFICATION SYSTEMS

Xu Li, Jinghua Zhong, Xixin Wu, Jianwei Yu, Xunying Liu, Helen Meng, Chinese University of Hong Kong, Hong Kong SAR of China

SPE-P1.5: ORTHOGONAL TRAINING FOR TEXT-INDEPENDENT SPEAKER VERIFICATION	6584
<i>Yingke Zhu, Brian Mak, Hong Kong University of Science and Technology, Hong Kong SAR of China</i>	
SPE-P1.6: ASSESSING THE SCOPE OF GENERALIZED COUNTERMEASURES FOR ANTI-SPOOFING	6589
<i>Rohan Kumar Das, Jichen Yang, Haizhou Li, National University of Singapore, Singapore</i>	
SPE-P1.7: IMPROVING SPEAKER-ATTRIBUTE ESTIMATION BY VOTING BASED ON SPEAKER CLUSTER INFORMATION	6594
<i>Naohiro Tawara, NTT Communication Science Laboratories, Japan; Hosana Kamiyama, Satoshi Kobashikawa, NTT Media Intelligence Laboratories, Japan; Atsunori Ogawa, NTT Communication Science Laboratories, Japan</i>	
SPE-P1.8: AN ENSEMBLE BASED APPROACH FOR GENERALIZED DETECTION OF SPOOFING ATTACKS TO AUTOMATIC SPEAKER RECOGNIZERS	6599
<i>Joao Monteiro, Institut National de la Recherche Scientifique, Canada; Jahangir Alam, Centre de Recherche Informatique de Montreal, Canada; Tiago Falk, Institut National de la Recherche Scientifique, Canada</i>	
SPE-P1.9: A DISCRIMINATIVE CONDITION-AWARE BACKEND FOR SPEAKER VERIFICATION	6604
<i>Luciana Ferrer, UBA-CONICET, Argentina; Mitchell McLaren, SRI International, United States</i>	
SPE-P1.10: ADVERSARIAL MULTI-TASK LEARNING FOR SPEAKER NORMALIZATION IN REPLAY DETECTION	6609
<i>Gajan Suthokumar, Vidhyasaharan Sethu, Kaavya Sriskandaraja, Eliathamby Ambikairajah, University of New South Wales, Australia</i>	
SPE-P1.11: ROBUST SPEAKER RECOGNITION USING UNSUPERVISED ADVERSARIAL INVARIANCE	6614
<i>Raghuveer Peri, Monisankha Pal, Arindam Jati, Krishna Somandepalli, Shrikanth Narayanan, University of Southern California, United States</i>	
SPE-P1.12: A GENERALIZED FRAMEWORK FOR DOMAIN ADAPTATION OF PLDA IN SPEAKER RECOGNITION	6619
<i>Qiongqiong Wang, Koji Okabe, Kong Aik Lee, Takafumi Koshinaka, NEC, Japan</i>	
SPE-P2: SPEECH ENHANCEMENT I: NETWORK ARCHITECTURES	
SPE-P2.1: CP-GAN: CONTEXT PYRAMID GENERATIVE ADVERSARIAL NETWORK FOR SPEECH ENHANCEMENT	6624
<i>Gang Liu, Sun Yat-Sen University, China; Ke Gong, DarkMatter AI Research, China; Xiaodan Liang, Zhiguang Chen, Sun Yat-Sen University, China</i>	
SPE-P2.2: DENSELY CONNECTED NEURAL NETWORK WITH DILATED CONVOLUTIONS FOR REAL-TIME SPEECH ENHANCEMENT IN THE TIME DOMAIN	6629
<i>Ashutosh Pandey, DeLiang Wang, Ohio State University, United States</i>	
SPE-P2.3: PAN: PHONEME-AWARE NETWORK FOR MONAURAL SPEECH ENHANCEMENT	6634
<i>Zhihao Du, Harbin Institute of Technology, China; Ming Lei, Alibaba Group, China; Jiqing Han, Harbin Institute of Technology, China; Shiliang Zhang, Alibaba Group, China</i>	
SPE-P2.4: EFFICIENT TRAINABLE FRONT-ENDS FOR NEURAL SPEECH ENHANCEMENT	6639
<i>Jonah Casebeer, University of Illinois at Urbana–Champaign, United States; Umut Isik, Amazon Web Services, United States; Shrikant Venkataramani, University of Illinois at Urbana–Champaign, United States; Arvinth Krishnaswamy, Amazon Web Services, United States</i>	

SPE-P2.5: INVERTIBLE DNN-BASED NONLINEAR TIME-FREQUENCY TRANSFORM 6644	FOR SPEECH ENHANCEMENT
<i>Daiki Takeuchi, Kohei Yatabe, Waseda University, Japan; Yuma Koizumi, NTT Corporation, Japan; Yasuhiro Oikawa, Waseda University, Japan; Noboru Harada, NTT Corporation, Japan</i>	
SPE-P2.6: T-GSA: TRANSFORMER WITH GAUSSIAN-WEIGHTED SELF-ATTENTION 6649	FOR SPEECH ENHANCEMENT
<i>Jaeyoung Kim, Google, United States; Mostafa El-Khamy, Jungwon Lee, Samsung Semiconductor, Inc., United States</i>	
SPE-P2.7: REDUNDANT CONVOLUTIONAL NETWORK WITH ATTENTION 6654	MECHANISM FOR MONAURAL SPEECH ENHANCEMENT
<i>Tian Lan, Yilan Lyu, Guoqiang Hui, Refuoe Mokhosi, Sen Li, Qiao Liu, University of Electronic Science and Technology of China, China</i>	
SPE-P2.8: RESIDUAL RECURRENT NEURAL NETWORK FOR SPEECH 6659	ENHANCEMENT
<i>Jalal Abdulbaqi, Yue Gu, Shuhong Chen, Ivan Marsic, Rutgers, The State University of New Jersey, United States</i>	
SPE-P2.9: 2D-TO-2D MASK ESTIMATION FOR SPEECH ENHANCEMENT BASED ON 6664	FULLY CONVOLUTIONAL NEURAL NETWORK
<i>Yanhui Tu, Jun Du, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
SPE-P2.10: SELF-SUPERVISED DENOISING AUTOENCODER WITH LINEAR 6669	REGRESSION DECODER FOR SPEECH ENHANCEMENT
<i>Ryandhimas Edo Zezario, Tassadaq Hussain, Academia Sinica, Taiwan; Xugang Lu, National Institute of Information and Communications Technology (NICT), Japan; Hsin-Min Wang, Yu Tsao, Academia Sinica, Taiwan</i>	
SPE-P2.11: FULLY CONVOLUTIONAL RECURRENT NETWORKS FOR SPEECH 6674	ENHANCEMENT
<i>Maximilian Strake, Technische Universität Braunschweig, Germany; Bruno Defraene, Kristoff Fluyt, Wouter Tirry, NXP Semiconductors, Belgium; Tim Fingscheidt, Technische Universität Braunschweig, Germany</i>	
SPE-P2.12: PHONETIC FEEDBACK FOR SPEECH ENHANCEMENT WITH AND 6679	WITHOUT PARALLEL SPEECH DATA
<i>Peter Plantinga, Deblin Bagchi, Eric Fosler-Lussier, Ohio State University, United States</i>	
SPE-P3: MACHINE LEARNING FOR SPEECH SYNTHESIS I	
SPE-P3.1: SCALABLE MULTILINGUAL FRONTEND FOR TTS..... 6684	
<i>Alistair Conkie, Andrew Finch, Apple, United States</i>	
SPE-P3.2: A UNIFIED SEQUENCE-TO-SEQUENCE FRONT-END MODEL FOR 6689	MANDARIN TEXT-TO-SPEECH SYNTHESIS
<i>Junjie Pan, Xiang Yin, ByteDance, China; Zhiling Zhang, Shanghai Jiao Tong University, China; Shichao Liu, Yang Zhang, Zejun Ma, Yuxuan Wang, ByteDance, China</i>	
SPE-P3.3: A HYBRID TEXT NORMALIZATION SYSTEM USING MULTI-HEAD 6694	SELF-ATTENTION FOR MANDARIN
<i>Junhui Zhang, Junjie Pan, Xiang Yin, Chen Li, Shichao Liu, Yang Zhang, Yuxuan Wang, Zejun Ma, Bytedance, China</i>	
SPE-P3.4: GENERATING DIVERSE AND NATURAL TEXT-TO-SPEECH SAMPLES 6699	USING A QUANTIZED FINE-GRAINED VAE AND AUTOREGRESSIVE PROSODY PRIOR
<i>Guangzhi Sun, Cambridge University, United Kingdom; Yu Zhang, Ron Weiss, Yuan Cao, Heiga Zen, Andrew Rosenberg, Bhuvana Ramabhadran, Yonghui Wu, Google, United States</i>	
SPE-P3.5: IMPROVING PROSODY WITH LINGUISTIC AND BERT DERIVED 6704	FEATURES IN MULTI-SPEAKER BASED MANDARIN CHINESE NEURAL TTS
<i>Yujia Xiao, Lei He, Huaiping Ming, Microsoft China, China; Frank K. Soong, Microsoft Research Asia, China</i>	

SPE-P3.6: FOCUSING ON ATTENTION: PROSODY TRANSFER AND ADAPTATIVE OPTIMIZATION STRATEGY FOR MULTI-SPEAKER END-TO-END SPEECH SYNTHESIS	6709
<i>Ruibo Fu, Jianhua Tao, Zhengqi Wen, Jiangyan Yi, Tao Wang, National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-P3.7: ALIGNTTS: EFFICIENT FEED-FORWARD TEXT-TO-SPEECH SYSTEM WITHOUT EXPLICIT ALIGNMENT	6714
<i>Zhen Zeng, Jianzong Wang, Ning Cheng, Tian Xia, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
SPE-P3.8: GRAPHTTS: GRAPH-TO-SEQUENCE MODELLING IN NEURAL TEXT-TO-SPEECH	6719
<i>Aolan Sun, Jianzong Wang, Ning Cheng, Huayi Peng, Zhen Zeng, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
SPE-P3.9: EFFECT OF CHOICE OF PROBABILITY DISTRIBUTION, RANDOMNESS, AND SEARCH METHODS FOR ALIGNMENT MODELING IN SEQUENCE-TO-SEQUENCE TEXT-TO-SPEECH SYNTHESIS USING HARD ALIGNMENT	6724
<i>Yusuke Yasuda, Xin Wang, Junichi Yamagishi, National Institute of Informatics, Japan</i>	
SPE-P3.10: TRANSFORMER-BASED TEXT-TO-SPEECH WITH WEIGHTED FORCED ATTENTION	6729
<i>Takuma Okamoto, National Institute of Information and Communications Technology (NICT), Japan; Tomoki Toda, Nagoya University, Japan; Yoshinori Shiga, Hisashi Kawai, National Institute of Information and Communications Technology (NICT), Japan</i>	
SPE-P3.11: IMPROVING END-TO-END SPEECH SYNTHESIS WITH LOCAL RECURRENT NEURAL NETWORK ENHANCED TRANSFORMER	6734
<i>Yibin Zheng, Xin-Hui Li, Fenglong Xie, Li Lu, Tencent, China</i>	
 SPE-P4: SPEECH ANALYSIS AND CODING	
SPE-P4.1: GCI DETECTION FROM RAW SPEECH USING A FULLY-CONVOLUTIONAL NETWORK	6739
<i>Luc Ardaillon, Axel Roebel, IRCAM, France</i>	
SPE-P4.2: FRAME-BASED OVERLAPPING SPEECH DETECTION USING CONVOLUTIONAL NEURAL NETWORKS	6744
<i>Midia Yousefi, John H.L. Hansen, University of Texas at Dallas, United States</i>	
SPE-P4.3: LEARNING DOMAIN INVARIANT REPRESENTATIONS FOR CHILD-ADULT CLASSIFICATION FROM SPEECH	6749
<i>Rimita Lahiri, Manoj Kumar, University of Southern California, United States; Somer Bishop, University of California, San Francisco, United States; Shrikanth Narayanan, University of Southern California, United States</i>	
SPE-P4.5: SINGLE FREQUENCY FILTER BANK BASED LONG-TERM AVERAGE SPECTRA FOR HYPERNASALITY DETECTION AND ASSESSMENT IN CLEFT LIP AND PALATE SPEECH	6754
<i>Hashim Javid Mohammad, Krishna Gurugubelli, Anil Kumar Vuppala, International Institute of Information Technology, Hyderabad, India</i>	
SPE-P4.6: AUTOREGRESSIVE PARAMETER ESTIMATION WITH DNN-BASED PRE-PROCESSING	6759
<i>Zihao Cui, Changchun Bao, Beijing University of Technology, China; Jesper Kjær Nielsen, Mads Græsbøll Christensen, Aalborg University, Denmark</i>	
SPE-P4.7: ENHANCEMENT OF CODED SPEECH USING A MASK-BASED POST-FILTER	6764
<i>Srikanth Korse, Fraunhofer Institute for Integrated Circuits IIS, Germany; Kishan Gupta, Guillaume Fuchs, AudioLabs-IIS, Germany</i>	

SPE-P4.8: ROBUST LOW RATE SPEECH CODING BASED ON CLONED NETWORKS AND WAVENET	6769
<i>Felicia Lim, Google, United States; W. Bastiaan Kleijn, Victoria University of Wellington, New Zealand; Michael Chinen, Jan Skoglund, Google, United States</i>	
SPE-P4.9: MIXTURE FACTORIZED AUTO-ENCODER FOR UNSUPERVISED HIERARCHICAL DEEP FACTORIZATION OF SPEECH SIGNAL	6774
<i>Zhiyuan Peng, Siyuan Feng, Tan Lee, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPE-P4.10: A NOVEL APPROACH FOR INTELLIGIBILITY ASSESSMENT IN DYSARTHIC SUBJECTS	6779
<i>Ayush Tripathi, Swapnil Bhosale, Sunil Kumar Kopparapu, Tata Consultancy Services, India</i>	
SPE-P4.11: VOICE BASED CLASSIFICATION OF PATIENTS WITH AMYOTROPHIC LATERAL SCLEROSIS, PARKINSON’S DISEASE AND HEALTHY CONTROLS WITH CNN-LSTM USING TRANSFER LEARNING	6784
<i>Jhansi Mallela, Aravind Illa, Suhas B N, Sathvik Udupa, Indian Institute of Science, India; Yamini Belur, Nalini Atchayaram, Ravi Yadav, Pradeep Reddy, National Institute of Mental Health and Neuro Sciences, India; Dipanjan Gope, Prasanta Kumar Ghosh, Indian Institute of Science, India</i>	
SPE-P4.12: ANALYSIS OF ACOUSTIC FEATURES FOR SPEECH SOUND BASED CLASSIFICATION OF ASTHMATIC AND HEALTHY SUBJECTS	6789
<i>Shivani Yadav, Indian Institute of Science, India; Merugu Keerthana, Rajiv Gandhi University of Knowledge Technologies, Kadapa, India; Dipanjan Gope, Indian Institute of Science, India; Uma Maheswari Krishnaswamy, St. Johns National Academy of Health Sciences, India; Prasanta Kumar Ghosh, Indian Institute of Science, India</i>	
SPE-P5: DEEP SPEAKER RECOGNITION MODELS	
SPE-P5.1: FREQUENCY AND TEMPORAL CONVOLUTIONAL ATTENTION FOR TEXT-INDEPENDENT SPEAKER RECOGNITION	6794
<i>Sarthak Yadav, Atul Rai, Staqu Technologies, India</i>	
SPE-P5.2: FRAME-LEVEL PHONEME-INVARIANT SPEAKER EMBEDDING FOR TEXT-INDEPENDENT SPEAKER RECOGNITION ON EXTREMELY SHORT UTTERANCES	6799
<i>Naohiro Tawara, Atsunori Ogawa, Tomoharu Iwata, Marc Delcroix, NTT Communication Science Laboratories, Japan; Tetsuji Ogawa, Waseda University, Japan</i>	
SPE-P5.3: PROTOTYPICAL NETWORKS FOR SMALL FOOTPRINT TEXT-INDEPENDENT SPEAKER VERIFICATION	6804
<i>Tom Ko, South University of Science and Technology, China; Yangbin Chen, City University of Hong Kong, Hong Kong SAR of China; Qing Li, Hong Kong Polytechnic University, Hong Kong SAR of China</i>	
SPE-P5.4: TDMF: TASK-DRIVEN MULTILEVEL FRAMEWORK FOR END-TO-END SPEAKER VERIFICATION	6809
<i>Chen Chen, Jiqing Han, Harbin Institute of Technology, China</i>	
SPE-P5.5: AN IMPROVED DEEP NEURAL NETWORK FOR MODELING SPEAKER CHARACTERISTICS AT DIFFERENT TEMPORAL SCALES	6814
<i>Bin Gu, Wu Guo, Li-Rong Dai, Jun Du, University of Science and Technology of China, China</i>	
SPE-P5.6: PARTIAL AUC OPTIMIZATION BASED DEEP SPEAKER EMBEDDINGS WITH CLASS-CENTER LEARNING FOR TEXT-INDEPENDENT SPEAKER VERIFICATION	6819
<i>Zhongxin Bai, Xiao-Lei Zhang, Jingdong Chen, Northwestern Polytechnical University, China</i>	
SPE-P5.7: KNOWLEDGE DISTILLATION AND RANDOM ERASING DATA AUGMENTATION FOR TEXT-DEPENDENT SPEAKER VERIFICATION	6824
<i>Victoria Mingote, Antonio Miguel, Dayana Ribas, Alfonso Ortega, Eduardo Lleida, University of Zaragoza, Spain</i>	

SPE-P5.8: DISENTANGLED SPEECH EMBEDDINGS USING CROSS-MODAL SELF-SUPERVISION	6829
<i>Arsha Nagrani, Joon Son Chung, Samuel Albanie, Andrew Zisserman, Oxford University, United Kingdom</i>	
SPE-P5.9: IMPROVING DEEP CNN NETWORKS WITH LONG TEMPORAL CONTEXT FOR TEXT-INDEPENDENT SPEAKER VERIFICATION	6834
<i>Yong Zhao, Tianyan Zhou, Zhuo Chen, Jian Wu, Microsoft Corporation, United States</i>	
SPE-P5.10: MULTI-LEVEL DEEP NEURAL NETWORK ADAPTATION FOR SPEAKER VERIFICATION USING MMD AND CONSISTENCY REGULARIZATION	6839
<i>Weiwei Lin, Man-Mai Mak, Hong Kong Polytechnic University, Hong Kong SAR of China; Na Li, Dan Su, Dong Yu, Tencent AI Lab, China</i>	
SPE-P5.11: MULTI-TASK LEARNING FOR SPEAKER VERIFICATION AND VOICE TRIGGER DETECTION	6844
<i>Siddharth Sigtia, Erik Marchi, Sachin Kajarekar, Devang Naik, John Bridle, Apple, United States</i>	
SPE-P5.12: STATISTICS POOLING TIME DELAY NEURAL NETWORK BASED ON X-VECTOR FOR SPEAKER VERIFICATION	6849
<i>Qian-Bei Hong, Chung-Hsien Wu, Hsin-Min Wang, National Cheng Kung University and Academia Sinica, Taiwan; Chien-Lin Huang, Ping An Technology (Shenzhen) Co., Ltd., United States</i>	
 SPE-P6: SPEECH RECOGNITION: ACOUSTIC MODELLING I	
SPE-P6.1: SNDCNN: SELF-NORMALIZING DEEP CNNs WITH SCALED EXPONENTIAL LINEAR UNITS FOR SPEECH RECOGNITION	6854
<i>Zhen Huang, Tim Ng, Leo Liu, Henry Mason, Xiaodan Zhuang, Daben Liu, Apple, United States</i>	
SPE-P6.2: ROBUST MULTI-CHANNEL SPEECH RECOGNITION USING FREQUENCY ALIGNED NETWORK	6859
<i>Taejin Park, University of Southern California, United States; Kenichi Kumatani, Minhua Wu, Shiva Sundaram, Amazon, Inc., United States</i>	
SPE-P6.3: FULLY LEARNABLE FRONT-END FOR MULTI-CHANNEL ACOUSTIC MODELING USING SEMI-SUPERVISED LEARNING	6864
<i>Sanna Wager, Indiana University, United States; Aparna Khare, Minhua Wu, Kenichi Kumatani, Shiva Sundaram, Amazon, Inc., United States</i>	
SPE-P6.4: G2G: TTS-DRIVEN PRONUNCIATION LEARNING FOR GRAPHEMIC HYBRID ASR	6869
<i>Duc Le, Thilo Koehler, Christian Fuegen, Michael L. Seltzer, Facebook, United States</i>	
SPE-P6.5: TRANSFORMER-BASED ACOUSTIC MODELING FOR HYBRID SPEECH RECOGNITION	6874
<i>Yongqiang Wang, Abdelrahman Mohamed, Duc Le, Chunxi Liu, Alex Xiao, Jay Mahadeokar, Hongzhao Huang, Andros Tjandra, Xiaohui Zhang, Frank Zhang, Christian Fuegen, Geoffrey Zweig, Michael L. Seltzer, Facebook, United States</i>	
SPE-P6.6: SPECAUGMENT ON LARGE SCALE DATASETS	6879
<i>Daniel Park, Yu Zhang, Chung-Cheng Chiu, Youzheng Chen, Bo Li, William Chan, Quoc Le, Yonghui Wu, Google, Inc., United States</i>	
SPE-P6.7: FAST TRAINING OF DEEP NEURAL NETWORKS FOR SPEECH RECOGNITION	6884
<i>Guojing Cong, Brian Kingsbury, Chih-Chieh Yang, IBM, United States; Tianyi Liu, Georgia Institute of Technology, United States</i>	
SPE-P6.8: UNSUPERVISED PRE-TRAINING OF BIDIRECTIONAL SPEECH ENCODERS VIA MASKED RECONSTRUCTION	6889
<i>Weiran Wang, Qingming Tang, Amazon, Inc., United States; Karen Livescu, TTI-Chicago, United States</i>	

SPE-P6.9: DISTILLING ATTENTION WEIGHTS FOR CTC-BASED ASR SYSTEMS.....	6894
<i>Takafumi Moriya, Hiroshi Sato, Tomohiro Tanaka, Takanori Ashihara, Ryo Masumura, Yusuke Shinohara, NTT Corporation, Japan</i>	
SPE-P6.10: DEJA-VU: DOUBLE FEATURE PRESENTATION AND ITERATED LOSS IN DEEP TRANSFORMER NETWORKS	6899
<i>Andros Tjandra, Nara Institute of Science and Technology, Japan; Chunxi Liu, Frank Zhang, Xiaohui Zhang, Yongqiang Wang, Gabriel Synnaeve, Facebook AI, United States; Satoshi Nakamura, Nara Institute of Science and Technology, Japan; Geoffrey Zweig, Facebook AI, United States</i>	
SPE-P6.11: FRAME-LEVEL MMI AS A SEQUENCE DISCRIMINATIVE TRAINING CRITERION FOR LVCSR	6904
<i>Wilfried Michel, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
SPE-P6.12: CROSS LINGUAL TRANSFER LEARNING FOR ZERO-RESOURCE DOMAIN ADAPTATION	6909
<i>Alberto Abad, INESC-ID/IST, Portugal; Peter Bell, Andrea Carmantini, Steve Renals, CSTR/University of Edinburgh, United Kingdom</i>	
SPE-P7: SPEECH ENHANCEMENT III: HEARING AIDS AND OTHER APPLICATIONS	
SPE-P7.1: IMPROVING ROBUSTNESS OF DEEP LEARNING BASED MONAURAL SPEECH ENHANCEMENT AGAINST PROCESSING ARTIFACTS	6914
<i>Ke Tan, DeLiang Wang, Ohio State University, United States</i>	
SPE-P7.2: CAD-AEC: CONTEXT-AWARE DEEP ACOUSTIC ECHO CANCELLATION.....	6919
<i>Amin Fazel, Mostafa El-Khamy, Jungwon Lee, Samsung, United States</i>	
SPE-P7.3: ARTIFICIAL BANDWIDTH EXTENSION USING CONDITIONAL VARIATIONAL AUTO-ENCODERS AND ADVERSARIAL LEARNING	6924
<i>Pramod Bachhav, Massimiliano Todisco, Nicholas Evans, EURECOM, France</i>	
SPE-P7.4: USING AUTOMATIC SPEECH RECOGNITION AND SPEECH SYNTHESIS TO IMPROVE THE INTELLIGIBILITY OF COCHLEAR IMPLANT USERS IN REVERBERANT LISTENING ENVIRONMENTS	6929
<i>Kevin Chu, Leslie Collins, Boyla Mainsah, Duke University, United States</i>	
SPE-P7.5: SPEECH INTELLIGIBILITY ENHANCEMENT BY EQUALIZATION FOR IN-CAR APPLICATIONS	6934
<i>Enguerrand Gentet, Groupe PSA, France; Bertrand David, LTCI Télécom Paris, France; Sébastien Denjean, Groupe PSA, France; Gaël Richard, LTCI Télécom Paris, France; Vincent Roussarie, Groupe PSA, France</i>	
SPE-P7.6: MAXIMUM LIKELIHOOD ESTIMATION OF THE INTERFERENCE-PLUS-NOISE CROSS POWER SPECTRAL DENSITY MATRIX FOR OWN VOICE RETRIEVAL	6939
<i>Poul Hoang, Zheng-Hua Tan, Aalborg University, Denmark; Thomas Lunner, Jan Mark de Haan, Jesper Jensen, Oticon A/S, Denmark</i>	
SPE-P7.7: A CONSTRAINED MAXIMUM LIKELIHOOD ESTIMATOR OF SPEECH AND NOISE SPECTRA WITH APPLICATION TO MULTI-MICROPHONE NOISE REDUCTION	6944
<i>Adel Zahedi, Michael Syskind Pedersen, Oticon A/S, Denmark; Jan Østergaard, Aalborg University, Denmark; Lars Bramsløw, Thomas Ulrich Christiansen, Jesper Jensen, Oticon A/S, Denmark</i>	
SPE-P7.8: CLCNET: DEEP LEARNING-BASED NOISE REDUCTION FOR HEARING AIDS USING COMPLEX LINEAR CODING	6949
<i>Hendrik Schröter, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Tobias Rosenkranz, Alberto Nicolas Escalante Banuelos, Sivantos GmbH, Germany; Marc Aubreville, Andreas Maier, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany</i>	

SPE-P7.9: A TIME-FREQUENCY NETWORK WITH CHANNEL ATTENTION AND NON-LOCAL MODULES FOR ARTIFICIAL BANDWIDTH EXTENSION	6954
<i>Yuanjie Dong, Yaxing Li, Xiaoqi Li, Shan Xu, Dan Wang, Zhihui Zhang, Shengwu Xiong, School of Computer Science and Technology, Wuhan University of Technology, China</i>	
SPE-P7.10: MASKING AND INPAINTING: A TWO-STAGE SPEECH ENHANCEMENT APPROACH FOR LOW SNR AND NON-STATIONARY NOISE	6959
<i>Xiang Hao, Xiangdong Su, Inner Mongolia University, China; Shixue Wen, Sogou incorporated, China; Zhiyu Wang, Inner Mongolia University, China; Yiqian Pan, Sogou incorporated, China; Feilong Bao, Inner Mongolia University, China; Wei Chen, Sogou incorporated, China</i>	
SPE-P7.11: 3-D ACOUSTIC MODELING FOR FAR-FIELD MULTI-CHANNEL SPEECH RECOGNITION	6964
<i>Anurenjan Purushothaman, Anirudh Sreeram, Sriram Ganapathy, Indian Institute of Science, Bangalore, India</i>	
 SPE-P8: ROBUST SPEECH RECOGNITION	
SPE-P8.1: IMPROVING REVERBERANT SPEECH TRAINING USING DIFFUSE ACOUSTIC SIMULATION	6969
<i>Zhenyu Tang, University of Maryland, United States; Lianwu Chen, Bo Wu, Dong Yu, Tencent AI Lab, United States; Dinesh Manocha, University of Maryland, United States</i>	
SPE-P8.2: LOW-FREQUENCY COMPENSATED SYNTHETIC IMPULSE RESPONSES FOR IMPROVED FAR-FIELD SPEECH RECOGNITION	6974
<i>Zhenyu Tang, Hsien-Yu Meng, Dinesh Manocha, University of Maryland, United States</i>	
SPE-P8.3: AIPNET: GENERATIVE ADVERSARIAL PRE-TRAINING OF ACCENT-INVARIANT NETWORKS FOR END-TO-END SPEECH RECOGNITION	6979
<i>Yi-Chen Chen, National Taiwan University, Taiwan; Zhaojun Yang, Ching-Feng Yeh, Mahaveer Jain, Michael L. Seltzer, Facebook, United States</i>	
SPE-P8.4: AUDIO-VISUAL RECOGNITION OF OVERLAPPED SPEECH FOR THE LRS2 DATASET	6984
<i>Jianwei Yu, Chinese University of Hong Kong, Hong Kong SAR of China; Shi-Xiong Zhang, Tencent AI Lab, United States; Jian Wu, Tencent, China; Shahram Ghorbani, University of Texas at Dallas, United States; Bo Wu, Shiyin Kang, Tencent, China; Shansong Liu, Xunying Liu, Helen Meng, Chinese University of Hong Kong, Hong Kong SAR of China; Dong Yu, Tencent, United States</i>	
SPE-P8.5: MULTI-TASK SELF-SUPERVISED LEARNING FOR ROBUST SPEECH RECOGNITION	6989
<i>Mirco Ravanelli, Université de Montréal, Canada; Jianyuan Zhong, University of Rochester, United States; Santiago Pascual, Universitat Politècnica de Catalunya, Spain; Pawel Swietojanski, University of New South Wales, Australia; Joao Monteiro, Institut National de la Recherche Scientifique/Computer Research Institute of Montréal, Canada; Jan Trmal, Johns Hopkins University, Canada; Yoshua Bengio, Université de Montréal, Canada</i>	
SPE-P8.6: END-TO-END MULTI-PERSON AUDIO/VISUAL AUTOMATIC SPEECH RECOGNITION	6994
<i>Otavio Braga, Takaki Makino, Olivier Siohan, Hank Liao, Google, United States</i>	
SPE-P8.7: END-TO-END AUTOMATIC SPEECH RECOGNITION INTEGRATED WITH CTC-BASED VOICE ACTIVITY DETECTION	6999
<i>Takenori Yoshimura, Tomoki Hayashi, Kazuya Takeda, Nagoya University, Japan; Shinji Watanabe, Johns Hopkins University, United States</i>	
SPE-P8.8: END-TO-END TRAINING OF TIME DOMAIN AUDIO SEPARATION AND RECOGNITION	7004
<i>Thilo von Neumann, Paderborn University, Germany; Keisuke Kinoshita, NTT, Japan; Lukas Drude, Christoph Boeddeker, Paderborn University, Germany; Marc Delcroix, Tomohiro Nakatani, NTT, Japan; Reinhold Haeb-Umbach, Paderborn University, Germany</i>	

SPE-P8.9: IMPROVING NOISE ROBUST AUTOMATIC SPEECH RECOGNITION WITH SINGLE-CHANNEL TIME-DOMAIN ENHANCEMENT NETWORK	7009
<i>Keisuke Kinoshita, Tsubasa Ochiai, Marc Delcroix, Tomohiro Nakatani, NTT, Japan</i>	
SPE-P8.10: A PRACTICAL TWO-STAGE TRAINING STRATEGY FOR MULTI-STREAM END-TO-END SPEECH RECOGNITION	7014
<i>Ruizhi Li, Gregory Sell, Johns Hopkins University, United States; Xiaofei Wang, Microsoft, United States; Shinji Watanabe, Hynek Hermansky, Johns Hopkins University, United States</i>	
SPE-P8.11: MULTI-SCALE OCTAVE CONVOLUTIONS FOR ROBUST SPEECH RECOGNITION	7019
<i>Joanna Rownicka, Peter Bell, Steve Renals, University of Edinburgh, United Kingdom</i>	
SPE-P8.12: LEARNING NOISE INVARIANT FEATURES THROUGH TRANSFER LEARNING FOR ROBUST END-TO-END SPEECH RECOGNITION	7024
<i>Shucong Zhang, University of Edinburgh, United Kingdom; Cong-Thanh Do, Rama Doddipatla, Toshiba Research Europe Limited Company, United Kingdom; Steve Renals, University of Edinburgh, United Kingdom</i>	
SPE-P9: END-TO-END SPEECH RECOGNITION III: GENERAL TOPICS	
SPE-P9.1: IMPROVING SPEECH RECOGNITION USING CONSISTENT PREDICTIONS ON SYNTHESIZED SPEECH	7029
<i>Gary Wang, Simon Fraser University, Canada; Andrew Rosenberg, Zhehuai Chen, Yu Zhang, Bhuvana Ramabhadran, Yonghui Wu, Pedro Moreno, Google, United States</i>	
SPE-P9.2: ATTENTION-BASED ASR WITH LIGHTWEIGHT AND DYNAMIC CONVOLUTIONS	7034
<i>Yuya Fujita, Yahoo Japan Corporation, Japan; Aswin Shanmugam Subramanian, Johns Hopkins University, United States; Motoi Omachi, Yahoo Japan Corporation, Japan; Shinji Watanabe, Johns Hopkins University, United States</i>	
SPE-P9.3: AN ATTENTION-BASED JOINT ACOUSTIC AND TEXT ON-DEVICE END-TO-END MODEL	7039
<i>Tara Sainath, Ruoming Pang, Ron Weiss, Yanzhang He, Chung-cheng Chiu, Trevor Strohman, Google, Inc., United States</i>	
SPE-P9.4: STRUCTURED SPARSE ATTENTION FOR END-TO-END AUTOMATIC SPEECH RECOGNITION	7044
<i>Jiabin Xue, Tieran Zheng, Jiqing Han, Harbin Institute of Technology, China</i>	
SPE-P9.5: RNN-TRANSDUCER WITH STATELESS PREDICTION NETWORK	7049
<i>Mohammadreza Ghodsi, Xiaofeng Liu, James Apfel, Rodrigo Cabrera, Eugene Weinstein, Google, United States</i>	
SPE-P9.6: SEQUENCE-LEVEL CONSISTENCY TRAINING FOR SEMI-SUPERVISED END-TO-END AUTOMATIC SPEECH RECOGNITION	7054
<i>Ryo Masumura, Mana Ithori, Akihiko Takashima, Takafumi Moriya, Atsushi Ando, Yusuke Shinohara, NTT Corporation, Japan</i>	
SPE-P9.7: INDEPENDENT LANGUAGE MODELING ARCHITECTURE FOR END-TO-END ASR	7059
<i>Van Tung Pham, Haihua Xu, Nanyang Technological University, Singapore; Yerbolat Khassanov, Nazarbayev University, Kazakhstan; Zhiping Zeng, Eng Siong Chng, Nanyang Technological University, Singapore; Chongjia Ni, Bin Ma, Alibaba Group, Singapore; Haizhou Li, National University of Singapore, Singapore</i>	
SPE-P9.8: SPEAKER-AWARE TRAINING OF ATTENTION-BASED END-TO-END SPEECH RECOGNITION USING NEURAL SPEAKER EMBEDDINGS	7064
<i>Aku Rouhe, Tuomas Kaseva, Mikko Kurimo, Aalto University, Finland</i>	
SPE-P9.9: GENERATING SYNTHETIC AUDIO DATA FOR ATTENTION-BASED SPEECH RECOGNITION SYSTEMS	7069
<i>Nick Rossenbach, Albert Zeyer, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	

SPE-P9.10: CORRECTION OF AUTOMATIC SPEECH RECOGNITION WITH TRANSFORMER SEQUENCE-TO-SEQUENCE MODEL	7074
<i>Oleksii Hrinchuk, Moscow Institute of Physics and Technology, NVIDIA, Russia; Mariya Popova, Carnegie Mellon University and NVIDIA, United States; Boris Ginsburg, NVIDIA, United States</i>	
SPE-P9.11: EXPLORING PRE-TRAINING WITH ALIGNMENTS FOR RNN TRANSDUCER BASED END-TO-END SPEECH RECOGNITION	7079
<i>Hu Hu, Georgia Institute of Technology, United States; Rui Zhao, Jinyu Li, Liang Lu, Yifan Gong, Microsoft, United States</i>	
SPE-P9.12: SELF-TRAINING FOR END-TO-END SPEECH RECOGNITION	7084
<i>Jacob Kahn, Ann Lee, Awni Hannun, Facebook, United States</i>	
 SPE-P10: SPEAKER DIARIZATION AND CHARACTERIZATION	
SPE-P10.1: TOWARD BETTER SPEAKER EMBEDDINGS: AUTOMATED COLLECTION OF SPEECH SAMPLES FROM UNKNOWN DISTINCT SPEAKERS	7089
<i>Minh Pham, Zeqian Li, Jacob Whitehill, Worcester Polytechnic Institute, United States</i>	
SPE-P10.2: CHANNEL ADVERSARIAL TRAINING FOR SPEAKER VERIFICATION AND DIARIZATION	7094
<i>Chau Luu, Peter Bell, Steve Renals, University of Edinburgh, United Kingdom</i>	
SPE-P10.3: PROGRESSIVE MULTI-TARGET NETWORK BASED SPEECH ENHANCEMENT WITH SNR-PRESELECTION FOR ROBUST SPEAKER DIARIZATION	7099
<i>Lei Sun, Jun Du, University of Science and Technology of China, China; Xueyang Zhang, Tian Gao, Xin Fang, IFLYTEK Research, China; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
SPE-P10.4: IMPROVED LARGE-MARGIN SOFTMAX LOSS FOR SPEAKER DIARISATION	7104
<i>Yassir Fathullah, Chao Zhang, Philip Woodland, University of Cambridge, United Kingdom</i>	
SPE-P10.5: SPEAKER DIARIZATION WITH SESSION-LEVEL SPEAKER EMBEDDING REFINEMENT USING GRAPH NEURAL NETWORKS	7109
<i>Jixuan Wang, University of Toronto, Canada; Xiong Xiao, Jian Wu, Ranjani Ramamurthy, Microsoft, Canada; Frank Rudzicz, Michael Brudno, University of Toronto, Canada</i>	
SPE-P10.6: OVERLAP-AWARE DIARIZATION: RESEGMENTATION USING NEURAL END-TO-END OVERLAPPED SPEECH DETECTION	7114
<i>Latané Bullock, Rice University, United States; Hervé Bredin, LIMSI, CNRS, Univ. Paris-Sud, Université Paris-Saclay, France; Leiby Paola Garcia Perera, Johns Hopkins University, United States</i>	
SPE-P10.7: ON THE IMPORTANCE OF VOCAL TRACT CONSTRICTION FOR SPEAKER CHARACTERIZATION: THE WHISPERED SPEECH STUDY	7119
<i>Rohan Kumar Das, Haizhou Li, National University of Singapore, Singapore</i>	
SPE-P10.8: PYANNOTE.AUDIO: NEURAL BUILDING BLOCKS FOR SPEAKER DIARIZATION	7124
<i>Hervé Bredin, Ruiqing Yin, LIMSI, CNRS, Université Paris-Saclay, France; Juan Manuel Coria, LIMSI, CNRS, Univ. Paris-Sud, Université Paris-Saclay, France; Gregory Gelly, LIMSI, CNRS, France; Pavel Korshunov, Idiap Research Institute, Switzerland; Marvin Lavechin, Ecole Normale Supérieure/INRIA, France; Diego Fustes, Toptal LLC, Spain; Hadrien Titeux, Université PSL, France; Wassim Bouaziz, Ecole Normale Supérieure/INRIA, France; Marie-Philippe Gill, Ecole de Technologie Supérieure, Université du Québec, Canada</i>	
SPE-P10.9: SPEAKER EMBEDDINGS INCORPORATING ACOUSTIC CONDITIONS FOR DIARIZATION	7129
<i>Yosuke Higuchi, Waseda University, Japan; Masayuki Suzuki, Gakuto Kurata, IBM, Japan</i>	

SPE-P10.10: SUPERVISED ONLINE DIARIZATION WITH SAMPLE MEAN LOSS FOR MULTI-DOMAIN DATA	7134
<i>Enrico Fini, PerVoice, Italy; Alessio Brutti, Fondazione Bruno Kessler, Italy</i>	
SPE-P10.11: INVESTIGATION OF SPECAUGMENT FOR DEEP SPEAKER EMBEDDING LEARNING	7139
<i>Shuai Wang, Shanghai Jiao Tong University, China; Johan Rohdin, Oldřich Plchot, Lukáš Burget, Brno University of Technology, Czech Republic; Kai Yu, Shanghai Jiao Tong University, China; Jan Cernocky, Brno University of Technology, Czech Republic</i>	
SPE-P11: EMOTION	
SPE-P11.1: SPEAKER-INVARIANT AFFECTIVE REPRESENTATION LEARNING VIA ADVERSARIAL TRAINING	7144
<i>Haoqi Li, University of Southern California, United States; Ming Tu, Jing Huang, JD AI Research, United States; Shrikanth Narayanan, Panayiotis Georgiou, University of Southern California, United States</i>	
SPE-P11.2: SPEECH SENTIMENT ANALYSIS VIA PRE-TRAINED FEATURES FROM END-TO-END ASR MODELS	7149
<i>Zhiyun Lu, University of Southern California, United States; Liangliang Cao, Yu Zhang, Chung-Cheng Chiu, James Fan, Google, Inc., United States</i>	
SPE-P11.3: GENDER DIFFERENCES ON THE PERCEPTION AND PRODUCTION OF UTTERANCES WITH WILLINGNESS AND RELUCTANCE IN CHINESE	7154
<i>Wenqian Li, Shanghai Jiao Tong University, China; Janice Wing-Sze Wong, Hong Kong Baptist University, Hong Kong SAR of China; Jung-yueh Tu, National Chengchi University, Taiwan</i>	
SPE-P11.4: HIERARCHICAL ATTENTION TRANSFER NETWORKS FOR DEPRESSION ASSESSMENT FROM SPEECH	7159
<i>Ziping Zhao, Zhongtian Bao, Tianjin Normal University, China; Zixing Zhang, Imperial College London, United Kingdom; Nicholas Cummins, University of Augsburg, Germany; Haishuai Wang, Fairfield University, United States and Tianjin Normal University, China; Björn Schuller, Imperial College London, United Kingdom and University of Augsburg, Germany</i>	
SPE-P11.5: DETECTING EMOTION PRIMITIVES FROM SPEECH AND THEIR USE IN DISCERNING CATEGORICAL EMOTIONS	7164
<i>Vasudha Kowtha, University of Maryland, College Park, United States; Vikramjit Mitra, Chris Bartels, Erik Marchi, Sue Booker, William Caruso, Sachin Kajarekar, Devang Naik, Apple, United States</i>	
SPE-P11.6: X-VECTORS MEET EMOTIONS: A STUDY ON DEPENDENCIES BETWEEN EMOTION AND SPEAKER RECOGNITION	7169
<i>Raghavendra Pappagari, Tianzi Wang, Jesús Villalba, Nanxin Chen, Najim Dehak, Johns Hopkins University, United States</i>	
SPE-P11.7: SPEECH EMOTION RECOGNITION WITH LOCAL-GLOBAL AWARE DEEP REPRESENTATION LEARNING	7174
<i>Jiaxing Liu, Zhilei Liu, Longbiao Wang, Lili Guo, Tianjin University, China; Jianwu Dang, Japan Advanced Institute of Science and Technology, Japan</i>	
SPE-P11.8: MULTI-HEAD ATTENTION FOR SPEECH EMOTION RECOGNITION WITH AUXILIARY LEARNING OF GENDER RECOGNITION	7179
<i>Anish Nediyanath, Periyasamy Paramasivam, Promod Yenigalla, Samsung R&D Institute India - Bangalore, India</i>	
SPE-P11.9: GENERATING AND PROTECTING AGAINST ADVERSARIAL ATTACKS FOR DEEP SPEECH-BASED EMOTION RECOGNITION MODELS	7184
<i>Zhao Ren, Alice Baird, Jing Han, University of Augsburg, Germany; Zixing Zhang, Imperial College London, United Kingdom; Björn Schuller, Imperial College London, United Kingdom and University of Augsburg, Germany</i>	
SPE-P11.10: DEEP ENCODED LINGUISTIC AND ACOUSTIC CUES FOR ATTENTION BASED END TO END SPEECH EMOTION RECOGNITION	7189
<i>Swapnil Bhosale, Rupayan Chakraborty, Sunil Kumar Koppurapu, TCS Research and Innovation, India</i>	

SPE-P11.11: MULTI-CONDITIONING AND DATA AUGMENTATION USING GENERATIVE NOISE MODEL FOR SPEECH EMOTION RECOGNITION IN NOISY CONDITIONS	7194
<i>Upasana Tiwari, Meet Soni, Rupayan Chakraborty, Ashish Panda, Sunil Kumar Kopparapu, TCS Research and Innovation, India</i>	
SPE-P11.12: A SELF-ATTENTIVE EMOTION RECOGNITION NETWORK	7199
<i>Harris Partaourides, Kostantinos Papadamou, Cyprus University of Technology, Cyprus; Nicolas Kourtellis, Telefonica Research, Spain; Ilias Leontiadis, Samsung AI, United Kingdom; Sotirios Chatzis, Cyprus University of Technology, Cyprus</i>	
SPE-P12: MACHINE LEARNING FOR SPEECH SYNTHESIS II	
SPE-P12.1: EFFICIENT SHALLOW WAVENET VOCODER USING MULTIPLE SAMPLES OUTPUT BASED ON LAPLACIAN DISTRIBUTION AND LINEAR PREDICTION	7204
<i>Patrick Lumban Tobing, Yi-Chiao Wu, Tomoki Hayashi, Kazuhiro Kobayashi, Tomoki Toda, Nagoya University, Japan</i>	
SPE-P12.2: FLOW-TTS: A NON-AUTOREGRESSIVE NETWORK FOR TEXT TO SPEECH BASED ON FLOW	7209
<i>Chenfeng Miao, Shuang Liang, Minchuan Chen, Jun Ma, Shaojun Wang, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
SPE-P12.3: WAVEFFJORD: FFJORD-BASED VOCODER FOR STATISTICAL PARAMETRIC SPEECH SYNTHESIS	7214
<i>Ning-Qian Wu, Zhen-Hua Ling, University of Science and Technology of China, China</i>	
SPE-P12.4: IMPROVING LPCNET-BASED TEXT-TO-SPEECH WITH LINEAR PREDICTION-STRUCTURED MIXTURE DENSITY NETWORK	7219
<i>Min-Jae Hwang, Yonsei university, Korea (South); Eunwoo Song, Naver corporation, Korea (South); Ryuichi Yamamoto, LINE Corporation, Japan; Frank K. Soong, Microsoft Research Asia, China; Hong-Goo Kang, Yonsei university, Korea (South)</i>	
SPE-P12.5: DISENTANGLING TIMBRE AND SINGING STYLE WITH MULTI-SINGER SINGING SYNTHESIS SYSTEM	7224
<i>Juheon Lee, Hyeong-Seok Choi, Junghyun Koo, Kyogu Lee, Seoul National University, Korea (South)</i>	
SPE-P12.6: SEQUENCE-TO-SEQUENCE SINGING SYNTHESIS USING THE FEED-FORWARD TRANSFORMER	7229
<i>Merlijn Blaauw, Jordi Bonada, Universitat Pompeu Fabra, Spain</i>	
SPE-P12.7: KOREAN SINGING VOICE SYNTHESIS BASED ON AUTO-REGRESSIVE BOUNDARY EQUILIBRIUM GAN	7234
<i>Soonbeom Choi, Wonil Kim, Saeyul Park, Sangeon Yong, Juhan Nam, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
SPE-P12.8: FAST AND HIGH-QUALITY SINGING VOICE SYNTHESIS SYSTEM BASED ON CONVOLUTIONAL NEURAL NETWORKS	7239
<i>Kazuhiro Nakamura, Shinji Takaki, Kei Hashimoto, Keiichiro Oura, Techno-Speech, Japan; Yoshihiko Nankaku, Nagoya Institute of Technology, Japan; Keiichi Tokuda, Techno-Speech, Japan</i>	
SPE-P12.9: HYBRID NEURAL-PARAMETRIC F0 MODEL FOR SINGING SYNTHESIS	7244
<i>Jordi Bonada, Merlijn Blaauw, Universitat Pompeu Fabra, Spain</i>	
SPE-P12.10: UTTERANCE-LEVEL SEQUENTIAL MODELING FOR DEEP GAUSSIAN PROCESS BASED SPEECH SYNTHESIS USING SIMPLE RECURRENT UNIT	7249
<i>Tomoki Koriyama, Hiroshi Saruwatari, University of Tokyo, Japan</i>	
SPE-P12.11: EMOTIONAL SPEECH SYNTHESIS WITH RICH AND GRANULARIZED CONTROL	7254
<i>Se-Yun Um, Sangshin Oh, Kyungguen Byun, Yonsei University, Korea (South); Inseon Jang, Chunghyun Ahn, Electronics and Telecommunications Research Institute (ETRI), Korea (South); Hong-Goo Kang, Yonsei University, Korea (South)</i>	

SPE-P12.12: TOWARDS UNSUPERVISED SPEECH RECOGNITION AND SYNTHESIS WITH QUANTIZED SPEECH REPRESENTATION LEARNING	7259
<i>Alexander H. Liu, Tao Tu, Hung-yi Lee, Lin-shan Lee, National Taiwan University, Taiwan</i>	
SPE-P13: SPEECH SEPARATION AND EXTRACTION III	
SPE-P13.1: AN EMPIRICAL STUDY OF CONV-TASNET	7264
<i>Berkant Kadioglu, Northeastern University, United States; Michael Horgan, Xiaoyu Liu, Jordi Pons, Dan Darcy, Vivek Kumar, Dolby Laboratories, United States</i>	
SPE-P13.2: MASK-DEPENDENT PHASE ESTIMATION FOR MONAURAL SPEAKER SEPARATION	7269
<i>Zhaoheng Ni, Graduate Center, City University of New York, United States; Michael I Mandel, Brooklyn College, City University of New York, United States</i>	
SPE-P13.3: JOINT PHONEME ALIGNMENT AND TEXT-INFORMED SPEECH SEPARATION ON HIGHLY CORRUPTED SPEECH	7274
<i>Kilian Schulze-Forster, LTCI, Télécom Paris, Institut Polytechnique de Paris, France; Clement S. J. Doire, Audionamix, France; Gaël Richard, Roland Badeau, LTCI, Télécom Paris, Institut Polytechnique de Paris, France</i>	
SPE-P13.4: SINGLE-CHANNEL SPEECH SEPARATION INTEGRATING PITCH INFORMATION BASED ON A MULTI TASK LEARNING FRAMEWORK	7279
<i>Xiang Li, Rui Liu, Tao Song, Xihong Wu, Jing Chen, Peking University, China</i>	
SPE-P13.5: CONTINUOUS SPEECH SEPARATION: DATASET AND ANALYSIS	7284
<i>Zhuo Chen, Takuya Yoshioka, Liang Lu, Tianyan Zhou, Zhong Meng, Yi Luo, Jian Wu, Xiong Xiao, Jinyu Li, Microsoft, United States</i>	
SPE-P13.6: THE SOUND OF MY VOICE: SPEAKER REPRESENTATION LOSS FOR TARGET VOICE SEPARATION	7289
<i>Seongkyu Mun, Soyeon Choe, Jaesung Huh, Joon Son Chung, Naver Corporation, Korea (South)</i>	
SPE-P13.7: SPEAKER-AWARE TARGET SPEAKER ENHANCEMENT BY JOINTLY LEARNING WITH SPEAKER EMBEDDING EXTRACTION	7294
<i>Xuan Ji, Meng Yu, Chunlei Zhang, Dan Su, Tao Yu, Xiaoyu Liu, Dong Yu, Tencent, China</i>	
SPE-P13.8: FAR-FIELD LOCATION GUIDED TARGET SPEECH EXTRACTION USING END-TO-END SPEECH RECOGNITION OBJECTIVES	7299
<i>Aswin Shanmugam Subramanian, Johns Hopkins University, United States; Chao Weng, Meng Yu, Tencent AI, United States; Shi-Xiong Zhang, Tencent AI Lab, United States; Yong Xu, Tencent AI, United States; Shinji Watanabe, Johns Hopkins University, United States; Dong Yu, Tencent AI, United States</i>	
SPE-P13.9: A STUDY OF CHILD SPEECH EXTRACTION USING JOINT SPEECH ENHANCEMENT AND SEPARATION IN REALISTIC CONDITIONS	7304
<i>Xin Wang, Jun Du, University of Science and Technology of China, China; Alejandrina Cristia, Laboratoire de Sciences Cognitives et Psycholinguistique, France; Lei Sun, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
SPE-P13.10: AN ANALYSIS OF SPEECH ENHANCEMENT AND RECOGNITION LOSSES IN LIMITED RESOURCES MULTI-TALKER SINGLE CHANNEL AUDIO-VISUAL ASR	7309
<i>Luca Pasa, University of Padova, Italy; Giovanni Morrone, University of Modena and Reggio Emilia, Italy; Leonardo Badino, Istituto Italiano di Tecnologia (IIT), Italy</i>	
SPE-P13.11: DEEP AUDIO-VISUAL SPEECH SEPARATION WITH ATTENTION MECHANISM	7314
<i>Chenda Li, Yanmin Qian, Shanghai Jiao Tong University, China</i>	

SPE-P13.12: ENHANCING END-TO-END MULTI-CHANNEL SPEECH SEPARATION VIA SPATIAL FEATURE LEARNING	7319
<i>Rongzhi Gu, Peking University Shenzhen Graduate School, China; Shi-Xiong Zhang, Tencent AI Lab, United States; Lianwu Chen, Yong Xu, Meng Yu, Dan Su, Tencent, China; Yuexian Zou, Peking University Shenzhen Graduate School, China; Dong Yu, Tencent, United States</i>	
SPE-P14: SPEECH PRODUCTION	
SPE-P14.1: DETECTION AND ANALYSIS OF T/D DELETION IN LIBRISPEECH	7324
<i>Jiahong Yuan, Baidu Research, United States; Hui Lin, LAIX Inc., China; Yang Liu, Amazon Alexa AI, United States</i>	
SPE-P14.2: PREDICTION OF VOICING AND THE F0 CONTOUR FROM ELECTROMAGNETIC ARTICULOGRAPHY DATA FOR ARTICULATION-TO-SPEECH SYNTHESIS	7329
<i>Simon Stone, Philipp Schmidt, Peter Birkholz, Technische Universität Dresden, Germany</i>	
SPE-P14.3: A COMPARATIVE STUDY OF ESTIMATING ARTICULATORY MOVEMENTS FROM PHONEME SEQUENCES AND ACOUSTIC FEATURES	7334
<i>Abhayjeet Singh, Aravind Illa, Prasanta Kumar Ghosh, Indian Institute of Science, India</i>	
SPE-P14.4: AUTOMATIC VOCAL TRACT LANDMARK TRACKING IN RTMRI USING FULLY CONVOLUTIONAL NETWORKS AND KALMAN FILTER	7339
<i>Sasan Asadiabadi, Engin Erzin, Koc University, Turkey</i>	
SPE-P14.5: SPEECH-BASED PARAMETER ESTIMATION OF AN ASYMMETRIC VOCAL FOLD OSCILLATION MODEL AND ITS APPLICATION IN DISCRIMINATING VOCAL FOLD PATHOLOGIES	7344
<i>Wenbo Zhao, Rita Singh, Carnegie Mellon University, United States</i>	
SPE-P14.6: END-TO-END ARTICULATORY MODELING FOR DYSARTHIC ARTICULATORY ATTRIBUTE DETECTION	7349
<i>Yuqin Lin, Longbiao Wang, Jianwu Dang, Tianjin University, China; Sheng Li, Chenchen Ding, National Institute of Information and Communications Technology (NICT), Japan</i>	
SPE-P14.7: VOCAL TRACT ARTICULATORY CONTOUR DETECTION IN REAL-TIME MAGNETIC RESONANCE IMAGES USING SPATIO-TEMPORAL CONTEXT	7354
<i>S Ashwin Hebbar, National Institute of Technology Karnataka, India; Rahul Sharma, Krishna Somandepalli, Asterios Toutios, Shrikanth Narayanan, University of Southern California, United States</i>	
SPE-P14.8: RETRIEVING VOCAL-TRACT RESONANCE AND ANTI-RESONANCE FROM HIGH-PITCHED VOWELS USING A RAHMONIC SUBTRACTION TECHNIQUE	7359
<i>Zhao Zhang, Kiyoshi Honda, Jianguo Wei, Tianjin University, China</i>	
SPE-P14.9: EPOCH EXTRACTION FROM A SPEECH SIGNAL USING GAMMATONE WAVELETS IN A SCATTERING NETWORK	7364
<i>Pavan Kulkarni, Jishnu Sadasivan, Indian Institute of Science, India; Aniruddha Adiga, University of Virginia, United States; Chandra Sekhar Seelamantula, Indian Institute of Science, India</i>	
SPE-P14.10: STUDY OF CLOSED PHASE RESONANCE BANDWIDTHS FOR ORAL AND NASAL TRACTS USING ZERO TIME WINDOWING	7369
<i>Haala Deebe Abbas, International Institute of Information Technology, Hyderabad, India; RaviShankar Prasad, Idiap Research Institute, Switzerland; Bhanu teja Nellore, Suryakanth V Gangashetty, International Institute of Information Technology, Hyderabad, India</i>	
SPE-P14.11: ALGORITHMIC EXPLORATION OF AMERICAN ENGLISH DIALECTS	7374
<i>Alëna Aksënova, Stony Brook University, United States; Antoine Bruguier, Amanda Ritchart-Scott, Uri Mendlovic, Google LLC, United States</i>	

SPE-P14.12: COMPARISON OF GLOTTAL CLOSURE INSTANTS DETECTION	7379
ALGORITHMS FOR EMOTIONAL SPEECH	
<i>Sudarsana Reddy Kadiri, Paavo Alku, Aalto University, Finland; Yegnanarayana B, Indian Institute of Technology Hyderabad, India</i>	
 SPE-P15: SPEECH RECOGNITION: ADAPTATION	
SPE-P15.1: UNSUPERVISED SPEAKER ADAPTATION USING ATTENTION-BASED	7384
SPEAKER MEMORY FOR END-TO-END ASR	
<i>Leda Sari, University of Illinois at Urbana-Champaign, United States; Niko Moritz, Takaaki Hori, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SPE-P15.2: L-VECTOR: NEURAL LABEL EMBEDDING FOR DOMAIN ADAPTATION	7389
<i>Zhong Meng, Microsoft Corporation, United States; Hu Hu, Georgia Institute of Technology, United States; Jinyu Li, Changliang Liu, Yan Huang, Yifan Gong, Microsoft Corporation, United States; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
SPE-P15.3: ACOUSTIC MODEL ADAPTATION FOR PRESENTATION TRANSCRIPTION	7394
AND INTELLIGENT MEETING ASSISTANT SYSTEMS	
<i>Yan Huang, Yifan Gong, Microsoft Corporation, United States</i>	
SPE-P15.4: USING PERSONALIZED SPEECH SYNTHESIS AND NEURAL LANGUAGE	7399
GENERATOR FOR RAPID SPEAKER ADAPTATION	
<i>Yan Huang, Lei He, Wenning Wei, William Gale, Jinyu Li, Yifan Gong, Microsoft Corporation, United States</i>	
SPE-P15.5: ATTENTION-BASED GATED SCALING ADAPTIVE ACOUSTIC MODEL FOR	7404
CTC-BASED SPEECH RECOGNITION	
<i>Fenglin Ding, Wu Guo, Li-Rong Dai, Jun Du, University of Science and Technology of China, China</i>	
SPE-P15.6: ADAPTIVE KNOWLEDGE DISTILLATION BASED ON ENTROPY.....	7409
<i>Kisoo Kwon, Hwidong Na, Hoshik Lee, Samsung Electronics, Korea (South); Nam Soo Kim, Seoul national university, Korea (South)</i>	
SPE-P15.7: UNSUPERVISED PRETRAINING TRANSFERS WELL ACROSS LANGUAGES.....	7414
<i>Morgane Rivi�re, Armand Joulin, Pierre-Emmanuel Mazar�, Emmanuel Dupoux, Facebook, France</i>	
SPE-P15.8: INCREMENTAL SEMI-SUPERVISED LEARNING FOR MULTI-GENRE	7419
SPEECH RECOGNITION	
<i>Banriskhem K. Khonglah, Srikanth Madikeri, Subhadeep Dey, Herv� Bourlard, Petr Motlicek, Idiap Research Institute, Switzerland; Jayadev Billa, Information Sciences Institute, University of Southern California, United States</i>	
SPE-P15.9: SOURCE DOMAIN DATA SELECTION FOR IMPROVED TRANSFER	7424
LEARNING TARGETING DYSARTHIC SPEECH RECOGNITION	
<i>Feifei Xiong, Jon Barker, Zhengjun Yue, Heidi Christensen, University of Sheffield, United Kingdom</i>	
SPE-P15.10: STUDY OF FORMANT MODIFICATION FOR CHILDREN ASR.....	7429
<i>Hemant Kumar Kathania, Sudarsana Reddy Kadiri, Paavo Alku, Mikko Kurimo, Aalto University, Finland</i>	
SPE-P15.11: PSEUDO LIKELIHOOD CORRECTION TECHNIQUE FOR LOW	7434
RESOURCE ACCENTED ASR	
<i>Avni Rajpal, Achuth Rao M V, Chiranjeevi Yarra, Ritu Aggarwal, Prasanta Kumar Ghosh, Indian Institute of Science, India</i>	
SPE-P15.12: LIBRI-ADAPT: A NEW SPEECH DATASET FOR UNSUPERVISED DOMAIN	7439
ADAPTATION	
<i>Akhil Mathur, University College London and Nokia Bell Labs, United Kingdom; Fahim Kawsar, Nokia Bell Labs, United Kingdom; Nadia Berthouze, University College London, United Kingdom; Nicholas Lane, University of Oxford, United Kingdom</i>	

SPE-P16: WORD SPOTTING

SPE-P16.1: MINING EFFECTIVE NEGATIVE TRAINING SAMPLES FOR KEYWORD SPOTTING 7444

Jingyong Hou, Northwestern Polytechnical University, China; Yangyang Shi, Mobvoi AI Lab, United States; Mari Ostendorf, University of Washington, United States; Mei-Yuh Hwang, Mobvoi AI Lab, United States; Lei Xie, Northwestern Polytechnical University, China

SPE-P16.2: MULTI-TASK LEARNING FOR VOICE TRIGGER DETECTION 7449

Siddharth Sigtia, Pascal Clark, Rob Haynes, Hywel Richards, John Bridle, Apple, United States

SPE-P16.3: SMALL-FOOTPRINT KEYWORD SPOTTING ON RAW AUDIO DATA WITH SINC-CONVOLUTIONS 7454

Simon Mittermaier, Ludwig Kürzinger, Technische Universität München, Germany; Bernd Waschneck, Infineon Technologies AG, Germany; Gerhard Rigoll, Technische Universität München, Germany

SPE-P16.4: LATTICE-BASED IMPROVEMENTS FOR VOICE TRIGGERING USING GRAPH NEURAL NETWORKS 7459

Pranay Dighe, Saurabh Adya, Nuoyu Li, Srikanth Vishnubhotla, Devang Naik, Adithya Sagar, Ying Ma, Stephen Pulman, Jason Williams, Apple, United States

SPE-P16.5: INTEGRATION OF MULTI-LOOK BEAMFORMERS FOR MULTI-CHANNEL KEYWORD SPOTTING 7464

Xuan Ji, Meng Yu, Jie Chen, Jimeng Zheng, Dan Su, Dong Yu, Tencent, China

SPE-P16.6: FAST LATTICE-FREE KEYWORD FILTERING FOR ACCELERATED SPOKEN TERM DETECTION 7469

Jonathan Wintrobe, Jenny Wilkes, Raytheon Applied Signal Technology, United States

SPE-P16.7: TRAINING KEYWORD SPOTTERS WITH LIMITED AND SYNTHESIZED SPEECH DATA 7474

James Lin, Kevin Kilgour, Dominik Roblek, Matt Sharifi, Google Research, Switzerland

SPE-P16.8: TOWARDS DATA-EFFICIENT MODELING FOR WAKE WORD SPOTTING 7479

Yixin Gao, Yuriy Mishchenko, Anish Shah, Spyros Matsoukas, Shiv Vitaladevuni, Amazon, Inc., United States

SPE-P16.9: ADAPTATION OF RNN TRANSDUCER WITH TEXT-TO-SPEECH TECHNOLOGY FOR KEYWORD SPOTTING 7484

Eva Sharma, Khoury College of Computer Sciences, Northeastern University, United States; Guoli Ye, Speech and Language Group, Microsoft, United States; Wenning Wei, Microsoft China, China; Rui Zhao, Speech and Language Group, Microsoft, United States; Yao Tian, Microsoft China, China; Jian Wu, Speech and Language Group, Microsoft, United States; Lei He, Ed Lin, Microsoft China, China; Yifan Gong, Speech and Language Group, Microsoft, United States

SPE-P16.11: CRNN-CTC BASED MANDARIN KEYWORDS SPOTTING..... 7489

Haikang Yan, Qianhua He, Wei Xie, South China University of Technology, China

SPE-P17: SPEECH ENHANCEMENT IV

SPE-P17.1: UNSUPERVISED NEURAL MASK ESTIMATOR FOR GENERALIZED EIGEN-VALUE BEAMFORMING BASED ASR 7494

Rohit Kumar, Anirudh Sreeram, Anurenjan Purushothaman, Sriram Ganapathy, Indian Institute Science, India

SPE-P17.2: SPATIAL ATTENTION FOR FAR-FIELD SPEECH RECOGNITION WITH DEEP BEAMFORMING NEURAL NETWORKS 7499

Weipeng He, Idiap Research Institute, Switzerland; Lu Lu, Biqiao Zhang, Jay Mahadeokar, Kaustubh Kalgaonkar, Christian Fuegen, Facebook, United States

SPE-P17.3: TENSOR-TO-VECTOR REGRESSION FOR MULTI-CHANNEL SPEECH ENHANCEMENT BASED ON TENSOR-TRAIN NETWORK	7504
<i>Jun Qi, Hu Hu, Georgia Institute of Technology, United States; Yannan Wang, Tencent, China; Chao-Han Huck Yang, Georgia Institute of Technology, United States; Marco Siniscalchi, University of Enna, Italy; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
SPE-P17.4: TRUTH-TO-ESTIMATE RATIO MASK: A POST-PROCESSING METHOD FOR SPEECH ENHANCEMENT DIRECT AT LOW SIGNAL-TO-NOISE RATIOS	7509
<i>Bohan Chen, He Wang, Hong Kong University of Science and Technology Shenzhen Research Institute, China; Yue Wei, Incus Company Limited, China; Richard H.Y. So, Hong Kong University of Science and Technology, China</i>	
SPE-P17.5: GEOMETRY CONSTRAINED PROGRESSIVE LEARNING FOR LSTM-BASED SPEECH ENHANCEMENT	7514
<i>Xin Tang, Jun Du, Li Chai, University of Science and Technology of China, China; Yannan Wang, Qing Wang, Tencent Technology(Shenzhen) Company Limited, China; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
SPE-P17.6: USING SEPARATE LOSSES FOR SPEECH AND NOISE IN MASK-BASED SPEECH ENHANCEMENT	7519
<i>Ziyi Xu, Samy Elshamy, Tim Fingscheidt, Technische Universität Braunschweig, Germany</i>	
SPE-P17.7: STABLE TRAINING OF DNN FOR SPEECH ENHANCEMENT BASED ON PERCEPTUALLY-MOTIVATED BLACK-BOX COST FUNCTION	7524
<i>Masaki Kawanaka, National Institute of Technology, Tokuyama College, Japan; Yuma Koizumi, NTT Corporation, Japan; Ryoichi Miyazaki, National Institute of Technology, Tokuyama College, Japan; Kohei Yatabe, Waseda University, Japan</i>	
SPE-P17.8: A ROBUST AUDIO-VISUAL SPEECH ENHANCEMENT MODEL	7529
<i>Wupeng Wang, Chao Xing, Huawei Noah's Ark Lab, China; Dong Wang, Tsinghua University, China; Xiao Chen, Huawei Noah's Ark Lab, China; Fengyu Sun, Huawei Technologies CO. LTD, China</i>	
SPE-P17.9: ROBUST UNSUPERVISED AUDIO-VISUAL SPEECH ENHANCEMENT USING A MIXTURE OF VARIATIONAL AUTOENCODERS	7534
<i>Mostafa Sadeghi, Xavier Alameda-Pineda, Inria, Grenoble Alpes, France</i>	
SPE-P17.10: AV(SE)²: AUDIO-VISUAL SQUEEZE-EXCITE SPEECH ENHANCEMENT	7539
<i>Michael Iuzzolino, University of Colorado Boulder, United States; Kazuhito Koishida, Microsoft Corporation, United States</i>	
SPE-P17.11: SPECTROGRAMS FUSION WITH MINIMUM DIFFERENCE MASKS ESTIMATION FOR MONAURAL SPEECH DEREVERBERATION	7544
<i>Hao Shi, Longbiao Wang, Meng Ge, Tianjin University, China; Sheng Li, National Institute of Information and Communications Technology (NICT), Japan; Jianwu Dang, Tianjin University, China</i>	
SPE-P17.12: A RETURN TO DEREVERBERATION IN THE FREQUENCY DOMAIN USING A JOINT LEARNING APPROACH	7549
<i>Yuying Li, Indiana University Bloomington, United States; Donald S. Williamson, Indiana University, United States</i>	
SPE-P18: SPEAKER RECOGNITION SYSTEMS, DATA AND FEATURES	
SPE-P18.1: IN-DOMAIN AND OUT-OF-DOMAIN DATA AUGMENTATION TO IMPROVE CHILDREN'S SPEAKER VERIFICATION SYSTEM IN LIMITED DATA SCENARIO	7554
<i>Syed Shahnawazuddin, National Institute of Technology Patna, India; Waquar Ahmad, National Institute of Technology Calicut, India; Nagaraj Adiga, University of Crete, Greece; Avinash Kumar, National Institute of Technology Sikkim, India</i>	
SPE-P18.2: JHU-HLTCOE SYSTEM FOR THE VOXSRC SPEAKER RECOGNITION CHALLENGE	7559
<i>Daniel Garcia-Romero, Alan McCree, David Snyder, Gregory Sell, Johns Hopkins University, United States</i>	
SPE-P18.3: DETECTION OF SPEECH EVENTS AND SPEAKER CHARACTERISTICS THROUGH PHOTO-PLETHYSMOGRAPHIC SIGNAL NEURAL PROCESSING	7564
<i>Guillermo Cámara, Jordi Luque, Telefónica, Spain; Mireia Farrús, Universitat Pompeu Fabra, Spain</i>	

SPE-P18.4: XMU-TS SYSTEMS FOR NIST SRE19 CTS CHALLENGE.....	7569
<i>Hao Lu, Jianfeng Zhou, Miao Zhao, Xiamen University, China; Wendian Lei, Xiamen Talentedsoft, China; Qingyang Hong, Lin Li, Xiamen University, China</i>	
SPE-P18.5: I-VECTOR TRANSFORMATION USING K-NEAREST NEIGHBORS FOR SPEAKER VERIFICATION	7574
<i>Umair Khan, Miquel India, Javier Hernando, Universitat Politecnica de Catalunya, Spain</i>	
SPE-P18.6: H-VECTORS: UTTERANCE-LEVEL SPEAKER EMBEDDING USING A HIERARCHICAL ATTENTION MODEL	7579
<i>Yanpei Shi, Qiang Huang, Thomas Hain, University of Sheffield, United Kingdom</i>	
SPE-P18.7: FEATURE ENHANCEMENT WITH DEEP FEATURE LOSSES FOR SPEAKER VERIFICATION	7584
<i>Saurabh Kataria, Phani Sankar Nidadavolu, Jesús Villalba, Nanxin Chen, Paola García-Perera, Najim Dehak, Johns Hopkins University, United States</i>	
SPE-P18.8: COMBINING DEEP EMBEDDINGS OF ACOUSTIC AND ARTICULATORY FEATURES FOR SPEAKER IDENTIFICATION	7589
<i>Qian-Bei Hong, Chung-Hsien Wu, Hsin-Min Wang, National Cheng Kung University and Academia Sinica, Taiwan; Chien-Lin Huang, Ping An Technology (Shenzhen) Co., Ltd., United States</i>	
SPE-P18.9: BAYESIAN ESTIMATION OF PLDA WITH NOISY TRAINING LABELS, WITH APPLICATIONS TO SPEAKER VERIFICATION	7594
<i>Bengt Borgstrom, Pedro Torres-Carrasquillo, MIT Lincoln Laboratory, United States</i>	
SPE-P18.10: UNSUPERVISED FEATURE ENHANCEMENT FOR SPEAKER VERIFICATION	7599
<i>Phani Sankar Nidadavolu, Saurabh Kataria, Jesús Villalba, Paola García-Perera, Najim Dehak, Johns Hopkins University, United States</i>	
SPE-P18.11: CN-CELEB: A CHALLENGING CHINESE SPEAKER RECOGNITION DATASET	7604
<i>Yue Fan, Jiawen Kang, Lantian Li, Kaicheng Li, Haolin Chen, Sitong Cheng, Pengyuan Zhang, Ziya Zhou, Yunqi Cai, Dong Wang, Tsinghua University, China</i>	
SPE-P18.12: HI-MIA : A FAR-FIELD TEXT-DEPENDENT SPEAKER VERIFICATION DATABASE AND THE BASELINES	7609
<i>Xiaoyi Qin, Duke Kunshan University, China; Hui Bu, Beijing Shell Shell Technology Co. Ltd., China; Ming Li, Duke Kunshan University, China</i>	
 SPE-P19: MACHINE LEARNING FOR SPEECH SYNTHESIS III	
SPE-P19.1: END-TO-END CODE-SWITCHING TTS WITH CROSS-LINGUAL LANGUAGE MODEL	7614
<i>Xuehao Zhou, Xiaohai Tian, Grandee Lee, Rohan Kumar Das, Haizhou Li, National University of Singapore, Singapore</i>	
SPE-P19.2: CODE-SWITCHED SPEECH SYNTHESIS USING BILINGUAL PHONETIC POSTERIORGRAM WITH ONLY MONOLINGUAL CORPORA	7619
<i>Yuewen Cao, Songxiang Liu, Xixin Wu, Chinese University of Hong Kong, China; Shiyin Kang, Peng Liu, Tencent, China; Zhiyong Wu, Tsinghua University, China; Xunying Xliu, Chinese University of Hong Kong, Hong Kong SAR of China; Dan Su, Dong Yu, Tencent, China; Helen Meng, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPE-P19.3: GENERATING MULTILINGUAL VOICES USING SPEAKER SPACE TRANSLATION BASED ON BILINGUAL SPEAKER DATA	7624
<i>Soumi Maiti, City University of New York, United States; Erik Marchi, Alistair Conkie, Apple, United States</i>	

SPE-P19.4: SPEAKER ADAPTATION OF A MULTILINGUAL ACOUSTIC MODEL FOR CROSS-LANGUAGE SYNTHESIS	7629
<i>Ivan Himawan, Sandesh Aryal, Iris Ouyang, Sam Kang, Pierre Lanchantin, ObEN, United States; Simon King, University of Edinburgh, United Kingdom</i>	
SPE-P19.5: SEMI-SUPERVISED SPEAKER ADAPTATION FOR END-TO-END SPEECH SYNTHESIS WITH PRETRAINED MODELS	7634
<i>Katsuki Inoue, Sunao Hara, Masanobu Abe, Okayama university, Japan; Tomoki Hayashi, Nagoya university, Japan; Ryuichi Yamamoto, LINE Corporation, Japan; Shinji Watanabe, Johns Hopkins university, United States</i>	
SPE-P19.6: BOFFIN TTS: FEW-SHOT SPEAKER ADAPTATION BY BAYESIAN OPTIMIZATION	7639
<i>Henry Moss, Lancaster University, United Kingdom; Vatsal Aggarwal, Nishant Prateek, Javier Gonzalez, Roberto Barra-Chicote, Amazon, Inc., United Kingdom</i>	
SPE-P19.7: SEMI-SUPERVISED LEARNING BASED ON HIERARCHICAL GENERATIVE MODELS FOR END-TO-END SPEECH SYNTHESIS	7644
<i>Takato Fujimoto, Shinji Takaki, Kei Hashimoto, Keiichiro Oura, Yoshihiko Nankaku, Keiichi Tokuda, Nagoya Institute of Technology, Japan</i>	
SPE-P19.8: BREATHING AND SPEECH PLANNING IN SPONTANEOUS SPEECH SYNTHESIS	7649
<i>Éva Székely, Gustav Eje Henter, Jonas Beskow, Joakim Gustafson, KTH Royal Institute of Technology, Sweden</i>	
SPE-P19.9: ESPNET-TTS: UNIFIED, REPRODUCIBLE, AND INTEGRATABLE OPEN SOURCE END-TO-END TEXT-TO-SPEECH TOOLKIT	7654
<i>Tomoki Hayashi, Nagoya University, Japan; Ryuichi Yamamoto, LINE Corporation, Japan; Katsuki Inoue, Okayama University, Japan; Takenori Yoshimura, Nagoya University, Japan; Shinji Watanabe, Johns Hopkins University, United States; Tomoki Toda, Kazuya Takeda, Nagoya University, Japan; Yu Zhang, Google AI, United States; Xu Tan, Microsoft Research Asia, China</i>	
SPE-P19.10: EXTRACTING UNIT EMBEDDINGS USING SEQUENCE-TO-SEQUENCE ACOUSTIC MODELS FOR UNIT SELECTION SPEECH SYNTHESIS	7659
<i>Xiao Zhou, Zhen-Hua Ling, Li-Rong Dai, University of Science and Technology of China, China</i>	
SPE-P19.11: AUDIO-ASSISTED IMAGE INPAINTING FOR TALKING FACES	7664
<i>Alexandros Koumparoulis, Gerasimos Potamianos, University of Thessaly, Greece; Samuel Thomas, Edmilson da Silva Moraes, IBM, United States</i>	
 SPE-P20: SPEECH RECOGNITION: ACOUSTIC MODELLING II	
SPE-P20.1: LIBRI-LIGHT: A BENCHMARK FOR ASR WITH LIMITED OR NO SUPERVISION	7669
<i>Jacob Kahn, Morgane Rivière, Weiyei Zheng, Eugene Kharitonov, Qiantong Xu, Pierre-Emmanuel Mazaré, Facebook, United States; Julien Karadayi, ENS, France; Vitaly Liptchinsky, Ronan Collobert, Christian Fuegen, Tatiana Likhomanenko, Gabriel Synnaeve, Armand Joulin, Abdelrahman Mohamed, Facebook, United States; Emmanuel Dupoux, Facebook / EHESS, France</i>	
SPE-P20.2: A COMPREHENSIVE STUDY OF RESIDUAL CNNs FOR ACOUSTIC MODELING IN ASR	7674
<i>Vitalii Bozheniuk, Albert Zeyer, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
SPE-P20.3: LAYER-NORMALIZED LSTM FOR HYBRID-HMM AND END-TO-END ASR	7679
<i>Mohammad Zeineldeen, Albert Zeyer, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
SPE-P20.4: SMALL ENERGY MASKING FOR IMPROVED NEURAL NETWORK TRAINING FOR END-TO-END SPEECH RECOGNITION	7684
<i>Chanwoo Kim, Kwangyoun Kim, Sathish Reddy Indurthi, Samsung Research, Korea (South)</i>	

SPE-P20.5: IMPROVING SEQUENCE-TO-SEQUENCE SPEECH RECOGNITION TRAINING WITH ON-THE-FLY DATA AUGMENTATION	7689
<i>Thai Son Nguyen, Sebastian Stueker, Karlsruhe Institute of Technology, Germany; Jan Niehues, Maastricht University, Netherlands; Alex Waibel, Karlsruhe Institute of Technology, Germany</i>	
SPE-P20.6: EFFECTIVENESS OF SELF-SUPERVISED PRE-TRAINING FOR ASR	7694
<i>Alexei Baevski, Abdelrahman Mohamed, Facebook, United States</i>	
SPE-P20.7: HIGH-ACCURACY AND LOW-LATENCY SPEECH RECOGNITION WITH TWO-HEAD CONTEXTUAL LAYER TRAJECTORY LSTM MODEL	7699
<i>Jinyu Li, Rui Zhao, Eric Sun, Jeremy Wong, Amit Das, Zhong Meng, Yifan Gong, Microsoft, United States</i>	
SPE-P20.8: DFSMN-SAN WITH PERSISTENT MEMORY MODEL FOR AUTOMATIC SPEECH RECOGNITION	7704
<i>Zhao You, Dan Su, Jie Chen, Chao Weng, Dong Yu, Tencent, China</i>	
SPE-P20.9: DYNAMIC TEMPORAL RESIDUAL LEARNING FOR SPEECH RECOGNITION	7709
<i>Jiaqi Xie, Ruijie Yan, Shanyu Xiao, Liangrui Peng, Tsinghua University, China; Michael T. Johnson, University of Kentucky, United States; Wei-Qiang Zhang, Tsinghua University, China</i>	
SPE-P20.10: E2E-SINCNET: TOWARD FULLY END-TO-END SPEECH RECOGNITION	7714
<i>Titouan Parcollet, University of Oxford, United Kingdom; Mohamed Morchid, Georges Linarès, University of Avignon, France</i>	
SPE-P20.11: SPEAKER AUGMENTATION FOR LOW RESOURCE SPEECH RECOGNITION	7719
<i>Chenpeng Du, Kai Yu, Shanghai Jiao Tong University, China</i>	
SPE-P20.12: CGCNN: COMPLEX GABOR CONVOLUTIONAL NEURAL NETWORK ON RAW SPEECH	7724
<i>Paul-Gauthier Noé, Avignon Université, France; Titouan Parcollet, University of Oxford, France; Mohamed Morchid, Avignon Université, France</i>	
SPE-P21: VOICE CONVERSION	
SPE-P21.1: ONE-SHOT VOICE CONVERSION USING STAR-GAN	7729
<i>Ruobai Wang, Yu Ding, Lincheng Li, Changjie Fan, Netease Inc., China</i>	
SPE-P21.2: ONE-SHOT VOICE CONVERSION BY VECTOR QUANTIZATION	7734
<i>Da-Yi Wu, Hung-yi Lee, National Taiwan University, Taiwan</i>	
SPE-P21.3: NEUTRAL TO LOMBARD SPEECH CONVERSION WITH DEEP LEARNING	7739
<i>Enguerrand Gentet, Groupe PSA, France; Bertrand David, LTCI, Télécom Paris, Institut Polytechnique de Paris, France; Sébastien Denjean, Groupe PSA, France; Gaël Richard, LTCI, Télécom Paris, Institut Polytechnique de Paris, France; Vincent Roussarie, Groupe PSA, France</i>	
SPE-P21.4: END-TO-END VOICE CONVERSION VIA CROSS-MODAL KNOWLEDGE DISTILLATION FOR DYSARTHIC SPEECH RECONSTRUCTION	7744
<i>Disong Wang, Jianwei Yu, Xixin Wu, Songxiang Liu, Chinese University of Hong Kong, Hong Kong SAR of China; Lifa Sun, SpeechX Limited, China; Xunying Liu, Helen Meng, Chinese University of Hong Kong, Hong Kong SAR of China</i>	
SPE-P21.5: PITCHNET: UNSUPERVISED SINGING VOICE CONVERSION WITH PITCH ADVERSARIAL NETWORK	7749
<i>Chengqi Deng, Zhejiang University, China; Chengzhu Yu, Heng Lu, Chao Weng, Dong Yu, Tencent, United States</i>	
SPE-P21.6: AN IMPROVED FRAME-UNIT-SELECTION BASED VOICE CONVERSION SYSTEM WITHOUT PARALLEL TRAINING DATA	7754
<i>Feng-Long Xie, Xin-Hui Li, Bo Liu, Yi-Bin Zheng, Li Meng, Li Lu, Tencent, China; Frank K. Soong, Microsoft Research Asia, China</i>	

SPE-P21.7: VOICE CONVERSION WITH TRANSFORMER NETWORK	7759
<i>Ruolan Liu, Xiao Chen, Xue Wen, Samsung Research China-Beijing, China</i>	
SPE-P21.8: MSPEC-NET : MULTI-DOMAIN SPEECH CONVERSION NETWORK	7764
<i>Harshit Malaviya, Jui Shah, Maitreya Patel, Jalansh Munshi, Hemant Patil, Dhirubhai Ambani Institute of Information and Communication Technology, India</i>	
SPE-P21.9: MULTI-SPEAKER AND MULTI-DOMAIN EMOTIONAL VOICE	7769
CONVERSION USING FACTORIZED HIERARCHICAL VARIATIONAL AUTOENCODER	
<i>Mohamed Elgaar, Jung Bae Park, Humelo Inc. and Korea Advanced Institute of Science and Technology, Korea (South); Sang Wan Lee, Humelo Inc. and Korea Advanced Institute of Science and Technology, KAIST Institute for Artificial Intelligence, KAIST Center for Neuroscience-inspired Artificial Intelligence, Korea (South)</i>	
SPE-P21.10: EMOTIONAL VOICE CONVERSION USING MULTITASK LEARNING	7774
WITH TEXT-TO-SPEECH	
<i>Tae-Ho Kim, Sungjae Cho, Shinkook Choi, Sejik Park, Soo-Young Lee, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
SPE-P21.11: EFFECTIVE WAVENET ADAPTATION FOR VOICE CONVERSION WITH	7779
LIMITED DATA	
<i>Hongqiang Du, Northwestern Polytechnical University, Singapore; Xiaohai Tian, National University of Singapore, Singapore; Lei Xie, Northwestern Polytechnical University, China; Haizhou Li, National University of Singapore, Singapore</i>	
SPE-P21.12: LIFTER TRAINING AND SUB-BAND MODELING FOR	7784
COMPUTATIONALLY EFFICIENT AND HIGH-QUALITY VOICE CONVERSION USING SPECTRAL DIFFERENTIALS	
<i>Takaaki Saeki, Yuki Saito, Shinnosuke Takamichi, Hiroshi Saruwatari, University of Tokyo, Japan</i>	
SPE-P22: LARGE VOCABULARY CONTINUOUS SPEECH RECOGNITION AND SEARCH	
SPE-P22.1: IMPROVING PROPER NOUN RECOGNITION IN END-TO-END ASR BY	7789
CUSTOMIZATION OF THE MWER LOSS CRITERION	
<i>Cal Peyser, Tara Sainath, Golan Pundak, Google, Inc., United States</i>	
SPE-P22.2: NEURAL LATTICE SEARCH FOR SPEECH RECOGNITION	7794
<i>Rao Ma, Hao Li, Qi Liu, Lu Chen, Kai Yu, Shanghai Jiao Tong University, China</i>	
SPE-P22.3: DELIBERATION MODEL BASED TWO-PASS END-TO-END SPEECH	7799
RECOGNITION	
<i>Ke Hu, Tara Sainath, Ruoming Pang, Rohit Prabhavalkar, Google, Inc., United States</i>	
SPE-P22.4: ALIGNMENT-LENGTH SYNCHRONOUS DECODING FOR RNN	7804
TRANSDUCER	
<i>George Saon, Zoltan Tuske, Kartik Audhkhasi, IBM Research AI, United States</i>	
SPE-P22.5: INCORPORATING WRITTEN DOMAIN NUMERIC GRAMMARS INTO	7809
END-TO-END CONTEXTUAL SPEECH RECOGNITION SYSTEMS FOR IMPROVED RECOGNITION OF NUMERIC SEQUENCES	
<i>Ben Haynor, Petar Aleksic, Google, Inc., United States</i>	
SPE-P22.6: LSTM-BASED ONE-PASS DECODER FOR LOW-LATENCY STREAMING	7814
<i>Javier Jorge, Adrià Giménez, Javier Iranzo-Sánchez, Joan Albert Silvestre-Cerdà, Jorge Civera, Albert Sanchis, Alfons Juan, Universitat Politècnica de València, Spain</i>	
SPE-P22.7: MULTISTATE ENCODING WITH END-TO-END SPEECH RNN	7819
TRANSDUCER NETWORK	
<i>Zelin Wu, Bo Li, Yu Zhang, Petar Aleksic, Tara Sainath, Google LLC, United States</i>	
SPE-P22.8: NEURAL ORACLE SEARCH ON N-BEST HYPOTHESES	7824
<i>Ehsan Variani, Tongzhou Chen, James Apfel, Bhuvana Ramabhadran, Seungji Lee, Pedro Moreno, Google, United States</i>	

SPE-P22.10: TRANSFORMER TRANSDUCER: A STREAMABLE SPEECH RECOGNITION MODEL WITH TRANSFORMER ENCODERS AND RNN-T LOSS	7829
<i>Qian Zhang, Han Lu, Hasim Sak, Anshuman Tripathi, Erik McDermott, Stephen Koo, Shankar Kumar, Google, United States</i>	
SPE-P22.11: FULL-SUM DECODING FOR HYBRID HMM BASED SPEECH RECOGNITION USING LSTM LANGUAGE MODEL	7834
<i>Wei Zhou, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
SPE-P22.12: THE RWTH ASR SYSTEM FOR TED-LIUM RELEASE 2: IMPROVING HYBRID HMM WITH SPECAUGMENT	7839
<i>Wei Zhou, Wilfried Michel, Kazuki Irie, Markus Kitz, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
 SPE-P23: SPEECH RECOGNITION: GENERAL TOPICS	
SPE-P23.1: META LEARNING FOR END-TO-END LOW-RESOURCE SPEECH RECOGNITION	7844
<i>Jui-Yang Hsu, Yuan-Jui Chen, Hung-yi Lee, National Taiwan University, Taiwan</i>	
SPE-P23.2: CROSS-SPEAKER SILENT-SPEECH COMMAND WORD RECOGNITION USING ELECTRO-OPTICAL STOMATOGRAPHY	7849
<i>Simon Stone, Peter Birkholz, Technische Universität Dresden, Germany</i>	
SPE-P23.3: EXPLORING A ZERO-ORDER DIRECT HMM BASED ON LATENT ATTENTION FOR AUTOMATIC SPEECH RECOGNITION	7854
<i>Parnia Bahar, Nikita Makarov, Albert Zeyer, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
SPE-P23.4: IMPROVING DEVICE DIRECTEDNESS CLASSIFICATION OF UTTERANCES WITH SEMANTIC LEXICAL FEATURES	7859
<i>Kellen Gillespie, Ioannis Konstantakopoulos, Amazon, Inc., United States; Xingzhi Guo, Stony Brook University, United States; Vishal Thanvantri Vasudevan, Abhinav Sethy, Amazon, Inc., United States</i>	
SPE-P23.5: TRAINING ASR MODELS BY GENERATION OF CONTEXTUAL INFORMATION	7864
<i>Kritika Singh, Dmytro Okhonko, Jun Liu, Yongqiang Wang, Frank Zhang, Ross Girshick, Sergey Edunov, Fuchun Peng, Yatharth Saraf, Geoffrey Zweig, Abdelrahman Mohamed, Facebook AI, United States</i>	
SPE-P23.6: SPEECH RECOGNITION MODEL COMPRESSION	7869
<i>Madhumitha Sakthi, Ahmed Tewfik, University of Texas at Austin, United States; Raj Pawate, Cadence Design Systems Inc., United States</i>	
SPE-P23.7: GPU-ACCELERATED VITERBI EXACT LATTICE DECODER FOR BATCHED ONLINE AND OFFLINE SPEECH RECOGNITION	7874
<i>Hugo Braun, Justin Luitjens, Ryan Leary, Tim Kaldewey, NVIDIA, United States; Daniel Povey, Self, United States</i>	
SPE-P23.8: SEQUENCE-TO-SEQUENCE AUTOMATIC SPEECH RECOGNITION WITH WORD EMBEDDING REGULARIZATION AND FUSED DECODING	7879
<i>Alexander H. Liu, National Taiwan University, Taiwan; Tzu-Wei Sung, University of California, San Diego, Taiwan; Shun-Po Chuang, Hung-yi Lee, Lin-shan Lee, National Taiwan University, Taiwan</i>	
SPE-P23.9: SYNCHRONOUS TRANSFORMERS FOR END-TO-END SPEECH RECOGNITION	7884
<i>Zhengkun Tian, Jiangyan Yi, Ye Bai, Jianhua Tao, Shuai Zhang, Zhengqi Wen, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-P23.10: INVESTIGATION OF METHODS TO IMPROVE THE RECOGNITION PERFORMANCE OF TAMIL-ENGLISH CODE-SWITCHED DATA IN TRANSFORMER FRAMEWORK	7889
<i>Metilda Sagaya Mary N J, Vishwas M. Shetty, Srinivasan Umesh, Indian Institute of Technology Madras, India</i>	

SPE-P23.11: BANGLA VOICE COMMAND RECOGNITION IN END-TO-END SYSTEM 7894	USING TOPIC MODELING BASED CONTEXTUAL RESCORING
<i>Nafis Sadeq, Shafayat Ahmed, Sudipta Saha Shubha, Md. Nahidul Islam, Muhammad Abdullah Adnan, Bangladesh University of Engineering and Technology, Bangladesh</i>	
SPE-P23.12: LEARNING TO DETECT KEYWORD PARTS AND WHOLE BY 7899	SMOOTHED MAX POOLING
<i>Hyun-Jin Park, Patrick Violette, Niranjana Subrahmanya, Google, United States</i>	
HLT-L1: SPOKEN LANGUAGE TRANSLATION	
HLT-L1.1: END-END SPEECH-TO-TEXT TRANSLATION WITH MODALITY 7904	AGNOSTIC META-LEARNING
<i>Sathish Reddy Indurthi, Houjeung Han, Nikhil Kumar Lakumarapu, Beomseok Lee, Insoo Chung, Sangha Kim, Chanwoo Kim, Samsung Research, Korea (South)</i>	
HLT-L1.2: ANALYZING ASR PRETRAINING FOR LOW-RESOURCE 7909	SPEECH-TO-TEXT TRANSLATION
<i>Mihaela C. Stoian, Sameer Bansal, Sharon Goldwater, University of Edinburgh, Romania</i>	
HLT-L1.3: INSTANCE-BASED MODEL ADAPTATION FOR DIRECT SPEECH 7914	TRANSLATION
<i>Mattia Antonino Di Gangi, Fondazione Bruno Kessler and University of Trento, Italy; Viet Nhat Nguyen, University of Trento, Italy; Matteo Negri, Marco Turchi, Fondazione Bruno Kessler, Italy</i>	
HLT-L1.4: RE-TRANSLATION STRATEGIES FOR LONG FORM, SIMULTANEOUS, 7919	SPOKEN LANGUAGE TRANSLATION
<i>Naveen Arivazhagan, Colin Cherry, Te I, Wolfgang Macherey, Pallavi Baljekar, George Foster, Google, United States</i>	
HLT-L1.5: SKINAUGMENT: AUTO-ENCODING SPEAKER CONVERSIONS FOR 7924	AUTOMATIC SPEECH TRANSLATION
<i>Arya D. McCarthy, Johns Hopkins University, United States; Liezl Puzon, Juan Pino, Facebook, United States</i>	
HLT-L1.6: END-TO-END SPEECH TRANSLATION WITH SELF-CONTAINED 7929	VOCABULARY MANIPULATION
<i>Mei Tu, Fan Zhang, Wei Liu, Samsung Research China-Beijing, China</i>	
HLT-L2: LANGUAGE MODELING	
HLT-L2.1: AN EMPIRICAL STUDY OF TRANSFORMER-BASED NEURAL LANGUAGE 7934	MODEL ADAPTATION
<i>Ke Li, Johns Hopkins University, United States; Zhe Liu, Facebook, United States; Tianxing He, Massachusetts Institute of Technology, United States; Hongzhao Huang, Fuchun Peng, Facebook, United States; Daniel Povey, [None], United States; Sanjeev Khudanpur, Johns Hopkins University, United States</i>	
HLT-L2.2: LOW-BIT QUANTIZATION OF RECURRENT NEURAL NETWORK 7939	LANGUAGE MODELS USING ALTERNATING DIRECTION METHODS OF MULTIPLIERS
<i>Junhao Xu, Chinese University of Hong Kong, China; Xie Chen, Microsoft, China; Shoukang Hu, Jianwei Yu, Xunying Liu, Helen Meng, Chinese University of Hong Kong, China</i>	
HLT-L2.3: AUDIO-ATTENTION DISCRIMINATIVE LANGUAGE MODEL FOR ASR 7944	RESCORING
<i>Ankur Gandhe, Ariya Rastrow, Amazon, Inc., United States</i>	
HLT-L2.4: TRAINING CODE-SWITCHING LANGUAGE MODEL WITH 7949	MONOLINGUAL DATA
<i>Shun-Po Chuang, National Taiwan University, Taiwan; Tzu-Wei Sung, University of California, San Diego, Taiwan; Hung-Yi Lee, National Taiwan University, Taiwan</i>	

HLT-L2.5: DOMAIN ROBUST, FAST, AND COMPACT NEURAL LANGUAGE MODELS.....	7954
<i>Alexander Gerstenberger, Kazuki Irie, RWTH Aachen University, Germany; Pavel Golik, AppTek GmbH, Germany; Eugen Beck, Hermann Ney, RWTH Aachen University, Germany</i>	
HLT-L2.6: A RANDOM GOSSIP BMUF PROCESS FOR NEURAL LANGUAGE MODELING	7959
<i>Yiheng Huang, Jinchuan Tian, Lei Han, Guangsen Wang, Tencent, China; Xingchen Song, Tsinghua University, China; Dan Su, Dong Yu, Tencent, China</i>	
HLT-L3: SPOKEN LANGUAGE UNDERSTANDING AND DIALOGUE II	
HLT-L3.1: PSEUDO LABELING AND NEGATIVE FEEDBACK LEARNING FOR LARGE-SCALE MULTI-LABEL DOMAIN CLASSIFICATION	7964
<i>Joo-Kyung Kim, Young-Bum Kim, Amazon, Inc., United States</i>	
HLT-L3.2: PRE-TRAINING FOR QUERY REWRITING IN A SPOKEN LANGUAGE UNDERSTANDING SYSTEM	7969
<i>Zheng Chen, Drexel University, United States; Xing Fan, Yuan Ling, Lambert Mathias, Chenlei Guo, Amazon, Inc., United States</i>	
HLT-L3.3: END-TO-END ARCHITECTURES FOR ASR-FREE SPOKEN LANGUAGE UNDERSTANDING	7974
<i>Elisavet Palogiannidi, Ioannis Gkinis, George Mastrapas, Petr Mizera, Themis Stafylakis, Omilia Conversational Intelligence, Greece</i>	
HLT-L3.4: END-TO-END SPOKEN LANGUAGE UNDERSTANDING WITHOUT MATCHED LANGUAGE SPEECH MODEL PRETRAINING DATA	7979
<i>Ryan Price, Interactions, LLC., United States</i>	
HLT-L3.5: LEVERAGING UNPAIRED TEXT DATA FOR TRAINING END-TO-END SPEECH-TO-INTENT SYSTEMS	7984
<i>Yinghui Huang, Hong-Kwang Kuo, Samuel Thomas, Zvi Kons, Kartik Audhkhasi, Brian Kingsbury, Ron Hoory, Michael Picheny, IBM, United States</i>	
HLT-L3.6: GENERATING EMPATHETIC RESPONSES BY LOOKING AHEAD THE USER'S SENTIMENT	7989
<i>Jamin Shin, Peng Xu, Andrea Madotto, Pascale Fung, Hong Kong University of Science and Technology, Hong Kong SAR of China</i>	
HLT-P1: SPOKEN LANGUAGE UNDERSTANDING AND DIALOGUE I	
HLT-P1.1: A HIERARCHICAL MODEL FOR DIALOG ACT RECOGNITION CONSIDERING ACOUSTIC AND LEXICAL CONTEXT INFORMATION	7994
<i>Yuke Si, Longbiao Wang, Jianwu Dang, Mengfei Wu, Tianjin University, China; Aijun Li, Chinese Academy of Social Science, China</i>	
HLT-P1.2: LARGE-SCALE UNSUPERVISED PRE-TRAINING FOR END-TO-END SPOKEN LANGUAGE UNDERSTANDING	7999
<i>Pengwei Wang, Liangchen Wei, Yong Cao, Jinghui Xie, Zaiqing Nie, Alibaba, China</i>	
HLT-P1.3: IMPROVING SPOKEN QUESTION ANSWERING USING CONTEXTUALIZED WORD REPRESENTATION	8004
<i>Dan Su, Pascale Fung, Hong Kong University of Science and Technology, Hong Kong SAR of China</i>	
HLT-P1.4: LEARNING ASR-ROBUST CONTEXTUALIZED EMBEDDINGS FOR SPOKEN LANGUAGE UNDERSTANDING	8009
<i>Chao-Wei Huang, Yun-Nung Chen, National Taiwan University, Taiwan</i>	

HLT-P1.5: A HIERARCHICAL TRACKER FOR MULTI-DOMAIN DIALOGUE STATE TRACKING	8014
<i>Jieyu Li, Su Zhu, Kai Yu, Shanghai Jiao Tong University, China</i>	
HLT-P1.6: A BI-MODEL APPROACH FOR HANDLING UNKNOWN SLOT VALUES IN DIALOGUE STATE TRACKING	8019
<i>Yu Wang, Yilin Shen, Hongxia Jin, Samsung Research America, United States</i>	
HLT-P1.7: IMPROVING SAMPLE-EFFICIENCY IN REINFORCEMENT LEARNING FOR DIALOGUE SYSTEMS BY USING TRAINABLE-ACTION-MASK	8024
<i>Yen-Chen Wu, Bo-Hsiang Tseng, Carl Edward Rasmussen, Cambridge University, United Kingdom</i>	
HLT-P1.8: FG2SEQ: EFFECTIVELY ENCODING KNOWLEDGE FOR END-TO-END TASK-ORIENTED DIALOG	8029
<i>Zhenhao He, South China University of Technology, China; Yuhong He, South China Agricultural University, China; Qingyao Wu, Jian Chen, South China University of Technology, China</i>	
HLT-P1.9: A SIMPLE BUT EFFECTIVE BERT MODEL FOR DIALOG STATE TRACKING ON RESOURCE-LIMITED SYSTEMS	8034
<i>Tuan Lai, Purdue University, United States; Quan Tran, Trung Bui, Adobe Research, United States; Daisuke Kihara, Purdue University, United States</i>	
HLT-P1.10: FAST DOMAIN ADAPTATION FOR GOAL-ORIENTED DIALOGUE USING A HYBRID GENERATIVE-RETRIEVAL TRANSFORMER	8039
<i>Igor Shalymov, Heriot-Watt University, United Kingdom; Alessandro Sordani, Adam Atkinson, Hannes Schulz, Microsoft Research Montréal, Canada</i>	
HLT-P1.11: PREDICTING PERFORMANCE OUTCOME WITH A CONVERSATIONAL GRAPH CONVOLUTIONAL NETWORK FOR SMALL GROUP INTERACTIONS	8044
<i>Yun-Shao Lin, Chi-Chun Lee, National Tsing Hua University, Taiwan</i>	
HLT-P1.12: DESIGN CONSIDERATIONS FOR HYPOTHESIS REJECTION MODULES IN SPOKEN LANGUAGE UNDERSTANDING SYSTEMS	8049
<i>Aman Alok, Rahul Gupta, Shankar Ananthakrishnan, Amazon.com Services Inc., United States</i>	
HLT-P2: SPEECH AND LANGUAGE ANALYSIS	
HLT-P2.1: COMBINING ACOUSTICS, CONTENT AND INTERACTION FEATURES TO FIND HOT SPOTS IN MEETINGS	8054
<i>Dave Makhervaks, Harvey Mudd College, United States; William Hinthorn, Dimitrios Dimitriadis, Microsoft, United States; Andreas Stolcke, Amazon, Inc., United States</i>	
HLT-P2.2: ACCENT ESTIMATION OF JAPANESE WORDS FROM THEIR SURFACES AND ROMANIZATIONS FOR BUILDING LARGE VOCABULARY ACCENT DICTIONARIES	8059
<i>Hideyuki Tachibana, Yotaro Katayama, PKSHA Technology, Inc., Japan</i>	
HLT-P2.3: OH, JEEZ! OR UH-HUH? A LISTENER-AWARE BACKCHANNEL PREDICTOR ON ASR TRANSCRIPTIONS	8064
<i>Daniel Ortega, Chia-Yu Li, Ngoc Thang Vu, University of Stuttgart, Germany</i>	
HLT-P2.4: CONTROLLABLE TIME-DELAY TRANSFORMER FOR REAL-TIME PUNCTUATION PREDICTION AND DISFLUENCY DETECTION	8069
<i>Qian Chen, Mengzhe Chen, Bo Li, Wen Wang, Alibaba Group, China</i>	
HLT-P2.5: IDENTIFYING TRUTHFUL LANGUAGE IN CHILD INTERVIEWS	8074
<i>Victor Ardulov, Zane Durante, Shanna Williams, Thomas Lyon, Shrikanth Narayanan, University of Southern California, United States</i>	

HLT-P2.6: A MULTI-VIEW APPROACH FOR MANDARIN NON-NATIVE MISPRONUNCIATION VERIFICATION	8079
<i>Zhenyu Wang, John H.L. Hansen, University of Texas at Dallas, United States; Yanlu Xie, Beijing Language and Culture University, China</i>	
HLT-P2.7: DIACRITIC-LEVEL PRONUNCIATION ANALYSIS USING PHONOLOGICAL FEATURES	8084
<i>Alexander Kain, Amie Roten, Robert Gale, Oregon Health & Science University, United States</i>	
HLT-P2.8: PHONEME BOUNDARY DETECTION USING LEARNABLE SEGMENTAL FEATURES	8089
<i>Felix Kreuk, Bar-Ilan University, Israel; Yaniv Sheena, Facebook, Israel; Joseph Keshet, Bar-Ilan University, Israel; Yossi Adi, Facebook, Israel</i>	
HLT-P2.9: META-LEARNING FOR ROBUST CHILD-ADULT CLASSIFICATION FROM SPEECH	8094
<i>Nithin Rao Koluguri, Manoj Kumar, University of Southern California, United States; So Hyun Kim, Weill Cornell Medicine, United States; Catherine Lord, University of California, Los Angeles, United States; Shrikanth Narayanan, University of Southern California, United States</i>	
HLT-P2.11: ACCOUNTING FOR MICROPROSODY IN MODELING INTONATION	8099
<i>Peter Birkholz, Xinyu Zhang, Technische Universität Dresden, Germany</i>	
HLT-P2.12: HOW CONFIDENT ARE YOU? EXPLORING THE ROLE OF FILLERS IN THE AUTOMATIC PREDICTION OF A SPEAKER'S CONFIDENCE	8104
<i>Tanvi Dinkar, Telecom Paris, France; Ioana Vasilescu, Université Paris-Saclay, France; Catherine Pelachaud, Sorbonne University Pierre and Marie Curie, France; Chloé Clavel, Telecom Paris, France</i>	
HLT-P3: LANGUAGE UNDERSTANDING AND MODELING	
HLT-P3.1: TRAINING SPOKEN LANGUAGE UNDERSTANDING SYSTEMS WITH NON-PARALLEL SPEECH AND TEXT	8109
<i>Leda Sari, University of Illinois at Urbana-Champaign, United States; Samuel Thomas, IBM Research AI, United States; Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States</i>	
HLT-P3.2: WHAT IS BEST FOR SPOKEN LANGUAGE UNDERSTANDING: SMALL BUT TASK-DEPENDANT EMBEDDINGS OR HUGE BUT OUT-OF-DOMAIN EMBEDDINGS?	8114
<i>Sahar Ghannay, Université Paris-Saclay, CNRS, LIMS, 91400, France; Antoine Neuraz, Hôpital Necker-Enfants Malades, APHP INSERM UMRS 1138, Team 22, Paris Descartes, Université Sorbonne Paris Cité LIMS, CNRS, Université Paris-Saclay, France; Sophie Rosset, Université Paris-Saclay, CNRS, LIMS, 91400, France</i>	
HLT-P3.3: FAST INTENT CLASSIFICATION FOR SPOKEN LANGUAGE UNDERSTANDING SYSTEMS	8119
<i>Akshat Tyagi, Varun Sharma, University of Massachusetts, Amherst, United States; Rahul Gupta, Amazon, Inc., United States; Lynn Samson, Nan Zhuang, Zihang Wang, University of Massachusetts, Amherst, United States; Bill Campbell, Amazon, Inc., United States</i>	
HLT-P3.4: CONVERTING WRITTEN LANGUAGE TO SPOKEN LANGUAGE WITH NEURAL MACHINE TRANSLATION FOR LANGUAGE MODELING	8124
<i>Shintaro Ando, University of Tokyo, Japan; Masayuki Suzuki, Nobuyasu Itoh, Gakuto Kurata, IBM Research AI, Japan; Nobuaki Minematsu, University of Tokyo, Japan</i>	
HLT-P3.5: ADDRESSING THE POLYSEMY PROBLEM IN LANGUAGE MODELING WITH ATTENTIONAL MULTI-SENSE EMBEDDINGS	8129
<i>Rao Ma, Lesheng Jin, Qi Liu, Lu Chen, Kai Yu, Shanghai Jiao Tong University, China</i>	
HLT-P3.6: ADDRESSING CHALLENGES IN BUILDING WEB-SCALE CONTENT CLASSIFICATION SYSTEMS	8134
<i>Aditya Srinivas Timmaraju, Angli Liu, Pushkar Tripathi, Facebook, United States</i>	

HLT-P3.7: A NEURAL DOCUMENT LANGUAGE MODELING FRAMEWORK FOR SPOKEN DOCUMENT RETRIEVAL	8139
<i>Li-Phen Yen, Zhen-Yu Wu, Kuan-Yu Chen, National Taiwan University of Science and Technology, Taiwan</i>	
HLT-P3.8: SPOKEN DOCUMENT RETRIEVAL LEVERAGING BERT-BASED MODELING AND QUERY REFORMULATION	8144
<i>Shao-Wei Fan-Jiang, Tien-Hong Lo, National Taiwan Normal University, Taiwan; Berlin Chen, National Taiwan Normal University; ASUS AICS, Taiwan</i>	
HLT-P3.9: MULTITASK LEARNING FOR DARPA LORELEI'S SITUATION FRAME EXTRACTION TASK	8149
<i>Karan Singla, Shrikanth Narayanan, University of Southern California, United States</i>	
HLT-P3.10: AUXILIARY CAPSULES FOR NATURAL LANGUAGE UNDERSTANDING	8154
<i>Ieva Staliūnaitė, Ignacio Iacobacci, Huawei Noah's Ark Lab, United Kingdom</i>	
HLT-P3.11: DISCRETE WASSERSTEIN AUTOENCODERS FOR DOCUMENT RETRIEVAL	8159
<i>Yifei Zhang, Alibaba Group, China; Hao Zhu, Australian National University, Australia</i>	
HLT-P3.12: CROSS-LINGUAL TOPIC PREDICTION FOR SPEECH USING TRANSLATIONS	8164
<i>Sameer Bansal, University of Edinburgh, United Kingdom; Herman Kamper, Stellenbosch University, South Africa; Adam Lopez, Sharon Goldwater, University of Edinburgh, United Kingdom</i>	
HLT-P4: MACHINE LEARNING FOR LANGUAGE PROCESSING II	
HLT-P4.1: EMBEDDED LARGE-SCALE HANDWRITTEN CHINESE CHARACTER RECOGNITION	8169
<i>Yousseuf Chherawala, Hans Dolfing, Ryan Dixon, Jerome Bellegarda, Apple, United States</i>	
HLT-P4.2: LEVERAGING GANS TO IMPROVE CONTINUOUS PATH KEYBOARD INPUT MODELS	8174
<i>Akash Mehra, Jerome Bellegarda, Ojas Bapat, Partha Lal, Xin Wang, Apple, United States</i>	
HLT-P4.3: UNSUPERVISED KEY HAND SHAPE DISCOVERY OF SIGN LANGUAGE VIDEOS WITH CORRESPONDENCE SPARSE AUTOENCODERS	8179
<i>Recep Doga Siyli, Batuhan Gundogdu, Murat Saraçlar, Lale Akarun, Boğaziçi University, Turkey</i>	
HLT-P4.4: KEYWORD SEARCH FOR SIGN LANGUAGE	8184
<i>Nazif Can Tamer, Murat Saraçlar, Boğaziçi University, Turkey</i>	
HLT-P4.5: LARGE-CONTEXT POINTER-GENERATOR NETWORKS FOR SPOKEN-TO-WRITTEN STYLE CONVERSION	8189
<i>Mana Ihori, Akihiko Takashima, Ryo Masumura, NTT Corporation, Japan</i>	
HLT-P4.6: FROM UNSUPERVISED MACHINE TRANSLATION TO ADVERSARIAL TEXT GENERATION	8194
<i>Ahmad Rashid, Alan Do-Omri, Md. Akmal Haidar, Qun Liu, Mehdi Rezagholizadeh, Huawei Noah's Ark Lab, Canada</i>	
HLT-P4.7: SELF-ATTENTION AND RETRIEVAL ENHANCED NEURAL NETWORKS FOR ESSAY GENERATION	8199
<i>Wei Wang, Hai-Tao Zheng, Zibo Lin, Tsinghua University, China</i>	
HLT-P4.8: BERT IS NOT ALL YOU NEED FOR COMMONSENSE INFERENCE	8204
<i>Sunghyun Park, Junsung Son, Seung-Won Hwang, Yonsei University, Korea (South); Kyunglang Park, SK Telecom, Korea (South)</i>	
HLT-P4.9: SEMI-SUPERVISED SENTENCE CLASSIFICATION BASED ON USER POLARITY IN THE SOCIAL SCENARIOS	8209
<i>Bing Ma, Haifeng Sun, Jingyu Wang, Qi Qi, Jianxin Liao, Beijing University of Posts and Telecommunications, China</i>	

HLT-P4.10: UPGRADING CRFS TO JRFS AND ITS BENEFITS TO SEQUENCE MODELING AND LABELING	8214
<i>Yunfu Song, Zhijian Ou, Tsinghua University, China; Zitao Liu, Songfan Yang, TAL AI Lab, China</i>	
HLT-P4.11: SELECTIVE ATTENTION ENCODERS BY SYNTACTIC GRAPH	8219
CONVOLUTIONAL NETWORKS FOR DOCUMENT SUMMARIZATION <i>Haiyang Xu, DiDi Chuxing, China; Yun Wang, Peking University, China; Kun Han, Baochang Ma, Junwen Chen, Xiangang Li, DiDi Chuxing, United States</i>	
HLT-P4.12: LEARNING TO GENERATE DIVERSE QUESTIONS FROM KEYWORDS	8224
<i>Youcheng Pan, Baotian Hu, Qingcai Chen, Harbin Institute of Technology, China; Yang Xiang, University of Texas Health Science Center, China; Xiaolong Wang, Harbin Institute of Technology, China</i>	
HLT-P5: MULTILINGUAL PROCESSING OF LANGUAGE	
HLT-P5.1: EUROPARL-ST: A MULTILINGUAL CORPUS FOR SPEECH TRANSLATION OF PARLIAMENTARY DEBATES	8229
<i>Javier Iranzo-Sánchez, Joan Albert Silvestre-Cerdà, Javier Jorge, Nahuel Roselló, Adrià Giménez, Albert Sanchis, Jorge Civera, Alfons Juan, Universitat Politècnica de València, Spain</i>	
HLT-P5.2: MULTILINGUAL GRAPHEME-TO-PHONEME CONVERSION WITH BYTE REPRESENTATION	8234
<i>Mingzhi Yu, University of Pittsburgh, United States; Hieu Nguyen, Alex Sokolov, Jack Lepird, Kanthashree Sathyendra, Samridhi Choudhary, Athanasios Mouchtaris, Siegfried Kunzmann, Amazon, Inc., United States</i>	
HLT-P5.3: LANGUAGE-AGNOSTIC MULTILINGUAL MODELING.....	8239
<i>Arindrima Datta, Bhuvana Ramabhadran, Jesse Emond, Anjuli Kannan, Brian Roark, Google LLC, United States</i>	
HLT-P5.4: ADI17: A FINE-GRAINED ARABIC DIALECT IDENTIFICATION DATASET	8244
<i>Suwon Shon, ASAPP Inc, United States; Ahmed Ali, Younes Samih, Hamdy Mubarak, Qatar Computing Research Institute, Qatar; James Glass, Massachusetts Institute of Technology, United States</i>	
HLT-P5.5: UNIVERSAL PHONE RECOGNITION WITH A MULTILINGUAL ALLOPHONE SYSTEM	8249
<i>Xinjian Li, Siddharth Dalmia, Juncheng Li, Carnegie Mellon University, United States; Patrick Littell, National Research Council of Canada, Canada; Matthew Lee, SIL International, United States; Jiali Yao, ByteDance AI Lab, China; Antonios Anastasopoulos, David Mortensen, Graham Neubig, Alan Black, Florian Metze, Carnegie Mellon University, United States</i>	
HLT-P5.6: COUPLED TRAINING OF SEQUENCE-TO-SEQUENCE MODELS FOR ACCENTED SPEECH RECOGNITION	8254
<i>Vinit Unni, Nitish Joshi, Preethi Jyothi, Indian Institute of Technology Bombay, India</i>	
HLT-P5.7: ADDRESSING ACCENT MISMATCH IN MANDARIN-ENGLISH CODE-SWITCHING SPEECH RECOGNITION	8259
<i>Zhili Tan, Xinghua Fan, Hui Zhu, Ed Lin, Microsoft, China</i>	
HLT-P5.8: DETECTING MISMATCH BETWEEN TEXT SCRIPT AND VOICE-OVER USING UTTERANCE VERIFICATION BASED ON PHONEME RECOGNITION RANKING	8264
<i>Yoonjae Jeong, Hoon-Young Cho, NCSOFT, Korea (South)</i>	
HLT-P5.9: DNN-BASED SPEECH RECOGNITION FOR GLOBALPHONE LANGUAGES.....	8269
<i>Martha Yifiru Tachbelie, Ayimunishagu Abulimiti, Solomon Teferra Abate, Tanja Schultz, University of Bremen, Germany</i>	
HLT-P5.10: DEEP NEURAL NETWORKS BASED AUTOMATIC SPEECH RECOGNITION FOR FOUR ETHIOPIAN LANGUAGES	8274
<i>Solomon Teferra Abate, Martha Yifiru Tachbelie, Tanja Schultz, University of Bremen, Germany</i>	
HLT-P5.11: IMPROVING THE PERFORMANCE OF TRANSFORMER BASED LOW RESOURCE SPEECH RECOGNITION FOR INDIAN LANGUAGES	8279
<i>Vishwas M. Shetty, Metilda Sagaya Mary N J, Srinivasan Umesh, Indian Institute of Technology Madras, India</i>	

HLT-P5.12: IMPROVING LANGUAGE IDENTIFICATION FOR MULTILINGUAL SPEAKERS 8284

Andrew Titus, Jan Silovsky, Apple, United States; Nanxin Chen, Apple and Johns Hopkins University, United States; Roger Hsiao, Mary Young, Arnab Ghoshal, Apple, United States

IOT-P1: INTERNET OF THINGS

IOT-P1.1: INFORMATION FLOW OPTIMIZATION IN INFERENCE NETWORKS..... 8289

Aditya Deshmukh, Jing Liu, Venugopal Veeravalli, University of Illinois at Urbana–Champaign, United States; Gunjan Verma, U.S. Army Research Laboratory, United States

IOT-P1.2: EXPLOITING TWO-DIMENSIONAL SYMMETRY AND UNIMODALITY FOR MODEL-FREE SOURCE LOCALIZATION IN HARSH ENVIRONMENT 8294

Junting Chen, Chinese University of Hong Kong, Shenzhen, China

IOT-P1.3: UNCERTAINTY QUANTIFICATION FOR REMAINING USEFUL LIFETIME PREDICTION WITH MULTI-CHANNEL SENSORY DATA 8299

Yingjun Deng, Huaming Wu, Tianjin University, China; Chao Jiang, Research Institute of Physical & Chemical Engineering of Nuclear Industry, China

IOT-P1.4: VIMO: VITAL SIGN MONITORING USING COMMODITY MILLIMETER WAVE RADIO 8304

Fengyu Wang, Feng Zhang, Chenshu Wu, Beibei Wang, K. J. Ray Liu, University of Maryland, College Park, United States

IOT-P1.5: TIME REVERSAL BASED ROBUST GESTURE RECOGNITION USING WIFI 8309

Sai Deepika Regani, Beibei Wang, Min Wu, K. J. Ray Liu, University of Maryland, College Park, United States

IOT-P1.6: NONCOHERENT MAXIMUM-LIKELIHOOD DETECTION FOR AMBIENT BACKSCATTERING COMMUNICATIONS OVER AMBIENT OFDM SIGNALS 8314

Donatella Darsena, University of Naples Parthenope, Italy

IOT-P1.7: BANDIT SAMPLING FOR FASTER ACTIVITY AND DATA DETECTION IN MASSIVE RANDOM ACCESS 8319

Jialin Dong, ShanghaiTech University and Hong Kong Polytechnic University, China; Jun Zhang, Hong Kong Polytechnic University, Hong Kong SAR of China; Yuanming Shi, ShanghaiTech University, China

IOT-P1.8: CONSENSUS-BASED DISTRIBUTED CLUSTERING FOR IOT 8324

Hui Chen, Hao Yu, Shengjie Zhao, Qingjiang Shi, Tongji University, China

IOT-P1.9: ENERGY-EFFICIENT 3D UAV TRAJECTORY DESIGN FOR DATA COLLECTION IN WIRELESS SENSOR NETWORKS 8329

Daniel Bonilla Licea, International University of Rabat, Morocco; Edmond Nurellari, University of Lincoln, United Kingdom; Mounir Ghogho, International University of Rabat, United Kingdom

IOT-P1.10: APPLICATION INFORMED MOTION SIGNAL PROCESSING FOR FINGER MOTION TRACKING USING WEARABLE SENSORS 8334

Yilin Liu, Fengyang Jiang, Mahanth Gowda, Pennsylvania State University, United States

IOT-P1.11: INSTANT ADAPTIVE LEARNING: AN ADAPTIVE FILTER BASED FAST LEARNING MODEL CONSTRUCTION FOR SENSOR SIGNAL TIME SERIES CLASSIFICATION ON EDGE DEVICES 8339

Arpan Pal, Arijit Ukil, Trisrota Deb, Ishan Sahu, Tata Consultancy Services, India; Angshul Majumdar, Indraprastha Institute of Information Technology Delhi, India

COLL-L1: SESSION 3H: PROCESSING OF HIGHLY COMPLEX, HETEROGENEOUS, HIGH-DIMENSION DATA

COLL-L1.1: IMAGE FUSION USING JOINT SPARSE REPRESENTATIONS AND COUPLED DICTIONARY LEARNING 8344

Farshad Ghorbani Veshki, Nora Ouzir, Aalto university, Finland; Sergiy A. Vorobyov, Aalto University, Finland

COLL-L1.2: CLUSTERING OF NONNEGATIVE DATA AND AN APPLICATION TO MATRIX COMPLETION 8349

Christopher Strohmeier, Deanna Needell, University of California, Los Angeles, United States

COLL-L1.3: SAMPLING OF SURFACES AND LEARNING FUNCTIONS IN HIGH DIMENSIONS 8354

Qing Zou, Mathews Jacob, University of Iowa, United States

COLL-L1.4: STOCK MOVEMENT PREDICTION THAT INTEGRATES HETEROGENEOUS DATA SOURCES USING DILATED CAUSAL CONVOLUTION NETWORKS WITH ATTENTION 8359

Divyanshu Daiya, LNM Institute of Information Technology, India; Min-Sheng Wu, National Tsing Hua University, Taiwan; Che Lin, National Taiwan University, Taiwan

COLL-L1.5: LARGE-SCALE WEAKLY-SUPERVISED CONTENT EMBEDDINGS FOR MUSIC RECOMMENDATION AND TAGGING 8364

Qingqing Huang, Aren Jansen, Li Zhang, Google, United States; Daniel P. W. Ellis, Google Research, United States; Rif A. Saurous, John Anderson, Google, United States

COLL-L1.6: SUPERVISED CANONICAL CORRELATION ANALYSIS OF DATA ON SYMMETRIC POSITIVE DEFINITE MANIFOLDS BY RIEMANNIAN DIMENSIONALITY REDUCTION 8369

Faezeh Fallah, Bin Yang, University of Stuttgart, Germany

COLL-L2: SESSION 3R: ROBUSTNESS REPRODUCIBILITY REPLICABILITY

COLL-L2.1: THE EMPIRICAL DUALITY GAP OF CONSTRAINED STATISTICAL LEARNING 8374

Luiz Chamon, Santiago Paternain, Miguel Calvo-Fullana, Alejandro Ribeiro, University of Pennsylvania, United States

COLL-L2.2: CONTEXT AND UNCERTAINTY MODELING FOR ONLINE SPEAKER CHANGE DETECTION 8379

Hagai Aronowitz, Weizhong Zhu, IBM Research AI, Israel

COLL-L2.3: MODELING UNCERTAINTY IN PREDICTING EMOTIONAL ATTRIBUTES FROM SPONTANEOUS SPEECH 8384

Kusha Sridhar, Carlos Busso, University of Texas at Austin, United States

COLL-L2.4: ACCURACY-ROBUSTNESS TRADE-OFF FOR POSITIVELY WEIGHTED NEURAL NETWORKS 8389

Ana Neacsu, University Politehnica of Bucharest, Romania; Jean-Christophe Pesquet, Université Paris-Saclay, CentraleSupélec, Inria, France; Corneliu Burileanu, University Politehnica of Bucharest, Romania

COLL-L2.5: TOWARDS A NEW UNDERSTANDING OF THE TRAINING OF NEURAL NETWORKS WITH MISLABELED TRAINING DATA 8394

Herbert Gish, Raytheon BBN Technologies, United States; Jan Silovsky, Apple, United States; Man-Ling Sung, Chinese University of Hong Kong, China; Man-Hung Siu, Apple, United States; William Hartmann, Zhuolin Jiang, Raytheon BBN Technologies, United States

COLL-L2.6: ON NETWORK SCIENCE AND MUTUAL INFORMATION FOR EXPLAINING DEEP NEURAL NETWORKS 8399

Brian Davis, Umang Bhatt, Kartikeya Bhardwaj, Radu Marculescu, José Moura, Carnegie Mellon University, United States

SS-L1: ACTIVE CONTROL OF ACOUSTIC NOISE OVER SPATIAL REGIONS

SS-L1.1: SPATIAL ACTIVE NOISE CONTROL BASED ON KERNEL INTERPOLATION WITH DIRECTIONAL WEIGHTING 8404

Hayato Ito, Shoichi Koyama, Natsuki Ueno, Hiroshi Saruwatari, University of Tokyo, Japan

SS-L1.2: ACTIVE NOISE CONTROL OVER MULTIPLE REGIONS: PERFORMANCE ANALYSIS 8409

Jihui Zhang, Huiyuan Sun, Prasanga N. Samarasinghe, Thushara D. Abhayapala, Australian National University, Australia

SS-L1.3: ARRAY-GEOMETRY-AWARE SPATIAL ACTIVE NOISE CONTROL BASED ON DIRECTION-OF-ARRIVAL WEIGHTING 8414

Yu Maeno, Yuhta Takida, Naoki Murata, Yuki Mitsufuji, Sony Corporation, Japan

SS-L1.4: MULTICHANNEL ACTIVE NOISE CONTROL WITH SPATIAL DERIVATIVE CONSTRAINTS TO ENLARGE THE QUIET ZONE 8419

Dongyuan Shi, Bhan Lam, Shulin Wen, Woon-Seng Gan, Nanyang Technological University, Singapore

SS-L1.5: AN ACOUSTIC MODELLING BASED REMOTE ERROR SENSING APPROACH FOR QUIET ZONE GENERATION IN A NOISY ENVIRONMENT 8424

Qiaoxi Zhu, Xiaojun Qiu, Ian Burnett, University of Technology Sydney, Australia

SS-L1.6: DISTRIBUTED WAVE-DOMAIN ACTIVE NOISE CONTROL BASED ON THE DIFFUSION STRATEGY 8429

Yuchen Dong, Jie Chen, Wen Zhang, Northwestern Polytechnical University, China

SS-L2: SIGNAL PROCESSING METHODS FOR FINANCE APPLICATIONS

SS-L2.1: A THEORETICAL BASIS FOR PRACTITIONERS HEURISTIC 1/N AND LONG-ONLY QUINTILE PORTFOLIO 8434

Rui Zhou, Daniel Palomar, Hong Kong University of Science and Technology, Hong Kong SAR of China

SS-L2.2: A RECURSIVE BAYESIAN SOLUTION FOR THE EXCESS OVER THRESHOLD DISTRIBUTION WITH STOCHASTIC PARAMETERS 8439

Douglas Johnston, Farmingdale State College, United States; Petar Djuric, Stony Brook University, United States

SS-L2.3: GAUSSIAN PROCESS IMPUTATION OF MULTIPLE FINANCIAL SERIES 8444

Taco de Wolff, Alejandro Cuevas, Felipe Tobar, CMM, Universidad de Chile, Chile

SS-L2.4: ROBUST COVARIANCE MATRIX ESTIMATION AND PORTFOLIO ALLOCATION: THE CASE OF NON-HOMOGENEOUS ASSETS 8449

Emmanuelle Jay, Quanted & Fideas Capital, France; Thibault Soler, Fideas Capital & Université Paris 1 Panthéon Sorbonne, France; Jean-Philippe Ovarlez, DEMR/ONERA, France; Philippe De Peretti, Christophe Chorro, Centre d'Economie de la Sorbonne, France

SS-L2.5: PORTFOLIO CUTS: A GRAPH-THEORETIC FRAMEWORK TO DIVERSIFICATION 8454

Bruno Scalzo-Dees, Imperial College London, United Kingdom; Ljubisa Stankovic, University of Montenegro, Montenegro; Anthony G. Constantinides, Danilo P. Mandic, Imperial College London, United Kingdom

SS-L2.6: CORRGAN: SAMPLING REALISTIC FINANCIAL CORRELATION MATRICES USING GENERATIVE ADVERSARIAL NETWORKS 8459

Gautier Marti, Shell Street Labs, Hong Kong SAR of China

SS-L3: A SIGNAL-PROCESSING VIEW OF GRAPH NEURAL NETWORKS

SS-L3.1: GRAPH NEURAL NET USING ANALYTICAL GRAPH FILTERS AND TOPOLOGY OPTIMIZATION FOR IMAGE DENOISING 8464

Wengtai Su, National Tsing Hua University, Taiwan; Gene Cheung, Richard P. Wildes, York University, Taiwan; Chia-Wen Lin, National Tsing Hua University, Taiwan

SS-L3.2: DEFENDING GRAPH CONVOLUTIONAL NETWORKS AGAINST ADVERSARIAL ATTACKS 8469

Vassilis N. Ioannidis, Georgios B. Giannakis, University of Minnesota, United States

SS-L3.3: CONSTRAINED SPECTRAL CLUSTERING FOR DYNAMIC COMMUNITY DETECTION 8474

Abdullah Karaaslanli, Selin Aviyente, Michigan State University, United States

SS-L3.4: TOWARDS AN EFFICIENT AND GENERAL FRAMEWORK OF ROBUST TRAINING FOR GRAPH NEURAL NETWORKS 8479

Kaidi Xu, Northeastern University, United States; Sijia Liu, Pin-Yu Chen, IBM Research, United States; Mengshu Sun, Northeastern University, United States; Caiwen Ding, University of Connecticut, United States; Bhavya Kailkhura, Lawrence Livermore National Laboratory, United States; Xue Lin, Northeastern University, United States

SS-L3.5: DEEP GEOMETRIC KNOWLEDGE DISTILLATION WITH GRAPHS..... 8484

Carlos Lassance, Myriam Bontonou, Ghouthi Boukli Hacene, Vincent Gripon, IMT Atlantique, France; Jian Tang, HEC Montreal/Mila, Canada; Antonio Ortega, University of Southern California, France

SS-L3.6: ON THE CHOICE OF GRAPH NEURAL NETWORK ARCHITECTURES..... 8489

Clément Vignac, Guillermo Ortiz-Jiménez, Pascal Frossard, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

SS-L4: END-TO-END APPROACHES FOR SPOKEN LANGUAGE UNDERSTANDING

SS-L4.1: MULTITASK LEARNING WITH CAPSULE NETWORKS FOR SPEECH-TO-INTENT APPLICATIONS 8494

Jakob Poncelet, Hugo Van hamme, Katholieke Universiteit Leuven, Belgium

SS-L4.2: USING SPEECH SYNTHESIS TO TRAIN END-TO-END SPOKEN LANGUAGE UNDERSTANDING MODELS 8499

Loren Lugosch, McGill University / Mila, Canada; Brett H. Meyer, McGill University, Canada; Derek Nowrouzezahrai, McGill University / Mila, Canada; Mirco Ravanelli, Université de Montréal / Mila, Canada

SS-L4.3: IMPROVED END-TO-END SPOKEN UTTERANCE CLASSIFICATION WITH A SELF-ATTENTION ACOUSTIC CLASSIFIER 8504

Ryan Price, Mahnoosh Mehrabani, Srinivas Bangalore, Interactions, LLC., United States

SS-L4.4: DIALOGUE HISTORY INTEGRATION INTO END-TO-END SIGNAL-TO-CONCEPT SPOKEN LANGUAGE UNDERSTANDING SYSTEMS 8509

Natalia Tomashenko, University of Avignon, France; Christian Raymond, Rennes/IRISA, France; Antoine Caubrière, Le Mans Université, France; Renato De Mori, McGill University, France; Yannick Estève, Avignon Université, France

SS-L4.5: ERROR ANALYSIS APPLIED TO END-TO-END SPOKEN LANGUAGE UNDERSTANDING 8514

Antoine Caubrière, Le Mans Université, France; Sahar Ghannay, LIMSI, CNRS, Univ. Paris-Sud, Univ. Paris-Saclay, France; Natalia Tomashenko, Renato De Mori, Avignon Université, France; Antoine Laurent, Le Mans Université, France; Emmanuel Morin, Nantes Université, France; Yannick Estève, Avignon Université, France

SS-L4.6: A DATA EFFICIENT END-TO-END SPOKEN LANGUAGE UNDERSTANDING ARCHITECTURE 8519

Marco Dinarelli, Nikita Kapoor, LIG, France; Bassam Jabaian, LIA, France; Laurent Besacier, LIG, France

SS-L5: SPIKE-BASED NEUROMORPHIC INFORMATION REPRESENTATION, PROCESSING AND LEARNING

SS-L5.1: FEDERATED NEUROMORPHIC LEARNING OF SPIKING NEURAL NETWORKS FOR LOW-POWER EDGE INTELLIGENCE 8524

Nicolas Skatchkovsky, Hyeryung Jang, Osvaldo Simeone, King's College London, United Kingdom

SS-L5.2: TEMPORAL CODING IN SPIKING NEURAL NETWORKS WITH ALPHA SYNAPTIC FUNCTION 8529

Iulia M. Comsa, Krzysztof Potempa, Luca Versari, Thomas Fischbacher, Andrea Gesmundo, Jyrki Alakuijala, Google Research, Switzerland

SS-L5.3: EVENT-DRIVEN SIGNAL PROCESSING WITH NEUROMORPHIC COMPUTING SYSTEMS 8534

Peter Blouw, Chris Eliasmith, Applied Brain Research Inc., Canada

SS-L5.4: CHALLENGES AND PERSPECTIVES IN NEUROMORPHIC-BASED VISUAL IOT SYSTEMS AND NETWORKS 8539

Maria G. Martini, Nabeel Khan, Kingston University, United Kingdom; Yin Bi, Yiannis Andreopoulos, University College London, United Kingdom; Hadi Saki, Mohammad Shikh-Bahaei, King's College London, United Kingdom

SS-L5.5: SPIKING NEURAL NETWORKS TRAINED WITH BACKPROPAGATION FOR LOW POWER NEUROMORPHIC IMPLEMENTATION OF VOICE ACTIVITY DETECTION 8544

Flavio Martinelli, Giorgia Dellaferrea, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Pablo Mainar, Milos Cernak, Logitech Europe, Switzerland

SS-L5.6: TRAINING DEEP SPIKING NEURAL NETWORKS FOR ENERGY-EFFICIENT NEUROMORPHIC COMPUTING 8549

Gopalakrishnan Srinivasan, Chankyu Lee, Purdue University, United States; Abhronil Sengupta, Pennsylvania State University, United States; Priyadarshini Panda, Yale University, United States; Syed Shakib Sarwar, Kaushik Roy, Purdue University, United States

SS-L6: MACHINE LEARNING FOR COMMUNICATIONS II

SS-L6.1: DEEP LEARNING FOR ROBUST POWER CONTROL FOR WIRELESS NETWORKS 8554

Wei Cui, Kaiming Shen, Wei Yu, University of Toronto, Canada

SS-L6.2: FEEDBACK TURBO AUTOENCODER 8559

Yihan Jiang, University of Washington, United States; Hyeji Kim, Samsung AI Research Cambridge, United Kingdom; Himanshu Asnani, Tata Institute of Fundamental Research, India; Sewoong Oh, Sreeram Kannan, University of Washington, United States; Pramod Viswanath, University of Illinois at Urbana Champaign, United States

SS-L6.3: EXPLOITING CHANNEL LOCALITY FOR ADAPTIVE MASSIVE MIMO SIGNAL DETECTION 8564

Mehrdad Khani, Mohammad Alizadeh, Massachusetts Institute of Technology, United States; Jakob Hoydis, Nokia Bell Labs, France; Phil Fleming, Independent Consultant, United States

SS-L6.4: DEEP LEARNING-BASED BEAM ALIGNMENT IN MMWAVE VEHICULAR NETWORKS 8569

Nitin Jonathan Myers, Yuyang Wang, Nuria González-Prelcic, Robert W. Heath Jr., University of Texas at Austin, United States

SS-L6.5: JOINT SOURCE-CHANNEL CODING AND BAYESIAN MESSAGE PASSING DETECTION FOR GRANT-FREE RADIO ACCESS IN IOT 8574

Johannes Dommel, Zoran Utkovski, Slawomir Stanczak, Fraunhofer Heinrich-Hertz-Institute, Germany; Osvaldo Simeone, King's College London, United Kingdom

SS-L6.6: CNN-BASED ANALOG CSI FEEDBACK IN FDD MIMO-OFDM SYSTEMS 8579

Mahdi Boloursaz Mashhadi, Qianqian Yang, Deniz Gündüz, Imperial College London, United Kingdom

SS-L7: LEARNING AND OPTIMIZATION IN NON-CONVEX ENVIRONMENTS

SS-L7.1: SCALABLE LEARNING-BASED SAMPLING OPTIMIZATION FOR 8584 COMPRESSIVE DYNAMIC MRI

Thomas Sanchez, Baran Gözcü, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Ruud B. van Heeswijk, Centre Hospitalier Universitaire Vaudois, Switzerland; Armin Eftekhari, Umeå university, Sweden; Efe Ilıcak, Tolga Çukur, Bilkent University, Sweden; Volkan Cevher, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

SS-L7.2: LINEAR SPEEDUP IN SADDLE-POINT ESCAPE FOR DECENTRALIZED 8589 NON-CONVEX OPTIMIZATION

Stefan Vlaski, Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

SS-L7.3: ON DISTRIBUTED STOCHASTIC GRADIENT ALGORITHMS FOR GLOBAL 8594 OPTIMIZATION

Brian Swenson, Anirudh Sridhar, H. Vincent Poor, Princeton University, United States

SS-L7.4: DISTRIBUTED TENSOR COMPLETION OVER NETWORKS 8599

Claudio Battiloro, Paolo Di Lorenzo, Sapienza University of Rome, Italy

SS-L7.5: LOOKAHEAD CONVERGES TO STATIONARY POINTS OF SMOOTH 8604 NON-CONVEX FUNCTIONS

Jianyu Wang, Carnegie Mellon University, United States; Vinayak Tantia, Nicolas Ballas, Michael Rabbat, Facebook AI Research, Canada

SS-L7.6: COMMUNICATION CONSTRAINED LEARNING WITH UNCERTAIN 8609 MODELS

James Hare, U.S. Army Research Laboratory, United States; Cesar Uribe, Massachusetts Institute of Technology, United States; Lance Kaplan, U.S. Army Research Laboratory, United States; Ali Jadbabaie, Massachusetts Institute of Technology, United States

SS-L8: RECENT ADVANCES IN AUTOMOTIVE RADAR SYSTEMS

SS-L8.1: A SPARSE LINEAR ARRAY APPROACH IN AUTOMOTIVE RADARS USING 8614 MATRIX COMPLETION

Shunqiao Sun, University of Alabama, United States; Athina Petropulu, Rutgers University, United States

SS-L8.2: A LOW-RESOLUTION ADC PROOF-OF-CONCEPT DEVELOPMENT FOR A 8619 FULLY-DIGITAL MILLIMETER-WAVE JOINT COMMUNICATION-RADAR

Preeti Kumari, University of Texas at Austin, United States; Amine Mezghani, University of Manitoba, Canada; Robert W. Heath Jr., University of Texas at Austin, United States

SS-L8.3: PERFORMANCE BOUNDS FOR DISPLACED SENSOR AUTOMOTIVE RADAR 8624 IMAGING

Guohua Wang, Kumar Vijay Mishra, Hertzwell Pte Ltd, Singapore

SS-L8.4: SPATIAL AND TEMPORAL SMOOTHING FOR COVARIANCE ESTIMATION IN 8629 SUPER-RESOLUTION ANGLE ESTIMATION IN AUTOMOTIVE RADARS

Ali Erdem Ertan, Murtaza Ali, Uhnder Inc., United States

SS-L8.5: SLOW-TIME MIMO-FMCW AUTOMOTIVE RADAR DETECTION WITH 8634 IMPERFECT WAVEFORM SEPARATION

Pu Wang, Petros T. Boufounos, Hassan Mansour, Philip V. Orlik, Mitsubishi Electric Research Laboratories (MERL), United States

SS-L8.6: ON BINARY SEQUENCE SET DESIGN WITH APPLICATIONS TO 8639 AUTOMOTIVE RADAR

Ronghao Lin, Jian Li, University of Science and Technology of China, China

SS-L9: LEARNING BASED INVERSION

SS-L9.1: OPTIMAL TRANSPORT STRUCTURE OF CYCLEGAN FOR UNSUPERVISED LEARNING FOR INVERSE PROBLEMS 8644

Byeongsu Sim, Gyutaek Oh, Jong Chul Ye, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)

SS-L9.2: LIGHT-FIELD RECONSTRUCTION AND DEPTH ESTIMATION FROM FOCAL STACK IMAGES USING CONVOLUTIONAL NEURAL NETWORKS 8648

Zhengyu Huang, Jeffrey Fessler, Theodore Norris, University of Michigan, United States; Il Yong Chun, University of Hawai'i at Mānoa, United States

SS-L9.3: JOINT LEARNING OF CARTESIAN UNDERSAMPLING AND RECONSTRUCTION FOR ACCELERATED MRI 8653

Tomer Weiss, Sanketh Vedula, Ortal Senouf, Technion - Israel Institute of Technology, Israel; Oleg Michailovich, University of Waterloo, Canada; Michael Zibulevsky, Alex Bronstein, Technion - Israel Institute of Technology, Israel

SS-L9.4: BUILDING FIRMLY NONEXPANSIVE CONVOLUTIONAL NEURAL NETWORKS 8658

Matthieu Terris, Audrey Repetti, Heriot-Watt University, United Kingdom; Jean-Christophe Pesquet, Université Paris-Saclay, CentraleSupélec, Inria, France; Yves Wiaux, Heriot-Watt University, United Kingdom

SS-L9.5: CONFIRMNET: CONVOLUTIONAL FIRMNET AND APPLICATION TO IMAGE DENOISING AND INPAINTING 8663

Praveen Kumar Pokala, Prakash Kumar Uttam, Chandra Sekhar Seelamantula, Indian Institute of Science, India

SS-L9.6: LEARNING DIFFERENTIABLE SPARSE AND LOW RANK NETWORKS FOR AUDIO-VISUAL OBJECT LOCALIZATION 8668

Jie Pu, Imperial College London, United Kingdom; Yannis Panagakis, University of Athens, Greece; Maja Pantic, Imperial College London, United Kingdom

SS-L10: SIGNAL PROCESSING FOR EMERGING WIRELESS HARDWARE ARCHITECTURES

SS-L10.1: SPHERICAL LARGE INTELLIGENT SURFACES..... 8673

Sha Hu, Huawei Sweden, Sweden; Fredrik Rusek, Lund University, Sweden

SS-L10.2: PATHLOSS PREDICTION USING DEEP LEARNING WITH APPLICATIONS TO CELLULAR OPTIMIZATION AND EFFICIENT D2D LINK SCHEDULING 8678

Ron Levie, Cagkan Yapar, Gitta Kutyniok, Giuseppe Caire, Technische Universität Berlin, Germany

SS-L10.3: BEAMFORMING IN INTELLIGENT ENVIRONMENTS BASED ON ULTRA-MASSIVE MIMO PLATFORMS IN MILLIMETER WAVE AND TERAHERTZ BANDS 8683

Shuai Nie, Ian Akyildiz, Georgia Institute of Technology, United States

SS-L10.4: A SINGLE-RF ARCHITECTURE FOR MULTIUSER MASSIVE MIMO VIA REFLECTING SURFACES 8688

Ali Bereyhi, Vahid Jamali, Ralf R. Müller, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Antonia M. Tulino, Nokia Bell Labs and University degli Studi di Napoli Federico II, United States; Georg Fischer, Robert Schober, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany

SS-L10.5: HYBRID PRECODING FOR SECURE TRANSMISSION IN REFLECT-ARRAY-ASSISTED MASSIVE MIMO SYSTEMS 8693

Saba Asaad, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Rafael F. Schaefer, Technische Universität Berlin, Germany; H. Vincent Poor, Princeton University, United States

SS-L10.6: WIDEBAND CHANNEL TRACKING FOR MILLIMETER WAVE MASSIVE MIMO SYSTEMS WITH HYBRID BEAMFORMING RECEPTION 8698

George Alexandropoulos, National and Kapodistrian University of Athens, Greece; Evangelos Vlachos, John Thompson, University of Edinburgh, United Kingdom

SS-L11: NEURAL AND AUDIO SIGNAL PROCESSING FOR HEARING DEVICES

SS-L11.1: IMPROVING AUDITORY ATTENTION DECODING PERFORMANCE OF 8703 LINEAR AND NON-LINEAR METHODS USING STATE-SPACE MODEL

Ali Aroudi, Tobias de Taillez, Simon Doclo, University of Oldenburg, Germany

SS-L11.2: TOWARDS DECODING SELECTIVE ATTENTION FROM SINGLE-TRIAL 8708 EEG DATA IN COCHLEAR IMPLANT USERS BASED ON DEEP NEURAL NETWORKS

Waldo Nogueira, Hanna Dolhopiatenko, Medical University Hannover, Germany

SS-L11.3: HARMONIC/PERCUSSIVE SOUND SEPARATION AND SPECTRAL 8713 COMPLEXITY REDUCTION OF MUSIC SIGNALS FOR COCHLEAR IMPLANT LISTENERS

Benjamin Lentz, Anil Nagathil, Johannes Gauer, Rainer Martin, Ruhr-Universität Bochum, Germany

SS-L11.4: BIO-MIMETIC ATTENTIONAL FEEDBACK IN MUSIC SOURCE 8718 SEPARATION

Ashwin Bellur, Mounya Elhilali, LCAP, Johns Hopkins University, United States

SS-L11.5: TALKER-INDEPENDENT SPEAKER SEPARATION IN REVERBERANT 8723 CONDITIONS

Masood Delfarah, Yuzhou Liu, DeLiang Wang, Ohio State University, United States

SS-L11.6: EVALUATION OF JOINT AUDITORY ATTENTION DECODING AND 8728 ADAPTIVE BINAURAL BEAMFORMING APPROACH FOR HEARING DEVICES WITH ATTENTION SWITCHING

Wenqiang Pu, Shenzhen Research Institute of Big Data, Chinese University of Hong Kong, Shenzhen, China; Peng Zan, University of Maryland, United States; Jinjun Xiao, Tao Zhang, Starkey Hearing Technologies, United States; Zhi-Quan Luo, Shenzhen Research Institute of Big Data, Chinese University of Hong Kong, Shenzhen, China

SS-L12: MACHINE LEARNING FOR PHYSICAL LAYER SECURITY AND PRIVACY

SS-L12.1: ROBUST PRICING MECHANISM FOR RESOURCE SUSTAINABILITY 8733 UNDER PRIVACY CONSTRAINT IN COMPETITIVE ONLINE LEARNING MULTI-AGENT SYSTEMS

Ezra Tampubolon, Holger Boche, Technische Universität München, Germany

SS-L12.2: NEURAL NETWORK WIRETAP CODE DESIGN FOR MULTI-MODE FIBER 8738 OPTICAL CHANNELS

Karl-Ludwig Besser, Andrew Lonnstrom, Eduard A. Jorswieck, Technische Universität Braunschweig, Germany

SS-L12.3: AGE-BASED SCHEDULING POLICY FOR FEDERATED LEARNING IN 8743 MOBILE EDGE NETWORKS

Howard Yang, Singapore University of Technology and Design, Singapore; Ahmed Arafa, University of North Carolina - Charlotte, United States; Tony Quek, Singapore University of Technology and Design, Singapore; H. Vincent Poor, Princeton University, United States

SS-L12.4: ADVERSARIAL NETWORKS FOR SECURE WIRELESS COMMUNICATIONS..... 8748

Thomas Marchioro, Nicola Laurenti, University of Padova, Italy; Deniz Gündüz, Imperial College London, United Kingdom

SS-L12.5: LATENCY-MINIMIZED DESIGN OF SECURE TRANSMISSIONS IN 8753 UAV-AIDED COMMUNICATIONS

Xiongwei Wu, Chinese University of Hong Kong, Hong Kong SAR of China; Qiang Li, University of Electronic Science and Technology of China, China; Yawei Lu, Tsinghua University, China; H. Vincent Poor, Princeton University, United States; Victor C. M. Leung, Shenzhen University, China; P. C. Ching, Chinese University of Hong Kong, Hong Kong SAR of China

SS-L12.6: DETECT INSIDER ATTACKS USING CNN IN DECENTRALIZED 8758 OPTIMIZATION

Gangqiang Li, Sissi Xiaoxiao Wu, Shengli Zhang, College of Electronic and Information Engineering, Shenzhen University, China; Qiang Li, School of Info. and Commun. Engineering, University of Electronic Science and Technology of China, China

SS-L13: RANDOM MATRIX THEORY AND HIGH-DIMENSIONAL STATISTICAL SIGNAL PROCESSING

SS-L13.1: RISK CONVERGENCE OF CENTERED KERNEL RIDGE REGRESSION 8763 WITH LARGE DIMENSIONAL DATA

Khalil Elkhail, Duke university, United States; Abia Kammoun, Xiangliang Zhang, Mohamed-Slim Alouini, Tareq Al-Naffouri, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

SS-L13.2: A WHITENESS TEST BASED ON THE SPECTRAL MEASURE OF LARGE 8768 NON-HERMITIAN RANDOM MATRICES

Arup Bose, Indian Statistical Institute, India; Walid Hachem, CNRS / Université Paris-Est Marne-la-Vallée, France

SS-L13.3: ON THE LIMIT DISTRIBUTION OF THE CANONICAL CORRELATION 8772 COEFFICIENTS BETWEEN THE PAST AND THE FUTURE OF A HIGH-DIMENSIONAL WHITE NOISE

Daria Tiepova, Philippe Loubaton, Université Paris-Est/Marne la Vallée, France; Leonid Pastur, Institute of Low Temperature Physics and Engineering, Ukraine

SS-L13.4: POSITIVE SOLUTIONS FOR LARGE RANDOM LINEAR SYSTEMS 8777

Pierre Bizeul, Sorbonne Université, France; Maxime Clenet, Université Paris Est Marne-La-Vallée, France; Jamal Najim, Université Paris Est Marne-La-Vallée et Centre National de la Recherche Scientifique, France

SS-L13.5: ON THE FREQUENCY DOMAIN DETECTION OF HIGH DIMENSIONAL 8782 TIME SERIES

Alexis Rosuel, Université Paris-Est Marne-la-Vallée, France; Pascal Vallet, Université de Bordeaux, France; Philippe Loubaton, Université Paris-Est Marne-la-Vallée, France; Xavier Mestre, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain

SS-L13.6: LARGE DIMENSIONAL ASYMPTOTICS OF MULTI-TASK LEARNING..... 8787

Malik Tiomoko, Université Paris Sud/ Gipsa Lab, France; Cosme Louart, Gipsa Lab / CEA LIST, France; Romain Couillet, Gipsa-Lab / Centrale-Supélec, France

SS-L14: SIGNAL PROCESSING AND MACHINE LEARNING FOR SATELLITE AND SPACE COMMUNICATIONS

SS-L14.1: ROBUST HYBRID BEAMFORMING FOR SATELLITE-TERRESTRIAL 8792 INTEGRATED NETWORKS

Zhi Lin, Army Engineering University, China; Min Lin, Nanjing University of Posts and Telecommunications, China; Benoit Champagne, McGill University, Canada; Wei-Ping Zhu, Concordia University, Canada; Naofal Al-Dhahir, University of Texas at Austin, United States

SS-L14.2: IN-NETWORK CACHING FOR HYBRID SATELLITE-TERRESTRIAL 8797 NETWORKS USING DEEP REINFORCEMENT LEARNING

Navneet Garg, Mathini Sellathurai, Heriot-Watt University, United Kingdom; Tharmalingam Ratnarajah, University of Edinburgh, United Kingdom

SS-L14.3: MULTIGRAPH SPECTRAL CLUSTERING FOR JOINT CONTENT 8802 DELIVERY AND SCHEDULING IN BEAM-FREE SATELLITE COMMUNICATIONS

Miguel Ángel Vázquez, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain; Ana Isabel Pérez-Neira, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Universitat Politècnica de Catalunya (UPC), Spain

SS-L14.4: CONSTANT-ENVELOPE PRECODING FOR SATELLITE SYSTEMS..... 8807

Christos Tsinos, Aakash Arora, Björn Ottersten, University of Luxembourg, Luxembourg

SS-L14.5: RESOURCE MANAGEMENT IN THE MULTIBEAM NOMA-BASED 8812 SATELLITE DOWNLINK

Tomás Ramirez, Carlos Mosquera, University of Vigo, Spain

SS-L14.6: GENETIC ALGORITHM OPTIMIZED SUPPORT VECTOR MACHINE IN NOMA-BASED SATELLITE NETWORKS WITH IMPERFECT CSI	8817
<i>Xiaojuan Yan, Beibu Gulf University, China; Kang An, National University of Defense Technology, China; Cheng-Xiang Wang, Southeast University, China; Wei-Ping Zhu, Concordia University, Canada; Yusheng Li, National University of Defense Technology, China; Zhiqiang Feng, Beibu Gulf University, China</i>	
SS-L15: SIGNAL PROCESSING AND CODING FOR MACROMOLECULAR STORAGE AND COMPUTING	
SS-L15.1: OVERCOMING HIGH NANOPORE BASECALLER ERROR RATES FOR DNA STORAGE VIA BASECALLER-DECODER INTEGRATION AND CONVOLUTIONAL CODES	8822
<i>Shubham Chandak, Joachim Neu, Kedar Tatwawadi, Jay Mardia, Billy Lau, Stanford University, United States; Matthew Kubit, Berkeley Lights, Inc., United States; Reyna Hulett, Peter Griffin, Mary Wootters, Tsachy Weissman, Hanlee Ji, Stanford University, United States</i>	
SS-L15.2: EFFICIENT CONSTRAINED ENCODERS CORRECTING A SINGLE NUCLEOTIDE EDIT IN DNA STORAGE	8827
<i>Kui Cai, Xuan He, Singapore University of Technology and Design, Singapore; Han Mao Kiah, Nanyang Technological University, Singapore; Tuan Thanh Nguyen, Singapore University of Technology and Design, Singapore</i>	
SS-L15.3: IMAGE PROCESSING IN DNA	8831
<i>Chao Pan, University of Illinois at Urbana–Champaign, United States; S. M. Hossein Tabatabaei Yazdi, Dorna Robotics, United States; S Kasra Tabatabaei, Alvaro G. Hernandez, Charles Schroeder, Olga Milenkovic, University of Illinois at Urbana–Champaign, United States</i>	
SS-L15.4: CONCENTRATION-BASED POLYNOMIAL CALCULATIONS ON NICKED DNA	8836
<i>Tonglin Chen, Marc Riedel, University of Minnesota, United States</i>	
SS-L15.5: CAPACITY OF THE ERASURE SHUFFLING CHANNEL	8841
<i>Seiyun Shin, University of Illinois at Urbana-Champaign, United States; Reinhard Heckel, Technische Universität München, Germany; Ilan Shomorony, University of Illinois at Urbana-Champaign, United States</i>	
SS-L15.6: ACHIEVING THE CAPACITY OF THE DNA STORAGE CHANNEL	8846
<i>Andreas Lenz, Technische Universität München, Germany; Paul Siegel, University of California, San Diego, United States; Antonia Wachter-Zeh, Technische Universität München, Germany; Eitan Yaakobi, Technion - Israel Institute of Technology, Israel</i>	
SS-L16: DISTRIBUTED MACHINE LEARNING ON WIRELESS NETWORKS	
SS-L16.1: FEDERATED LEARNING WITH QUANTIZATION CONSTRAINTS	8851
<i>Nir Shlezinger, Weizmann Institute of Science, Israel; Mingzhe Chen, Princeton University, United States; Yonina Eldar, Weizmann Institute of Science, Israel; H. Vincent Poor, Princeton University, United States; Shuguang Cui, Chinese University of Hong Kong, China</i>	
SS-L16.2: COOPERATIVE LEARNING VIA FEDERATED DISTILLATION OVER FADING CHANNELS	8856
<i>Jin-Hyun Ahn, Korea Advanced Institute of Science and Technology (KAIST), Korea (South); Osvaldo Simeone, King's College London, United Kingdom; Joonhyuk Kang, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
SS-L16.3: ON THE BYZANTINE ROBUSTNESS OF CLUSTERED FEDERATED LEARNING	8861
<i>Felix Sattler, Fraunhofer Heinrich-Hertz-Institute, Germany; Klaus-Robert Müller, Technische Universität Berlin, Germany; Thomas Wiegand, Wojciech Samek, Fraunhofer Heinrich-Hertz-Institute, Germany</i>	
SS-L16.4: HIERARCHICAL FEDERATED LEARNING ACROSS HETEROGENEOUS CELLULAR NETWORKS	8866
<i>Mehdi Salehi Haydar Abad, Sabanci University, Turkey; Emre Ozfatura, Deniz Gündüz, Imperial College London, United Kingdom; Ozgur Ercetin, Sabanci University, Turkey</i>	

SS-L16.5: OVERLAP LOCAL-SGD: AN ALGORITHMIC APPROACH TO HIDE COMMUNICATION DELAYS IN DISTRIBUTED SGD	8871
<i>Jianyu Wang, Hao Liang, Gauri Joshi, Carnegie Mellon University, United States</i>	
SS-L16.6: Q-GADMM: QUANTIZED GROUP ADMM FOR COMMUNICATION EFFICIENT DECENTRALIZED MACHINE LEARNING	8876
<i>Anis Elgabli, Jihong Park, University of Oulu, Finland; Amrit S. Bedi, Indian Institute of Technology Kanpur, India; Mehdi Bennis, University of Oulu, Finland; Vaneet Aggarwal, Purdue University, United States</i>	
SS-L17: MODEL BASED DEEP LEARNING	
SS-L17.1: DEEP SOFT INTERFERENCE CANCELLATION FOR MIMO DETECTION	8881
<i>Nir Shlezinger, Weizmann Institute of Science, Israel; Rong Fu, Tsinghua University, China; Yonina Eldar, Weizmann Institute of Science, Israel</i>	
SS-L17.2: AN EMPIRICAL BAYES APPROACH TO PARTIALLY LABELED AND SHUFFLED DATA SETS	8886
<i>Alex Dytso, H. Vincent Poor, Princeton University, United States</i>	
SS-L17.3: REINFORCED DEPTH-AWARE DEEP LEARNING FOR SINGLE IMAGE DEHAZING	8891
<i>Tiantong Guo, Vishal Monga, Pennsylvania State University, United States</i>	
SS-L17.4: LEARNING PLUG-AND-PLAY PROXIMAL QUASI-NEWTON DENOISERS	8896
<i>Abdullah Al-Shabili, New York University, United States; Hassan Mansour, Petros T. Boufounos, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SS-L17.5: JOINT OPTIMIZATION OF SAMPLING PATTERNS AND DEEP PRIORS FOR IMPROVED PARALLEL MRI	8901
<i>Hemant Kumar Aggarwal, Mathews Jacob, University of Iowa, United States</i>	
SS-L17.6: LEARNING SAMPLING AND MODEL-BASED SIGNAL RECOVERY FOR COMPRESSED SENSING MRI	8906
<i>Iris A.M. Huijben, Eindhoven University of Technology, Netherlands; Bastiaan S. Veeling, University of Amsterdam, Netherlands; Ruud J.G. van Sloun, Eindhoven University of Technology, Netherlands</i>	
SS-L18: ANOMALY DETECTION AND INTENT INFERENCE IN OBJECT TRACKING	
SS-L18.1: INFERRING DYNAMIC GROUP LEADERSHIP USING SEQUENTIAL BAYESIAN METHODS	8911
<i>Qing Li, Simon Godsill, Jiaming Liang, Bashar Ahmad, University of Cambridge, United Kingdom</i>	
SS-L18.2: SCALABLE DETECTION AND TRACKING OF EXTENDED OBJECTS	8916
<i>Florian Meyer, University of California, San Diego, United States; Jason L. Williams, Commonwealth Scientific and Industrial Research Organisation, Australia</i>	
SS-L18.3: ADVERSARIAL ANOMALY DETECTION FOR MARKED SPATIO-TEMPORAL STREAMING DATA	8921
<i>Shixiang Zhu, Henry Shaowu Yuchi, Yao Xie, Georgia Institute of Technology, United States</i>	
SS-L18.4: QUICKEST DETECTION OF GROWING DYNAMIC ANOMALIES IN NETWORKS	8926
<i>Georgios Rovatsos, Venugopal Veeravalli, University of Illinois at Urbana-Champaign, United States; Don Towsley, University of Massachusetts, Amherst, United States; Ananthram Swami, Army Research Lab, United States</i>	
SS-L18.5: IMAGE SEGMENTATION BASED PRIVACY-PRESERVING HUMAN ACTION RECOGNITION FOR ANOMALY DETECTION	8931
<i>Jiawei Yan, Federico Angelini, Syed Mohsen Naqvi, Newcastle University, United Kingdom</i>	

SS-L18.6: PREDICTION OF VESSEL TRAJECTORIES FROM AIS DATA VIA SEQUENCE-TO-SEQUENCE RECURRENT NEURAL NETWORKS	8936
<i>Nicola Forti, Leonardo M. Millefiori, Paolo Braca, NATO STO Centre for Maritime Research and Experimentation, Italy; Peter Willett, University of Connecticut, United States</i>	
SS-L19: HARDWARE-EFFICIENT LARGE-SCALE ANTENNA ARRAYS: THE STAGE FOR SYMBOL-LEVEL PRECODING	
SS-L19.1: NEAR-OPTIMAL INTERFERENCE EXPLOITATION 1-BIT MASSIVE MIMO PRECODING VIA PARTIAL BRANCH-AND-BOUND	8941
<i>Ang Li, University of Sydney, Australia; Fan Liu, Christos Masouros, University College London, United Kingdom; Yonghui Li, Branka Vucetic, University of Sydney, Australia</i>	
SS-L19.2: SECURE SYMBOL-LEVEL MISO PRECODING	8946
<i>Qian Xu, Pinyi Ren, Xi'an Jiaotong University, China; A. Lee Swindlehurst, University of California, Irvine, United States</i>	
SS-L19.3: ROBUST SYMBOL-LEVEL PRECODING VIA AUTOENCODER-BASED DEEP LEARNING	8951
<i>Foad Sahrabi, Hei Victor Cheng, Wei Yu, University of Toronto, Canada</i>	
SS-L19.4: CONSTANT ENVELOPE MASSIVE MIMO-OFDM PRECODING: AN IMPROVED FORMULATION AND SOLUTION	8956
<i>Stavros Domouchtsidis, Christos Tsinos, Symeon Chatzinotas, Björn Ottersten, University of Luxembourg, Luxembourg</i>	
SS-L19.5: PASSIVE INTELLIGENT SURFACE ASSISTED MIMO POWERED SUSTAINABLE IOT	8961
<i>Deepak Mishra, University of New South Wales, Australia; Erik G. Larsson, Linköping University, Sweden</i>	
SS-L19.6: MULTIUSER MASSIVE MIMO DOWNLINK PRECODING USING SECOND-ORDER SPATIAL SIGMA-DELTA MODULATION	8966
<i>Mingjie Shao, Wing-Kin Ma, Chinese University of Hong Kong, China; Lee Swindlehurst, University of California, Irvine, United States</i>	
SS-L20: SUSTAINABLE NETWORKING AND COMPUTING THROUGH MACHINE LEARNING	
SS-L20.1: ALLOCATION OF COMPUTING TASKS IN DISTRIBUTED MEC SERVERS CO-POWERED BY RENEWABLE SOURCES AND THE POWER GRID	8971
<i>Davide Cecchinato, Michele Berno, University of Padova, Italy; Flavio Esposito, Saint Louis University, United States; Michele Rossi, University of Padova, Italy</i>	
SS-L20.2: MULTI-AGENT DEEP REINFORCEMENT LEARNING FOR DISTRIBUTED HANDOVER MANAGEMENT IN DENSE MMWAVE NETWORKS	8976
<i>Mohamed Sana, Antonio de Domenico, Emilio Calvanese Strinati, Antonio Clemente, Commissariat à l'énergie atomique et aux énergies alternatives - Laboratoire d'électronique et de technologie de l'information (CEA-Leti), France</i>	
SS-L20.3: INTERPRETABLE MACHINE LEARNING IN SUSTAINABLE EDGE COMPUTING: A CASE STUDY OF SHORT-TERM PHOTOVOLTAIC POWER OUTPUT PREDICTION	8981
<i>Xiaomin Chang, Wei Li, Jin Ma, University of Sydney, Australia; Ting Yang, Tianjin University, China; Albert Zomaya, University of Sydney, Australia</i>	
SS-L20.4: LOAD MANAGEMENT WITH PREDICTIONS OF SOLAR ENERGY PRODUCTION FOR CLOUD DATA CENTERS	8986
<i>Maurizio Floridia, Politecnico di Torino, Italy; Demetrio Laganà, Eco4Cloud, Italy; Carlo Mastroianni, CNR, Italy; Michela Meo, Daniela Renga, Politecnico di Torino, Italy</i>	

SS-L20.5: SPECTRUM ALLOCATION IN WIRELESS NETWORKS FOR CROWD LABELLING 8991

Xiaoyang Li, University of Hong Kong, Hong Kong SAR of China; Guangxu Zhu, Shenzhen Research Institute of Big Data, China; Kaiming Shen, University of Toronto, Canada; Yi Gong, Southern University of Science and Technology, China; Kaibin Huang, University of Hong Kong, Hong Kong SAR of China

SS-L20.6: MODELING THE ENVIRONMENT IN DEEP REINFORCEMENT LEARNING: THE CASE OF ENERGY HARVESTING BASE STATIONS 8996

Nicola Piovesan, Marco Miozzo, Paolo Dini, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain

SS-L21: ADVANCES IN SIGNAL PROCESSING FOR ENVIRONMENTAL STUDIES

SS-L21.1: A DIFFERENTIAL APPROACH FOR RAIN FIELD TOMOGRAPHIC RECONSTRUCTION USING MICROWAVE SIGNALS FROM LEO SATELLITES 9001

Xi Shen, Defeng (David) Huang, University of Western Australia, Australia; Claire Vincent, University of Melbourne, Australia; Wenxiao Wang, Roberto Togneri, University of Western Australia, Australia

SS-L21.2: UNCERTAINTIES IN SHORT COMMERCIAL MICROWAVE LINKS FADING DUE TO RAIN 9006

Hai Victor Habi, Hagit Messer, Tel Aviv University, Israel

SS-L21.3: ON THE OPPORTUNISTIC USE OF COMMERCIAL KU AND KA BAND SATCOM NETWORKS FOR RAIN RATE ESTIMATION: POTENTIALS AND CRITICAL ISSUES 9011

Filippo Giannetti, Marco Moretti, Ruggero Reggiannini, Università di Pisa, Italy; Attilio Vaccaro, MBI SRL, Italy; Simone Scarfone, Università di Pisa, Italy; Alberto Ortolani, LaMMA Consortium, Italy

SS-L21.4: PERFORMANCE ANALYSIS FOR PATH ATTENUATION ESTIMATION OF MICROWAVE SIGNALS DUE TO RAINFALL AND BEYOND 9016

Boming Song, Defeng (David) Huang, Xi Shen, Roberto Togneri, University of Western Australia, Australia

SS-L21.5: DEEP RAINRATE ESTIMATION FROM HIGHLY ATTENUATED DOWNLINK SIGNALS OF GROUND-BASED COMMUNICATIONS SATELLITE TERMINALS 9021

Kumar Vijay Mishra, Bhavani Shankar M. R., Björn Ottersten, University of Luxembourg, Luxembourg

SS-L21.6: STATISTICAL SIGNAL PROCESSING APPROACH FOR RAIN ESTIMATION BASED ON MEASUREMENTS FROM NETWORK MANAGEMENT SYSTEMS 9026

Jonatan Ostrometzky, Columbia University, United States; Hagit Messer, Tel Aviv University, United States

SS-L22: SIGNAL PROCESSING FOR IOT

SS-L22.1: DYNAMIC OVERSAMPLING IN 1-BIT QUANTIZED ASYNCHRONOUS LARGE-SCALE MULTIPLE-ANTENNA SYSTEMS FOR SUSTAINABLE IOT NETWORKS 9031

Zhichao Shao, Lukas T. N. Landau, Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil

SS-L22.2: DYNAMIC RESOURCE ALLOCATION FOR WIRELESS EDGE MACHINE LEARNING WITH LATENCY AND ACCURACY GUARANTEES 9036

Mattia Merluzzi, Paolo Di Lorenzo, Sergio Barbarossa, Sapienza University of Rome, Italy

SS-L22.3: FEDERATING SOLAR, STORAGE AND COMMUNICATIONS IN THE ELECTRIC GRID AND INTERNET OF THINGS 9041

Raksha Ramakrishna, Nurullah Karakoc, Kari Hreinsson, Anna Scaglione, Arizona State University, United States

SS-L22.4: NON-GAUSSIAN BLE-BASED INDOOR LOCALIZATION VIA GAUSSIAN SUM FILTERING COUPLED WITH WASSERSTEIN DISTANCE 9046

Parvin Malekzadeh, Concordia University, Canada; Shervin Mehryar, University of Toronto, Canada; Petros Spachos, University of Guelph, Canada; Konstantinos N. Plataniotis, University of Toronto, Canada; Arash Mohammadi, Concordia University, Canada

SS-L22.5: OPTIMAL JOINT CHANNEL ESTIMATION AND DATA DETECTION BY L1-NORM PCA FOR STREETSCAPE IOT	9051
<i>George Sklivanitis, Konstantinos Tountas, Florida Atlantic University, United States; Nicholas Tsagkarakis, Ericsson AB, Sweden; Dimitris Pados, Stella Batalama, Florida Atlantic University, United States</i>	
SS-L22.6: ON MEASURING DOPPLER SHIFTS BETWEEN TAGS IN A BACKSCATTERING TAG-TO-TAG NETWORK WITH APPLICATIONS IN TRACKING	9055
<i>Abeer Ahmad, Yuanfei Huang, Xiao Sha, Akshay Athalye, Milutin Stanacevic, Samir R. Das, Petar Djuric, Stony Brook University, United States</i>	
SS-L23: DEEP GRAPH LEARNING	
SS-L23.1: EFFICIENT BELIEF PROPAGATION FOR GRAPH MATCHING	9060
<i>Efe Onaran, Soledad Villar, New York University, United States</i>	
SS-L23.2: SUPERVISED GRAPH REPRESENTATION LEARNING FOR MODELING THE RELATIONSHIP BETWEEN STRUCTURAL AND FUNCTIONAL BRAIN CONNECTIVITY	9065
<i>Yang Li, Rasoul Shafipour, Gonzalo Mateos, Zhengwu Zhang, University of Rochester, United States</i>	
SS-L23.3: STABILITY OF GRAPH NEURAL NETWORKS TO RELATIVE PERTURBATIONS	9070
<i>Fernando Gama, University of Pennsylvania, United States; Joan Bruna, New York University, United States; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SS-L23.4: ACTIVE SEMI-SUPERVISED LEARNING FOR DIFFUSIONS ON GRAPHS	9075
<i>Bishwadeep Das, Elvin Isufi, Geert Leus, Delft University of Technology, Netherlands</i>	
SS-L23.5: STOCHASTIC GRAPH NEURAL NETWORKS	9080
<i>Zhan Gao, University of Pennsylvania, United States; Elvin Isufi, Delft University of Technology, Netherlands; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SS-L23.6: GENERATIVE ADVERSARIAL NETWORKS FOR GRAPH DATA IMPUTATION FROM SIGNED OBSERVATIONS	9085
<i>Amarlingam Madapu, Indian Institute of Science, India; Santiago Segarra, Rice University, United States; Sundeep Prabhakar Chepuri, Indian Institute of Science, India; Antonio Marques, King Juan Carlos University, Spain</i>	
SS-L24: AMP AND OTHER APPROXIMATE BAYESIAN INFERENCE TECHNIQUES	
SS-L24.1: JOINT FREQUENCY DOMAIN CHANNEL ESTIMATION AND EQUALIZATION BASED ON EXPECTATION PROPAGATION FOR SINGLE CARRIER TRANSMISSIONS	9090
<i>Serdar Şahin, Antonio Maria Cipriano, Thales, France; Charly Poulliat, Marie-Laure Boucheret, Toulouse INP - IRT, France</i>	
SS-L24.2: BP-VB-EP BASED STATIC AND DYNAMIC SPARSE BAYESIAN LEARNING WITH KRONECKER STRUCTURED DICTIONARIES	9095
<i>Christo Kurisummoottil Thomas, Dirk Slock, EURECOM, India</i>	
SS-L24.3: ROBUSTNESS OF SPARSE BAYESIAN LEARNING IN CORRELATED ENVIRONMENTS	9100
<i>Rohan R. Pote, Bhaskar D. Rao, University of California, San Diego, United States</i>	
SS-L24.4: A SIMPLE DERIVATION OF AMP AND ITS STATE EVOLUTION VIA FIRST-ORDER CANCELLATION	9105
<i>Philip Schniter, Ohio State University, United States</i>	
SS-L24.5: VAMP WITH VECTOR-VALUED DIAGONALIZATION	9110
<i>Robert Fischer, Carmen Sippel, Ulm University, Germany; Norbert Goertz, Technische Universität Wien, Austria</i>	

SS-L24.6: DISTRIBUTED VERIFICATION OF BELIEF PRECISIONS CONVERGENCE9115
IN GAUSSIAN BELIEF PROPAGATION

Bin Li, Nan Wu, Beijing Institute of Technology, China; Yik-Chung Wu, University of Hong Kong, China

SS-L25: ADVANCES IN LOW-RESOLUTION SAMPLING AND SIGNAL PROCESSING

SS-L25.1: ADMM-BASED ONE-BIT QUANTIZED SIGNAL DETECTION FOR MASSIVE 9120
MIMO SYSTEMS WITH HARDWARE IMPAIRMENTS

Özlem Tugfe Demir, Emil Björnson, Linköping University, Sweden

SS-L25.2: LEARNING TASK-BASED ANALOG-TO-DIGITAL CONVERSION FOR MIMO 9125
RECEIVERS

Nir Shlezinger, Weizmann Institute of Science, Israel; Ruud J.G. van Sloun, Iris A.M. Huijben, Eindhoven University of Technology, Netherlands; George Tsintsadze, Yonina Eldar, Weizmann Institute of Science, Israel

SS-L25.3: ONE-BIT NORMALIZED SCATTER MATRIX ESTIMATION FOR COMPLEX 9130
ELLIPTICALLY SYMMETRIC DISTRIBUTIONS

Chun-Lin Liu, National Taiwan University, Taiwan; P. P. Vaidyanathan, California Institute of Technology, United States

SS-L25.4: ONE-BIT DOA ESTIMATION VIA SPARSE LINEAR ARRAYS..... 9135

Saeid Sedighi, Bhavani Shankar M. R., University of Luxembourg, Luxembourg; Mojtaba Soltanalian, University of Illinois at Chicago, United States; Björn Ottersten, University of Luxembourg, Luxembourg

SS-L25.5: ONE-BIT SAMPLING IN FRACTIONAL FOURIER DOMAIN..... 9140

Ayush Bhandari, Imperial College London, United Kingdom; Olga Graf, Felix Krahmer, Technische Universität München, Germany; Ahmed Zayed, DePaul University, United States

SS-L25.6: TARGET PARAMETER ESTIMATION VIA ONE-BIT PMCW RADAR..... 9145

Heng Zhu, Xiaolei Shang, University of Science and Technology of China, China; Jian Li, University of Florida, United States

SS-L26: SIGNAL PROCESSING FOR BEYOND 5G COMMUNICATIONS

SS-L26.1: MOBILITY-AWARE BEAM STEERING IN METASURFACE-BASED 9150
PROGRAMMABLE WIRELESS ENVIRONMENTS

Christos Liaskos, Foundation for Research and Technology-Hellas (FORTH), Greece; Shuai Nie, Georgia Institute of Technology, United States; Ageliki Tsioliaridou, Foundation for Research and Technology-Hellas (FORTH), Greece; Andreas Pitsillides, University of Cyprus, Cyprus; Sotiris Ioannidis, Foundation for Research and Technology-Hellas (FORTH), Greece; Ian Akyildiz, Georgia Institute of Technology, United States

SS-L26.2: DYNAMIC METASURFACE ANTENNAS FOR BIT-CONSTRAINED 9155
MIMO-OFDM RECEIVERS

Hanqing Wang, Southeast University, China; Nir Shlezinger, Weizmann Institute of Science, Israel; Shi Jin, Southeast University, China; Yonina Eldar, Weizmann Institute of Science, Israel; Insang Yoo, Mohammadreza Imani, David Smith, Duke University, United States

SS-L26.3: USING INTELLIGENT REFLECTING SURFACES FOR RANK 9160
IMPROVEMENT IN MIMO COMMUNICATIONS

Özgecan Özdoğan, Emil Björnson, Erik G. Larsson, Linköping University, Sweden

SS-L26.4: OPTIMIZING BACKSCATTERING COEFFICIENT DESIGN FOR 9165
MINIMIZING BER AT MONOSTATIC MIMO READER

Deepak Mishra, Jinhong Yuan, University of New South Wales, Australia

SS-L26.5: REAL-TIME IMPLEMENTATION ASPECTS OF LARGE INTELLIGENT 9170
SURFACES

Harsh Tatara, Fredrik Tufvesson, Ove Edfors, Lund University, Sweden

SS-L26.6: A HARDWARE ARCHITECTURE FOR RECONFIGURABLE INTELLIGENT SURFACES WITH MINIMAL ACTIVE ELEMENTS FOR EXPLICIT CHANNEL ESTIMATION	9175
<i>George Alexandropoulos, National and Kapodistrian University of Athens, Greece; Evangelos Vlachos, University of Edinburgh, United Kingdom</i>	
SS-L27: SIGNAL PROCESSING FOR SENSING, INFORMATION FUSION, AND SITUATIONAL AWARENESS IN AUTONOMOUS SYSTEMS	
SS-L27.1: CONDITIONAL DENSITY DRIVEN GRID DESIGN IN POINT-MASS FILTER	9180
<i>Jindrich Dunik, Ondrej Straka, Jakub Matousek, University of West Bohemia, Czech Republic</i>	
SS-L27.2: ENHANCED SAFETY OF AUTONOMOUS DRIVING BY INCORPORATING TERRESTRIAL SIGNALS OF OPPORTUNITY	9185
<i>Mahdi Maaref, Joe Khalife, Zaher Kassas, University of California, Irvine, United States</i>	
SS-L27.3: OPPORTUNISTIC USE OF GNSS SIGNALS TO CHARACTERIZE THE ENVIRONMENT BY MEANS OF MACHINE LEARNING BASED PROCESSING	9190
<i>Fabio Dovis, Rayan Imam, Wenjian Qin, Caner Savas, Politecnico di Torino, Italy; Hans Visser, Fugro Innovation & Technology B.V., Netherlands</i>	
SS-L27.4: AN OPTIMAL SYMMETRIC THRESHOLD STRATEGY FOR REMOTE ESTIMATION OVER THE COLLISION CHANNEL	9195
<i>Xu Zhang, Beijing Institute of Technology, China; Marcos Vasconcelos, University of Southern California, United States; Wei Cui, Beijing Institute of Technology, China; Urbashi Mitra, University of Southern California, United States</i>	
SS-L27.5: AUTOMOTIVE COLLISION RISK ESTIMATION UNDER COOPERATIVE SENSING	9200
<i>Daniel Lachapelle, Todd Humphreys, Lakshay Narula, Peter Iannucci, University of Texas at Austin, United States; Ehsan Moradi-Pari, Honda R&D Americas, Inc., United States</i>	
SS-L27.6: EXPLOITATION OF 3D CITY MAPS FOR HYBRID 5G RTT AND GNSS POSITIONING SIMULATIONS	9205
<i>José A. del Peral-Rosado, IEEC-CERES, Universitat Autònoma de Barcelona (UAB), Spain; Fredrik Gunnarsson, Satyam Dwivedi, Sara Modarres Razavi, Ericsson Research, Sweden; Olivier Renaudin, José A. López-Salcedo, Gonzalo Seco-Granados, IEEC-CERES, Universitat Autònoma de Barcelona (UAB), Spain</i>	
SS-P1: SIGNAL PROCESSING EDUCATION: TRENDS AND INNOVATIONS	
SS-P1.1: A DATASET FOR MEASURING READING LEVELS IN INDIA AT SCALE	9210
<i>Dolly Agarwal, Pratham Education Foundation, India; Jayant Gupchup, Microsoft Corporation, United States; Nishant Baghel, Pratham Education Foundation, United States</i>	
SS-P1.2: NOISE-ROBUST KEY-PHRASE DETECTORS FOR AUTOMATED CLASSROOM FEEDBACK	9215
<i>Brian Zylich, Jacob Whitehill, Worcester Polytechnic Institute, United States</i>	
SS-P1.3: EXPERIMENTS IN CREATING ONLINE COURSE CONTENT FOR SIGNAL PROCESSING EDUCATION	9220
<i>Carl-Gustav Jansson, Rajeev Thottappillil, KTH Royal Institute of Technology, Sweden; Stefan Hillmann, Sebastian Möller, Technische Universität Berlin, Germany; Hari KVS, Rajesh Sundaresan, Indian Institute of Science, India</i>	
SS-P1.4: TEACHING SIGNALS AND SYSTEMS - A FIRST COURSE IN SIGNAL PROCESSING	9224
<i>Nikhil Rakhshia, Indian Institute of Technology Bombay, India; Ankit Bhurane, Indian Institute of Information Technology Nagpur, India; Vikram Gadre, Indian Institute of Technology Bombay, India</i>	

SS-P1.5: COCHLEAR SIGNAL PROCESSING: A PLATFORM FOR LEARNING THE FUNDAMENTALS OF DIGITAL SIGNAL PROCESSING	9229
<i>Eliathamby Ambikairajah, Vidhyasaharan Sethu, University of New South Wales, Australia</i>	
SS-P1.6: MULTIMODAL LEARNING FOR CLASSROOM ACTIVITY DETECTION	9234
<i>Hang Li, Yu Kang, Wenbiao Ding, Song Yang, Songfan Yang, Gale Yan Huang, Zitao Liu, TAL AI Lab, China</i>	
SS-P1.7: AUTOMATIC FLUENCY EVALUATION OF SPONTANEOUS SPEECH USING DISFLUENCY-BASED FEATURES	9239
<i>Huaijin Deng, Youchao Lin, Takehito Utsuro, University of Tsukuba, Japan; Akio Kobayashi, Tsukuba University of Technology, Japan; Hiromitsu Nishizaki, University of Yamanashi, Japan; Junichi Hoshino, University of Tsukuba, Japan</i>	
SS-P1.8: INTELLIGENT STUDENT BEHAVIOR ANALYSIS SYSTEM FOR REAL CLASSROOMS	9244
<i>Rui Zheng, Fei Jiang, Ruimin Shen, Shanghai Jiao Tong University, China</i>	
SS-P2: UNCONVENTIONAL SENSING	
SS-P2.1: CODED ILLUMINATION AND MULTIPLEXING FOR LENSLESS IMAGING	9249
<i>Yucheng Zhang, Rongjia Zheng, M. Salman Asif, University of California, Riverside, United States</i>	
SS-P2.2: SPARSE CONVOLUTIONAL BEAMFORMING FOR WIRELESS ULTRASOUND	9254
<i>Alon Mamistvalov, Yonina Eldar, Weizmann Institute of Science, Israel</i>	
SS-P2.3: DIVERGENCE-BASED ADAPTIVE EXTREME VIDEO COMPLETION	9259
<i>Majed El Helou, Ruofan Zhou, Frank Schmutz, Fabrice Guibert, Sabine Süssstrunk, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SS-P2.4: ENCODING AND DECODING MIXED BANDLIMITED SIGNALS USING SPIKING INTEGRATE-AND-FIRE NEURONS	9264
<i>Karen Adam, Adam Scholefield, Martin Vetterli, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SS-P2.5: ON THE EFFECT OF REFLECTANCE ON PHASOR FIELD NON-LINE-OF-SIGHT IMAGING	9269
<i>Ibón Guillén, Universidad de Zaragoza, Spain; Xiaochun Liu, Andreas Velten, University of Wisconsin-Madison, United States; Diego Gutierrez, Adrian Jarabo, Universidad de Zaragoza, Spain</i>	
SS-P2.6: SIGNAL SENSING AND RECONSTRUCTION PARADIGMS FOR A NOVEL MULTI-SOURCE STATIC COMPUTED TOMOGRAPHY SYSTEM	9274
<i>Alankar Kotwal, Carnegie Mellon University, United States; Avilash Cramer, Massachusetts Institute of Technology, United States; Dufan Wu, Kai Yang, Wolfgang Krull, Massachusetts General Hospital, United States; Ioannis Gkioulekas, Carnegie Mellon University, United States; Rajiv Gupta, Massachusetts General Hospital, United States</i>	
SS-P2.7: SAMPLING CLASSES OF NON-BANDLIMITED SIGNALS USING INTEGRATE-AND-FIRE DEVICES: AVERAGE CASE ANALYSIS	9279
<i>Roxana Alexandru, Imperial College London, United Kingdom; Nguyen T. Thao, City College of New York, United States; Dominik Rzepka, AGH University of Science and Technology, Poland; Pier Luigi Dragotti, Imperial College London, United Kingdom</i>	
SS-P2.8: TOWARDS AN INTELLIGENT MICROSCOPE: ADAPTIVELY LEARNED ILLUMINATION FOR OPTIMAL SAMPLE CLASSIFICATION	9284
<i>Amey Chaware, Colin Cooke, Kanghyun Kim, Roarke Horstmeyer, Duke University, United States</i>	
SS-P2.9: HIGH DYNAMIC RANGE IMAGING USING DEEP IMAGE PRIORS	9289
<i>Gauri Jagatap, Chinmay Hegde, Iowa State University, United States</i>	

SS-P2.10: KERNEL COMPUTATIONS FROM LARGE-SCALE RANDOM FEATURES 9294
OBTAINED BY OPTICAL PROCESSING UNITS

Ruben Ohana, Ecole Normale Supérieure, France; Jonas Wacker, EURECOM, France; Jonathan Dong, Ecole Normale Supérieure, France; Sébastien Marmin, EURECOM, France; Florent Krzakala, Ecole Normale Supérieure, France; Maurizio Filippone, EURECOM, France; Laurent Daudet, LightOn, France

SS-P2.11: MULTI-DEPTH COMPUTATIONAL PERISCOPY WITH AN ORDINARY 9299
CAMERA

Charles Saunders, Boston University, United States; Rishabh Bose, Stockdale High School, United States; John Murray-Bruce, Vivek Goyal, Boston University, United States

SS-P2.12: SUPER-RESOLUTION WITH NOISY MEASUREMENTS: RECONCILING 9304
UPPER AND LOWER BOUNDS

Heng Qiao, Sina Shasavari, Piya Pal, University of California, San Diego, United States