Nikolaos (Nikos) Flemotomos

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RESEARCH INTERESTS	Speech Processing, Recognition, and Understanding
	Behavioral Signal Processing, Computational Psychotherapy

EDUCATION

Ph.D., Electrical Engineering — expected May 2022
University of Southern California, Los Angeles, CA, U.S.A.
Thesis: *Roles People Play: Leveraging Speaker Role Information in Speech Processing Applications*

M.Sc., Computer Science — Aug 2021
University of Southern California, Los Angeles, CA, U.S.A.
GPA: 3.94/4.00

M.Sc., Electrical Engineering — Dec 2018
University of Southern California, Los Angeles, CA, U.S.A.
GPA: 4.00/4.00

Diploma (5-years degree)**, Electrical and Computer Engineering** — Apr 2016
National Technical University of Athens, Athens, Greece
Thesis: *Robust Acoustic Features for Distant Speech Recognition*
GPA: 9.34/10.00

RESEARCH EXPERIENCE

University of Southern California, Los Angeles, CA, U.S.A.
Signal Processing and Interpretation Laboratory (SAIL)
Graduate Research Assistant — May 2017 to present
Supervisor: Prof. Shrikanth Narayanan
- Developing computational methods to represent intersectional dimensions of identity (e.g., gender, age, social status, profession) in order to study how such dimensions affect conversational interactions.
- Leveraging speaker role information in various speech processing tasks (e.g., diarization, speech recognition).
- Leading a subgroup that develops a real-world system which, after processing recordings of psychotherapy sessions, gives feedback to the therapist. The system is used for computer-aided therapist training.

Apple, Los Angeles, CA, U.S.A. (home office)
Siri – Automatic Speech Recognition R&D Team
Machine Learning Engineering Intern — May 2021 to Aug 2021
Supervisor: Dr. Arnab Ghoshal
- Explored adaptation methods for end-to-end speech recognition.

Microsoft Research, Bellevue, WA, U.S.A.
Speech and Dialog Research Group
Research Intern — May 2019 to Aug 2019
Supervisor: Dr. Dimitrios Dimitriadis
- Worked on speaker identification and diarization in meeting scenarios.
- Proposed a novel algorithm for continuous speaker identification based on memory-augmented neural networks (presented at ICASSP '20).

Czech Technical University in Prague, Prague, Czech Republic
Biomedical Data and Signal Processing Group (BioDat)
Research Intern   Mar 2016 to Jun 2016
Supervisor: Assoc. Prof. Lenka Lhotska
- Developed an algorithm for automatic sleep staging from polysomnographic signals, motivated by ideas used in speech recognition.

National Technical University of Athens, Athens, Greece
Computer Vision, Speech Communication and Signal Processing Group (CVSP)
Undergraduate Research Assistant   Feb 2015 to Mar 2016
Supervisor: Prof. Petros Maragos
- Explored the Teager-Kaiser energy operator for energy estimation in speech signals.
- Developed a system for single-microphone distant speech recognition, comparing various acoustic feature sets, with an emphasis on those based on the AM-FM speech model.

SOFTWARE SKILLS	**Programming Languages**: Python, UNIX shell scripting, MATLAB, C, R **Tools & Libraries**: Tensorflow, PyTorch, Kaldi, OpenFST, SRILM, LaTeX
GRADUATE COURSEWORK	Multimodal Probabilistic Learning of Human Communication, Advanced Natural Language Processing, Law and Intellectual Property, Computational Social Sciences, Mathematics of High-Dimensional Data, Machine Learning Theory, Deep Learning, Machine Learning from Signals, Pattern Recognition, Statistics, Probability, Random Processes, Analysis of Algorithms

TEACHING EXPERIENCE

University of Southern California, Los Angeles, CA, U.S.A.
Teaching Assistant   Spring 2019, 2020 & 2021
Speech Recognition and Processing for Multimedia

Society of Astronomy and Space, Volos, Greece
Teaching Assistant   Summer 2011 & 2012
Preparation for the International Olympiad on Astronomy and Astrophysics

HONORS AND AWARDS

Myronis Endowed Ph.D. Fellowship   Aug 2021 to May 2022
University of Southern California

Annenberg Ph.D. Fellowship   Aug 2016 to Aug 2020
University of Southern California

Phi Kappa Phi   initiation: May 2020
Member (academic honor society)

Gerontelis Graduate Studies Scholarship   Apr 2020
Gerontelis Foundation

Travel Grant   Sep 2018
International Speech Communication Association (ISCA)

Honorable Mention   Sep 2010
4th International Olympiad on Astronomy and Astrophysics

JOURNAL PUBLICATIONS

1. **N. Flemotomos**, V.R. Martinez, Z. Chen, T.A. Creed, D.C. Atkins, and S. Narayanan, "Automated Quality Assessment of Cognitive Behavioral Therapy Sessions Through Highly Contextualized Language Representations", *PLOS ONE*, 2021. *(accepted)*

2. **N. Flemotomos**, V.R. Martinez, Z. Chen, K. Singla, V. Ardulov, R. Peri, D. Caperton, J. Gibson, M.J. Tanana, P. Georgiou, J. Van Epps, S.P. Lord, T. Hirsch., Z.E. Imel, D.C. Atkins, and S. Narayanan. "Automated Evaluation of Psychotherapy Skills Using Speech and Language Technologies", *Behavior Research Methods*, 2021.

3. S.B. Goldberg, **N. Flemotomos**, V.R. Martinez, M. Tanana, P. Kuo, B.T. Pace, J.L. Villatte, P. Georgiou, J. Van Epps, Z.E. Imel, S. Narayanan, and D.C. Atkins. "Machine Learning and Natural Language Processing in Psychotherapy Research: Alliance as Example Use Case", *Journal of Counseling Psychology*, 2020.

Peer Reviewed Conference & Workshop Proceedings

1. Z. Chen, **N. Flemotomos**, V. Ardulov, T.A. Creed, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Feature Fusion Strategies for End-to-End Evaluation of Cognitive Behavior Therapy Sessions", *EMBC*, 2021.

2. **N. Flemotomos**, P. Georgiou, and S. Narayanan. "Linguistically Aided Speaker Diarization Using Speaker Role Information", *Odyssey*, 2020.
Best Student Paper Finalist

3. **N. Flemotomos**, and D. Dimitriadis. "A Memory Augmented Architecture for Continuous Speaker Identification in Meetings", *ICASSP*, 2020.

4. T.J. Park, M. Kumar, **N. Flemotomos**, M. Pal, R. Peri, R. Lahiri, P. Georgiou, and S. Narayanan. "The Second DIHARD Challenge: System Description for USC-SAIL Team", *Interspeech*, 2019

5. V.R. Martinez, **N. Flemotomos**, V. Ardulov, K. Somandepalli, S.B. Goldberg, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Identifying Therapist and Client Personae for Therapeutic Alliance Estimation", *Interspeech*, 2019.

6. **N. Flemotomos**, P. Georgiou, D.C. Atkins, and S. Narayanan, "Role Specific Lattice Rescoring for Speaker Role Recognition from Speech Recognition Outputs", *ICASSP*, 2019.

7. **N. Flemotomos**, Z. Chen, D.C. Atkins, and S. Narayanan, "Role Annotated Speech Recognition for Conversational Interactions", *SLT*, 2018.

8. **N. Flemotomos**, P. Papadopoulos, J. Gibson, and S. Narayanan, "Combined Speaker Clustering and Role Recognition in Conversational Speech", *Interspeech*, 2018.

9. **N. Flemotomos**, V.R. Martinez, J. Gibson, D.C. Atkins, T.A. Creed, and S. Narayanan, "Language Features for Automated Evaluation of Cognitive Behavior Psychotherapy Sessions", *Interspeech*, 2018.

10. K. Singla, Z. Chen, **N. Flemotomos**, J. Gibson, D. Can, D.C. Atkins, and S. Narayanan, "Using Prosodic and Lexical Information for Learning Utterance-level Behaviors in Psychotherapy", *Interspeech*, 2018.

Invited Talks

1. **Alberta Hospital Edmonton/University of Alberta**   Sep 2021
Forensic Grand Rounds
Towards Automated Large-Scale Evaluation of Psychotherapy

2. **University of Southern California**   Apr 2021
Interaction Lab
Who Spoke When? and how speaker roles can help us find the answer

Reviewer

Journals:
Applied Artificial Intelligence, PLOS ONE, Cogent Psychology, Behavior Research Methods

Conferences:
Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)

SERVICE AND VOLUNTARY WORK	**USC Behavioral Science Society**
	Student executive board member Dec 2020 to present

IEEE Engineering in Medicine & Biology Society NTUA Student Chapter

President   Sep 2014 to Jun 2015

Student volunteer   Sep 2013 to Jun 2014