1 Welcome Messages

1.1 Welcome Message from the Executive Committee of IJCNN 2017
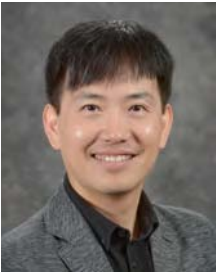
Yoonsuck Choe General Chaiir	Chrisina Jayne Program Chair	Barbara Hammer Technical Program Co-Chair	Irwin King Technical Program Co-Chair

As the Executive Committee, on behalf of the Program Committee and Organizing Committee, we would like to warmly welcome you to the 2017 International Joint Conference on Neural Networks (IJCNN 2017) in the city of lights and flowers: Anchorage, Alaska, USA. This year, we are especially honored to host our 30th anniversary meeting.

Continuing with the long tradition, this conference is organized by the International Neural Network Society (INNS), in cooperation with the IEEE Computational Intelligence Society (IEEE-CIS). We would like to thank the leadership of the two societies for their support and encouragement, especially the presidents Robert Kozma and Pablo Estevez.

In IJCNN 2017 we received 933 submissions from 73 countries, 24 of which were later withdrawn. Of these, 621 papers (66.6%) were accepted. The conference features 372 oral presentations and 249 poster presentations. The program also features 7 plenary talks, 4 panels, 20 tutorials, 5 post-conference workshops, 15 special sessions, and 2 competitions.

The plenary talks by Alex Graves, Stephen Grossberg, Odest ChadwickeJenkins, Christof Koch, Jose C. Principe, Hava Siegelmann, and Paul Werbos reflect the diverse themes of deep learning, consciousness, robotics, neuroscience, cognitive and brain architectures, and foundations of advanced learning systems. The program includes a broad coverage of topics in the general area of neural networks, with a strong showing of trendy topics such as deep neural networks. The five panels on cutting edge neural networks research, cybersecurity intelligence, 30th birthday of the INNS, and new opportunities in neural networks funding are expected to provide deep insights and vision of the future for the field of neural networks.

Organizing a conference of this scale and diversity is not possible without the dedicated service by our colleagues. We are especially indebted to the two Technical Program Co-Chairs, Barbara Hammer and Irwin King for their timely and professional help with all matters relating to the program. We would also like to thank the Plenary Chair Cesare Alippi; Publication Chair Bill Howell; Panels Chair Robert Kozma; Publicity Co-Chairs Giacomo Boracchi, Simone Scardapane and Teck-Hou Teng; Tutorials Chair Asim Roy; Special Sessions Co-Chairs Derong Liu and Tatiana Tamcouratzis; Workshop Chair Lazaros Iliadis; Competition Chair Juyang (John) Weng; Poster Session Chair Richard Duro; Awards Chair Nikola Kasabov; Sponsors and Exhibits Chair Lipo Wang; Web Reviews Chair Tomasz Cholewo; Regional and Topical Liaisons Teresa Ludermir, Danilo P. Mandic, Minho Lee, Péter Érdi, Pierre-Yves Oudeyer, and Sven F. Crone; Local Arrangements Co-Chairs Frank W. Moore and Kenrick Mock; Registration Chair Jaerock Kwon; and last but not least, Webmaster Jaewook Yoo.

We are extremely grateful to all the program commitee members who helped us with the review of a record number of papers submitted this year, and all the reviewers who turned in thoughtful and meaningful reviews for the assigned papers. Foremost, we would like to thank all of the authors, especially student authors, who worked so hard on their research and took extreme effort to write up and submit their papers. Without such high quality, high impact papers, the continuing success of IJCNN would not have been possible.

We are also very grateful of the INNS Board of Governors for their support and advice, especially the past INNS presidents Ali Minai and Danil Prokhorov, and the late Dave Casasent who served as the treasurer for INNS for a long time.

We would also like to thank the INNS Central Office led by Marianne Van Wagner and Alison Watson, who took care of all of the complexities relating to the conference logistics so that the organizing committee can focus soley on the scientific aspect of the conference. Also, special thanks to Marianne Van Wagner for the beautiful cover page photo.

Finally, we would like to thank the following sponsors for their generous support: Platinum sponsor Intel; and Bronze sponsors Budapest Semester in Cognitive Science and Brain-Mind Institute. We also thank IEEE-CIS for providing generous travel support for student authors and attendees.

We wish you have a stimulating and informative experience at IJCNN 2017.

Yoonsuck Choe Texas A&M University General Chair	Chrisina Jayne Robert Gordon University Program Chair	Barbara Hammer Univ. of Bielefeld Technical Program Co-Chair	Irwin King The Chinese Univ. of Hong Kong Technical Program Co-Chair

1.2   Welcome Message from the President of INNS

Robert Kozma
INNS President

As President of the International Neural Network Society (INNS) I am delighted to welcome you at the International Joint Neural Network Conference (IJCNN 2017). IJCNN 2017 is the flagship conference of INNS, organized by INNS jointly with the IEEE Computational Intelligence Society (CIS). I would like the express my gratitude to the IJCNN 2017 organizing team lead by Yoonsuck Choe, Chrisina Jayne, Barbara Hammer, and Irwin King.

In 2017 we celebrate the 30th birthday of INNS and various events at IJCNN 2017 provide excellent forums to mark this special anniversary. Many pioneers of neural networks research attend IJCNN 2017 and provide an exciting vista of past, present, and future progress. Indeed, the past three decades demonstrated explosive proliferation of neural networks in science, technology, and in a wide range of applications. The recent popularity and success of novel AI techniques, deep learning, brain and cognitive networks, brain inspired computing, soft computing, and other influential approaches are rooted in the foundations that have been created in the past decades in the series of IJCNN conferences. We proudly carry this legacy. Collaboration between INNS and the IEEE CIS has a special significance producing IJCNN, which became one of the leading international conferences in the field. We rely strongly on these collaborations and explore new ones, in order to strengthen the success of INNS in working towards its mission and providing value to our members.

I want to use this opportunity to summarize key initiatives of INNS and convince you to join some of the many activities we provide to our members. INNS has a tradition of mutually beneficial collaboration with sister organizations such as the Japanese Neural Network Society, European Neural Network Society, Asian-Pacific Neural Network Society, INNS India Chapter, in addition to IEEE CIS, IEEE Systems, Man, And Cybernetics (SMC) Society, and many other regional and national organizations and Chapters. Our flagship journal "Neural Networks" published through our partnership with Elsevier is one of the leading journals on neural networks research. It is our resolve to strengthen Educational activities and connect effectively with young generations of scientists who represent our future. We work on developing efficient ways of Public Relations to reach out to our members and to the society at large. INNS gives additional value to our members who can present their newest results at IJCNN and other conferences, including Deep Learning and Big Data. We provide opportunity to professional development starting from Student Member, to Full and Senior Members, and election to the College of Fellows. We provide valuable networking opportunity with leaders of field, as well as acknowledging breakthrough achievements by prestigious Awards, such as the Gabor Award, Hebb Award, Helmholtz Award, and the Young Investigator Awards.

I wish you a very productive and enjoyable IJCNN 2017 and I look forward to meeting you at Anchorage.

Sincerely,

Robert Kozma
President of INNS

First Birthday of INNS, 1988, Boston, Massachusetts, USA
Photo courtesy of Harold Szu (INNS Fellow).

1.3 Welcome Message from the President of IEEE-CIS

Pablo A. Estevez
IEEE-CIS President

On behalf of the IEEE Computational Intelligence Society (CIS), it is my greatest pleasure to welcome you to the 2017 International Joint Conference on Neural Networks (IJCNN) held in Anchorage, Alaska. CIS has been a partner with INNS in running IJCNN every year for nearly three decades. INNS is leading the organization of IJCNN'17 and the next year IJCNN'18 will be led by IEEE CIS as part of the 2018 World Congress in Computational Intelligence, in Rio de Janeiro, Brazil (http://www.ieee-wcci.org).

IJCNN is the major event in the field of neural networks and learning systems, covering all topics in the field from theory to applications. It provides a forum for researchers, students and professionals in the field. The meeting is a unique opportunity to present our research to other colleagues and exchange the latest advances in theories, technologies and practices. It is tremendous opportunity also to know what are the trending topics, the current state-of-the-art and the main applications. The grow of the field is reflected in the success of the IEEE Transactions on Neural Networks and Learning Systems, which latest impact factor is 4.854. I take this opportunity to invite you to submit papers to the brand new IEEE Transactions on Emerging Topics in Computational Intelligence.

Glancing through the programme of IJCNN'17, one can find the trending topics ranked by the number of sessions: Deep Learning (9), Spiking Neurons (4), Extreme Learning Machines (2), Data Mining (2), Concept Drift (2), Clustering (2), and Big Data and Data Analytics (2). The range of topics include transfer learning, ensemble learning, metric learning, semisupervised learning, cortical modeling, sensory processing, attention and emotion, explainability and interpretability in machine learning, and many applications, among others.

I would like to express my gratitude to all the authors who submitted their work, to the program committee and reviewers, the organizers of Special Sessions as well as to all the participants of IJCNN 2017. Special thanks to the General Chair, Yoonsuck Choe, and the Executive Committee of IJCNN 2017. I would like to take this opportunity to congratulate the International Neural Network Society on its 30th anniversary.

Wish you all have a wonderful conference experience at IJCNN'17!

Pablo A. Estevez
President
IEEE Computational Intelligence Society