

IEEE SSCI 2018, IEEE Symposium Series on Computational Intelligence,  
Special Session on:  
**Physiological and Affective Computing for Human Centered and Social Systems**

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**Introduction to the Special Session:**

Wireless sensing and distributed embedded computation is spurring a growth in connected computing artefacts - enabling accessibility to a plethora of new and diverse, multi-modal sources of quantitative, qualitative, environmental and user centered data. Examples of these data sources include geolocation, social media and online interaction from different personalised devices, mobile phone data, audio, visual, text, digitally associated opinions, and sociometric sensor data. These heterogeneous data sources can be used to contextualise, track and model user behaviours and infer societal phenomena, systems and process. In order to create ambient personalisation and contextualisation of services tailored to individuals and user groups there is a need to integrate and utilize physiological information (e.g., as in computer-human interaction, health and fitness monitoring) together with the recognition, interpretation, processing, and modeling of human affective states.

Practical applications of Affective and Physiological Computing (APC) based systems seek to enhance user context and sensitivity by monitoring, recognising and acting on our emotional states and physiological signals. Integrating these sensing modalities into intelligent and pervasive computing systems raises many new challenges for signal processing and modeling of complex high dimensional data sources such as: body signals (e.g., heart rate, brain waves, skin conductance and respiration) facial features, speech and human kinematics, which can be very noisy/uncertain and subject-dependent.

This special session aims to bring together researchers to discuss how CI techniques can be used to help solve challenging APC problems and conversely, how interpreting and modeling physiological and affect (emotion) data can inspire new approaches in CI and its applications in human centered technologies in social computing settings. Topics of interest for this special session include but are not limited to:

- Models of emotion and physiological information
- Classifiers for physiological information
- Applications based on/around physiological information for social computing
- Architectures for processing emotions and other affective states
- Automatic emotion recognition & synthesis from physiological signals, facial expressions, body language, speech, or neurocognitive performance
- Sentiment mining from texts, images, or videos
- Affective interaction with virtual agents and robots
- Applications of affective computing in interactive learning, affective gaming, personalized robotics, virtual reality, social networking, smart environments, healthcare and behavioral informatics, assistive technology, industrial automation, distributed cognition etc.

**Keywords:**

Affective computing, Physiological computing, classification of physiological signals, affective interaction, emotion modeling, emotion recognition/synthesis, emotion mining, computational Intelligence

## **Organizers:**

The organizers have a track record at organizing and chairing special sessions at a number of previous IEEE conferences, including WCCI 2018, FUZZ-IEEE 2017, IEEE SSCI 2016, WCCI 2016, Fuzz-IEEE 2015, WCCI 2014, Fuzz-IEEE 2013, WCCI 2012, FUZZ-IEEE 2011, WCCI 2010 and FUZZ-IEEE 2009.

### **Dr Faiyaz Doctor**

School of Computer Science and Electronic Engineering  
University of Essex  
Wivenhoe Park  
Colchester CO4 3SQ  
Email: fdocto AT essex.ac.uk

Faiyaz Doctor is a Lecturer at the School of Computer Science and Electronic Engineering, University of Essex, UK. He has over 15 years' experience in research and development projects focusing on the design and implementation of intelligence systems for real world application domains. He has led and co-led projects funded through the Newton Fund, Conacyt, Innovate UK and Harvard University in collaboration with industry, governmental organisations and academic partners. Dr Doctor's research interests are in the area of computational intelligence with an emphasis on fuzzy logic, type-2 fuzzy logic, deep learning and hybrid systems where his research has been applied to ambient intelligence, pervasive and affective computing, industrial automation and biomedical systems. His work has resulted in high profile innovation awards and an international patent on improved approaches for data analysis and decision making using hybrid neuro-fuzzy and type-2 fuzzy systems: WO/2009/141631. He has published over 60 papers in peer reviewed international journals, conferences, workshops and book chapters. He is currently a member of the IEEE Computational Intelligence Society's (CIS) Emergent Technologies Technical Committee (ETTC), chairs the 'ETTC Task Force on Affective Computing' and has been co-organizer of the special sessions at previous IEEE SSCI conferences as well as IEEE WCCI and FUZZ-IEEE conference since 2009. He is also and member of the IEEE and IEEE CIS.

### **Dr Dongrui Wu**

School of Automation  
Huazhong University of Science and Technology, Wuhan, China  
Email: drwu AT hust.edu.cn

Dongrui Wu received a PhD in Electrical Engineering from the University of Southern California (USC) in 2009. He was a Lead Researcher at GE Global Research, NY, and Chief Scientist of several startups. He is now a Professor at the School of Automation, Huazhong University of Science and Technology, Wuhan, China. Prof. Wu's research interests include affective computing, brain-computer interface, computational intelligence, and machine learning. He has over 90 publications, including a book "Perceptual Computing" (with J.M. Mendel, Wiley-IEEE, 2010). He received the IEEE International Conference on Fuzzy Systems Best Student Paper Award in 2005, the IEEE Computational Intelligence Society (CIS) Outstanding PhD Dissertation Award in 2012, the IEEE Transactions on Fuzzy Systems Outstanding Paper Award in 2014, the North American Fuzzy Information Processing Society (NAFIPS) Early Career Award in 2014, and the IEEE Systems, Man and Cybernetics (SMC) Society Early Career Award in 2017. He was a finalist of the IEEE Transactions on Affective Computing Most Influential Paper Award in 2015, the IEEE Brain Initiative Best Paper Award in 2016, and the International Conference on Neural Information Processing (ICONIP) Best Student Paper Award in 2017. Prof. Wu is an Associate Editor of the IEEE Transactions on Fuzzy Systems (2011-), the IEEE Transactions on Human-Machine Systems (2014-), and the IEEE Computational Intelligence Magazine (2017-). He was the lead Guest Editor of the IEEE Computational Intelligence Magazine Special Issue on Computational Intelligence and Affective Computing, and the lead Guest Editor

of the IEEE Transactions on Fuzzy Systems Special Issue on Brain Computer Interface. He is a Senior Member of the IEEE, an Executive Committee member of the Association for the Advancement of Affective Computing (AAAC), a Board member of the NAFIPS, and a member of IEEE Systems, Man and Cybernetics Society Brain-Machine Interface Systems Technical Committee, IEEE CIS Fuzzy Systems Technical Committee, Emergent Technologies Technical Committee, and Intelligent Systems Applications Technical Committee. He has been Chair/Vice Chair of the IEEE CIS Affective Computing Task Force since 2012.

**Dr Andreu Perez**

School of Computer Science and Electronic Engineering  
University of Essex  
Wivenhoe Park  
Colchester CO4 3SQ  
Email: javier.andreu AT essex.ac.uk

Andreu-Perez is Lecturer in Artificial Intelligence and Machine Learning at the School of Computer Science and Electronic Engineering, University of Essex. He is within the Harms-Lab, led by Dr. George Mylonas at the Department of Surgery and Cancer, Faculty of Medicine. He holds a PhD in Intelligent Systems, MEng in Computer Science, and MSc in Software Engineering. He has contributed to a number of research projects funded by the EU, NHS, the UK's Ministry of Defence (MoD), as well as the industry. He is a member of the Standards Committee of the IEEE Society in Computational Intelligence and has co-edited special issues in the area. He also serves as a member of several editorial boards of relevant journals computational intelligence and artificial intelligence. His main research interests are neuroinformatics, artificial intelligence, machine learning, cognitive neuroscience, human-robot interaction, physiological sensing, computational neuroscience, health informatics, sensor informatics.

**Potential Contributors**

Dr Chin-Teng (CT) Lin, National Chiao-Tung University, Taiwan  
Dr Brent Lance, U.S. Army Research Laboratory  
Dr Vernon Lawhern, U.S. Army Research Laboratory  
Dr Vasile Palade, Coventry University, UK  
Dr Victor Zamudio, Instituto Tecnológico de León, Mexico  
Dr Ahmed Kattan, Um Al-Qura University, Saudi Arabia  
Dr Palaniappan Ramaswamy, University of Kent, UK  
Ms Anasol Peña-Rios, University of Essex  
Dr Christopher Peters, KTH Royal Institute of Technology, Sweden

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