TC – 19 Annual Reporting 2019-2020

TC-19 "Imaging Signals and Systems"

Chair: George C. Giakos, Manhattan College, USA

Co-Chairs: Michalis Zervakis, Technical University of Crete, Greece

Jacob Scharcanski, Federal University of Rio Grande do Sul (UFRGS), Brazil

Committee Members:

Suman Shrestha, ONN Semiconductors, USA
Lijun Xu, Beihang University, China
Lihui Peng, Tsinghua University, China
Sos Agaian, The Graduate Center, CUNY, NY, USA
Yixin Ma, Shanghai Jiao Tong University, China
Wuqiang Yang, University of Manchester, UK
Vicenzo Piuri, University of Milan, Italy
Matteo Pastorino, University of Genoa, Italy
Aditi Deshpande, University of Arizona, USA
Tannaz Farrahi, University of Virginia, USA
Michalis Zervakis, Technical University of Crete, Greece
Keerthi Valluru   Stanford University, USA
Andrzei Skalski, AGH University of Science and Technology, Poland
Mohammed Ghazal, Abu Dhabi University, HE
Cesare Svelto, Polytechnic of Milan, Italy
Mel Siegel, Carnegie Mellon, USA
Ayman El-Baz University of Louisville, USA
Luay Fraiwan, Abu Dhabi University, HE
Mohd. Zaid Abdullah, Universiti Sains Malaysia, Malaysia
Richard Picard, ARCON Corporation, USA
Emil Petriu, University of Ottawa, Canada
Michele Ceccarelli, *University of Sannio, Italy*
Amitava Chatterjee*, Jadavpur University, India*
Edmund Lam, *University of Hong Kong, China*
George Livanos, Technical University of Crete, Greece
Antonios Gasteratos, DUTH, Greece
Jiamin Ye, IET, China
Selina Kolokytha, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland
Kanchan Lata Kashyap, Indian Institute of Information Technology, Design and Manufacturing (IIITDM), India
Jin Montclare, NYU Polytechnic School of Engineering, USA

Aditi Deshpande, University of Arizona, USA
Stavroula Mougiakakou, University of Bern, Switzerland
Dimitris Iakovidis, University of Thessaly, Greece
Yi Wang, Manhattan College, USA
Konstantinos Michmizos, Rutgers University, USA
Nicolas Karakatsanis, Mount Sinai, USA
Na Ying, Hangzhou Dianzi University, China
Angelos Amanatiadis, DUTH, Greece
James Basilion, Case Western Reserve University, USA
Bing Yu, Marquette University, USA

1. **Status of all standards developed or maintained by your committee**

   - Cognitive Vision groups are working towards the development of Figures of Merits (FOM)s for performance assessment of Cognitive Vision Systems, ladars and electrooptical vision systems.
   - Polarimetric measurements and metrology as applied to image formation process, image characterization.
   - Suman Shrestha developed novel calibration procedures of electrooptical polarimetric systems.
   - Feature extraction and target motion recognition using cognitive-deep learning architectures and polarimetric principles.
   - Underwater vision and imaging-variable illumination-spatial-temporal-frequency response.

2. **Updating of all activities reports**

   I.   The TC-19 Committee organized together with the IEEE Instrumentation & Measurement Society, The 2019 International Conference on Imaging Systems and Techniques, in Abu Dhabi, UAE, December 10-12, 2019.

   II.   Professor Giakos has been an eminent speaker and chief guest of the Workshop on Machine Vision, sponsored by the National Institute of Technology Jamshedpur, India, July 27-29, 2020. Several eminent speakers from several IIT Institutes from India, and other prestigious international institutions were among the presenters.

   III. The TC-19 Technical Committee has been actively involved in the organization of annual 2021 IST (International Conference on Imaging Systems and Techniques), jointly with the International School on Imaging, and the IM Society in Kaohsiung, Taiwan, June 22-24, 202. Dr. Chi-Hung Hwang serves as the organizer of this prestigious event.

   IV.   Dr. Georgios Kollias, Research Staff Member (RSM) IBM T.J. Watson Research Center, USA, presented an invited lecture on Quantum State Tomography: An integrated approach", sponsored by the IEEE Instrumentation and Measurement Society, TC-19 Technical Committee on

Imaging Signals and Systems, and MC Electrical and Computer Engineering.

V. A contributing article reflecting current and novel directions of the TC-19 was submitted to the IMS Magazine and will be published on November 2020 issue.

VI. The Committee have been actively involved in the recruitment, mentoring and promotion of leadership skills of young, enthusiastic engineers. As result, several leading positions are filled with young enthusiastic engineers; as demonstrated by the organization of the IST Conferences and the International School of Imaging.

VII. The Committee has been involved in the peer-review of Proceedings and Transactions papers; assisted in the review process of papers relevant to other IM Conferences and Symposia.

VIII. The Committee organizes one book, on "Multifaceted Imaging Principles and Augmented Intelligence" with the Springer Nature, NY.

3. Future standardization work

The Committee initiated efforts in the development of standards in Cognitive Vision. Efforts on polarimetry are continued.

Existing support being provided by the committee to conferences

The committee provides support to the following events:

1. International Conference on Imaging Systems and Techniques (IST)
2. IEEE International School of Imaging.

4. Interaction with other societies in IEEE

Interaction with the following societies:
IEEE Engineering in Medicine and Biology Society (EMBS)
IEEE Power and Energy Society
IEEE Industrial Applications Society
IEEE Antenna and Propagation

5. Existing support being provided by the committee to conferences

The TC-19 Committee actively promotes the International Conference on Imaging Systems and Techniques (IST), a premier conference on Imaging and Computer Visualization, and the IEEE International School on Imaging. The scopes of the IST and the School are to explore multifaceted design principles and new applications of imaging that would lead ultimately to novel devices and technologies, standards and metrology, and systems with unsurpassable image quality, scalability, reconfigurability, and miniaturization capabilities; increase the understanding of

pathophysiology and metabolism and measure therapeutic efficacy; bridge technology and clinical disciplines in the multidisciplinary areas of imaging, spectroscopy, machine learning, deep learning, aerospace, industry, and medical diagnostic device industry. The TC-19 provides support to the IMTC Technical conferences, by soliciting technical papers, organizing special sessions and reviewing submitted contributions.

6. **Existing support being provided by the committee to publications (IMS Magazine and TIM)**

A TC-19 contributing article reflecting current and future directions of the committee was submitted to the IMS Magazine and will be published on November 2020 issue.

Peer-review of Transactions and Conference Papers.

7. **Industry links**

Local companies from NYC area, Healthcare, Defense.

8. **Succession plans**

The TC-19 operates through a Committee-shared leadership model aimed at retaining and rewarding active members and high performers, while promoting scholarship and dissemination of new imaging principles. To meet this goals, several leading positions are filled with young enthusiastic engineers; as demonstrated by the organization of the IST Conferences and the International School of Imaging This helps ensure smooth operation, enhanced continuity, and minimal disruption to it's activities,.

a) **Main concerns and possible solutions**

Increase efforts and incentives towards the recruitment and participation of STEM students to Society activities.

b) **New ideas**

The presence of this pandemic would propel multifaceted conferences sponsored by several Technical committees, covering broad areas; leading to integration and generation of new knowledge; all this in addition to the yearly-sponsored TC Conferences/Workshops, which provide and promote specialized knowledge.

9. **Development of initiatives / On the News**

The TC-19 submitted an article at the IEEE Instrumentation Magazine addressing current and future research directions and activities of the Committee. This article will be published on November 2020.

Professor Wuqiang Yang, published a book on "Imaging Sensor Technologies and Applications" IET, The Institute of Engineering and Technology, 2020.

Professor Andrzei Skalski, AGH University of Science and Technology, Poland, was promoted to Associate Professor.

Professor Giakos has been an eminent speaker and chief guest of the Workshop on Machine Vision, sponsored by the National Institute of Technology Jamshedpur, India, July 27-29, 2020. Several eminent speakers from several IIT Institutes from India, and other prestigious international institutions were among the presenters.

Professor Michalis Zervakis was appointed, in a four-year term, Vice Rector of the Technical University of Crete, Greece.

Professor Giakos has been the recipient of the Fulbright US Scholar Award, by the State Department.

Dr. Georgios Kollias, Research Staff Member (RSM) IBM T.J. Watson Research Center, USA, presented an invited lecture on Quantum State Tomography: An integrated approach", sponsored by the IEEE Instrumentation and Measurement Society, TC-19 Technical Committee on Imaging Signals and Systems, and MC Electrical and Computer Engineering, 2019.

Professor Vincenzo Piuri was invited by the NY Chapter of Instrumentation & Measurement Society and NY Chapter of Computer Society and delivered a key-note lecture on "Artificial Intelligence for Industry and Environment", Scala Room, Leo Engineering, Manhattan College.

Dr. Giakos has delivered a key-note lecture on "Brain-Inspired Neuromorphic Computing for Cognitive Augmentation in Cyber Security and Dynamic Vision." invited by the New York chapter of the IEEE Power and Energy Society Industrial Applications Society, at Con Edison headquarters, 2019.

Dr. Giakos serves as Chair of the Instrumentation Measurement, NY Chapter, 2018-present. The main goal is to attract and recruit new members from NYC area within the Society.

Respectfully

George Giakos, Ph.D.

Fellow of the IEEE
Distinguished Faculty Fellow Office of Naval Research
Fulbright US Scholar

Chairman and Professor, Director of the Graduate Program
Manhattan College
Department of Electrical and Computer Engineering

Founding Director IEEE International School on Imaging
Chair, New York Chapter of the IEEE
Instrumentation and Measurement Society

Founding Director, Laboratory for Cognitive Imaging and Neuromorphic Engineering (CINE)
Augmented Intelligence and Bioinspired Vision and Guidance Systems

---

Phone: 718-862-7154, Cell:330-622-0000, Fax: 718-862-7162
Faculty web site: https://manhattan.edu/campus-directory/george.giakos