

2019 Fellow Newly Elevated Fellows

Ali Abdi

for contributions to wireless channel modeling and underwater communications

Karim Abed-Meraim

for contributions to blind system identification and source separation for communications

Edward Adelson

for contributions to image representation and analysis in computer vision

Sonia Aissa

for contributions to design and performance analysis of cognitive radio and cooperative communication systems

J .Stewart Aitchison

for contributions to nonlinear optical devices and point-of-care testing systems

Elad Alon

for contributions to mixed-signal integrated circuit design and methodology

Max Ammann

for contributions to compact antennas for wideband wireless applications

Leopoldo Angrisani

for contributions to test and measurement of communication systems

Yoshihiro Baba

for contributions to electromagnetic modeling of lightning

Michael Backes

for contributions to computer security and privacy

Matthias Bauer

for contributions to growth technologies for alloys for transistors

Navakanta Bhat

for contributions to electrochemical biosensors in nanoelectronic devices

William Blackwell

for contributions to atmospheric remote sensing algorithms and instrumentation

Pierre Blondy

for contributions to radio frequency micro electromechanical systems

Iustin Radu Bojoi

for contributions to control of electrical drives and power electronics

2019 Fellow Newly Elevated Fellows

Silverio Bolognani

for contributions to permanent magnet synchronous motor technology

Gabriella Bosco

for contributions to modeling and design of coherent optical communication systems

Jill M. Boyce

for contributions to video coding

Lucien Breems

for contributions to over-sampled converters using complementary metal-oxide-semiconductor technology

Olav Breinbjerg

for leadership in spherical near-field antenna measurements

Michael Bronstein

for contributions to acquisition, processing, and analysis of geometric data

Walter Buchanan

for leadership in accreditation activities of engineering technology programs

Steven Butler

for technical leadership in aerospace systems

Bruce Campbell

for contributions to radar remote sensing for planetary science

Richard Campbell

for contributions to millimeter and terahertz wafer-probe technology

Hui Cao

for contributions to spatial coherence engineering of lasers

Antonio Capone

for contributions to the design and resource management of wireless and Internet Protocol networks

Richard Carson

for contributions to quantitative positron emission tomography

Friedhelm Caspers

for contributions to charged particle accelerators

David Castañón

for contributions to discrete-time stochastic control and information fusion

2019 Fellow Newly Elevated Fellows

Mujdat Cetin

for contributions to image processing for synthetic aperture radar and sensor array

Meng-Fan Chang

for contributions to static and nonvolatile memories for embedded systems

Patrick Chapman

for application of power electronics devices and systems for solar energy conversion

Deming Chen

for contributions to field-programmable gate array high-level synthesis

Jie Chen

for contributions to optimization and control of complex systems

Jiming Chen

for contributions to resource allocation and optimization in wireless sensor networks

Xing Bi Chen

for contributions to power super-junction metal-oxide-semiconductor field-effect transistors

Z. Chen

for contributions to power electronics for wind energy conversion

Kangguo Cheng

for contributions to fully depleted Silicon-on-Insulator Complementary Metal-Oxide Semiconductor process technology

Kin Ping Cheung

for contributions to plasma process-induced damage in integrated circuits

Pei-Yu Chiou

for contributions to optofluidics for high throughput single cell manipulation

Hyouk Ryeol Choi

for contributions to robotic interactive sensing

Jong Choi

for contributions to debugging and compilers for parallel computing

Sewan Choi

for contributions to power converter technologies

Paul Chow

for contributions to the programmability of field-programmable gate array based computing

2019 Fellow Newly Elevated Fellows

Tommy Chow

for contributions to computational intelligence techniques for control systems diagnosis

Qing-Xin Chu

for contributions to compact wideband antennas

Brian Classon

for contributions to commercial cellular system standardization

Peter Clout

for leadership in data acquisition and control in nuclear and plasma sciences

Jose Cobos

for contributions to power supply systems

Michael Condry

for leadership in the development of semiconductor and computing technologies

Jose Luis Contreras

for contributions to brain-machine interfaces and wearable exoskeletons

Kerstin Dautenhahn

for contributions to social robotics and human-robot interaction

Timothy Davidson

for contributions to optimization of signal processing and communication systems

Bart De Schutter

for contributions to optimal control of discrete-event and hybrid systems

Antonio Della Corte

for leadership in superconducting magnets

Xiaotie Deng

for contributions to computing in partial information and interactive environments

Tayeb Denidni

for contributions to frequency selective surfaces and their application to reconfigurable antennas

Santosh Devasia

for contributions to feedforward control of nonminimum-phase systems

Thomas Dionise

for contributions to mitigation of transients and harmonics in power systems

2019 Fellow Newly Elevated Fellows

Antun Domic

for technical leadership in the integrated circuits design automation

David Dorrell

for contributions to time efficient design methodology of rotating electrical machines

Robert Durham

for contributions to submersible electrical equipment analysis and multi-point ground methods in hazardous petroleum and chemical environments

Nicola Elia

for contributions to networked control systems

Christian Enz

for contributions to low-power analog circuit design

Meng Hwa Er

for contributions to electronic engineering education

Joseph Evans

for contributions to cognitive networks and deployment of defense networks

Jiyuan Fan

for leadership in applications for power distribution systems

Xuejun Fan

for contributions to the modeling and characterization of electronic packaging design

Luca Fanucci

for the contributions to the design of Very-large-scale integration systems for network-on-chip

Dejan Filipovic

for contributions to frequency-independent and wideband antennas

Robert Fish

for application of visual communications and networking

Dimitrios Fotiadis

for contributions to modelling and machine learning in biomedical data processing

Mark Fox

for contributions to constraint-directed reasoning and ontologies

Emilio Frazzoli

for contributions to motion planning and control of autonomous vehicles

2019 Fellow Newly Elevated Fellows

Emilia Fridman

for contributions to time-delay systems and sampled-data control

Yun Fu

for contributions to manifold learning and face and gesture recognition

Claudio Fuerte-Esquivel

for contributions to modeling, analysis and operation of Flexible Alternating Current Transmission Systems

Christophe Fumeaux

for contributions to resonant dielectric-loaded antennas

Alexander Gaeta

for contributions to quantum and nonlinear photonics

Jianfeng Gao

for contributions to machine learning for Web search and natural language processing

Kaizhong Gao

for contributions to data storage technologies

Shichang Gao

for contributions to low-cost pattern-reconfigurable and broadband printed antennas

Prof. Julian Gardner

for contributions to electronic noses and gas sensors

Simson Garfinkel

for contributions to digital forensics and computer security

Anne Gattiker

for contributions to integrated circuit test and diagnosis

Guido Gerig

for contributions to medical image processing

Maysam Ghovanloo

for contributions to implantable wireless integrated circuits and systems

Ali Ghrayeb

for contributions to modulation design and implementation of multiple antenna wireless systems

Bruce Gnade

for contributions to electronic materials and device technologies

2019 Fellow Newly Elevated Fellows

Reuven Gordon

for contributions to nanoaperture optical manipulation for protein and nanoparticle analysis

Timothy Green

for contributions to power electronics for power systems control

Robert Greenberg

for the invention and development of the retinal prosthesis for the blind

Warren Grundfest

for contributions to the development of minimally invasive surgical techniques

Venkatesan Guruswami

for contributions to list error-correction and algorithmic coding theory

A. Gutierrez Aitken

for contributions to compound semiconductor devices and heterogeneous microelectronics for space applications

Qing-Long Han

for contributions to control and filtering of networked systems

Mor Harchol-Balter

for contributions to performance analysis and design of computer systems

Hossein Hashemi

for development of radio-frequency and optical phased-array integrated circuits

Ahmed Hassan

for contributions to the quality assurance of large-scale software systems

Xiaodong He

for contributions to multimodal signal processing in human language and vision technologies

Ahmed A-G Helmy

for contributions to routing protocol design and mobility modeling

Pin-Han Ho

for contributions to failure restoration in optical backbone networks

Steven Chu-Hong Hoi

for contributions to machine learning for multimedia information retrieval and scalable data analytics

Keum-Shik Hong

for contributions to adaptive estimation and brain-computer interface techniques

2019 Fellow Newly Elevated Fellows

Zeng-Guang Hou

for contributions to neural network optimization and control for rehabilitation

Gang Hua

for contributions to facial recognition in images and videos

Tingwen Huang

for contributions to dynamical analysis of neural networks

Mei-Yuh Hwang

for contributions to speech and language technology

Daniele Ielmini

for contributions to nonvolatile semiconductor memories

Syed Islam

for contributions to wind energy conversion systems

Hiroshi Ito

for contributions to high-speed photodiodes for millimeter and terahertz wave generation

Hans-Arno Jacobsen

for contributions to publish subscribe and event processing

Nitin Jain

for leadership in the development of physics-based models for mm-wave System-on-Chip ICs

Mona Jarrahi

for contributions to terahertz technology and microwave photonics

Lijun Jiang

for contributions to broadband computational electromagnetic methods

Tao Jiang

for contributions to coding, modulation, and cognitive radio systems design

Hai Jin

for contributions to peer-to-peer and cloud computing systems

Mihalo Jovanovic

for contributions to modeling, optimization, and control of large-scale distributed systems

Chia-Feng Juang

for contributions to data-driven fuzzy systems

2019 Fellow Newly Elevated Fellows

Christoph Jungemann

for contributions to hierarchical simulation of semiconductor devices

Wen-Chung Kao

for leadership in the development of electrophoretic display technology

Srinivasan Keshav

for contributions to fair queueing techniques and flow-control algorithms in computer networks

Ali Khakifirooz

for contributions to fully depleted silicon-on-insulator complementary-metal-oxide-semiconductor technology

Chris Hyung-II Kim

for contributions to on-chip circuit reliability evaluation and characterization

Dong In Kim

for contributions to cross-layer design of wireless communications systems

Lee-Sup Kim

for contributions to energy-efficient multimedia processor architectures

Irwin King

for contributions to the theory and applications of machine learning in social computing

Farinaz Koushanfar

for contributions to hardware and embedded systems security and to privacy-preserving computing

Ioannis Krikidis

for contributions to full-duplex radio and wireless-powered communications

Randall Kubena

for contributions to ion-beam processing and nanofabrication

Daniel Kuchta

for contributions to high-speed Vertical Cavity Surface-Emitting Lasers and optical interconnects

Shrikrishna Kulkarni

for contributions to transformer engineering education

Chih-Huang Lai

for contributions to magnetic information storage and spintronic devices

Roger Lake

for contributions to quantum mechanical electronic device modeling

2019 Fellow Newly Elevated Fellows

Mark Lantz

for contributions to digital magnetic tape recording

Patrick Lecallet

for contributions to perceptual optimization of video signal processing

Jaejin Lee

for contributions to programming systems of heterogeneous machines

Juho Lee

for leadership in standardization of cellular communication technologies

Seung Jae Lee

for contributions to power distribution protection and automation

Frank Leferink

for leadership in electromagnetic compatibility measurement techniques

Chih-Peng Li

for contributions to digital broadcasting and wireless transmission

Hai Li

for contributions to neuromorphic computing systems

Hongbin Li

for contributions to adaptive radar signal processing with limited data

Qi Li

for contributions in speech signal processing and speaker authentication

Shutao Li

for contributions to image fusion and classification in remote sensing

Yonghui Li

for contributions to cooperative communications technologies

C. Steven Lingafelt

for leadership in cybersecurity education and practice

Alex Liu

for contributions to firewall design and analysis

Jinjun Liu

for contributions to modeling and control of power systems

2019 Fellow Newly Elevated Fellows

Shaoying Liu

for contributions to the design of Structured Object-Oriented Formal Language

Xiaoping Liu

for contributions to system identification and networked teleoperation

Xin Liu

for contributions to the design of cross-layer resource allocation algorithms for cellular and cognitive radio networks

Teng Long

for contributions to high resolution radar systems

Cristina Lopes

for contributions to ubiquitous and immersive programming

Marco Lops

for contributions to radar target detection and estimation in clutter

Anant Madabhushi

for contributions in image analysis tools for diagnosis and prognosis of diseases

Pui-In Mak

for contributions to radio-frequency and analog circuits

John Malinowski

for contributions to motor efficiency manufacturing regulations and standards

Shiwen Mao

for contributions to wireless multimedia networking

Charles Mc Shane

for leadership in safety, performance, and sustainability of power transformers

Dale McMorrow

for contributions to laser-based methodologies for simulating single-event effects in digital devices

Derek McNamara

for contributions to antenna synthesis and engineering

Neelesh Mehta

for contributions to opportunistic selection in wireless communication systems

Tao Mei

for contributions to multimedia analysis and applications

2019 Fellow Newly Elevated Fellows

Erik Meijering

for contributions to computational methods for biological image analysis

Tim Menzies

for contributions to software engineering for artificial intelligence

Bruno Michel

for contributions to energy efficiency for computers and solar systems

Miroslav Micovic

for contributions to gallium nitride electronics

Joydeep Mitra

for contributions to the development of power system reliability methods

Theodore Moise

for contributions to ferroelectric memory development and engineering

Sasan Mokhtari

for leadership in energy industry technology solutions

Onur Mutlu

for contributions to computer architecture research and practice

Katsufumi Nakamura

for contributions to integrated circuits for digital imaging

Jason Nieh

for contributions to virtualization, scheduling, and mobile computing

Anibal Ollero Baturone

for contributions to the development and deployment of aerial robots

Antonis Papachristodoulou

for contributions to analysis and design of networked control systems

Evangelos Papadopoulos

for contributions to space and field robotics

Milorad Papic

for contributions to probabilistic planning methods to mitigate cascading of the bulk power system

Danilo Pau

for contributions to the development of memory efficient architectures for advanced multimedia applications

2019 Fellow Newly Elevated Fellows

Jan Peters

for contributions to robot learning of dexterous motor skills

Daniel Pitt

for leadership in networking and of the Open Networking Foundation

Alessandro Piva

for contributions to multimedia security

Maurizio Porfiri

for contributions to biomimetic robotics

Yi Qian

for contributions to wireless communication networks and smart grid communication architectures

Hong Qiao

for contributions to robotic manipulation and biologically inspired robotic cognition

Xianming Qing

for contributions to antennas for radio frequency identification systems

Arifur Rahman

for leadership in 2.5- and 3-dimensional integrated circuits for field programmable gate arrays

Siddharth Ramachandran

for contributions to higher-order modes in optical fibers

Srinivasan Ramani

for contributions to computer networks for developing countries

Mary Ellen Randall

for leadership in the development and commercialization of audio-video decoders

Stewart Rauch

for contributions to microelectronics reliability

Gerhard Rigoll

for contributions to multimodal human-machine communication

Robert Rohling

for contributions to ultrasound for medical diagnosis and intervention

2019 Fellow Newly Elevated Fellows

Joachim Rosenthal

for contributions to algebraic coding theory and cryptography

Matthew Roughan

for contributions to Internet measurement and analysis

Romit Roy Choudhury

for contributions to wireless network protocols and indoor localization

Amit Roy-Chowdhury

for contributions to video-based tracking and behavior analysis

Dan Rubenstein

for contributions to massively distributed networked systems

Stuart Rubin

for contributions to computational intelligence

Roland Ryf

for contributions to optical switching and multiplexing technology

Walid Saad

for contributions to distributed optimization in cooperative and heterogeneous wireless systems

Rajiv Sabherwal

for contributions to research on management of knowledge and information technologies

Samar Saha

for contributions to compact modeling of silicon field-effect transistors

Tapan Saha

for contributions to monitoring and assessment of power transformers

Sayeef Salahuddin

for contributions to low power electronic and spintronic devices

Murti Salapaka

for application of control and systems technology in nano-science

Venkatesh Saligrama

for contributions to distributed detection and estimation of structured signals

Igal Sason

for contributions to the gaussian interference channel

2019 Fellow Newly Elevated Fellows

Andries Scholten

for contributions to noise and radio frequency modeling of semiconductor devices

Venkat Selvamanickam

for contributions to development and manufacturing of superconductor tapes

Kyuseok Shim

for contributions to scalable data mining and database query processing

Mei-Ling Shyu

for contributions to multimedia big data analytics and management

Ramesh Sitaraman

for contributions to content delivery, internet performance, and distributed systems

Mikael Skoglund

for contributions to source-channel coding and wireless communications

Dawn Song

for contributions to systems security and privacy

Lingyang Song

for contributions to cooperative communication and networking

Maarten Steinbuch

for contributions to motion control and mechatronics

Christoph Stiller

for contributions to machine vision for automated driving

Fuchun Sun

for contributions to neural network control of nonlinear systems with applications to robotic manipulators

Jonathan Sun

for contributions to spin-transfer-torque magnetic random access memory

Yan Sun

for contributions to trust modeling and statistical signal processing for cyber-physical security

Kenji Sunagawa

for contributions to cardiovascular mechanics, baroreflex dynamics, and bionic cardiology applications

Bruce Suter

for contributions to data acquisition for aerospace sensory information systems

2019 Fellow Newly Elevated Fellows

Jonathan Sykes

for leadership in the application and management of reliable protection systems for electric power networks

Mario Sznaier

for contributions to identification of switched systems and multiobjective control

Joseph Tabrikian

for contributions to estimation theory and Multiple Input Multiple Output radars

Munehiro Tada

for contributions to copper interconnects for very-large-scale integration

Seishi Takamura

for application of video coding

HarkHoe Tan

for contributions to compound semiconductor optoelectronic materials and devices

Yap-Peng Tan

for contributions to visual data analysis and processing

Chi-Keung Tang

for contributions to interactive segmentation algorithms in computer graphics applications

Jian Tang

for contributions to optimization in wireless networks and mobile crowdsourcing systems

Meixia Tao

for contributions to resource allocation in broadband wireless networks

Jan-Ulrich Thiele

for contributions to magnetic recording

Ioannis Tomkos

for contributions to dynamic optical networks

Carme Torras

for contributions to learning algorithms for robot perception, planning and manipulation

David Torrey

for contributions to modeling, design, and control of electric machines and drives

Piero Tortoli

for contributions to ultrasound signal processing hardware and algorithms

2019 Fellow Newly Elevated Fellows

Jean-Yves Tournet

for contributions to statistical signal and image analysis

Hon Tsang

for contributions to nonlinear silicon photonics and advanced waveguide grating couplers

Panagiotis Tsiotras

for contributions to nonlinear control of aerospace systems

Zhuowen Tu

for contributions to computer vision, medical imaging, and deep learning

Deepak Uttamchandani

for contributions to photonics-based sensing

Murat Uysal

for contributions to cooperative and diversity techniques in wireless and optical communications

Benjamin Van Roy

for contributions to reinforcement learning and approximate dynamic programming

Paul Vanoorschot

for contributions to applied cryptography and authentication

Dragica Vasileska

for contributions to computational electronics and simulation of nanoscale devices

Namrata Vaswani

for contributions to dynamic structured high-dimensional data recovery

Jelena Vuckovic

for contributions to experimental nano and quantum photonics

Jeffrey Walker

for contributions to airborne and satellite remote sensing of soil moisture

Liang Wang

for contributions to video-based human identification and motion analysis

Shuo Wang

for contributions to reduction of electromagnetic interference in electronic systems

Xiaofeng Wang

for contributions to system security and genomic privacy

2019 Fellow Newly Elevated Fellows

Yuanxun Wang

for contributions to time-varying and nonlinear electromagnetic devices and systems

Simon Warfield

for contributions to medical imaging

ShaoJun Wei

for leadership in Integrated Circuits engineering of smart cards and reconfigurable devices

John Turner Whitted

for contributions to computer graphics

Chee Wei Wong

for contributions to silicon nanophotonics

Robert Wood

for contributions to small-scale and soft robotics

Guangning Wu

for contributions to traction power supply equipment diagnostics for high-speed electrified railways

Min Wu

for contribution to control and automation for complex systems

Naiqi Wu

for contributions to discrete-event production systems

Zhaohui Wu

for contributions to intelligent service computing

Shengli Xie

for contributions to blind source separation and its applications

Eric Xing

for contributions to machine learning algorithms and systems

Zeshui Xu

for contributions to decision-making methodologies

Fan Yang

for contributions to surface electromagnetics for antennas

Ming-Hsuan Yang

for contributions to object tracking and face recognition

2019 Fellow Newly Elevated Fellows

Xiaokang Yang

for contributions to perceptual modeling and processing of visual signals

Steve Yao

for leadership in opto-electronic oscillator and optical polarization devices

Hiroto Yasuura

for contributions to energy-efficiency and dependability of Very Large Scale Integration designs

Minerva Yeung

for leadership in multimedia signal processing

Eiichi Yoshida

for leadership in the development of modular reconfigurable robotic systems

Marwan Younis

for contributions to digital beam-forming techniques for spaceborne radar systems

Moustafa Youssef

for contributions to wireless location tracking technologies

Yizhou Yu

for contributions to geometric and image-based modeling

Pericle Zanchetta

for contributions to the control of complex power electronics systems

Jared Zerbe

for contributions to the development of high performance serial interfaces

Bao-Hui Zhang

for contributions to power system transient stability prediction

Cha Zhang

for contributions to machine learning for image and video data processing

Daqing Zhang

for contributions to context-aware mobile and pervasive systems

Liangpei Zhang

for contributions to image processing of remote sensing data

Mengjie Zhang

for contributions to evolutionary learning and optimization methodologies

2019 Fellow Newly Elevated Fellows

Ping Zhang
for leadership in theory, standardization, and application of wireless technologies

Richard Zhang
for leadership in development of power electronic converters

Yanchao Zhang
for contributions to wireless and mobile security

Yimin D. Zhang
for contributions to high-resolution direction finding and radar signal processing

Weisheng Zhao
for contributions to spintronic integrated circuit design

Lin Zhong
for contributions to the development of energy-efficient driver circuits for organic light-emitting diodes

Donghua Zhou
for contributions to reliability and maintenance of dynamic systems

Jingren Zhou
for contributions to cloud computing and query processing

Lidong Zhou
for contributions to trusted distributed computing

Qifa Zhou
for contributions to medical ultrasound transducers and multimodal imaging

Michael Zyda
for contributions to game design and networking