Columbia University
The Fu Foundation School of Engineering and Applied Science

TWO THOUSAND FIFTEEN
Celebrating Faculty Excellence

Acclaiming the awards, honors, and recognitions that our faculty received during the past year
Today we celebrate and recognize the significant accomplishments of our faculty during the past academic year. Our collective research continues to advance disciplinary frontiers as we seek to solve the global engineering challenges of our age. It is important to pause and acknowledge that the excellence and impact of these efforts are recognized by institutions and organizations that represent both national and international academic communities and professional organizations.

As we’ve examined our strengths as a faculty, it has become clear that we are defining and pushing disciplinary frontiers that will impact our lives in ways we can only begin to imagine. Our investigations—in the fields of data science; advanced materials and devices; sensing, imaging, and visualization; and computer-based engineering science—have shown how our work is transcending disciplines. At the same time, our work in health and wellness, sustainability and resilience, communications and information, and risk and security has the power to transform lives.

Last year’s celebration of the 150th anniversary of our founding gave us reason to reflect on the past accomplishments of our faculty, students, and alumni. As we move forward, our faculty continues this great tradition, actively translating their research into practical innovations, capitalizing on our expanding avenues for entrepreneurship and engagement with industry. Through our teaching, mentoring, and example, we are preparing our students to use their intellect, their diverse talents, their creativity, and their passion to impact our world and to make the lives of future generations better. Faculty who are cited in these pages represent the continuation of our School’s impressive tradition of outstanding research and scholarship into succeeding generations.

This year we are pleased to celebrate the exceptional scholarship of David Yao, elected to the National Academy of Engineering; Kartik Chandran, a new MacArthur Fellow; three professors who have received named chairs—Alexander L. Gaeta, Michal Lipson, and Peter Schlosser; and all our faculty who have received recognitions this past year. Congratulations!

Mary C. Boyce
Dean of Engineering
Morris A. and Alma Schapiro Professor
David Yao

Piyasombatkul Family Professor of Industrial Engineering and Operations Research

National Academy of Engineering

elected a member of the National Academy of Engineering for his leading scholarship and research into stochastic systems and their applications in engineering and service operations
Kartik Chandran
Associate Professor of Earth and Environmental Engineering

MacArthur Foundation Fellowship
given to individuals with exceptional creativity, promise for important future advances based on a track record of significant accomplishments, and potential for the fellowship to facilitate subsequent creative work; for his work in transforming wastewater from a pollutant requiring disposal to a resource for useful products, such as commodity chemicals, energy sources, and fertilizers
Named Professors

ALEXANDER L. GAETA
David M. Rickey Professor of Applied Physics and of Materials Science
Applied Physics and Applied Mathematics

MICHAL LIPSON
Eugene Higgins Professor of Electrical Engineering
Electrical Engineering

PETER SCHLOSSER
Maurice Ewing and J. Lamar Worzel Professor of Geophysics and Professor of Earth and Environmental Sciences
Earth and Environmental Engineering

Singular Honors

ALFRED AHO
Lawrence Gussman Professor of Computer Science
Honorary Doctorate, Doctor of Science, honoris causa, University of Toronto

MARY C. BOYCE
Dean, The Fu Foundation School of Engineering and Applied Science; Morris A. and Alma Schapiro Professor, Mechanical Engineering
2015 Engineering Science Medal, Society of Engineering Science
awarded by the Society of Engineering Science for seminal contributions to the understanding of the mechanical behavior of nonlinear viscoelastic/viscoplastic solids and for opening up the field for quantitative modeling of finite deformation analysis of the inelastic response of polymers

MICHAEL J. MASSIMINO
Professor of Professional Practice, Mechanical Engineering
NASA Hubble 25th Anniversary Commendation
presented to members of the Hubble Space Telescope Astronaut Team by NASA Administrator Charles Bolden
Cradle of Aviation Museum Spirit of Discovery Award
given to leaders in aerospace who inspire future generations, in particular, in recognition for his courage, sacrifice, and service to the country as a Space Shuttle astronaut
Singular Honors

SHREE NAYAR
T. C. Chang Professor of Computer Science
National Academy of Inventors
for demonstrating “a highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society”; he has been awarded more than 40 patents for his inventions related to digital imaging, computer vision, human-computer interfaces, and robotics

ISMAIL C. NOYAN
Professor of Materials Science and Engineering and of Earth and Environmental Engineering; Chair, Department of Applied Physics and Applied Mathematics
Jenkins Lifetime Achievement Award, International Centre for Diffraction Data
for contributions to the development of residual stress measurements and their applications in materials science and for his teaching and research in neutron and x-ray diffraction methods for analyses of micro- and nanoscale structures

RICHARD M. OSGOOD JR.
Eugene Higgins Professor Emeritus of Electrical Engineering and Professor Emeritus of Applied Physics and Applied Mathematics
2015 IEEE Photonics Society Quantum Electronics Award
for seminal contributions to novel laser systems, laser-surface photochemistry, and integrated linear and nonlinear Si waveguides

SINGULAR HONORS

CHRISTOPHER SCHOLZ
Professor of Earth and Environmental Sciences and of Applied Physics and Applied Mathematics
Harry Fielding Reid Medal, Seismological Society of America
awarded for outstanding contributions in seismology and earthquake engineering

GORDANA VUNJAK-NOVAKOVIC
Mikati Foundation Professor of Biomedical Engineering and Professor of Medical Sciences
National Academy of Inventors
for demonstrating “a highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society”; she has over 70 licensed, issued, or pending patents and has founded two biotech companies

Y. LAWRENCE YAO
Professor of Mechanical Engineering
Milton C. Shaw Manufacturing Research Medal, American Society of Mechanical Engineers
for “significant fundamental contributions to the science and technology of manufacturing processes”
Matei Ciocarlie
Assistant Professor of Mechanical Engineering
Office of Naval Research (ONR) Young Investigator Program Award
for work on human-in-the-loop systems in which humans and robotic manipulators work together, side by side, on the same task

Pierre Gentine
Assistant Professor of Earth and Environmental Engineering
U.S. Department of Energy (DOE) Early Career Research Program Award
to support research on land-atmosphere interactions and the role they play in weather and climate prediction

Christine Hendon
Assistant Professor of Electrical Engineering
NSF Faculty Early Career Development (CAREER) Award
to support her project, “Structure-Functional Imaging of the Atrial Myocardium,” and for her work using optical imaging and spectroscopy as a means to monitor radiofrequency ablation treatment of cardiac arrhythmias

Nima Mesgarani
Assistant Professor of Electrical Engineering
2015 Pew Scholar
to support interdisciplinary research spanning electrical engineering, neurophysiology, linguistics, and computational modeling to explore the complex neural networks involved in language perception and advance biologically inspired speech recognition programs

Kristin Myers
Associate Professor of Mechanical Engineering
NSF Faculty Early Career Development (CAREER) Award
to support her project, “Growth and Remodeling of the Uterine Cervix during Pregnancy”

Mingoo Seok
Assistant Professor of Electrical Engineering
NSF Faculty Early Career Development (CAREER) Award
to support his project focused on computing chip design, “Addressing Deepening Variability Challenges for Next-Generation Margin-Free VLSI Computing Platform Design”
STEVE WAICHING SUN
Assistant Professor of Civil Engineering and Engineering Mechanics

U.S. Army Young Investigator Program Award
to support further research on modeling how microscopic water and air seepages inside each pore of granular materials, such as sand, silt, and sediment, affect the bearing capacity and stability of the ground

Elected member of Computational Mechanics Committee and Granular Mechanics Committee of ASCE Engineering Mechanics Institute

JOHN WRIGHT
Assistant Professor of Electrical Engineering

2015 PAMI Young Researcher Award
given by the IEEE Computer Society to one early career researcher per year for outstanding research in the area of computer vision

NANFANG YU
Assistant Professor of Applied Physics and Applied Mathematics

DARPA Young Faculty Award
to support his research on “flat optics,” using strong interactions between light and 2D-structured materials to control light at will, and, in particular, metasurface-based flat optical modulators

CHANGXI ZHENG
Assistant Professor of Computer Science

NSF Faculty Early Career Development (CAREER) Award
for his proposal, “Simulating Nonlinear Audiovisual Dynamics for Virtual Worlds and Interactive Applications,” to create realistic computer-generated sounds
Election to Professional Societies

**MARK CANE**

*G. Unger Vetlesen Professor of Earth and Climate Sciences and Professor of Applied Physics and Applied Mathematics*

Fellow, **Oceanography Society**

for contributions to the understanding and prediction of the El Niño-Southern Oscillation (ENSO) and the tropical oceans and their effects on climate and society

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**MICHAEL J. MASSIMINO**

*Professor of Professional Practice, Mechanical Engineering*

Member, **Association of Space Explorers**

for individuals who have completed at least one orbit of the earth in a spacecraft

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**FENIOSKY PEÑA-MORA**

*Edwin Howard Armstrong Professor of Civil Engineering and Engineering Mechanics and Professor of Computer Science and of Earth and Environmental Engineering*

Fellow, **Chartered Institute of Building (United Kingdom)**

the world’s largest professional body for construction management and leadership

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**LORENZO POLVANI**

*Professor of Applied Physics and Applied Mathematics and of Earth and Environmental Sciences*

Fellow, **American Meteorological Society**

for outstanding contributions to the atmospheric or related oceanic or hydrologic sciences

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**HENNING SCHULZRINNE**

*Julian Clarence Levi Professor of Mathematical Methods and Computer Science and Professor of Electrical Engineering*

Fellow, **Association for Computing Machinery**

for contributions to the design of protocols, applications, and algorithms for Internet multimedia

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**LATHA VENKATARAMAN**

*Associate Professor of Applied Physics*

Fellow, **American Physical Society**

for pioneering contributions to measurement and understanding of electron transport through single organic molecules

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**GORDANA VUNJAK-NOVAKOVIC**

*Mikati Foundation Professor of Biomedical Engineering and Professor of Medical Sciences*

Fellow, **American Association for the Advancement of Science (AAAS)**

for distinguishing contributions to the field of tissue engineering, particularly by developing functional human tissues for regenerative medicine, stem cell research, and modeling of disease

Board of Directors, **American Institute for Medical and Biological Engineering (AIMBE)**

Chair-Elect, College of Fellows, AIMBE

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**CHRIS H. WIGGINS**

*Associate Professor of Applied Mathematics*

Fellow, **American Physical Society**

for pioneering work in computational biology, including the applications of machine learning, statistical inference, and information theory for the investigation of biological networks
Recognitions and Achievements

Augustin Chaintreau
Assistant Professor of Computer Science

Roxana Geambasu
Assistant Professor of Computer Science

XRay (the first fine-grained, robust, and scalable personal data tracking system for the Web) featured in the New York Times Bits blog, 2014; Guardian Technology blog; Fast Company Co.Exist blog; ReadWrite; NetworkWorld.com; and nine other sources

Jingguang G. Chen
Thayer Lindsley Professor of Chemical Engineering

2015 MCS Giuseppe Parravano Memorial Award for Excellence in Catalysis Research

Xi Chen
Associate Professor of Computer Science

2015 Presburger Award, European Association for Theoretical Computer Science (EATCS) to a young scientist for outstanding contributions in theoretical computer science, documented by a published paper or a series of published papers

Recognitions and Achievements

Roxana Geambasu
Assistant Professor of Computer Science

2014 Microsoft Faculty Fellowship
given to early-career scholars who are engaged in state-of-the-art computing research and have the potential to make significant advances in the field

Daniel Hsu
Assistant Professor of Computer Science

2014 Yahoo Academic Career Enhancement (ACE) Award for pioneering innovations that improve the Internet in both evolutionary and revolutionary ways

Shiho Kawashima
Assistant Professor of Civil Engineering and Engineering Mechanics

Forbes 30 Under 30 List: Science recognized for her work in experimental cement and concrete research

Ioannis Kymissis
Associate Professor of Electrical Engineering

2014 Popular Science Magazine’s Invention Award for Radiator Labs, developer of a radiator retrofit that increases the energy efficiency of steam heating systems

Verizon Powerful Answers Award for entrepreneurs, companies, and innovators worldwide to provide innovative solutions in transportation, emergency response, and Internet of Things
Recognitions and Achievements

**Feniosky Peña-Mora**

*Edwin Howard Armstrong Professor of Civil Engineering and Engineering Mechanics and Professor of Computer Science and of Earth and Environmental Engineering*

*ASCE Construction Management Award* for exceptional leadership and outstanding contributions to the field of construction engineering and management through his education and research innovations

*Thousand Talents Program Expert (China)*

*Visiting Chair Professorship, Tsinghua University*

*Visiting Fellow, Royal Academy of Engineering (United Kingdom)*

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**Henning Schulzrinne**

*Julian Clarence Levi Professor of Mathematical Methods and Computer Science and Professor of Electrical Engineering*

*IEEE Internet Award* for exceptional contributions to the advancement of Internet technology

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**Adam Sobel**

*Professor of Applied Physics and Applied Mathematics and of Earth and Environmental Sciences*

*2014 Ascent Award, American Geophysical Union (Atmospheric Sciences Section)* for outstanding contributions to the modeling of aerosol properties and their impact on climate in the troposphere and lower stratosphere

*Louis J. Batten Author’s Award from the American Meteorological Society* for his book, *Storm Surge: Hurricane Sandy, Our Changing Climate, and Extreme Weather of the Past and Future*, which “makes accessible the sophisticated science behind Hurricane Sandy, highlighting the critical connection of severe weather prediction to our lives and a warming world”

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**Ponisseril Somasundaran**

*La Von Duddleson Krumb Professor of Mineral Engineering, Earth and Environmental Engineering*

*2015 Alexander Schwarzkopf Prize for Technological Innovation from the Industry/University Cooperative Research Center (I/UCRC) Association Committee* on behalf of the Center for Particulate and Surfactant Systems (CPaSS), recognized for its “exemplary research contribution to technology innovation and its positive impact on the technology, industry, and to society as a whole”

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**Yannis Tsividis**

*Edwin Howard Armstrong Professor of Electrical Engineering*

*Fall 2014 issue of IEEE Solid-State Circuits Magazine* was devoted to the impact of his research on the field of solid-state circuits

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**Francesco Volpe**

*Associate Professor of Applied Physics*

*Fusion Power Associates 2015 Excellence in Fusion Engineering Award* given annually since 1987 to recognize persons in the relatively early part of their careers who have shown both technical accomplishment and potential to become exceptionally influential leaders in the fusion field
Recognitions and Achievements

**GORDANA VUNJAK-NOVAKOVIC**

*Mikati Foundation Professor of Biomedical Engineering and Professor of Medical Sciences*

named one of the 100 Leading Global Thinkers for 2014 by *Foreign Policy Magazine* for successfully using a 3D printer to create replacement cartilage tissue

Blue Ribbon Advisory Panel for Bioengineering/Computational Biology Study Sections, NIH–Center for Scientific Review

**MICHAEL WEINSTEIN**

*Professor of Applied Mathematics and of Mathematics*

Simons Math+X Investigator

on a program established by the Simons Foundation to encourage novel collaborations between mathematics and other fields in science or engineering; to lead collaborations between the Applied Mathematics program of the Department of Applied Physics and Applied Mathematics and the Department of Mathematics in the mathematics of waves in novel media, such as those arising in optics, photonics, and condensed matter physics

Scholarly Leadership

**SUNIL AGRAWAL**

*Professor of Mechanical Engineering and of Rehabilitation and Regenerative Medicine*

Chair, ASME Design Division

**GERARD ATESHIAN**

*Andrew Walz Professor of Mechanical Engineering and Professor of Biomedical Engineering*

Vice Chair, U.S. National Committee on Biomechanics

**KATAYUN BARMAK**

*Philips Electronics Professor of Applied Physics and Applied Mathematics*

Program Co-Chair, 16th Joint International Magnetism and Magnetic Materials and Intermag Conference

**SIMON J. L. BILLINGE**

*Professor of Materials Science and of Applied Physics and Applied Mathematics*

Symposium Co-Organizer, ACA Annual Meeting on “Powder Pair Distribution Function and Pharmaceuticals”

2015 Chair, Materials Special Interest Group of the American Crystallographic Association

2015 SNS Triannual Review of Photon Sciences Division

2015 Special Edition, Nanoscale, Perovskites at the Nanoscale: From Fundamentals to Applications
Scholarly Leadership

**PATRICIA CULLIGAN**

*Professor of Civil Engineering and Engineering Mechanics; Associate Director, Data Science Institute*

**Elected Chair, Standing Committee on Geological and Geotechnical Engineering, Division of Earth and Life Sciences, National Academies**

**Elected Member, Board of Governors, ASCE Geo-Institute**

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**GEORGE DEODATIS**

*Santiago and Robertina Calatrava Family Professor of Civil Engineering; Chair, Department of Civil Engineering and Engineering Mechanics*

**Member, Board of Governors, Engineering Mechanics Institute of the American Society of Civil Engineers**

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**X. EDWARD GUO**

*Professor of Biomedical Engineering; Vice Chair, Department of Biomedical Engineering*

**Vice Chair, Cellular and Tissue Engineering Committee, Bioengineering Division, ASME**

**Chair, NSF-Columbia Mechatronics Syposium, Columbia University**

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**ANDREAS HIELSCHER**

*Professor of Biomedical Engineering, of Radiology (Physics), and of Electrical Engineering*

**Theme Chair, Biomedical Imaging & Image Processing, IEEE Engineering in Medicine and Biology Conference, “Biomedical Engineering: A Bridge to Improve the Quality of Health Care and the Quality of Life”**

**Chair, European Conference on Biomedical Optics (ECBO)**

**Theme Chair and Editor, Biomedical Imaging & Image Processing Theme, 36th Annual International Conference, IEEE Engineering in Medicine and Biology Society (EMBC’14)**

**Chair, External Advisory Board Meeting, NIH Bioengineering Research Project, “A Novel Optical Spectral Imaging System for Rapid Imaging of Breast Tumor Margins”**

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**ELIZABETH HILLMAN**

*Associate Professor of Biomedical Engineering and of Radiology (Physics)*

**Inaugural General Chair, The Optical Society (OSA) Optics and the Brain Meeting**

**Elected General Chair, OSA Biomedical Optics (BIOMED) Meeting, 2018 (Vice Chair in 2016)**

**2014 Co-Chair, SPIE/OSA ECBO Meeting, “Neurophotonics” Conference**

**2015 Co-Chair, “Neurophotonics” ECI Conference, “Advances in Optics for Biotechnology, Medicine, and Surgery XII”**

**2014 Program Chair, OSA BIOMED, “Biophysics, Biology & Biophotonics: The Crossroads”**
Scholarly Leadership

**GARUD IYENGAR**
Professor of Industrial Engineering and Operations Research; Chair, Department of Industrial Engineering and Operations Research

Simons Foundation Distinguished Visitor, Simons Center for Study of Living Machines at the National Center for Biological Science, Bangalore

**PETER KINGET**
Professor of Electrical Engineering

Distinguished Lecturer, 2015 IEEE Solid-State Circuits Society

**ELISA KONOFAGOU**
Professor of Biomedical Engineering and of Radiology (Physics)

2014 Co-Chair, International Tissue Elasticity Imaging Conference

2014 Co-Chair, IEEE International Ultrasonics Symposium

**IOANNIS KOUGIOUTZOGLOU**
Assistant Professor of Civil Engineering and Engineering Mechanics

Certificate of Appreciation, American Society of Civil Engineers (ASCE) for extraordinary efforts organizing the Second International Conference on Risk and Uncertainty (ICVRAM-ISUMA) at University of Liverpool, United Kingdom

**SANAT KUMAR**
Professor of Chemical Engineering; Chair, Department of Chemical Engineering

Editor, *npj Computational Materials*, part of the new online series of *Nature Partner Journals*

Elected Vice Chair, Division of Polymer Physics, American Physical Society

**V. FAYE MCNEILL**
Associate Professor of Chemical Engineering

Vice Chair, AIChE Environmental Division 2015 (Second Vice Chair in 2014, Chair in 2016)

Symposium Chair, “The Role of Water in Aerosol Chemistry,” AAAR Annual Meeting, Minneapolis, MN, October 2015

**BARCLAY MORRISON III**
Associate Professor of Biomedical Engineering; Vice Dean of Undergraduate Programs

Elected Vice President, International Research Council on Biomechanics of Injury

**GERALD NAVRATIL**
Thomas Alva Edison Professor, Applied Physics and Applied Mathematics

Member, Board of Directors, Fusion Power Associates
Scholarly Leadership

**Ismail C. Noyan**
Professor of Materials Science and Engineering and of Earth and Environmental Engineering; Chair, Department of Applied Physics and Applied Mathematics
Chair, Hard X-ray Nanoprobe Beamline Advisory Team (HXN-BAT), National Synchrotron Light Source II (NSLS-II), Brookhaven National Laboratory
Chair, Beamtime Allocation Committee, NSLS-II

**Aron Pinczuk**
Professor of Applied Physics and of Physics
Editor-in-Chief, Solid State Communications Journal

**Lorenzo Polvani**
Professor of Applied Physics and Applied Mathematics and of Earth and Environmental Sciences
Convener, AGU Chapman Conference on "The Width of the Tropics"
Lead Author, UNEP/WMO 2014 Scientific Assessment of Ozone Depletion
Co-Chair, Whole Atmosphere Chemistry Climate Model (WACCM)

**Andrew Smyth**
Professor of Civil Engineering and Engineering Mechanics
Vice President, ASCE EMI Board of Governors

**Michael Weinstein**
Professor of Applied Mathematics and of Mathematics
Senior Editor, Journal of Nonlinear Science (Springer-Verlag)
Editorial Board, Studies in Applied Mathematics (MIT)
Editorial Board, AMS Mathematical Surveys and Monographs
Chair, Thematic Year on Mathematics and Optics, NSF–Institute for Mathematics and its Applications (IMA)
MISSION STATEMENT

The mission of The Fu Foundation School of Engineering and Applied Science is to expand knowledge and advance technology through research, while educating students to become leaders informed by an engineering foundation. Enriched with the intellectual resources of a global university in the City of New York, we push disciplinary frontiers, confront complex issues, and engineer innovative solutions to address the grand challenges of our time. We create a collaborative environment that embraces interdisciplinary thought, integrated entrepreneurship, cultural awareness, and social responsibility, and advances the translation of ideas into practical innovations.