Plenary & Keynote Talks

META 2017 will feature **several Plenary Talks** and **Keynote Lectures** by world's leading experts on nanophotonics, plasmonics and metamaterials.

Plenary Lectures

Plenary Lecture 1: Metaoptics in the visible

Federico Capasso

Harvard University, USA

Federico Capasso is the Robert Wallace Professor of Applied Physics at Harvard University, which he joined in 2003 after 27 years at Bell Labs where he was Member of Technical Staff, Department Head and Vice President for Physical Research. He is visiting professor at NTU with both the School of Physical and Mathematical Sciences and Electrical and Electronic Engineering. His research has focused on nanoscale science and technology encompassing a broad range of topics. He pioneered band-structure engineering of semiconductor nanostructures and devices, invented and first demonstrated the quantum cascade laser and investigated QED forces including the first measurement of a repulsive Casimir force. His most recent contributions are new plasmonic devices and flat optics based on metasurfaces. He is a member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences. His awards include the King Faisal Prize, the IEEE Edison Medal, the SPIE Gold Medal, the American Physical Society Arthur Schawlow Prize in Laser Science, the Jan Czochralski Award for lifetime achievements in Materials Science, the IEEE Sarnoff Award in Electronics, the Materials Research Society Medal, the Wetherill Medal of the Franklin Institute, the Rank Prize in Optoelectronics, the Optical Society Wood Prize, the Berthold Leibinger Future Prize, the Julius Springer Prize in Applied Physics, the European Physical Society Quantum Electronics Prize.

Plenary Lecture 2: Towards Scalable Semiconductor Quantum Networks

Dirk Englund

MIT, USA

Dirk Englund received his BS in Physics from Caltech in 2002. Following a Fulbright year at TU Eindhoven, he earned an MS in electrical engineering and a PhD in Applied Physics in 2008, both from Stanford University. He was a postdoctoral fellow at Harvard University until 2010, when he started his group as Assistant Professor of Electrical Engineering and of Applied Physics at Columbia University. In 2013, he joined the faculty of MIT's Department of Electrical Engineering and Computer Science. Dirk's research focuses on quantum technologies based on semiconductor and optical systems. Recent recognitions include the 2011 Presidential Early Career Award for Scientists and Engineers, the 2011 Sloan Research Fellowship in Physics, the 2012 DARPA Young Faculty Award, the 2012 IBM Faculty Award, an 2016 R&D100 Award, the OSA's 2017 Adolph Lomb Medal , and the 2017 ACS Photonics Young Investigator Award.

Plenary Lecture 3: Active Quantum Nanoplasmonics: From Single Molecule Strong Coupling to Stopped-Light QED and Lasing

Ortwin Hess

Imperial College London, UK

Ortwin Hess currently holds the Leverhulme Chair in Metamaterials in the Blackett Laboratory (Department of Physics) at Imperial College London. He obtained the PhD degree from the Technical University of Berlin (Germany) in 1993 and the Habilitation at the University of Stuttgart in 1997. From 2003 to 2010 he was professor at the University of Surrey (Guildford, UK) and visiting professor at Stanford University (1997/98) and at the Ludwig-Maximilians University of Munich (1999/2000). Ortwin's research interests bridge theoretical condensed matter physics with photonics and are focused on light-matter interaction in nano-photonics, metamaterials and spatio-temporal nano-laser dynamics. He discovered the 'trapped-rainbow' principle, had the idea of stopped-light lasing and made defining contributions to the fields of spatio-temporal dynamics of semiconductor lasers, ultraslow light in metamaterials, complex quantum dot photonics and photonic crystals and strong coupling in nanoplasmonics. Ortwin pioneered active nanoplasmonics and optical metamaterials with quantum gain for which he is awarded the 2016 Royal Society Rumford Medal.

Plenary Lecture 4: Tip-enhanced Raman scattering microscopy: plasmonic molecular imaging beyond the limits

Satoshi Kawata

Osaka University, Japan

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Satoshi Kawata has been a Professor (currently Distinguished Professor) of Applied Physics and Frontier Biosciences at Osaka University since 1993, and also a Chief Scientist in RIKEN from 2002 to 2012. He has served as the President of Japan Society of Applied Physics, the President for Spectroscopical Society of Japan, Editor of Optics Communications, and a Director of Board of OSA. Professor Kawata is one of pioneers in near field optics (the inventor of aperture-less near-field scanning optical microscope and tip-enhanced Raman microscopy), two-photon engineering (the inventor of 3D fabrication with two-photon polymerization, isomerization, photo-refraction, and reduction). He has published a number of papers and books on three-dimensional and nano-resolution microscopy, vibrational spectroscopy, bio-imaging, signal recovery and photon pressure on nano-structures. The “8-micron bull” fabricated with his invented two-photon polymerization has been awarded in Guinness World Record Book 2004 Edition. He is a Fellow of OSA, SPIE, IOP, and JSAP.

Plenary Lecture 5: Squeezing of Photonic Energy into A Point-like Space

Yong-Hee Lee

Korea Advanced Institute of Science and Technology (KAIST), Korea

Yong-Hee Lee received his master degree in Applied Physics and Ph.D degree in Optical Sciences at Korea Advanced Institute of Science and Technology (KAIST) and at the University of Arizona, respectively. During his stay at AT&T Bell Laboratories, he pioneered and demonstrated the first proton-implanted VCSELs in 1990 and holds the original patent on this industrial VCSEL. In 1991 he joined the Department of Physics of KAIST where he continued his research on VCSELs and started new research on photonic crystal nano-lasers. His laboratory demonstrated various forms of photonic crystal laser including the first electrically-driven photonic crystal laser. His recent interest lies in on the physics of light-matter interaction at the nano-scale and the ultimate light source for photonic integrated circuits and quantum information science. From 2003 to 2004 he was an IEEE LEOS Distinguish Lecturer. Prof. Lee served as an Associate Editor of Optics Express. He is a Fellow of IEEE and the Optical Society of America. Domestically he received numerous awards including the National Academy of Science Award, Korea Scientist Award and the most recent Korea Best Scientist and Engineer Award. In 2014 He received the Humboldt Research Award and the IEEE Photonics Society Engineering Achievement Award. He co-authored more than 180 international journal papers and patents related to nanophotonics. He advised and produced over 40 PhD's in physics during his stay at KAIST.

Plenary Lecture 6: Parity-Time-Symmetric Optics, extraordinary momentum and spin in evanescent waves, and the quantum spin Hall effect of light

Franco Nori

RIKEN, Japan & University of Michigan, USA

Franco Nori is a RIKEN Chief Scientist, as well as Group Director of the "Quantum Condensed Matter Research Group" at CEMS (Center for Emergent Matter Science). Also, he is a Team Leader of the Interdisciplinary Theoretical Science Program at RIKEN (the Japanese National Laboratory). Also, since 1990 he has been a faculty member of the Physics Department at the University of Michigan, Ann Arbor, USA. Prior to this, he did postdoctoral research work at the Institute for Theoretical Physics, at the University of California, Santa Barbara. He received a PhD in Physics from the University of Illinois.

His group is studying the interface between quantum information, nanoscience, condensed matter physics, quantum optics, and atomic physics. Examples include: atomic-physics-like phenomena in quantum circuitry, quantum-optics-like-phenomena in quantum nano-electro-mechanical systems, optomechanics, hybrid quantum circuitry, coupling resonators and qubits, non-classical photon state generation from qubits, designing artificial atoms, micromasers from artificial atoms, decoherence/entanglement/scalability of quantum circuits, quantum simulators, quantum measurements, and quantum interferometry. Also topics related to optics, including optical diodes, PT-symmetry in optics, evanescent waves, transverse and longitudinal angular momenta of light, quantum spin Hall effect of light, electron vortex beams, and duality in electromagnetic fields. Also more traditional condensed matter physics, including superconductivity, semiconductors, and graphene.

He has co-authored over 80 papers in Physical Review Letters as well as over 30 in Science and Nature journals, and has been cited over 29K times, with an h-index of 84. He is an Elected Fellow of the American Physics Society (APS), Institute of Physics (IoP), Optical Society of America (OSA), and the American Association for the Advancement of Science (AAAS). He received the 2014 Prize for Research in Physics, from the Matsuo Foundation, Japan; and the 2013 Prize for Science, by the Minister of Education, Culture, Sports, Science and Technology, Japan. Also, an "Excellence in Research Award" and an "Excellence in Education Award" from the University of Michigan.

Plenary Lecture 7: Optical Antennas; Spontaneous Emission Faster Than Stimulated Emission

Eli Yablonovitch

UC Berkeley, USA

Eli Yablonovitch introduced the idea that strained semiconductor lasers could have superior performance due to reduced valence band (hole) effective mass. With almost every human interaction with the internet, optical telecommunication occurs by strained semiconductor lasers. He is regarded as a Father of the Photonic BandGap concept, and he coined the term "Photonic Crystal". The geometrical structure of the first experimentally realized Photonic bandgap, is sometimes called “Yablonovite”. In his photovoltaic research, Yablonovitch introduced the 4(n squared) (“Yablonovitch Limit”) light-trapping factor that is in worldwide use, for almost all commercial solar panels. His mantra that “a great solar cell also needs to be a great LED”, is the basis of the world record solar cells: single-junction 28.8% efficiency; dual-junction 31.5%; quadruple-junction 38.8% efficiency; all at 1 sun. His startup company Ethertronics Inc., has shipped over one billion cellphone antennas.

Prof. Yablonovitch is elected as a Member of the National Academy of Engineering, the National Academy of Sciences, the American Academy of Arts & Sciences, and is a Foreign Member of the Royal Society of London. He has been awarded the Buckley Prize of the American Physical Society, the Isaac Newton Medal of the UK Institute of Physics, the Rank Prize (UK), the Harvey Prize (Israel), the IEEE Photonics Award, the IET Mountbatten Medal (UK), the Julius Springer Prize (Germany), the R.W. Wood Prize, the W. Streifer Scientific Achievement Award, and the Adolf Lomb Medal. He also has an honorary Ph.D. from the Royal Institute of Technology, Stockholm, & the Hong Kong Univ. of Science & Technology, and is honorary Professor at Nanjing University.

Eli Yablonovitch is the Director of the NSF Center for Energy Efficient Electronics Science (E3S), a multi-University Center headquartered at Berkeley. He received his Ph.D. degree in Applied Physics from Harvard University in 1972. He worked for two years at Bell Telephone Laboratories, and then became a professor of Applied Physics at Harvard. In 1979 he joined Exxon to do research on photovoltaic solar energy. Then in 1984, he joined Bell Communications Research, where he was a Distinguished Member of Staff, and also Director of Solid-State Physics Research. In 1992 he joined the University of California, Los Angeles, where he was the Northrop-Grumman Chair Professor of Electrical Engineering. Then in 2007 he became Professor of Electrical Engineering and Computer Sciences at UC Berkeley, where he holds the James & Katherine Lau Chair in Engineering.

Plenary Lecture 8: Parity-time Symmetry Breaking Lasing and Anti-Lasing

Xiang Zhang

UC Berkeley, USA

Xiang Zhang is the Ernest Kuh Chaired Professor at the University of California, Berkeley and Director of Materials Science Division at Lawrence Berkeley National Laboratory (LBNL). He is also the Director of the NSF Nano-scale Science and Engineering Center (SINAM). He is an elected member of the US National Academy of Engineering (NAE), Academia Sinica and foreign member of Chinese Academy of Sciences. His research in optical metamaterials was selected by Times Magazine as "Top 10 Scientific Discoveries in 2008". Xiang Zhang was a recipient of many awards including the NSF CAREER Award, Fred Kavli Distinguished Lecturehip, Fitzroy Medal, Charles R. Richards Memorial Award, the Max Born Award, the Julius Springer Prize for Applied Physics. He received his BS/MS in physics in Nanjing University, China, and Ph.D from UC Berkeley in 1996 and was on faculty at Pennsylvania State University and UCLA prior returning Berkeley faculty in 2004.

Plenary Lecture 9: Metamaterials, anapoles and flying donuts

Nikolay Zheludev

University of Southampton, UK and NTU, Singapore

Nikolay Zheludev's research interest are in nanophotonics and metamaterials. He is the Director of the Centre for Photonic metamaterials and Deputy Director of the Optoelectronics Research Centre in Southampton University, UK. He is also co-Director of The Photonics Institute and directs the Centre for Disruptive Photonic Technologies at Nanyang Technological University. His personal awards include the Thomas Young medal (IOP) for "global leadership and pioneering, seminal work in optical metamaterials and nanophotonics", the Leverhulme Trust Senior Research Fellowship; Senior Research Professorship of the EPSRC; The Royal Society Wolfson Research Merit Award & Fellowship. He is a Fellow of the European Physical Society (EPS), the Optical Society (OSA) and the Institute of Physics (London). He is Editor-in-Chief of the Journal of Optics (IOP) and an Advisory Board Member for Nanophotonics, ACS Photonics and Nature Publishing Group Scientific Reports. In 2007 created European Physical Society international meeting at the crossroads of nanophotonics and metamaterials, NANOMETA. He was among a small group of research community leaders who provided initial impetus to the International Year of Light, declared by United Nations for 2015.

Keynote Lectures (more to be announced)

Dynamic Wavefront Control and Imaging with Active Nanophotonic Structures

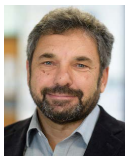
Harry Atwater, CALTECH, USA

Pseudo-spins and their consequences in classical waves

Che Ting Chan, HKUST, Hong Kong

Flat and conformal optics with dielectric metasurfaces

Andrei Faraon, California Institute of Technology, USA



Functionalized Hybrid Nanomagnets: New Materials for Innovations in Energy Storage and Medical Theranostics

Michael Farle, University of Duisburg-Essen, Germany & Immanuel Kant Baltic Federal University, Russia

Distinguished Lecturer of the IEEE Magnetics Society

Chiral plasmonic nanostructures

Peer Fischer, Max Planck Institute, Germany

Quantum plasmonics

Jean-Jacques Greffet, Institut d'Optique Graduate School, France

Chiral nanomaterials and their applications

Yurii Gun'ko, Trinity College Dublin, Ireland

Second order optical nonlinearity in metamaterial

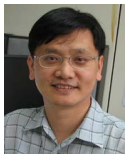
Teruya Ishihara, Tohoku University, Japan

Semiconductor Nanowires and Metastructures for Optoelectronic Device Applications

Chennupati Jagadish, The Australian National University, Australia

Extreme elastic anisotropy – realization by metamaterials.

Yoon Young Kim, Seoul National University, Korea



Metasurfaces for in-plane plasmonic arbitrary pattern generation

Byoungho Lee, Seoul National University, Korea

Hybrid nanostructures for sub-wavelength imaging, nonlinear optics, and chemistry

Stefan Maier, Imperial College London, UK

Acoustic omni meta-atom for decoupled access to all octants of a wave parameter space.

Namkyoo Park , Seoul National University, Korea

Seeing with the nano-eye: accessing structure, coupling, and dynamics in matter on its natural length and times scales.

Markus Raschke, University of Colorado Boulder, USA

Making Structured Metal Transparent for Ultra-Broadband Electromagnetic and Acoustic Waves

Mu Wang, Nanjing University, China

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