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2018 IEEE Research and Applications of Photonics In Defense Conference (RAPID)

Welcome to the 2018 IEEE Research and Applications of Photonics In Defense Conference (RAPID)

22 - 24 August 2018
Hilton Sandestin Beach Golf Resort & Spa
Mirimar Beach, FL, USA

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FA4.4: High Throughput and Low-Cost Detection of Short Nucleic Acid Biomarkers in Serum Using Dielectrophoretic Biosensor (Page 267)
Logeeshan Velmanickam *(North Dakota State University)*
Ivan T. Lima Jr. *(North Dakota State University)*
Dharmakeerthi Nawarathna *(North Dakota State University)*

FA4.5: Plasmonic Sensing of Neuropeptide Y and Orexin A with Gold Nanoparticles on Flexible Plastic Substrates (Page NA)
Rejeana Cary *(University of Cincinnati)*
Jamison Reifsteck *(University of Cincinnati)*
Ian Bruzas *(University of Cincinnati)*
Jorge Chavez Benavides *(USAF AFMC 711 HPW/RHXBC)*
Laura Sagle *(University of Cincinnati)*

FA4.6: Wide Subwavelength Grating Waveguide Sensitivity (Page 271)
Justin Bickford *(US Army Research Laboratory)*
Pak S. Cho *(General Technical Services, LLC)*
Mikella E. Farrell *(US Army Research Laboratory)*
Ellen L. Holthoff *(US Army Research Laboratory)*
Matthew B. Coppock *(US Army Research Laboratory)*
Paul M. Pellegrino *(US Army Research Laboratory)*

FA5: Human Analyst Augmentation — 3:30 pm–5:30 pm — Coral Ballroom A

Track 7: Optical Imaging and Sensing Technology (OIST)

FB1: Optical Imaging and Sensing TechnologySemiconductor Materials and Quantum Nanoscience — 8:00 am–8:30 am — Coral Ballroom B

FB2: Spectral, Polarimetric, and Multimodal Imaging — 8:30 am–10:30 am — Coral Ballroom B

FB3: Blast/Shock Wave Imaging and Spectroscopic Techniques — 10:30 am–12:30 pm — Coral Ballroom B

FB4: Terahertz Photonics — 1:30 pm–3:30 pm — Coral Ballroom B

FB4.1: Room-Temperature THz Quantum Cascade Laser Sources Based on Intra-Cavity Difference-Frequency Mixing with Improved Outcoupling Efficiency (Page NA)
Mikhail Belkin *(University of Texas)*

FB4.2: Harnessing Light-Metasurface Interactions for Enabling Technologies (Page NA)
Abul Azad *(Los Alamos National Laboratory)*

FB4.3: Advanced THZ Plasmonic Devices (Page NA)
Nezih Pala *(Florida International University)*

FB4.4: Hybrid Graphene/Semiconductor Technology for Terahertz Communications (Page NA)
Josep Miquel Jornet *(University at Buffalo)*

FB5: Target Detection and Pattern Recognition — 3:30 pm–5:30 pm — Coral Ballroom B

FB5.1: Designing Empirical Lab Experiments for SAR-ATR (Page 303)
Michael A. Saville *(Wright State University)*
Jacob D. Compaleo *(Wright State University)*
Heather L. Judd *(Wright State University)*
Paul Sotirelis *(Air Force Research Laboratory)*

FB5.2: Doppler-Only Imaging (Page NA)
Margaret Cheney *(Colorado State University)*

FB5.3: Forward-Looking InSAR Processing for Moving Target Imaging (Page 307)
Matthew J. Burfeindt *(Air Force Research Laboratory)*

FB5.4: k-Space Tomography for Spatial-Spectral Mapping (Page 311)
Conor J. Ryan *(University of Delaware)*
Dylan D. Ross *(University of Delaware)*
Janusz Murakowski *(University of Delaware)*
Garrett J. Schneider *(University of Delaware)*
Dennis W. Prather *(University of Delaware)*
Christopher A. Scheutz *(Phase Sensitive Innovations, Inc.)*

FB5.5: Deep Learning for Compressive Infrared and Hyperspectral Machine Vision (Page 315)
J. Chen *(Rice University)*
Y. Xu *(Rice University)*
L. Liyang *(Rice University)*
K. F. Kelly *(Rice University)*

FB5.6: Analytical BER Performance of a LDPC Coded OFDM FSO with Optical Intensity Modulation and a Direct Detection Receiver (Page N/A)
Bobby Barua *(Bangladesh University of Engineering and Technology)*
S. P. Majumder *(Bangladesh University of Engineering and Technology)*

Track 8: Bioinspired and Bioprincipic Technologies (BBT)

FC1: Bioinspired and Bioprincipic Technologies — 8:00 am–8:30 am — Coral Ballroom C

FC1.1: Why Should Engineers Be Interested in Vision in Animals, Especially Arthropods? (Page NA)
Ric Wehling *(Air Force Research Laboratory)*

FC2: Bioinspired Optical Technologies — 8:30 am–10:30 am — Coral Ballroom C

FC2.1: Bioinspired Micro-Optics and Applications to Imaging Polarimetry (Page 323)
Stanley Pau *(University of Arizona)*

FC2.2: Dynamic Materials Inspired by Cephalopods (Page NA)
Alon Gorodetsky *(University of California, Irvine)*

FC2.3: Biomimicry of Insect Eyes and Wings (Page NA)
Doekele Stavenga *(University of Groningen)*

FC2.4: The Biophotonics of Open-Ocean Animals: Anti-Reflective Coatings, Super-Black Skins, and Transparent Interiors (Page NA)
Sonke Johnsen *(Duke University)*

FC3: Bioinspired Sensors — 10:30 am–12:30 pm — Coral Ballroom C

FC3.1: Bio-Inspired Mechanosensors (Page NA)
Miao Yu *(University of Maryland)*

FC3.2: Infrared Biologically-Inspired Imaging Sensors - A Review (Page NA)
Mark Massie *(Raytheon Vision Systems)*

FC3.3: Bioinspired Sensors for Underwater Geolocalization (Page 325)
Viktor Gruev *(University of Illinois at Urbana-Champaign)*
Missael Garcia *(University of Illinois at Urbana-Champaign)*
Sam Powell *(University of Illinois at Urbana-Champaign)*
Nan Cui *(University of Illinois at Urbana-Champaign)*
Tyler Davis *(University of Illinois at Urbana-Champaign)*

FC3.4: Local Motion Sensor, Curvace Artificial Compound Eye and M2APIX Retina: From Sensors Design to Robotics Application (Page NA)
Franck Ruffier *(CNRS - Aix Marseille University (ISM - Biorobotics))*

FC4: Biobased Signal and Information Processing I — 1:30 pm–3:30 pm — Coral Ballroom C

FC4.1: TBD (Page NA)
Pamela Abshire *(University of Maryland)*

FC4.2: Visual Guidance of Polarotactic Horseflies (Page 327)
Gregor Belušič *(University of Ljubljana)*
Marko Ilić *(University of Ljubljana)*
Andrej Meglič *(University of Ljubljana)*
Martin F. Wehling *(Air Force Research Laboratory)*

FC4.3: Gaussian-Based Filters for Elementary Motion Detection Delay Element (Page 329)
Geoffrey Brooks *(Florida State University Panama City)*

FC4.4: Spatially-Variant Photonic Crystals and Possible Applications (Page 333)

Noel P. Martinez *(University of Texas at El Paso)*
Manuel Martinez *(University of Texas at El Paso)*
Jimmy E. Touma *(Air Force Research Laboratory)*
Joshua K. Lentz *(Air Force Research Laboratory)*
Stephen M. Kuebler *(University of Central Florida)*
Raymond C. Rumpf *(University of Texas at El Paso)*

FC4.5: Novel Bio-Inspired Infrared Imager with On Chip Object Computation (Page 337)
P. McCarley *(Air Force Research Laboratory)*
J. Caulfield *(Cyan Systems)*

FC4.6: Diamond Meta-Surfaces for High Power Laser Applications (Page 339)
Alexander Muhr *(Element Six Technologies US Corp.)*
Daniel Twitchen *(Element Six Technologies US Corp.)*
Henk de Wit *(Element Six Technologies US Corp.)*

FC5: Biobased Signal and Information Processing II — 3:30 pm–5:30 pm — Coral Ballroom C

FC5.1: A Dynamically-Positioned, Time-Domain Winner-Take-All Circuit for Spike-Based Path Planning (Page NA)
Timmer Horiuchi, *(University of Maryland)*

FC5.2: Nearest Neighbor Anomaly Detector for Passively Augmented LADAR (Page 423)
J. Brown
R. Roberts
C. Welsh
C. Keyser
C. Saludez

FC5.3: Neuromorphic Computing with Mixed Analog-Digital Chips (Page NA)
Kwabena Boahen *(Stanford University)*

Track 9: Novel Phenomena and New Materials for Advanced Photonics (NPNMAP)

FD1: Novel Phenomena and New Materials for Advanced Photonics — 8:00 am–8:30 am — Coral Ballroom D

FD1.1: Nano-Optical Phenomena in Quantum Materials (Page NA)
Dmitri Basov *(Columbia University)*

FD2: Quantum Sensing and Spintronics — 8:30 am–10:30 am — Coral Ballroom D

FD2.1: Local Manipulation and Characterization of Spin and Magnetization Dynamics (Page NA)
P. Chris Hammel *(Ohio State University)*
Vidya Bhallamudi *(Indian Institute Technoloby Madras)*
Shane White *(Ohio State University)*
William Ruane *(Ohio State University)*
Carola Purser *(Ohio State University)*
Brendan McCullian *(Ohio State University)*
Chris Wolfe *(Ohio State University)*

FD2.2: Single Photon Detection Using Chromophores and Nitrogen Vacancies in Diamond (Page 343)
N. J. Harmon *(University of Iowa)*

FD2.3: Plasmonic Structure Integrated Superconducting Nanowire Single-Photon Detectors for Transfering Specific Quantum Information (Page 345)
M. Csete *(University of Szeged)*
A. Szenes *(University of Szeged)*
B. Tóth *(University of Szeged)*
G. Szabó *(University of Szeged)*
B. Bánhelyi *(University of Szeged)*
T. Csendes *(University of Szeged)*

FD2.4: SiV Diamond Color Center Fluorescence Improvement via Silica-Silver Core-Shell Nanoresonators (Page 349)
M. Csete *(University of Szeged)*
A. Szenes *(University of Szeged)*
D. Vass *(University of Szeged)*
G. Szabó *(University of Szeged)*
B. Bánhelyi *(University of Szeged)*
T. Csendes *(University of Szeged)*

FD2.5: Electronic Structure and Quantum Optics of Carbon Nanotube Defects (Page N/A)
Han Htoon *(Los Alamos National Laboratory)*

FD2.6: Strong Photon Antibunching in Weakly Nonlinear Two-Dimensional Exciton-Polaritons (Page 355)
Albert Ryou *(University of Washington)*
David Rosser *(University of Washington)*
Abhi Saxena *(Indian Institute of Technology)*
Taylor Fryett *(University of Washington)*
Arka Majumdar *(University of Washington)*

FD3: Two-Dimensional Materials — 10:30 am–12:30 pm — Coral Ballroom D

FD3.1: 2D Semiconductor Quantum Optoelectronics (Page NA)
Xiaodong Xu *(University of Washington)*

FD3.2: Next Generation Photonics Based on 2D Materials (Page 359)
Michal Lipson *(Columbia University)*

FD3.3: Nanoimaging and Nano-FTIR of Muscovite Mica (Page 361)
Alireza Fali *(University of Georgia)*
Sampath Gamage *(Linköping University)*
Marquez Howard *(University of Georgia)*
Kirill Bolotin *(Free University of Berlin)*
Yohannes Abate *(University of Georgia)*

FD3.4: Optical Nano-Imaging of 2D Transition Metal Dichalcogenides (Page 363)
Sharad Ambardar *(University of South Florida)*
Dmitri V. Voronine *(University of South Florida)*

FD3.5: Compressive Hyperspectral Microscopy of Nanomaterials (Page 367)
Y. Xu *(Rice University)*

J. Chen *(Rice University)*
L. Liyang *(Rice University)*
K. F. Kelly *(Rice University)*

FD4: Topological Insulators and Photonics — 1:30 pm–3:30 pm — Coral Ballroom D

FD4.1: Quantum Inspired Integrated Photonics (Page NA)
Liang Feng *(University of Pennsylvania)*

FD4.2: Topological Light Sources (Page NA)
Boubacar Kante *(University of California, San Diego)*

FD4.3: Hyperspectral Time-Domain Terahertz Nano Imaging (Page 371)
N. Aghamiri *(University of Georgia)*
F. Huth *(Neaspec GmbH)*
A. Huber *(Neaspec GmbH)*
R. Hillenbrand *(CIC nanoGUNE and UPV/EHU & Basque Foundation of Science)*
Y. Abate *(University of Georgia)*

FD4.4: Resonant Ultrathin Infrared Detectors Enabling High Quantum Efficiency (Page 373)
David W. Peters *(Sandia National Laboratories)*
Jin K. Kim *(Sandia National Laboratories)*
Paul Davids *(Sandia National Laboratories)*
Anna Tauke-Pedretti *(Sandia National Laboratories)*
Paul S. Davids *(Sandia National Laboratories)*
Michael D. Goldflam *(Sandia National Labs)*
Michael B. Sinclair *(Sandia National Laboratories)*
Joel R. Wendt *(Sandia National Laboratories)*
Larry K. Warne *(Sandia National Laboratories)*
Salvatore Campione *(Sandia National Laboratories)*
Aaron J. Pung *(Sandia National Laboratories)*
Michael G. Wood *(Sandia National Laboratories)*
Evan M. Anderson *(Sandia National Laboratories)*
Patrick S. Finnegan *(Sandia National Laboratories)*
Charles R. Alford *(Sandia National Laboratories)*
Phillip H. Weiner *(Sandia National Laboratories)*
Torben R. Fortune *(Sandia National Laboratories)*
Wesley T. Coon *(Sandia National Laboratories)*
Samuel D. Hawkins *(Sandia National Laboratories)*

FD4.5: Near-Field Photocurrent Mapping of MoS_2-Based Device at Nanoscale (Page 377)
Rugang Geng *(University of Georgia)*
Yohannes Abate *(University of Georgia)*

FD4.6: 2D Material Printing for Cavity Integration (Page 379)
Xiaochen Ge *(University of Texas at Arlington)*
Zhonghe Liu *(University of Texas at Arlington)*
Weidong Zhou *(University of Texas at Arlington)*

FD5: Modeling and Simulation for Advanced Photonics — 3:30 pm–5:30 pm — Coral Ballroom D

FD5.1: Wave Propagation in Time-Modulated Metamaterials (Page NA)
Andrea Alu *(CUNY Advanced Science Research Center)*

FD5.2: Optics of Hybrid Nanomaterials: From Collective Resonances to Nonlinear Spectroscopy (Page NA)
Maxim Sukharev *(Arizona State University)*

FD5.3: Optical Response of Two-Dimensional Nanostructures by Theoretical Prediction (Page NA)
Ruth Pachter *(Air Force Research Laboratory)*
Jie Jiang *(Air Force Research Laboratory)*

FD5.4: To Etch or Not To Etch (Page 381)
Simeon Trendafilov *(Air Force Research Laboratory)*
Monica Allen *(Air Force Research Laboratory)*
Jeffery Allen *(Air Force Research Laboratory)*
Young Jun Yoon *(Georgia Institute of Technology)*
Yihuang Chen *(Georgia Institute of Technology)*
Cynthia Rivaldo Gomez *(Georgia Institute of Technology)*
Zhiqun Lin *(Georgia Institute of Technology)*

FD5.5: Enhanced Quantum Efficiency and Reduction of Reflection for MSM Photodetectors with Nano-Structured Surface (Page 385)
Ekaterina Ponizovskaya-Devine *(UC Davis)*
Hilal Cansizoglu *(UC Davis)*
Yan Gao *(UC Davis)*
Cesar Perez *(UC Davis)*
Toshishige Yamada *(UC Davis)*
Aly F. Elrefaie *(UC Davis)*
M. Saif Islam *(UC Davis)*
Shih-Yuan Wang *(UC Davis)*

Track 10: Advanced Nanophotonics Platforms (ANP)

FE1: Advanced Nanophotonics Platforms — 8:00 am–8:30 am — Heron

FE1.1: Opening Remarks (Page NA)
Alexandra Boltasseva

FE2: Ultrafast and Nonlinear Nanophotonics — 8:30 am–10:30 am — Heron

FE2.1: Topologically-Engineered Flat-Surface Metamaterials for the Far- & Near-Field Nanophotonics (Page NA)
Svetlana V. Boriskina *(Massachusetts Institute of Technology)*

FE2.2: Ultrafast All-Optical Modulation of Light with Hot-Carrier Plasmonics (Page NA)
Wenshan Cai *(Georgia Institute of Technology)*

FE2.3: Infrared and Active Photonics Using Nanoantennas and Metasurfaces (Page NA)
Otto Muskens *(University of Southampton)*

FE2.4: Plasmonically-Coupled Nanowire Sensors (Page NA)
Diana Huffaker *(Cardiff University)*

FE3: High Refractive Index Enabled Nanophotonics — 10:30 am–12:30 pm — Heron

FE3.1: Resonant Semiconductor Nanostructures for Optoelectronics (Page NA)
Mark Brongersma *(Stanford University)*

FE3.2: Dynamic All-Dielectric Metasurfaces (Page NA)
Jason Valentine *(Vanderbilt University)*

FE3.3: Ultrawide Thermal Tuning of Semiconductor Metasurface Resonators (Page NA)
Tomer Lewi *(Bar Ilan University)*

FE3.4: Electromagnetic Responses from Planar Arrays of Dielectric Nano-Disks at Overlapping Dipolar Resonances (Page 387)
N. Gandji *(Michigan Technological University)*
G. Semouchkin *(Michigan Technological University)*
E. Semouchkina *(Michigan Technological University)*

FE3.5: Achromatic Subwavelength Grating Micro Lens for Linear Polarized Incidence (Page 391)
Mao Ye *(University of Michigan-Dearborn)*
Vishva Ray *(University of Michigan)*
Yasha Yi *(University of Michigan-Dearborn)*

FE4: Emerging Material Platforms for Plasmonics — 1:30 pm–3:30 pm — Heron

FE4.1: Novel Silicon-Compatible Plasmonic Materials (Page 395)
Luca Dal Negro *(Boston University)*

FE4.2: Topological Insulator Thin Films as Terahertz Plasmonic Materials (Page 397)
Theresa Ginley *(University of Delaware)*
Yong Wang *(University of Delaware)*
Zhengtianye Wang *(University of Delaware)*
Stephanie Law *(University of Delaware)*

FE4.3: Synthesis and Characterizations of Plasmonic Nanoparticles: Large Plain Au and Au/TiO_2 (Page 401)
Young Jun Yoon *(Georgia Institute of Technology)*Yihuang Chen *(Georgia Institute of Technology)*
Cynthia Rivaldo Gomez *(Georgia Institute of Technology)*
Monica Allen *(Air Force Research Laboratory)*
Jeffrey Allen *(Air Force Research Laboratory)*
Zhiqun Lin *(Georgia Institute of Technology)*
Stephanie Law *(University of Delaware)*

FE4.5: Improving Transfer Efficiency of Molecular Photonic Wires on DNA Scaffolds (Page 409)
Sebastián A. Díaz *(US Naval Research Laboratory)*
William P. Klein *(US Naval Research Laboratory)*
Sean M. Oliver *(George Mason University)*
David A. Hastman *(US Naval Research Laboratory & University of Maryland)*
Susan Buckhout-White *(US Naval Research Laboratory)*
Mario G. Ancona *(US Naval Research Laboratory)*
Paul D. Cunningham *(US Naval Research Laboratory)*
Joseph S. Melinger *(US Naval Research Laboratory)*
Patrick M. Vora *(George Mason University)*
Igor L. Medintz *(US Naval Research Laboratory)*

FE4.6: New Materials and Designs for Nano- & Topo-Photonics (Page NA)
Vladimir Shalaev *(Purdue University)*

FE5: Active Plasmonics and Nanophotonics — 3:30 pm–5:30 pm — Heron

FE5.1: Nanoplasmonics: How to Avoid the Loss (Page NA)
Jacob Khurgin *(Johns Hopkins University)*

FE5.2: Highly Efficient Excitation of Plasmons across (Molecular) Tunneling Junctions (Page NA)
Christian Nijhuis *(National University of Singapore)*

FE5.3: Electrical Driving of Plasmonic Optical Antennas (Page 413)
Ali Mojibpour *(Rice University)*
Palash Bharadwaj *(Rice University)*

FE5.4: Monolithic Doped-Semiconductor Platform for Optical Devices in the Infrared (Page 415)
Raymond Wambold *(University of Wisconsin - Madison)*
Jad Salman *(University of Wisconsin - Madison)*
Martin Hafermann *(Friedrich Schiller University Jena)*
Jura Rensberg *(Friedrich Schiller University Jena)*
Chenghao Wan *(University of Wisconsin - Madison)*
Bradley S. Gundlach *(University of Wisconsin - Madison)*
Carsten Ronning *(Friedrich Schiller University Jena)*
Mikhail A. Kats *(University of Wisconsin - Madison)*

FE5.5: Surface Plasmon Polariton Laser Based on a Metallic Trench Fabry-Perot Resonator (Page NA)
Henri Lezec *(National Institute of Standards and Technology)*

FF2: Tutorial III — 9:00 am–11:00 am — Theater

FF2.1: Physics and Technology of Photonic Infrared Detectors (Page NA)
Sanjay Krishna *(Ohio State University)*

FF2.2: Principles and Applications of Resonant Metasurfaces (Page NA)
Robert Magnusson *(University of Texas - Arlington)*

FF4: Tutorial IV — 2:00 pm–4:00 pm — Theater

FF4.1: STEM Session: Why We Need STEM, What We Get Wrong, How Do We Fix It (Page N/A)
Brian Mitchell *(Air Force Research Laboratory)*

FF4.2: Helium Droplet Mediated Cluster Assembly as a Tool to Probe the Limits of Energy Storage in Metastable Nanomaterials (Page NA)
Claron Ridge *(Air Force Research Laboratory/RWME)*

Additional Paper

Impact of Interface Quality on the Strength of Volume Plasmon Polaritons in Semiconductor Hyperbolic Metamaterials (Page 405)

Patrick Sohr *(University of Delaware)*
Dongxia Wei *(University of Delaware)*
Stephanie Law *(University of Delaware)*