



DUKE UNIVERSITY  
Fitzpatrick Institute  
for Photonics

*2019 FIP Symposium*  
*Materials & Photonics: Advancing The World*

*March 11-12, 2019*

*Fitzpatrick Institute for Photonics (FIP)*  
*Pratt School of Engineering, Duke University*

# Symposium on Photonics Science and Technology

## 2019 Fitzpatrick Institute for Photonics (FIP) Annual Meeting

*March 11-12, 2019, Duke University*

### ADVANCE PROGRAM AGENDA

#### Monday, March 11, 2019 (Fitzpatrick Center) – Morning Session

8:30-9:00 am **Registration**

9:00-9:05 **Introduction**

**Tuan Vo-Dinh**, Director of the Fitzpatrick Institute for Photonics, R. Eugene and Susie E. Goodson Professor of Biomedical Engineering and Professor of Chemistry, Duke University

**Opening Welcome Address**

9:05-9:15 **Sally Kornbluth**, Provost and Jo Rae Wright University Professor, Duke University

9:15-9:25 **Ravi Bellamkonda**, Vinik Dean, Pratt School of Engineering, Duke University

9:25-10:05 **Symposium Keynote**

**“Invention of High Efficient blue LED and Future Solid State Lighting”**

**Shuji Nakamura**, 2014 Nobel Laureate in Physics  
CREE Distinguished Professor Materials Department  
University of California, Santa Barbara



Professor Shuji Nakamura, PhD  
*2014 Nobel Laureate in Physics*

**2019 FIP Pioneer  
Award Winner**

10:15-10:35 **COFFEE BREAK**

10:35-11:10 **Plenary Lecture**

**“Nanoelectronic Tools for Brain Science”**

**Charles M. Lieber**

Joshua & Beth Friedman University Professor  
Department of Chemistry & Chemical Biology  
Harvard University

11:10-12:00 **Session 1: Special Topic – *Materials & Photonics: Advancing The World***

**Chair: David N. Beratan**, R.J. Reynolds Professor of Chemistry,  
Departments of Chemistry, Biochemistry & Physics, Duke University

11:10- 11:40 **Invited Lecture**

**“Design Of Histone-Mimic Nanoparticles For Gene Delivery Using Molecular Modeling”**

**Yaroslava Yingling**, Professor and University Faculty Scholar, Department of Materials Science and Engineering  
North Carolina State University

11:40- 12:00 **“Engineering materials to unlock the regenerative capacity of tissues”**

**Tatiana Segura**, Professor  
Department of Biomedical Engineering  
Duke University

12:00-1:30 pm **LUNCH BREAK** (Lunch provided)

**Poster Session** (No presenters at this time)

Posters are on display in the Atrium area of the Fitzpatrick Center

**Monday, March 11, 2019 (Fitzpatrick Center) - *Afternoon Session***

1:30-2:05 pm **Plenary Lecture**

**“Photonics Nanomaterials in Oncology”**

**Ulrich B. Wiesner**

Spencer T. Olin Professor of Engineering  
Department of Materials Science of Engineering  
Cornell University

2:05-3:15 **Session 2: Special Topic – *Materials & Photonics: Advancing The World***

**Chair: Adam Wax**, Professor, Department of Biomedical Engineering,  
Duke University

2:05-2:35 **Invited Lecture**

**“Colorful Organic Solar Cells Employing Förster Resonance Energy Transfer”**

**Andre Taylor**, Associate Professor  
Department of Chemical and Biomolecular Engineering  
Tandon School of Engineering  
New York University

2:35-2:55      **“Biomaterial Enabled Translational Regenerative Medicine”**  
**Shyni Varghese**, Professor  
Departments of Biomedical Engineering, Mechanical Engineering and Materials Science, and Orthopaedic Surgery, Duke University

2:55-3:15      **“Waveguide QED: Catching and Storing a Single Photon”**  
**Harold U. Baranger**, Professor  
Department of Physics, Duke University

3:15-3:30      **COFFEE BREAK**

3:30-4:30      **Session 3: *Advanced Photonic Technologies and Systems I***  
**Chair: Jie Liu**, George Barth Geller Professor of Chemistry,  
Department of Chemistry, Duke University

3:30-3:50      **“Laser Interstitial Thermal Therapy (LITT) for Intracranial Lesions”**  
**Peter Fecci**, Assistant Professor of Neurosurgery, Associate Deputy Director of the Preston Robert Tisch Brain Tumor Center, Co-Director of the Center for Brain Metastasis, Department of Neurosurgery  
Duke School of Medicine

3:50-4:10      **“Molecular double slit experiments”**  
**David N. Beratan**, R.J. Reynolds Professor of Chemistry  
Departments of Chemistry, Biochemistry and Physics  
Duke University

4:10-4:30      **“Low-cost, Portable Optical Coherence Tomography for Point of Care Use”**  
**Adam Wax**, Professor  
Department of Biomedical Engineering  
Duke University

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4:30-6:00      **POSTER SESSION & RECEPTION**  
**Presenters will be at posters from 4:30-5:00pm**  
Posters are exhibited in the Atrium area of the Fitzpatrick Center

*FIP SYMPOSIUM COCKTAIL RECEPTION  
in the Atrium area of the Fitzpatrick Center  
(Heavy hors d'oeuvres will be served)*

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**Tuesday, March 12 (Fitzpatrick Center) – *Special Morning Session & Panel***

10:00- 12:00pm

**Session 4: *Special Session on Advancing the World Through  
Global Health Students***



**SESSION CO-SPONSORED BY**  
*Engineering World Health (EWH),  
Global Public Service Academies (GPSA),  
The Office of the Vice-Provost  
& The Fitzpatrick Institute for Photonics*

**Program Committee Chair:**

**Robert Malkin**, Professor of the Practice, Biomedical Engineering and Global Health and Director, Global Public Service Academies (GPSA), Duke University

10:00-11:00 ***Panel Discussion on Global Health STEM Outreach***

**Moderator: Brittany Ploss**, Project Manager, Duke Center Center for Applied Genomics and Precision Medicine, Assistant Director, GPSA, Duke University

***Panel Members***

**Robert Malkin**, Professor of the Practice, Biomedical Engineering and Global Health and Director, GPSA, Duke Engineering

**Leslie J. Calman**, CEO, Engineering World Health (EWH)

**Tamara Fitzgerald**, Assistant Professor of Surgery, Assistant Research Professor of Global Health, Duke School of Medicine

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12:00-1:30pm

**Poster Session - Duke Engineering World Health, Global Public Service Academies**

Participation from invited students across GPSA & EWH

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12:00-1:30 pm      **LUNCH BREAK** (Lunch provided)

**Poster session for Duke Engineering World Health**

Posters are exhibited in the Atrium area of the Fitzpatrick Center

**Tuesday, March 12 (Fitzpatrick Center) - *Afternoon Session***

1:30-3:00pm    **Session 5: Special Topic – *Materials & Photonics: Advancing The World***  
**Chair: Natalia Litchinitser**, Professor, Department of Electrical and  
Computer Engineering, Duke University

1:30-2:00      **Invited Lecture**  
**“Dye-Sensitization Of Semiconductor Nanocrystallites  
For Solar Energy Conversion”**  
**Gerald J. Meyer**, Professor  
Department of Chemistry  
University of North Carolina at Chapel Hill

2:00-2:20      **“Plasmonic Catalysis: Heating vs. Hot Electrons”**  
**Jie Liu**, George Barth Geller Professor of Chemistry  
Department of Chemistry, Duke University

2:20-2:40      **“Imaging the Cellular Response to Nanoparticles”**  
**Christine K. Payne**, Associate Professor  
Department of Mechanical Engineering & Materials  
Science, and Department of Chemistry, Duke University

2:40-3:00      **“Polymer-Mediated Assembly of Nanoparticles into  
Unique, Anisotropic Architectures”**  
**Gaurav Arya**, Associate Professor, Department of  
Mechanical Engineering and Materials Science  
Duke University

3:00-3:15      **COFFEE BREAK and FIP POSTER DISPLAY**

3:15-4:55      **Session 6: *Advanced Photonic Technologies and Systems II***  
**Chair: Harold U. Baranger**, Professor  
Department of Physics, Duke University

3:15-3:25      **Poster Award Winners Announced**

- 3:25-3:55      **Invited Lecture**  
**“Phonon coherences reveal the polaronic character of excitons in two-dimensional lead halide perovskites”**  
**Carlos Silva**, Professor, School of Chemistry and Biochemistry, School of Physics, Georgia Institute of Technology
- 3:55-4:15      **“Linear and Nonlinear Light-Matter Interactions in Engineered Photonic Media”**  
**Natalia Litchinitser**, Professor, Department of Electrical and Computer Engineering, Duke University
- 4:15-4:35      **“Imaging freely moving organisms at high resolution using a gigapixel microscope”**  
**Roarke Horstmeyer**, Assistant Professor, Department of Biomedical Engineering, Duke University
- 4:35-4:55      **“Photonics for Solar Fuels”**  
**Nico Hotz**, Assistant Professor of the Practice, Department of Mechanical Engineering & Materials Science, Duke University

4:55-5:00 pm    **Closing Remarks**

5:00pm          **SYMPOSIUM ADJOURNS**