Maiken Mikkelsen
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Maiken Mikkelsen

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Education

University of California, Santa Barbara	Physics	Ph.D. 2009
Experimental Condensed Matter Physics & Quantum Information Science Advisor: Prof. David Awschalom		
University of California, Santa Barbara	Physics	M.A., 2007
University of Copenhagen, Denmark	Physics	B.S., 2004

Appointments

Duke University

- James N. and Elizabeth H. Barton Associate Professor of Electrical & Computer Engineering — 2018– present
- Associate Professor of Physics (by courtesy) — 2019 – present
- Associate Professor of Mechanical Engineering and Materials Science (by courtesy) — 2018 – 2023
- Nortel Networks Assistant Professor — 2015 – 2017
- Assistant Professor of Electrical & Computer Engineering (50%) and Physics (50%) — 2012 – 2017

Stanford University

- Visiting Associate Professor of Materials Science and Engineering — 2018 – 2019

University of California, Berkeley

- Postdoctoral Fellow, Advisor: Prof. Xiang Zhang — 2010 – 2012

Research Interests

Prof. Mikkelsen's research interests are light-matter interactions in nanophotonic structures, quantum materials, and novel multi-scale fabrication techniques. A recent focus is on "*Extreme Nanophotonics*" where electromagnetic fields are sculpted on the molecular-scale to realize unprecedented material properties and behavior. Her research aims to provide new fundamental understanding as well as harness this insight for transformative breakthroughs in ultrafast optoelectronics, quantum technologies, the environment, and human health.

Awards & Honors

2021 MURI Award (PI), AFOSR
2021 Stansell Family Distinguished Research Award, Duke University
2020 American Chemical Society (ACS) Photonics Young Investigator Award
2019 Moore Inventor Fellow Award, Gordon and Betty Moore Foundation

2019 National Institutes of Health (NIH) RO1 Award
2017 Maria Goeppert Mayer Award, American Physical Society
2017 Early Career Achievement Award, SPIE (International Society for Optics and Photonics)
2017 Young Investigator Program (YIP) Award, Office of Naval Research
2016 Young Investigator Program (YIP) Award, Army Research Office
2016 Cottrell Scholar Award, Research Corporation for Science Advancement
2016 Scialog Fellow, Research Corporation for Science Advancement
2015 CAREER Award, National Science Foundation
2015 Young Investigator Program (YIP) Award, Air Force Office of Scientific Research
2014 Ralph E. Powe Junior Faculty Award
2011 European Physical Society Ph.D. Thesis prize, Quantum Electronics and Optics
2009 NSF ADVANCE Award, Workshop for Women in Science & Engineering
2007 Center for Nanoscience Innovation for Defense (CNID) Graduate Fellowship

Major Scientific Achievements

- **Revealed record-high spontaneous emission rates.** Elucidated the mechanisms behind large Purcell factors and demonstrated record-high 1,000-fold enhancement in the spontaneous emission rate of dye molecules and semiconductor quantum dots *(Nature Photonics 8, 835 (2014)*, *Nature Communications 6, 7788 (2015)).*

- **Realized first ultrafast and efficient single photon source.** Realized this long-sought goal by embedding single quantum dots in plasmonic cavities. Critical to quantum information and quantum optics communities, as the natural slow emission rate of single photon sources is a limiting factor for many experiments and future applications *(Nano Letters 16, 270 (2016)).*

- **Demonstrated first ultrafast, spectrally-selective thermal photodetector.** Utilized metasurfaces to create spectrally-selective perfect absorption enabling the use of an only 100 nm pyroelectric thermal detection layer and revealing speeds of <700 ps, an improvement of five-orders-of-magnitude over state-of-the-art. The metasurface also acts as an on-chip spectral filter promising for hyperspectral imaging *(Nature Materials 19, 158 (2020)).*

- **Created novel multi-scale fabrication technique to realize large-area structural color.** Utilized chemical self-assembly to achieve sub-10 nm gaps between metals to demonstrate spectrally-selective perfect absorbers. Combined with top-down large-scale patterning to realize multi-spectral pixels and ~10,000 plasmonic combinatorial colors. Promising for transformative breakthroughs of *e.g.* photodetectors and imaging devices *(Advanced Materials 27, 8028 (2015), Advanced Materials 29, 1602971 (2017)).*

- **Elucidated benefit of nanogap cavities for point-of-care immunoassays.** Integrated a sandwich immunoassay microarray within a plasmonic nanogap cavity resulting in a 151-fold increase in fluorescence and 14-fold improvement in the limit-of-detection for the cardiac biomarker B-type natriuretic peptide (BNP). *(Nano Letters 20, 4330 (2020), Advanced Materials 35, 2107986 (2023))*.

- **Showed first, ultrabright single photon source at 1550 nm.** Sandwiched colloidal quantum dots in a nanogap cavity to enhance their spontaneous emission rate ~10,000-times. This resulted in single photon emission count rates of 12.6 MHz for quantum dots emitting at 1550 nm and 15 MHz for quantum dots emitting at 1350 nm, corresponding to an improvement of more than two orders of magnitude over state-of-the-art. *(Under review, (2024))*.

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Peer-reviewed Publications

†: corresponding author; *****: equal contributors

Under Review

1. S. Zhang, A. J. Traverso, E. A. Dolgopolova, A. Singh, H. Kishida, M. Y. Livshits, C. J. Sheehan, E. G. Bowes, J. A. Hollingsworth & M. H. Mikkelsen†, "*Solution-processed ultrafast, room-temperature single-photon source at 1550 nm*", under review (2024)
2. H. Li, D. Acil, A. Boyce, C. Pederson, S. Chakravarthi, N. Yama, K.-M. C. Fu & M. H. Mikkelsen†, "*Room-temperature Picosecond Single Photon Emission from Silicon Vacancy Center in Diamond*", under review (2024)

Published

3. A. M. Boyce, H. Li, N. C. Wilson, D. Acil, A. Shams-Ansari, S. Chakravarthi, C. Pederson, Q. Shen, N. Yama, K.-M. C. Fu, M. Loncar & M. H. Mikkelsen†, "*Plasmonic Diamond Membranes for Ultrafast Silicon Vacancy Emission*", **Nano Letters** 24, 12, 3575–3580 (2024)
4. R. E. Bangle & M. H. Mikkelsen†, "*Tracking light-induced charge transport*", **Science** 382, 6668, (2023)
5. N. C. Wilson, E. Shin, R. E. Bangle, S. B. Nikodemski, J. H. Vella & M. H. Mikkelsen†, "*Ultrathin Pyroelectric Photodetector with Integrated Polarization-Sensing Metasurface*," **Nano Letters**, 23 (18), 8547-8552 (2023)
6. R. E. Bangle, H. Li & M. H. Mikkelsen†, "*Uncovering the Mechanisms of Triplet-Triplet Annihilation Upconversion Enhancement via Plasmonic Nanocavity Tuning*," **ACS Nano** 17, 23, 24022–24032 (2023)
7. D. Semeniak, D. F. Cruz, A. Chilkoti & M. H. Mikkelsen†, "*Plasmonic Fluorescence Enhancement in Diagnostics for Clinical Tests at Point-of-Care: A Review of Recent Technologies,*" **Advanced Materials** 35, 2107986 (2023)
8. J. W. Stewart, T. Nebabu & M. H. Mikkelsen†, "*Control of Nanoscale Hear Generation with Lithography-Free Metasurface Absorbers*," **Nano Letters** 22, 13, 5151-5157 (2022)
9. A. M. Boyce, J. W. Stewart, J. Avila, Q. Shen, S. Zhang, V. D. Wheeler & M. H. Mikkelsen†, "*Actively Tunable Metasurfaces via Plasmonic Nanogap Cavities with sub-10 nm VO_2 Films,*" **Nano Letters** 22, 9, 3525-3531 (2022)
10. H. Kishida & M. H. Mikkelsen†, "*Ultrafast Lifetime and Bright Emission from Graphene Quantum Dots Using Plasmonic Nanogap Cavities,*" **Nano Letters** 22, 3, 904–910 (2022)
11. A. J. Traverso*, J. Huang*, T. Peyronel, G. Yang, T. G. Tiecke & M. H. Mikkelsen†, "*Low-loss plasmonic metasurface for ultrafast optoelectronics*," **Optica** 8, 202-207 (2021)
12. C. M. Fontes, B. D. Lipes, J. Liu, K. N. Agans, A. Yan, P. Shi, D. F. Cruz, G. Kelly, K. M. Luginbuhl, D. Y. Joh, S. L. Foster, J. Heggestad, A. Hucknall, M. H. Mikkelsen, C. F. Pieper, R. W. Horstmeyer, T. W. Geisbert, M. D. Gunn, A. Chilkoti, "*Ultra-Sensitive Point-of-Care Immunoassay for Secreted Glycoprotein Detects Ebola Infection Earlier than PCR*", **Science Translational Medicine** 13, 588 (2021)

13. Q. Shen, A. Shams-Ansari, A. M. Boyce, N. C.Wilson, T. Cai, M. Loncar & M. H. Mikkelsen† "*A metasurface-based diamond frequency converter using plasmonic nanogap resonators*," **Nanophotonics** 10 (1), 589-595 (2021)
14. J. W. Stewart, N. C. Wilson & M. H. Mikkelsen†, "*Nanophotonic Engineering: A New Paradigm for Spectrally Sensitive Thermal Photodetectors*", **ACS Photonics** 8 (1), 71-84 (2021)
15. Q. Shen, W. Jin, G. Yang, A. W. Rodriguez & M. H. Mikkelsen†, "*Active control of multiple, simultaneous nonlinear optical processes in plasmonic nanogap cavities*", **ACS Photonics** 7 (4), 901-907 (2020)
16. D. F. Cruz, C. M. Fontes, D. Semeniak, J. Huang, A. Hucknall, A. Chilkoti & M. H. Mikkelsen†, "*Ultrabright Fluorescence Readout of a Point-of-Care Immunoassay using Plasmonic Metasurfaces*," **Nano Letters** 20 (6), 4330-4336 (2020)
17. J. W. Stewart, J. H. Vella, W. Li, S. Fan & M. H. Mikkelsen†, "*Ultrafast pyroelectric photodetection with on-chip spectral filters*", **Nature Materials** 19, 158-162 (2020)
18. G. Yang, Q. Shen, Y. Niu, H. Wei, B. Bai†, M. H. Mikkelsen† & H.-B. Sun "*Unidirectional, Ultrafast, and Bright Spontaneous Emission Source Enabled By a Hybrid Plasmonic Nanoantenna*", **Laser & Photonics Reviews** 1900213 (2020)
19. Q. Shen, A. M. Boyce, G. Yang & M. H. Mikkelsen†, "*Polarization-Controlled Nanogap Cavity with Dual-Band and Spatially Overlapped Resonances*", **ACS Photonics** 6 (8), 1916-1921 (2019)
20. J. J. Baumberg, J. Aizpurua, M. H. Mikkelsen & D. R. Smith, "*Extreme nanophotonics in ultrathin metallic junctions*," **Nature Materials** 18, 668-678 (2019)
21. J. Huang*, A. J. Traverso*, G. Yang, M. H. Mikkelsen†, "*Real-Time Tunable Strong Coupling: From Individual Nanocavities to Metasurfaces*," **ACS Photonics** 6 (4), 838-843 (2019)
22. W. M. Wilson, J. W. Stewart & M. H. Mikkelsen†, "*Surpassing Single Line Width Active Tuning with Photochromic Molecules Coupled to Plasmonic Nanoantennas*," **Nano Letters** 18, 853–858 (2018)
23. J. Huang, G. M. Akselrod, T. Ming & J. Kong & M. H. Mikkelsen†, "*Tailored emission spectrum of 2D semiconductors using plasmonic nanocavities,*" **ACS Photonics** 5, 552–558 (2018), selected as "*ACS Editors' Choice*"
24. Q. Shen, T. B. Hoang, G. Yang, V. D. Wheeler & M. H. Mikkelsen†, "*Probing the origin of highly-efficient third harmonic generation in plasmonic nanogaps,*" **Optics Express** 26, 20718-20725 (2018)
25. T. B. Hoang, G. M. Akselrod, A. Yang, T. W. Odom, and M. H. Mikkelsen†, "*Millimeter-Scale Spatial Coherence from a Plasmon Laser,*" **Nano Letters** 17, 6690–6695 (2017)
26. M. E. Sykes, J. W. Stewart, G. M. Akselrod, X.-T. Kong, Z. Wang, D. J. Gosztola, A. B. F. Martinson, D. Rosenmann, M. H. Mikkelsen†, A. O. Govorov† & G. P. Wiederrecht†, "*Enhanced generation and anisotropic Coulomb scattering of hot electrons in an ultra-broadband plasmonic nanopatch metasurface,*" **Nature Communications** 8, 986 (2017)
27. G. M. Akselrod & M. H. Mikkelsen, "*Controlled Radiative Dynamics Using Plasmonic Nanocavities*" (book chapter) in *Handbook of Metamaterials and Plasmonics* (ed O. Hess and S. A. Maier), World Scientific Publishing Co. (2017)

28. J. Huang, T. B. Hoang, T. Ming, J. Kong & M. H. Mikkelsen†, "*Temporal and spatial valley dynamics in two-dimensional semiconductors probed via Kerr rotation,*" **Physical Review B** 95, 075428, (2017)
29. J. W. Stewart, G. M. Akselrod, D. R. Smith & M. H. Mikkelsen†, "*Toward Multispectral Imaging with Colloidal Metasurface Pixels,*" **Advanced Materials** 29, 1602971 (2017), back cover article
30. G. M. Akselrod, D. R. Smith & M. H. Mikkelsen†, "*Controlled and enhanced fluorescence using plasmonic nanocavities*" (book chapter) in *Surface Plasmon Enhanced, Coupled and Controlled Fluorescence* (ed C. D. Geddes), John Wiley & Sons, Inc., Hoboken, NJ, USA, (2017)
31. G. M. Akselrod, M. C. Weidman, Y. Li, C. Argyropoulos, W. A. Tisdale & M. H. Mikkelsen†, "*Efficient nanosecond photoluminescence from infrared PbS quantum dots coupled to plasmonic nanoantennas,*" **ACS Photonics** 3, 1741–1746 (2016)
32. T. B. Hoang*, G.M. Akselrod* & M. H. Mikkelsen†, "*Ultrafast single photon emission from a quantum dot coupled to a plasmonic nanocavity,*" **Nano Letters** 16, 270 (2016)
33. T. B. Hoang & M. H. Mikkelsen†, "*Broad electrical tuning of plasmonic nanoantennas at visible frequencies,*" **Applied Physics Letters** 108, 183107 (2016)
34. W. Ge, T. B. Hoang, M. H. Mikkelsen, A. D. Stiff-Roberts, "*RIR MAPLE deposition of plasmonic silver nanoparticles,*" **Applied Physics A** 122, 824 (2016)
35. J. Huang, T. B. Hoang & M. H. Mikkelsen†, "*Probing the origin of excitonic states in monolayer WSe_2,*" **Scientific Reports** 6, 22414 (2016)
36. T. B. Hoang, J. Huang & M. H. Mikkelsen†, "*Colloidal synthesis of nanopatch antennas for applications in plasmonics and nanophotonics,*" **Journal of Visualized Experiments**, 111, e53876 (2016)
37. G. M. Akselrod, J. Huang, T. B. Hoang, P. T. Bowen, L. Su, D. R. Smith & M. H. Mikkelsen†, **"***Large-area metasurface perfect absorbers from visible to near infrared,*" **Advanced Materials**, 27, 7897 (2015), front cover article
38. T. B. Hoang*, G. M. Akselrod*, C. Argyropoulos, J. Huang, D. R. Smith & M. H. Mikkelsen†, "*Ultrafast spontaneous emission source using plasmonic nanoantennas,*" **Nature Communications** 6, 7788 (2015)
39. G. M. Akselrod, T. Ming, C. Argyropoulos, T. B. Hoang, Y. Lin, X. Ling, D. R. Smith, J. Kong & M. H. Mikkelsen†, "*Leveraging Nanocavity Harmonics for Control of Optical Processes in 2D Semiconductors,*" **Nano Letters** 15, 3578 (2015)
40. A. Baron, T. B. Hoang, C. Fang, M. H. Mikkelsen & D. R. Smith, "*Ultrafast self-action of surface plasmon polaritons at an air/metal interface,"* **Physical Review B** 91, 195412 (2015)
41. A. Yang, T. B. Hoang, M. Dridi, C. Deeb, M. H. Mikkelsen, G. C. Schatz & T. W. Odom, "*Real-time Tunable Lasing from Plasmonic Nanocavity Arrays,*" **Nature Communications,** 6, 6939 (2015)
42. G. M. Akselrod, C. Argyropoulos, T. B. Hoang, C. Ciracì, C. Fang, J. Huang, D. R. Smith & M. H. Mikkelsen†, "*Probing the mechanisms of large Purcell enhancement in plasmonic nanoantennas,*" **Nature Photonics** 8, 835 (2014)

43. A. Rose, T. B. Hoang, F. McGuire, J. J. Mock, C. Ciraci, D. R. Smith & M. H. Mikkelsen†, *"Control of radiative processes using tunable plasmonic nanopatch antennas,"* **Nano Letters** 14, 4797 (2014)
44. J. B. Lassiter, X. Chen, X. Liu, C. Ciracì, T. B. Hoang, S. Larouche, S.-H. Oh, M. H. Mikkelsen & D. R. Smith, "*Third-Harmonic Generation Enhancement by Film-Coupled Plasmonic Stripe Resonators,*" **ACS Photonics** 1, 1212 (2014)
45. P. Kolchin*, N. Pholchai*, M. H. Mikkelsen*, J. Oh, S. Ota, M. S. Islam, X. Yin, and X. Zhang, "*High Purcell Factor Due to Coupling of a Single Emitter to a Dielectric Slot Waveguide,*" **Nano Letters** 15, 464 (2015)
46. T. Zentgraf*****, Y. Liu*, M. H. Mikkelsen*, J. Valentine & X. Zhang, "*Plasmonic Luneburg and Eaton lenses,*" **Nature Nanotechnology** 6, 151 (2011)
47. M. H. Mikkelsen, J. Berezovsky & D. D. Awschalom, "Ultrafast optical manipulation of single electron spins in quantum dots," invited article, **Solid State Communications** 149, 1451, (2009)
48. J. Berezovsky*, M. H. Mikkelsen*, N. G. Stoltz, L. A. Coldren & D. D. Awschalom, "*Picosecond coherent optical manipulation of a single electron spin in a quantum dot,*" **Science** 320, 349 (2008), cover article
49. R. C. Myers, M. H. Mikkelsen, J.-M. Tang, A. C. Gossard, M. E. Flatté & D. D. Awschalom, "*Zero-field optical manipulation of magnetic ions in semiconductors,*" **Nature Materials** 7, 203 (2008)
50. M. H. Mikkelsen, R. C. Myers, G. D. Fuchs & D. D. Awschalom, "*Single spin coherence in semiconductors,*" (book chapter) in Spintronics, **Elsevier**, pp. 1 – 44 (2008)
51. M. H. Mikkelsen, J. Berezovsky, N. G. Stoltz, L. A. Coldren & D. D. Awschalom, "*Optically detected coherent spin dynamics of a single electron in a quantum dot,"* **Nature Physics** 3, 770 (2007)
52. J. Berezovsky, M. H. Mikkelsen, O. Gywat, N. G. Stoltz, L. A. Coldren & D. D. Awschalom, "*Nondestructive optical measurements of a single electron spin in a quantum dot,*" **Science** 314**,** 1916 (2006)

Patents

1. J. Stewart & M.H. Mikkelsen, "*High Speed and Spectrally Selective Pyroelectric Detectors with Plasmonic Structures and Methods of Making and Using Same,*" US 16/894,692 (2020)
2. G. M. Akselrod, R. A. Hyde, M. Y. Ishikawa, J. T. Kare, M. H. Mikkelsen, T. S. Pan, D. R. Smith, C. T. Tegreene, Y. A. Urzhumov, C. Whitmer, L. L. Wood, Jr., V. Y. H. Wood, "*Magnetic plasmonic nanoparticle positioned on a magnetic plasmonic substrate,*" US 14/853,370 (2017)
3. G. M. Akselrod, R. A. Hyde, M. Y. Ishikawa, J. T. Kare, M. H. Mikkelsen, T. S. Pan, D. R. Smith, C. T. Tegreene, Y. A. Urzhumov, C. Whitmer, L. L. Wood, Jr., V. Y. H. Wood, "*Magnetic plasmonic nanoparticle dimer,*" US 14/853,410 (2017)
4. G. M. Akselrod, R. A. Hyde, M. Y. Ishikawa, J. T. Kare, M. H. Mikkelsen, T. S. Pan, D. R. Smith, C. T. Tegreene, Y. A. Urzhumov, C. Whitmer, L. L. Wood, Jr., V. Y. H. Wood, "*Enhanced photoluminescence from plasmonic apparatus with two resonant cavity wavelengths,*" US 15/434,914 (2017)

5. G. M. Akselrod, R. A. Hyde, M. Y. Ishikawa, J. T. Kare, M. H. Mikkelsen, T. S. Pan, D. R. Smith, C. T. Tegreene, Y. A. Urzhumov, C. Whitmer, L. L. Wood, Jr., V. Y. H. Wood, "*Enhanced photoluminescence,*" US 15/193,282 (2017)
6. M. H. Mikkelsen, D. R. Smith & G. M. Akselrod, "*Nanopatch Antennas and Related Methods for Tailoring the Properties of Optical Materials and Metasurfaces,*" PCT/US15/55033 (2015) [**licensed**]

Invited Talks

1. "*Quantum Photonics with Single Colloidal Nanoparticles*", Noble Metal Nanoparticles Gordon Research Conference (GRC), South Hadley, MA, June 20, 2024
2. "*Plasmonic Nanocavities for Ultrafast Single Photon Sources in the Telecom*", CLEO, Charlotte, NC, May 7, 2024
3. "*Ultrafast Pyroelectric Detectors with on-chip polarization and spectral filters*," Optica Imaging Congress, Boston, MA (virtual), August 16, 2023
4. "*Strong Coupling with Nanogap Cavities*," Strong Coupling with Organic Molecules Conference 2023 (SCOM 23), La Jolla, CA, June 19, 2023
5. "*Extreme Photonics with Nanogap Cavities: From Ultrafast Single Photon Sources to Biosensors*", University of North Carolina at Chapel Hill (UNC) Physics colloquium, Chapel Hill, NC, April 17, 2023
6. "*Extreme Photonics with Nanogap Cavities*," Fitzpatrick Institute for Photonics Annual symposia, Durham, NC, March 13, 2023
7. "*Control of Nanoscale Heat Generation and Applications for Ultrafast Detectors*," Physics of Quantum Electronics (PQE), Snowbird, UT, January 12, 2023
8. "*Control of Nanoscale Heat Generation and Applications for Ultrafast Detectors*", MRS Fall Meeting, Boston, MA (virtual), December 6, 2022
9. "*Control of Nanoscale Heat Generation for Spectrally-Selective Thermal Photodetectors*", IEEE Photonics Conference (IPC), Vancouver, Canada, November 15, 2022
10. "*Applications of metasurfaces: From multispectral imaging to optical communications and biosensing*", Presentation to the Chief of Staff of the Air Force, General Brown, Duke University, September 1, 2022
11. "*Ultrafast Spectrally-Selective Photodetection with Plasmonic Metasurfaces*," METAMATERIALS –15th International Congress on Artificial Materials for Novel Wave Phenomena, New York, USA, September 22, 2021
12. "*Light Emitting and Absorbing Metasurfaces: From Multispectral Imaging to Optical Communications and Biosensing*" The Center for Integrated Nanotechnologies (CINT) Annual Meeting (Virtual), September 22, 2021
13. "*3D Nanogap Cavities for Extreme Light-Matter Behavior*", 3D Nano Assembly for Photonics Workshop (ARO), Caltech, September 13, 2021
14. "*Ultrafast spectrally-selective photodetection with plasmonic metasurfaces*," SPIE Optics + Photonics, San Diego, CA – remote, August 1, 2021

15. "*Metasurfaces for Ultrafast Pyroelectric Photodetectors*," OSA Advanced Photonics – virtual, July 29, 2021
16. "*Applications of metasurfaces: From multispectral imaging to optical communications and biosensing*," META 2021, Warsaw, Poland, July 22, 2021 – Virtual format (Plenary talk)
17. "*High-speed Spectrally Selective Photodetection with Metasurfaces*," CLEO – virtual, May 12, 2021
18. "*Extreme Photonics with Nanogap Cavities*," Dept. of Chemical Engineering and Materials Science Seminar, University of Minnesota, March 23, 2021
19. "*Nanogap Plasmonics for Tailored Properties of quantum emitters and 2D Materials*," APS March Meeting 2021 – Virtual, March 15, 2021
20. "*Atomic-scale Engineering for Ultrafast Optoelectronics*", ACS Photonics Young Investigator Award Lecture, ACS Global Webinar Series, December 9, 2020
21. "*Extreme Photonics with Nanogap Cavities*", Max Planck Lecture, Max Planck Institute for the Structure and Dynamics of Matter, November 25, 2020
22. "*Atomic-scale Engineering for On-chip Photonic Devices*", University of Southern California, Los Angeles, CA, February 28, 2020
23. "*Ultrafast Photodetection with Plasmonic Metasurfaces*", Photonics West, San Francisco, CA, February 5, 2020
24. "*Extreme nanophotonics from ultrathin metallic gaps*", PhD Summer School, University of Southern Denmark, Odense, Denmark, May 24, 2019
25. "*Realizing new quantum materials by sculpting electromagnetic fields on the atomic scale*," Columbia University, Applied Physics Seminar, New York City, New York, April 23, 2019
26. "*New quantum materials: Sculpting electromagnetic fields on the atomic scale*," Delft University of Technology, Department of Quantum Nanoscience Seminar, Delft, The Netherlands, April 11, 2019
27. "*New designer materials: Sculpting electromagnetic fields on the atomic scale*," City University of New York, Seminar, Advanced Science Research Center New York, March 7, 2019
28. "*New designer materials: Sculpting electromagnetic fields on the atomic scale*," University of Pennsylvania, Electrical & Systems Engineering Seminar, Philadelphia, PA, February 26, 2019
29. "*New designer materials: Sculpting electromagnetic fields on the atomic scale*," Rice, Electrical & Computer Engineering Seminar, Houston, TX, February 21, 2019
30. "*Plasmonic metasurfaces for high-speed thermal photodetection*," Photonics West, San Francisco, CA, February 6, 2019
31. "*New designer materials: Sculpting electromagnetic fields on the atomic scale*," Caltech, Materials Science Seminar, Pasadena, CA, January 31, 2019
32. "*Tailored light-matter interactions for high-speed thermal photodetectors and ultrafast spontaneous emission*," Spectra-Physics seminar, Santa Clara, CA, January 25, 2019
33. "*Plasmonic nanogap cavities for enhanced fluorescence-based bio sensing*," 49th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 7, 2019

34. "*New designer materials: Sculpting electromagnetic fields on the atomic scale,*" Optics & Electronics Seminar, Stanford University, Stanford, CA, November 26, 2018
35. "*Extreme Nanophotonics from Ultrathin Metallic Junctions,*" AVS 65th International Symposium & Exhibition, Long Beach, CA, October 25, 2018
36. "*Designer Materials: Leveraging ultrathin metallic junctions,*" Applied Physics Colloquium, Harvard, Cambridge, MA, October 19, 2018
37. "*Quantum Nanophotonics from Ultrathin Metallic Junctions,*" Physics Colloquium, University of Colorado Boulder, Boulder, CA, September 26, 2018
38. "*Nanogap Plasmonics: Dynamic Tuning, Perfect Absorbers & Photodetection,*" Metamaterials – 12th International Congress, Espoo, Finland, August 30, 2018
39. "*2017 Maria Goeppert Mayer Award Talk: Quantum Nanophotonics,*" 49th Annual APS Division of Atomic, Molecular & Optical Physics (DAMOP) Meeting, May 29, 2018, Lauderdale, FL, *plenary talk*
40. "*Plasmonic nanocavities for ultrafast photonics,*" SPIE Defense + Security, Orlando, FL, 15 - 19 April 2018
41. "*Extreme nanophotonics from ultrathin metallic junctions,*" Quantum Science and Technology Seminar, ETH Zürich, Switzerland, March 26, 2018
42. "*Ultra-small Plasmonic Cavities for Tailored Light-Matter Interactions,*" Fitzpatrick Institute for Photonics, 2018 Symposium, Durham, NC, March 13, 2018
43. "*Extreme nanophotonics from ultrathin metallic junctions,*" Materials Science Colloquium, Stanford, CA, March 3, 2018
44. "*Tailored emission of quantum dots and 2D materials using plasmonic nanocavities*," Physics of Quantum Electronics (PQE), Snowbird, UT, January 8, 2018
45. "*Ultra-small Plasmonic Cavities for Tailored Light-Matter Interactions*," Seminar, University of Southern Denmark, Odense, Denmark, November 13, 2017
46. "*Hybrid Nanomaterials for Tailored Light-Matter Interactions*," Seminar, Lund University, Lund, Sweden, November 10, 2017
47. "*Tailored emission of two-dimensional semiconductors*," Center for Nanostructured Graphene at the Technical University of Denmark Workshop, Helsingør, Denmark, November 8, 2017
48. "*Hybrid Nanomaterials for Tailored Light-Matter Interactions,*" Seminar, Purdue University, West Lafayette, IN, October 23, 2017
49. "*Molecular scale plasmonics,*" Summer School On Plasmonics 4, Porquerolles, France, September 7, 2017
50. "*Plasmonic pixels and colors using silver nanocubes*", International Conference on Enhanced Spectroscopies (ICES), Munich, Germany, September 5, 2017
51. "*Large-scale plasmonic pixels and combinatorial colors*", 2017 International Conference on Optical MEMS and Nanophotonics (OMN2017), Santa Fe, NM, August 15, 2017
52. "*Ultrafast spontaneous emission from single quantum dots coupled to plasmonic nanocavities*", SPIE Optics + Photonics, San Diego, CA, August 7, 2017

53. "*Film-Coupled Nanocubes: From Ultrafast Spontaneous Emission to Perfect Absorbers*", American Chemical Society (ACS) National Meeting, San Francisco, CA, April 5 2017 (presented by graduate student Jon Stewart)
54. "*Ultrafast single photon sources and enhanced nonlinear generation using plasmonic nanocavities*", Quantum Nanophotonics, Benasque, Spain, March 3, 2017 (presented by postdoc Andrew Traverso)
55. "*Hybrid Molecular-Scale Materials for Tailored Light-Matter Interactions*", Seminar, Tsinghua University, Beijing, China, October 14, 2016
56. "*Tailored and reconfigurable optical properties using plasmonics,*" SPIE/COS Photonics Asia 2016, Beijing, China, October 13, 2016
57. "*Control of radiative processes of quantum dots using colloidal silver nanoparticles,*" NC Photochem 2016 symposium, Raleigh, NC, October 1, 2016
58. "*Ultrafast single photon source using plasmonics,*" Single Photons Single Spins (SPSS) workshop, Oxford, UK, September 13, 2016.
59. "*Ultrafast light sources: Spontaneous and stimulated emission,*" OSA Incubator on the Science and Application of Nanolasers, Washington, DC, September 8, 2016
60. "*Plasmonic colloidal nanoparticles: Gateway to extreme radiative decay engineering,*" American Chemical Society (ACS) National Meeting, Philadelphia, PA, August 24, 2016
61. "*Hybrid Molecular-Scale Materials for Tailored Light-Matter Interactions,*" Physics Seminar, University of Sydney, Sydney, Australia, August 15, 2016
62. "*Hybrid Molecular-Scale Materials: From Ultrafast Spontaneous Emission to Perfect Absorbers,*" Seminar, Department of Physics, Imperial College London, London, U.K., July 22, 2016
63. "*Radiative decay engineering using optical antennas,*" 12th Conference on Photonic and Electromagnetic Crystal Structures (PECS-XII), York, UK, July 20, 2016
64. "*Extreme radiative decay engineering using nanopacth antennas,*" 2016 Gordon Research Conference on Plasmonics and Nanophotonics, Sunday River Resort, Newry, ME, July 10-15, 2016
65. "*Hybrid Molecular-Scale Materials: From Ultrafast Spontaneous Emission to Perfect Absorbers,*" 2016 Young Investigator Research Program (YIP) Annual Meeting, Air Force Office of Scientific Research, Arlington, VA, June 20-24, 2016
66. "*Large Purcell enhancement: From dye molecules to single quantum dots,*" Plasmonics Workshop, Center for Metamaterials and Integrated Plasmonics, Duke University, Durham, NC, June 14-15, 2016
67. "*Hybrid Molecular-Scale Materials*", Department of Chemistry Seminar, Duke University, April 12, 2016
68. "*Plasmonics: Fine-tuning the interaction between light and matter,*" Invited Lecture, Plasmonics and Its Applications, nanoBIO NODE, Workshop Series, Renewable and Sustainable Energy Institute, University of Colorado Boulder, March 22, 2016
69. "*Hybrid Molecular-Scale Materials,*" Invited Lecture, Plasmonics and Its Applications, nanoBIO NODE, Workshop Series, Renewable and Sustainable Energy Institute, University of Colorado Boulder, March 21, 2016

70. "*Control of radiative processes of quantum dots and 2D materials using plasmonics,*" Winter School of the Nanosystems Initiative Munich (NIM), Invited Lecture, Kirchberg, Austria, March 15, 2016
71. "*Control of radiative processes of quantum dots and 2D materials using plasmonics,*" Nanolight 2016 Winter School, Invited Lecture, Benasque, Spain, March 10, 2016
72. "*Tailored radiative processes of quantum dots and 2D materials,*" Condensed Matter seminar, Case Western Reserve University, Cleveland, OH, February 29, 2016
73. "*Plasmonics for tailored radiative processes of quantum dots and 2D materials,*" U.S. Naval Research Laboratory, Invited Research Seminar, Washington, DC, February 25, 2016
74. "*Ultrafast and directional spontaneous emission,*" Invited Research Seminar, Connectivity Lab at Facebook, Menlo Park, CA, February 19, 2016
75. "*Ultrafast spontaneous emission from semiconductor quantum dots coupled to plasmonic nanoantennas,*" Photonics West, San Francisco, CA, February 18, 2016
76. "*Tailored radiative processes of quantum dots and 2D materials,*" Virginia Polytechnic Institute and State University, Condensed Matter seminar, Department of Physics, February 8, 2016
77. "*Tailored radiative processes of quantum dots and 2D materials,*" University of Washington, Electrical Engineering Colloquium, Seattle, WA, February 2, 2016
78. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities,*" University of Texas at Austin, Center for Nano- and Molecular Science seminar, Austin, TX, January 20, 2016
79. "*A plasmonic platform for tailored radiative properties of quantum dots and 2D semiconductors,*" Southeast Ultrafast conference, North Carolina State University, Raleigh, NC, January 14, 2016
80. "*Spatial and temporal coherence properties of tunable lattice plasmon lasers,*" 46th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 4, 2016
81. "*Ultrafast Spontaneous Emission from Quantum Dots Using Plasmonic Nanoantennas,*" Materials Research Society's (MRS) Fall Meeting, Boston, MA, December 4, 2015
82. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities,*" Caltech, Materials Research Lecture Seminar, Pasadena, CA, November 18, 2015
83. "*Strongly Enhanced Light-Matter Interactions using Colloidally Synthesized Plasmonic Nanocavities,*" Frontiers in Optics and Laser Science Conference, San Jose, CA, October 22, 2015
84. "*Ultrafast single photon emission from quantum dots coupled to plasmonic nanocavities,*" Quantum Information on a Chip, NSF sponsored workshop, Universita Degli Studi di Padova, Padua, Italy, October 13, 2015
85. "*Film-coupled plasmonic stripe resonators for enhanced third-harmonic generation,*" OSA Nonlinear Metamaterials Incubator, Washington, DC, October 2, 2015
86. "*Fluorescence enhancement and control using plasmonics,*" Wright-Patterson Air Force Base, Invited Seminar, Dayton, Ohio, September 29, 2015
87. "*Ultrafast spontaneous emission source using plasmonic nanoantennas,*" Technical University of Denmark (DTU), Invited Lecture, Lyngby, Denmark, September 21, 2015

88. "*Emission rate control with plasmonic nanoantennas,*" Ninth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics – Metamaterials 2015, Oxford, United Kingdom, September 8, 2015
89. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities,*" META'15 - The 6th International Conference on Metamaterials, Photonic Crystals and Plasmonics, City College of New York, New York City, NY, August 5, 2015
90. "*Control of Radiative Processes using Colloidally Synthesized Plasmonic Nanocavities,*" Metamaterials Science & Technology Workshop, San Diego, CA, July 22, 2015
91. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities,*" Nanoscience & Technology Division Colloquium, Argonne National Laboratory, Lemont, IL, July 8, 2015
92. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities,*" Niels Bohr Institute, University of Copenhagen, Quantum Optics Seminar, Copenhagen, Denmark, June 23, 2015
93. "*Radiative Decay Engineering Using Plasmonic Nanostructures,*" 2015 Young Investigator Research Program (YIP) Annual Meeting, Air Force Office of Scientific Research, Arlington, VA, June 16, 2015
94. "*Radiative Decay Engineering Using Plasmonic Nanostructures,*" CMOS Emerging Technologies Research Symposium, Vancouver, Canada, May 20, 2015
95. "*Strongly Enhanced Light-Matter Interactions using Colloidally Synthesized Plasmonic Nanocavities,*" Harvard University, Electrical Engineering Seminar, Boston, MA, May 1, 2015
96. "*Large spontaneous emission rate enhancement in directional and efficient plasmonic nanoantennas,*" Materials Research Society's (MRS) Spring Meeting, San Francisco, CA, April 9, 2015
97. "*Artificially structured materials for tailored optical properties,*" University of Michigan, Department of Physics, AMO/CM Seminar, Ann Arbor, MI, March 31, 2015
98. "*Artificially structured materials for tailored optical properties,*" Assistant Secretary of Defense for Research and Engineering, ASD(R&E), Basic Research Forum Colloquium, Arlington, VA, January 29, 2015
99. "*Control of Radiative Processes Using Tunable Plasmonic Nanoantennas,*" Southeast Ultrafast Conference, Tallahassee, FL, January 16, 2015
100. "*Tunable light-matter interactions in a solid-state platform,*" 45th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 6, 2015
101. "*Film-Coupled Nanocubes for Enhancing Photodynamic and Nonlinear Processes,*" 45th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 6, 2015
102. "*Opportunities with Optical Metamaterials,*" Materials Research Society's (MRS) Fall Meeting, Boston, MA, December 3, 2014
103. "*On-demand optical properties of quantum emitters using plasmonic nanoantennas,*" IEEE Photonics Conference (IPC), San Diego, CA, October 15, 2014
104. "*Control of Radiative Processes Using Tunable Plasmonic Nanopatch Antennas,*" Los Alamos National Laboratory, Los Alamos, NM, September 19, 2014

105. "*Large enhancements of fluorescence and spontaneous emission using a tunable plasmonic platform,*" Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA, June 16, 2014

106. "*Manipulating Light with MesoPhotonic Metamaterials,*" Mesoscale Science Frontiers, 34th Annual Center for Nonlinear Studies Annual Conference, Santa Fe, NM, May 16, 2014

107. "*Single Quantum Dots as Building Blocks for Quantum Information Applications,*" New Faculty Lecture series, Pratt School of Engineering, Duke University, Durham, NC, April 26, 2013

108. "*Single Quantum Dots as Building Blocks for Quantum Information Applications,*" Condensed, Matter Seminar, Department of Physics, North Carolina State University, Raleigh, NC, April 23, 2013

109. "*Enhanced light-matter interactions of a single emitter coupled to a slot waveguide,*" Fitzpatrick Institute for Photonics Annual Meeting, Durham, NC, March 12, 2013

110. "*Plasmonics and enhanced light-matter interactions of a single emitter,*" University of North Carolina Wilmington, Department of Physics, Wilmington, NC, February 8, 2013

111. "*Single quantum dots as building blocks for quantum information applications,*" The 16th Annual Southeast Ultrafast Conference, Georgia Institute of Technology, Atlanta, GA, January 11, 2013

112. "*Plasmonics and enhanced light-matter interactions of a single emitter,*" Optics and Photonics Seminar Series, Duke University, Durham, NC, October 31, 2012

113. "*Spintronics & Nanophotonics for Quantum Information Science,*" Annual Meeting of the Danish Physical Society, Nyborg, Denmark, June 19, 2012

114. "*Spintronics & Nanophotonics for Quantum Information Science,*" Delft University of Technology, Department of Quantum Nanoscience, Delft, the Netherlands, March 26, 2012

115. "*Spintronics & Nanophotonics for Quantum Information Science,*" Duke University, Department of Electrical and Computer Engineering, Durham, NC, March 13, 2012

116. "*Spintronics & Nanophotonics for Quantum Information Science,*" University of Massachusetts Amherst, Department of Physics, Amherst, MA, March 6, 2012

117. "*Spintronics & Nanophotonics for Quantum Information Science,*" University of Oregon, Department of Physics, Eugene, OR, February 23, 2012

118. "*Spintronics & Nanophotonics for Quantum Information Science,*" MIT, Department of Physics, Chez Pierre Condensed Matter Physics Seminar Series, Boston, MA, February 21, 2012

119. "*Spintronics & Nanophotonics for Quantum Information Science,*" Washington University in St. Louis, Department of Physics, St. Louis, MO, February 15, 2012

120. "*Spintronics & Nanophotonics for Quantum Information Science,*" University of Utah, Department of Physics, Salt Lake City, UT, February 8, 2012

121. "*Spintronics & Nanophotonics for Quantum Information Science,*" University of Waterloo, Department of Physics and Institute for Quantum Computing, Waterloo, Canada, February 2, 2012

122. "*Spintronics & Nanophotonics for Quantum Information Science,*" ICFO, Institute of Photonic Sciences, Barcelona, Spain, January 17, 2012

123. "*Spintronics & Nanophotonics for Quantum Information Science,*" FOM Institute AMOLF, Amsterdam, the Netherlands, December 22, 2011

124. "*Spintronics & Nanophotonics for Quantum Information Science,*" University College London, Department of Physics, London, United Kingdom, November 22, 2011

125. "*Single quantum dots as building blocks for quantum information applications,*" University of Stuttgart, Department of Physics, Stuttgart, Germany, November 10, 2011

126. "*Ultrafast coherent control of a single electron spin in a quantum dot,*" March Meeting of the American Physical Society, Pittsburgh, PA, March 18, 2009

127. "*Manipulating single electron spins and coherence in a quantum dot,*" (plenary presentation), Conference on Excitonic Processes in Condensed Matter, Kyoto, Japan, June 23, 2008

128. "*Manipulating single electron spins and coherence in a quantum dot,*" Meeting of the APS Division of Atomic, Molecular, and Optical Physics, State College, PA, May 30, 2008

129. "*Optical detection and manipulation of single spin coherence in a quantum dot,*" SPIE Photonics West, San Jose, CA, January 24, 2008

130. "*Time-resolved measurements of single electron spin coherence in a quantum dot,*" Materials Research Society's Fall Meeting, Boston, MA, November 26, 2007

Students and Postdocs Supervised

Postdocs

Rachel Bangle, 05/2021 – present

Rahmatollah Eskandari, 08/2019 – 06/2021 (*Fab. Process Engineer, Nuvotronics*)

Tao Cai, 03/2018 – 04/2019 *(Optical Sensing HW Engineer, Apple)*

Andrew Traverso, 03/2016 – present *(Co-founder and Senior Scientist, Neurophos)*

Jiani Huang, 09/2017 – 05/2018 *(System Application Engineer, Marvell Technology)*

Gleb M. Akselrod, 09/2013 – 09/2016 *(CTO & Founder, Lumotive)*

Thang B. Hoang, 03/2013 – 08/2016 *(Associate Professor of Physics and Materials Science, University. of Memphis)*

PhD Students

Benjamin King (ECE), 08/2023 – present

Rahul Banerjee (ECE), 08/2023 – present

Deniz Acil (ECE), 08/2021 – present

Hengming Li (ECE), 08/2020 – present

Eunso Shin (ECE), 08/2020 – present

Siyuan Zhang (ECE), 08/2020 – present

Nathan Wilson (Physics), 08/2017 – 08/2023
Dissertation: *"Plasmonics for On-Chip Photodetectors and Light Sources"*

Andrew Boyce (ECE), 06/2016 – 06/2022
Dissertation: "*Control of Optical Processes in Diamond using Plasmonic Metasurfaces*"

Qixin Shen (Physics), 11/2014 – 08/2020
Dissertation: "*Manipulation of Nonlinear Optical Processes in Plasmonic Nanogap Cavities*"

Wade Wilson (ECE), 05/2016 – 07/2020
Dissertation: "Actively Tunable Plasmonic Nanostructures"

Jon Stewart (ECE), 07/2015 – 05/2020
Dissertation: "*Plasmonic Metasurfaces for Enhanced Pyroelectric Photodetection*"

Daniela Cruz (BME), 06/2015 – 05/2020
Dissertation: "*Enhancement of Fluorescence-Based Immunoassay for Point-of-Care Testing Using the Plasmonic Nanopatch Metasurface*"

Jiani Huang (Physics), 08/2012 – 09/2017
Dissertation: "*Valley Dynamics and Tailored Light-matter Interaction in Two-dimensional Transition Metal Dichalcogenides*"

Mikkelsen Lab Awards and Honors

2023 Fitzpatrick Institute for Photonics Symposium, Honorable Mention Poster (Nathan Wilson)
2022 Beckman Postdoctoral Fellow Award (Rachel Bangle)
2022 NASA Shining Star Intern Award (Nathan Wilson)
2021 NSF Graduate Fellowship, (Hengming Li)
2018 2nd place poster prize, 2018 Fitzpatrick Institute for Photonics Symposium, Duke (Daniela Cruz)
2017 National Defense Science and Engineering Graduate (NDSEG) Fellowship (Jon Stewart)
2017 Fitzpatrick Foundation Scholar Award, Duke (Andrew Boyce)
2017 Most Outstanding Student Speaker of the Fitzpatrick Institute for Photonics seminar series, Duke (Jiani Huang)
2016 1st place poster prize, Southeast Ultrafast conference, North Carolina State University (Jon Stewart)
2016 1st place poster prize, 2016 Fitzpatrick Institute for Photonics Symposium, Duke (Jon Stewart)
2016 NSF Graduate Fellowship, Honorable Mention (Jon Stewart)
2016 Pratt Research Fellowship, Duke (Tamra Nebabu)
2016 Fritz London Postdoctoral Fellowship, Duke (Andrew Traverso)
2015 John T. Chambers Scholar, Fitzpatrick Institute for Photonics, Duke (Jiani Huang)
2015 Pratt-Gardner Graduate Fellowship, Duke (Jon Stewart)
2015 John T. Chambers Fellowship, Fitzpatrick Institute for Photonics, Duke (Jon Stewart)
2015 NSF Research Triangle MRSEC Graduate Fellowship (Qixin Shen)

2015 NSF Research Triangle MRSEC Graduate Fellowship (Daniela Cruz)
2015 SMIF Undergraduate User Program Award, Duke (Tamra Nebabu)
2015 SMIF Undergraduate User Program Award, Duke (Andrew Walsworth)
2014 Intelligence Communities Postdoctoral Research Fellowship (Gleb M. Akselrod)
2014 Pratt Research Fellowship, Duke (Logan Su)
2013 University Scholar Award, University Scholars Program, Duke (Tamra Nebabu)
2013 NSF Graduate Fellowship (Daniela Cruz)
2013 Nanoscience Graduate Program Fellowship, Duke (Jiani Huang)

Leadership and Service to Scientific Community

Editor and Reviewer Service

- Associate Editor of the journal *Optica* (2022 – 2024)
- Editorial Advisory Board Member of the journal *ACS Photonics* (2015 – present)
- Proposal reviewer for:
    - National Institutes of Health
    - Department of Energy
    - Air Force Office of Scientific Research
    - National Science Foundation
    - Army Research Office
    - Research Corporation for Science Advancement
    - Center for Integrated Nanotechnologies, Los Alamos and Sandia National Labs
    - *And others*
- Journal Reviewer for:
    - Science, Nature
    - Nature Photonics, Nature Nanotechnology, Nature Materials
    - Nature Communications, Nano Letters, ACS Photonics
    - Proc. Natl. Academy of Sciences, Science Advances
    - Advanced Materials, Advanced Optical Materials
    - Optica, Optics Express, Scientific Reports
    - Journal of the American Chemical Society, Small
    - *And others*

Award selection committees

- Selection committee, "*APS Maria Goeppert Mayer Award*" (2017 – 2018)
- Selection committee, "*SPIE Early Career Achievement Award*" (2018 – 2022)

Conference program committees

- Symposium co-chair, "*Molecular Devices*", MRS Spring Meeting, San Francisco, CA (2022 – present)
- Technical committee, "*Quantum Nanophotonic Materials, Devices, and Systems"* session at the SPIE Optics & Photonics conference in San Diego, CA (2017 – present)

- Technical committee, "*2D Photonic Materials and Devices*" session at the SPIE Photonics West conference in San Francisco, CA (2019 – present)
- Scientific and Technical Program Committee*, "9th International Conference on Surface Plasmon Photonics (SPP9)",* Copenhagen, Denmark 2019
- Technical committee, "*Nonlinear Nanophotonics, Plasmonics, and Metamaterials*" session at the OSA Nonlinear Photonics conference in Zurich, Switzerland, 2018

Scientific advisor

Provided scientific insight to Department of Defense and National Science Foundation regarding future strategy for "*Nanomaterials*" and "*Quantum Information Science*"

- "*3D Assembly for Photonics Workshop*", Caltech, CA (virtual), September 12-13, 2021
- "*Microscale Adaptability,*" Army Science Planning and Strategy Meeting, Aberdeen Proving Ground, Aberdeen, MD, January 11–12, 2016
- "*Workshop on Quantum Information on a Chip,*" organized by the National Science Foundation and the University of Padova, Padova, Italy, October 12–14, 2015
- Presentation for the Assistant Secretary of Defense for Research and Engineering, ASD(R&E), Basic Research Forum Colloquium: "*Artificially structured materials for tailored optical properties*," Arlington, VA, January 29, 2015
- "*Center for Distributed Quantum Systems Science Technical Workshop,*" Army Research Laboratory, Adelphi Laboratory Center, Adelphi, MD, June 27, 2014

Outreach Activities

To broaden participation of groups underrepresented in STEM fields

- Invited speaker at the workshop "*Rising Stars*" held at MIT for female graduate students and postdocs interested in pursuing academic careers (10/2018)
- Hosted "*Power Hour: Committed to inclusion and the professional development of women in science*" at the Gordon Research Conference on Plasmonics in Newry, ME (7/2016)
- Organizer and instructor for "*Females Excelling More in Math, Engineering, and Science*" (FEMMES). Outreach activities for 4-6th grade girls from ethnically and socioeconomically diverse backgrounds in Durham, NC (2014 – 2022)
- Mentor meetings with small groups of female graduate and undergraduate students during visits at universities in the United States (2014 – present)
- Participated in the "*2016-17 SPIE Women in Optics Planner*" to offer advice and encouragement to those considering a career in STEM
- "*Women in Physics Group*," Duke University, Faculty Coordinator (2012–2017). Restarted group and organized lunches, meetings with female colloquium speakers, and recruitment events for prospective graduate students
- Host of "*Women in Engineering Lunch Series*" for Duke graduate students (2017)

Mentorship and career advice activities

- Panelist, "*Expectations from the Faculty Perspective,*" Duke (2017)
- Panelist, "*DoD Proposal Writing Workshop*", Duke (2017)
- Panelist, "*Future of the Field in Academia and Industry,"* Gordon Research Seminar on Plasmonics in Newry, ME (2016)
- Panelist, "*NSF CAREER Proposal Writing Workshop*", Duke (2016)
- Panelist, "*NSF Graduate Fellowship Proposal Workshop*", Duke (2015)

Funding

1. **Title:** DURIP: Visualizing Nanoscale Dynamics of Metasurface-Enabled Optoelectronics via Co-localized Optical, Thermal, and Electrical Scanning Probe Microscopy
   Source of Support: Air Force Office of Scientific Research
   Level of Effort: N/A
   Role: PI
   Total Period of Performance: 02/01/2024 – 01/01/2025
   Total Award: $485,949

2. **Title**: MURI: Meta-imaging: Sensing, Processing and Computing with Dynamic Metasurfaces
   Source of Support: Air Force Office of Scientific Research
   Level of Effort: 2 calendar months
   Role: PI
   Total Period of Performance: 07/01/2021 – 07/01/2026
   Total Award: $7,500,000

3. **Title**: Plasmonically Enhanced Point-of-care Detection of Cardiac Biomarkers by a Smart Phone
   Source of Support: National Institutes of Health (RO1)
   Level of Effort: 2 academic months
   Role: PI
   Total Period of Performance: 02/01/2019 – 01/31/2024
   Total Award: $3,381,615

4. **Title**: On-chip, High-speed Hyperspectral Imaging using Metasurfaces for Precision Agriculture
   Source of Support: Gordon and Betty Moore Foundation (Moore Inventor Fellows Award)
   Level of Effort: 9%
   Role: PI
   Total Period of Performance: 09/01/2019 – 08/31/2022
   Total Award: $825,000

5. **Title**: Hybrid Pyroelectric-Plasmonic Photodetectors for On-chip Hyperspectral Imaging
   Source of Support: Air Force Office of Scientific Research
   Level of Effort: 1 academic month
   Role: PI
   Total Period of Performance: 07/01/2018 – 06/30/2022

Total Award: $511,140

6. **Title**: Ultrafast Spectroscopic Investigation of Enhanced and Suppressed Fluorescence from Solid State Emitters using Plasmonic Nanostructures
   Source of Support: Army Research Office (supplement to ARO YIP)
   Level of Effort: 5% (no PI salary support)
   Role: PI
   Total Period of Performance: 01/01/2018 - 12/31/2022
   Total Award: $291,262

7. **Title**: YIP: Reconfigurable Optical Properties in the Near-IR Enabled by Bottom-Up Assembly of Nanoengineered Materials
   Source of Support: Army Research Office, Young Investigator Program (YIP)
   Level of Effort: 0.5 summer month
   Role: PI
   Total Period of Performance: 08/10/16 – 12/31/2022
   Total Award: $150,000

8. **Title**: Metasurface-Based Perfect Absorbers for Robust and Adaptable Coatings
   Source of Support: Office of Naval Research Young Investigator Program
   Level of Effort: 1 academic month
   Role: PI
   Total Period of Performance: 06/01/2017 – 05/31/2022
   Total Award: $510,000

9. **Title**: Gift to support research in novel photodetectors for future applications of optical wireless communications
   Source of Support: Connectivity Lab, Facebook
   Level of Effort: 5%
   Role: PI
   Total Gift: $165,000

10. **Title**: Gift to support research in spintronics, quantum information science, nanophotonics, plasmonics, and quantum optics
    Source of Support: Connectivity Lab, Facebook
    Level of Effort: 5%
    Role: PI
    Total Gift: $50,000

11. **Title**: JSR Corporation Gift Funds
    Source of Support: JSR Corporation
    Level of Effort: 5%
    Role: PI
    Total Gift: $40,000

12. **Title**: EFRI ACQUIRE: Integrated Nanophotonic Transmitter for Quantum Communication
    Source of Support: National Science Foundation
    Level of Effort: 1 academic month

Role: Co-PI (PI: Kai-Mei Fu [University of Washington], Co-PIs: Arka Majumdar [University of Washington], Alejandro Rodriguez [Princeton])
Total Period of Performance: 09/01/2016 – 08/31/2021 (completed)
Total Award: $2,000,000

13. **Title**: CAREER: Light-Matter Control of Single Defects in Diamond Using Plasmonic Nanocavities
Source of Support: National Science Foundation
Role: PI
Level of Effort: 1 summer month
Total Period of Performance: 07/01/2015 – 06/30/2020 (completed)
Total Award: $570,000
14. **Title**: Exploring the interplay between nanoscale design and optical properties of materials: A research and educational approach
Source of Support: Cottrell Scholar Award, Research Corporation for Science Advancement
Level of Effort: 5% (no PI salary support)
Role: PI
Total Period of Performance: 03/01/2016 – 02/28/2019 (completed)
Total Award: $100,000

15. **Title**: YIP: Tailoring Radiative Processes by Nanoengineering for Ultrafast Optoelectronic Devices
Source of Support: Air Force Office of Scientific Research, Young Investigator Program (YIP)
Level of Effort: 1 summer month
Role: PI
Total Period of Performance: 07/15/2015 – 07/14/2018 (completed)
Total Award: $360,000

16. **Title**: CAREER: Light-Matter Control of Single Defects in Diamond Using Plasmonic Nanocavities – *Career-Life Balance Supplement*
Source of Support: National Science Foundation
Role: PI
Level of Effort: 5% (no PI salary support)
Total Period of Performance: 04/01/2017 – 07/31/2017 (completed)
Total Award: $23,767

17. **Title**: YIP: Tailoring Radiative Processes by Nanoengineering for Ultrafast Optoelectronic Devices – *Additional Funding*
Source of Support: Air Force Office of Scientific Research
Level of Effort: 5% (no PI salary support)
Role: PI
Total Period of Performance: 09/30/2016 – 07/14/2017 (completed)
Total Award: $15,000

18. **Title**: Plasmonic enhanced Förster resonance energy transfer in nanoscale materials
Source of Support: Office of the Vice Provost for Research, Duke University
Level of Effort: 5% (no PI salary support)

Role: PI
Total Period of Performance: 03/15/2016 – 03/14/2017 (completed)
Total Award: $6,500

19. **Title**: MRSEC-Seed: Mesophotonic Materials for Tailored Light-Matter Interactions
Source of Support: Research Triangle Materials Research Science and Engineering Center (RT-MRSEC), National Science Foundation
Level of Effort: 5% (no PI salary support)
Role: PI
Total Period of Performance: 09/01/15 – 08/31/16 (completed)
Total Award: $99,690

20. **Title**: Large-Area Infrared Nanoplasmonic Tunable Surfaces for Photodetectors and Spectral Signature Engineering
Source of Support: Intelligence Communities Postdoctoral Research Fellowship Program
Level of Effort: 5% (no PI salary support)
Role: Co-PI (PI: David Smith [Duke])
Total Period of Performance: 08/04/14 – 08/03/16 (completed)
Total Award: $240,000

21. **Title**: Plasmonic-Enhanced Tunnel Junctions for Organic Solar Cells
Source of Support: Energy Research Seed Grant, Duke University Energy Initiative
Level of Effort: 5% (no PI salary support)
Role: Co-PI (PI: Adrienne Stiff-Roberts [Duke])
Total Period of Performance: 07/01/14 – 06/30/15 (completed)
Total Award: $36,000 (Stiff-Roberts $18,000; Mikkelsen $18,000)

22. **Title**: Tunable Light-Matter Interactions of Single Quantum Dots
Source of Support: Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities
Level of Effort: 5% (no PI salary support)
Role: PI
Total Period of Performance: 06/01/14 – 05/31/15 (completed)
Total Award: $5,000

23. **Title**: Plasmonic Platform for Tunable Light-Matter Interactions of Single Quantum Dots
Source of Support: Pratt School of Engineering, Seed Grant, Duke University
Level of Effort: 10% (no PI salary support)
Role: PI (Co-PI: David Smith [Duke])
Total Period of Performance: 10/15/13 – 10/14/14 (completed)
Total Award: $27,716