

# CURRICULUM VITAE – MAIKEN H. MIKKELSEN

**Nortel Networks Assistant Professor of Electrical and Computer Engineering and Assistant Professor of Physics, Duke University**

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## EDUCATION

University of California, Santa Barbara	Ph.D. Physics	12/2009
University of California, Santa Barbara	M.A. Physics	12/2007
University of Copenhagen, Denmark	B.S. Physics	06/2004

## APPOINTMENTS

July 2015 – present	Nortel Networks Assistant Professor, Duke University
Sep. 2012 – present	Assistant Professor, Duke University, Department of Electrical & Computer Engineering (50%); Department of Physics (50%)
Apr. 2010 – July 2012	Postdoctoral Fellow, University of California, Berkeley. Advisor: Prof. Xiang Zhang
Sep. 2004 – Dec. 2009	Graduate Student Researcher, University of California, Santa Barbara. Advisor: Prof. David Awschalom
Jan. 2004 – July 2004	Undergraduate Student Researcher, University of California, Santa Barbara. Advisor: Prof. David Awschalom

## RESEARCH INTERESTS

Experimental investigations of quantum nanophotonics, plasmonics, light-matter interactions in artificially structured nanoscale materials, hybrid molecular-scale materials and spin phenomena in the solid state.

## SELECTED AWARDS

1. 2017 Maria Goeppert Mayer Award from the American Physical Society
2. 2017 SPIE Early Career Achievement Award, Academic focus
3. Young Investigator Program (YIP) Award from the Army Research Office (2016)
4. Cottrell Scholar Award from the Research Corporation for Science Advancement (2016)
5. CAREER Award from the National Science Foundation (2015)

6. Young Investigator Program (YIP) Award from the Air Force Office of Scientific Research (2015)
7. Ralph E. Powe Junior Faculty Award (2014)
8. European Physical Society's Ph.D. Thesis prize, Quantum Electronics and Optics, Fundamental aspects (2011)
9. NSF ADVANCE Award, workshop for Women in Science & Engineering (2009)
10. Center for Nanoscience Innovation for Defense (CNID) Graduate Fellowship (2007-2008)

## **PUBLICATIONS** (†: Corresponding author; \*: equal contributors)

### ***Publications from Mikkelsen Group, Duke University (independent of mentors)***

1. J. W. Stewart, G. M. Akselrod, D. R. Smith & M. H. Mikkelsen†, “*Toward Multispectral Imaging with Colloidal Metasurface Pixels*”, **Advanced Materials**, in press (2016), DOI: 10.1002/adma.201602971
2. G. M. Akselrod, M. C. Weidman,, C. Argyropoulos, W. A. Tisdale & M. H. Mikkelsen†, “*Efficient nanosecond photoluminescence from infrared PbS quantum dots coupled to plasmonic nanoantennas*”, **ACS Photonics**, Article ASAP (2016), DOI: 10.1021/acsp Photonics.6b00357
3. 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) **“Highly Cited Paper” by Thomson Reuters — top 1% of highest cited papers in Physics.**
4. T. B. Hoang & M. H. Mikkelsen†, “*Broad electrical tuning of plasmonic nanoantennas at visible frequencies*”, **Applied Physics Letters** 108, 183107 (2016)
5. 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)
6. J. Huang, T. B. Hoang & M. H. Mikkelsen†, “*Probing the origin of excitonic states in monolayer WSe<sub>2</sub>*,” **Scientific Reports** 6, 22414 (2016)
7. 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*,” **John Wiley & Sons**, in press (2016)
8. 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)

9. 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), cover article
10. 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)
11. 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)  
**“Highly Cited Paper” by Thomson Reuters — top 1% of highest cited papers in Physics.**
12. 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)
13. 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)  
**“Highly Cited Paper” by Thomson Reuters — top 1% of highest cited papers in Physics.**
14. G. M. Akselrod, C. Argyropoulos, T. B. Hoang, C. Ciraci, 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), (>140 citations)  
**“Highly Cited Paper” by Thomson Reuters — top 1% of highest cited papers in Physics.**
15. 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)
16. J. B. Lassiter, X. Chen, X. Liu, C. Ciraci, 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)

### **Publications Submitted**

17. J. Huang, T. B. Hoang, T. Ming, X. Ling, J. Kong & M. H. Mikkelsen†, “*Ultrafast valley dynamics in 2D semiconductors probed via time-resolved Kerr rotation*”, under revisions at Physical Review B
18. T. B. Hoang, G. M. Akselrod, A. Yang, T. W. Odom & M. H. Mikkelsen†, “*Millimetre-scale spatial coherence from a plasmon laser*”, under review at Nature Communications

19. J. Huang, G. M. Akselrod, T. Ming, J. Kong & M. H. Mikkelsen, “*Selective control of exciton emissions in monolayer MoS<sub>2</sub> using a tunable plasmonic nanocavity*”, under review at Small
20. G. M. Akselrod & M. H. Mikkelsen, “*Controlled radiative dynamics using plasmonic nanocavities*”, invited book chapter for “*Handbook of Metamaterials and Plasmonics*” (edited by Stefan Maier and Ortwin Hess), World Scientific, under review

### **Publications from Prior Groups**

21. 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)
22. T. Zentgraf\*, Y. Liu\*, M. H. Mikkelsen\*, J. Valentine & X. Zhang, “*Plasmonic Luneburg and Eaton lenses*,” **Nature Nanotechnology** 6, 151 (2011), (>170 citations)
23. 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)
24. 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), (>430 citations), cover article  
**“Highly Cited Paper” by Thomson Reuters — top 1% of highest cited papers in Physics.**
25. 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)
26. 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)
27. 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), (>115 citations)
28. 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), (>175 citations)

### **PATENTS**

1. 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)

2. C. Tegreene, J. Kare, L. Wood, R. Hyde, C. Whitmer, M. Ishikawa, T. Pan, V.Y.H. Wood, Y. Urzhumov, D. Smith, M.H. Mikkelsen, G. Akselrod, “*Magnetic plasmonic nanoparticle positioned on a magnetic plasmonic substrate*,” PCT/14/853,370 (2015)
3. C. Tegreene, J. Kare, L. Wood, R. Hyde, C. Whitmer, M. Ishikawa, T. Pan, V.Y.H. Wood, Y. Urzhumov, D. Smith, M.H. Mikkelsen, G. Akselrod, “*Magnetic plasmonic nanoparticle dimer*,” PCT/14/853,410 (2015)

## INVITED TALKS

1. “*Hybrid Molecular-Scale Materials for Tailored Light-Matter Interactions*”, Seminar, Tsinghua University, China, October 14, 2016
2. “*Tailored and reconfigurable optical properties using plasmonics*”, SPIE/COS Photonics Asia 2016, Beijing, China, October 13, 2016
3. “*Control of radiative processes of quantum dots using colloidal silver nanoparticles*”, NC Photochem 2016 symposium, Raleigh, NC, October 1, 2016
4. “*Ultrafast single photon source using plasmonics*”, Single Photons Single Spins (SPSS) workshop, Oxford, UK, September 13, 2016.
5. “*Ultrafast light sources: Spontaneous and stimulated emission*”, OSA Incubator on the Science and Application of Nanolasers, Washington, DC, September 8, 2016
6. “*Plasmonic colloidal nanoparticles: Gateway to extreme radiative decay engineering*”, American Chemical Society (ACS) National Meeting, Philadelphia, PA, August 24, 2016
7. “*Hybrid Molecular-Scale Materials for Tailored Light-Matter Interactions*”, Physics Seminar, University of Sydney, Sydney, Australia, August 15, 2016
8. “*Hybrid Molecular-Scale Materials: From Ultrafast Spontaneous Emission to Perfect Absorbers*”, Seminar, Department of Physics, Imperial College London, U.K., July 22, 2016
9. “*Radiative decay engineering using optical antennas*”, 12th Conference on Photonic and Electromagnetic Crystal Structures (PECS-XII), York, UK, July 20, 2016
10. “*Extreme radiative decay engineering using nanopatch antennas*”, 2016 Gordon Research Conference on Plasmonics and Nanophotonics, Sunday River Resort, Newry, ME, July 10-15, 2016
11. “*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

12. "*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
13. "*Hybrid Molecular-Scale Materials*", Department of Chemistry Seminar, Duke University, April 12, 2016
14. "*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
15. "*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
16. "*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
17. "*Control of radiative processes of quantum dots and 2D materials using plasmonics*", Nanolight 2016 Winter School, Invited Lecture, Benasque, Spain, March 10, 2016
18. "*Tailored radiative processes of quantum dots and 2D materials*", Condensed Matter seminar, Case Western Reserve University, Cleveland, OH, February 29, 2016
19. "*Plasmonics for tailored radiative processes of quantum dots and 2D materials*", U.S. Naval Research Laboratory, Invited Research Seminar, Washington, DC, February 25, 2016
20. "*Ultrafast and directional spontaneous emission*", Invited Research Seminar, Connectivity Lab at Facebook, Menlo Park, CA, February 19, 2016
21. "*Ultrafast spontaneous emission from semiconductor quantum dots coupled to plasmonic nanoantennas*", Photonics West, San Francisco, CA, February 18, 2016
22. "*Tailored radiative processes of quantum dots and 2D materials*", Virginia Polytechnic Institute and State University, Condensed Matter seminar, Department of Physics, February 8, 2016
23. "*Tailored radiative processes of quantum dots and 2D materials*", University of Washington, Electrical Engineering Colloquium, Seattle, WA, February 2, 2016
24. "*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
25. "*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

26. "*Spatial and temporal coherence properties of tunable lattice plasmon lasers*," 46th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 4, 2016
27. "*Ultrafast Spontaneous Emission from Quantum Dots Using Plasmonic Nanoantennas*," Materials Research Society's (MRS) Fall Meeting, Boston, MA, December 4, 2015
28. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities*," Caltech, Materials Research Lecture Seminar, Pasadena, CA, November 18, 2015
29. "*Strongly Enhanced Light-Matter Interactions using Colloidally Synthesized Plasmonic Nanocavities*," Frontiers in Optics and Laser Science Conference, San Jose, CA, October 22, 2015
30. "*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
31. "*Film-coupled plasmonic stripe resonators for enhanced third-harmonic generation*," OSA Nonlinear Metamaterials Incubator, Washington, DC, October 2, 2015
32. "*Fluorescence enhancement and control using plasmonics*," Wright-Patterson Air Force Base, Invited Seminar, Dayton, Ohio, September 29, 2015
33. "*Ultrafast spontaneous emission source using plasmonic nanoantennas*," Technical University of Denmark (DTU), Invited Lecture, Lyngby, Denmark, September 21, 2015
34. "*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
35. "*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
36. "*Control of Radiative Processes using Colloidally Synthesized Plasmonic Nanocavities*," Metamaterials Science & Technology Workshop, San Diego, CA, July 22, 2015
37. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities*," Nanoscience & Technology Division Colloquium, Argonne National Laboratory, Lemont, IL, July 8, 2015
38. "*Strongly Enhanced Light-Matter Interactions using Plasmonic Nanocavities*," Niels Bohr Institute, University of Copenhagen, Quantum Optics Seminar, Copenhagen, Denmark, June 23, 2015
39. "*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

40. "*Radiative Decay Engineering Using Plasmonic Nanostructures*," CMOS Emerging Technologies Research Symposium, Vancouver, Canada, May 20, 2015
41. "*Strongly Enhanced Light-Matter Interactions using Colloidally Synthesized Plasmonic Nanocavities*," Harvard University, Electrical Engineering Seminar, Boston, MA, May 1, 2015
42. "*Large spontaneous emission rate enhancement in directional and efficient plasmonic nanoantennas*," Materials Research Society's (MRS) Spring Meeting, San Francisco, CA, April 9, 2015
43. "*Artificially structured materials for tailored optical properties*," University of Michigan, Department of Physics, AMO/CM Seminar, Ann Arbor, MI, March 31, 2015
44. "*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
45. "*Control of Radiative Processes Using Tunable Plasmonic Nanoantennas*," Southeast Ultrafast Conference, Tallahassee, FL, January 16, 2015
46. "*Tunable light-matter interactions in a solid-state platform*," 45th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 6, 2015
47. "*Film-Coupled Nanocubes for Enhancing Photodynamic and Nonlinear Processes*," 45th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 6, 2015
48. "*Opportunities with Optical Metamaterials*," Materials Research Society's (MRS) Fall Meeting, Boston, MA, December 3, 2014
49. "*On-demand optical properties of quantum emitters using plasmonic nanoantennas*," IEEE Photonics Conference (IPC), San Diego, CA, October 15, 2014
50. "*Control of Radiative Processes Using Tunable Plasmonic Nanopatch Antennas*," Los Alamos National Laboratory, Los Alamos, NM, September 19, 2014
51. "*Large enhancements of fluorescence and spontaneous emission using a tunable plasmonic platform*," Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA, June 16, 2014
52. "*Manipulating Light with MesoPhotonic Metamaterials*," Mesoscale Science Frontiers, 34th Annual Center for Nonlinear Studies Annual Conference, Santa Fe, NM, May 16, 2014
53. "*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



54. "*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
55. "*Enhanced light-matter interactions of a single emitter coupled to a slot waveguide*," Fitzpatrick Institute for Photonics Annual Meeting, Durham, NC, March 12, 2013
56. "*Plasmonics and enhanced light-matter interactions of a single emitter*," University of North Carolina Wilmington, Department of Physics, Wilmington, NC, February 8, 2013
57. "*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
58. "*Plasmonics and enhanced light-matter interactions of a single emitter*," Optics and Photonics Seminar Series, Duke University, Durham, NC, October 31, 2012
59. "*Spintronics & Nanophotonics for Quantum Information Science*," Annual Meeting of the Danish Physical Society, Nyborg, Denmark, June 19, 2012
60. "*Spintronics & Nanophotonics for Quantum Information Science*," Delft University of Technology, Department of Quantum Nanoscience, Delft, the Netherlands, March 26, 2012
61. "*Spintronics & Nanophotonics for Quantum Information Science*," Duke University, Department of Electrical and Computer Engineering, Durham, NC, March 13, 2012
62. "*Spintronics & Nanophotonics for Quantum Information Science*" University of Massachusetts Amherst, Department of Physics, Amherst, MA, March 6, 2012
63. "*Spintronics & Nanophotonics for Quantum Information Science*," University of Oregon, Department of Physics, Eugene, OR, February 23, 2012
64. "*Spintronics & Nanophotonics for Quantum Information Science*," MIT, Department of Physics, Chez Pierre Condensed Matter Physics Seminar Series, Boston, MA, February 21, 2012
65. "*Spintronics & Nanophotonics for Quantum Information Science*," Washington University in St. Louis, Department of Physics, St. Louis, MO, February 15, 2012
66. "*Spintronics & Nanophotonics for Quantum Information Science*," University of Utah, Department of Physics, Salt Lake City, UT, February 8, 2012
67. "*Spintronics & Nanophotonics for Quantum Information Science*," University of Waterloo, Department of Physics and Institute for Quantum Computing, Waterloo, Canada, February 2, 2012
68. "*Spintronics & Nanophotonics for Quantum Information Science*," ICFO, Institute of Photonic Sciences, Barcelona, Spain, January 17, 2012

69. "*Spintronics & Nanophotonics for Quantum Information Science*," FOM Institute AMOLF, Amsterdam, the Netherlands, December 22, 2011
70. "*Spintronics & Nanophotonics for Quantum Information Science*," University College London, Department of Physics, London, United Kingdom, November 22, 2011
71. "*Single quantum dots as building blocks for quantum information applications*," University of Stuttgart, Department of Physics, Stuttgart, Germany, November 10, 2011
72. "*Ultrafast coherent control of a single electron spin in a quantum dot*," March Meeting of the American Physical Society, Pittsburgh, PA, March 18, 2009
73. "*Manipulating single electron spins and coherence in a quantum dot*," (plenary presentation), Conference on Excitonic Processes in Condensed Matter, Kyoto, Japan, June 23, 2008
74. "*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
75. "*Optical detection and manipulation of single spin coherence in a quantum dot*," SPIE Photonics West, San Jose, CA, January 24, 2008
76. "*Time-resolved measurements of single electron spin coherence in a quantum dot*," Materials Research Society's Fall Meeting, Boston, MA, November 26, 2007

## **CONTRIBUTED PRESENTATIONS**

1. "*Probing and controlling large Purcell enhancement in plasmonic nanoantennas*", SPIE – Optics and Photonics, San Diego, CA, August 18, 2015
2. "*Control of radiative processes of molecules and quantum dots using plasmonic structures*", SPIE - Photonics West, San Francisco, CA, February 11, 2015
3. "*Giant fluorescence enhancement of molecules coupled to plasmonic nanoscale patch antennas*", Frontiers in Optics, Tucson, AZ, October 23, 2014
4. "Probing and controlling large Purcell enhancement in plasmonic nanoantennas", The Sixth International Workshop on Electromagnetic Metamaterials, Santa Fe, NM, September, 2014
5. "*Spectrally matched plasmonic cavities for giant fluorescence enhancement*", Eighth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics – Metamaterials 2014, Copenhagen, Denmark, August 2014
6. "*A plasmonic platform for greatly enhanced light-matter interactions of single quantum dots*", Gordon Research Conference – Quantum Science, Easton, MA, July 2014
7. "*Strongly Enhanced Light-Matter Interactions using Colloidally Synthesized Plasmonic Nanoantennas*", Gordon Research Conference – Plasmonics, Newry, ME, July 2014

8. *"Tunable plasmonic platform for giant fluorescence enhancement"*, CLEO, San Jose, June 2014
9. *"Giant fluorescence enhancement of fluorophores coupled to nanopatch antennas"*, APS March Meeting, Denver, CO, March 2014
10. *"Enhanced light-matter interactions of a single emitter coupled to a slot waveguide"*, March Meeting of the American Physical Society, Boston, MA, February 2012
11. *"Experimental demonstration of gradient index plasmonics"*, March Meeting of the American Physical Society, Dallas, TX, March 2011
12. *"Ultrafast coherent optical manipulation of a single electron spin in a quantum dot"*, March Meeting of the American Physical Society, New Orleans, LA, March 2008
13. *"Kerr rotation studies of single electron spin dynamics in a quantum dot"*, School and Conference on Spintronics and Quantum Information Technology, Maui, HI, June 2007
14. *"Kerr rotation studies of single electron spin dynamics in a quantum dot"*, March Meeting of the American Physical Society, Denver, CO, March 2007

## FUNDING

### ***Awarded – Current Support***

1. **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:** 1 summer month  
**Role:** PI  
**Total Period of Performance:** 09/30/2016 – 07/14/2017  
**Total Award Amount:** \$15,000
2. **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 – 08/31/2020  
**Total Award:** \$2,000,000
3. **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 – 08/09/17  
**Total Award:** \$50,000 (with 100,000 option periods)

4. **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  
**Total Award Amount:** \$360,000
5. **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  
**Total Award Amount:** \$570,000
6. **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%  
**Role:** PI  
**Total Period of Performance:** 03/01/2016 – 02/28/2019  
**Total Award Amount:** \$100,000
7. **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 Period of Performance:** 03/01/2016 – 06/30/2018  
**Total Gift Amount:** \$50,000
8. **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  
**Total Award Amount:** \$6,500

#### ***Awarded – Past Support***

9. **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 Amount:** \$99,690

10. **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 Amount:** \$240,000
11. **Title:** Tunable Light-Matter Interactions of Single Quantum Dots  
**Source of Support:** Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities and cost share provided by Duke University  
**Level of Effort:** 5% (no PI salary support)  
**Role:** PI  
**Total Period of Performance:** 06/01/14 – 05/31/15 (completed)  
**Total Award Amount:** \$10,000 (includes \$5,000 cost share provided by Duke)
12. **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 Amount:** \$36,000 (Stiff-Roberts \$18,000; Mikkelsen \$18,000)
13. **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 Amount:** \$27,716

## TEACHING

Fall 2016: ECE 340L / PHYS 320L – Optics and Photonics

Spring 2015: PHY 151 – Introductory Mechanics

Fall 2014: ECE 521 – Quantum Mechanics

Spring 2014: PHY 151 – Introductory Mechanics

Fall 2013: ECE 521 – Quantum Mechanics

### **Guest Lectures**

- BME 555/CHEM 630 - "Photonics at the Nanoscale and Ultrafast Spectroscopy"  
Department of Biomedical Engineering, Duke University, March 24, 2016
- BME 555/CHEM 630 - "*Photonics at the Nanoscale and Ultrafast Spectroscopy*"  
Department of Biomedical Engineering, Duke University, March 19, 2015

- PHY 766S - Physics Research Seminar, “*Light-matter interactions at the nanoscale*”  
Department of Physics, Duke University, October 1, 2014
- PHY 131S - Intro Seminar on Big Questions, “*Playing with spins and light at the nanoscale*”  
Department of Physics, Duke University, September 29, 2014
- Physics Open House, Prospective Graduate Student Visit Day, “*The Quantum World and Strong Correlations in Condensed Matter*”  
Department of Physics, Duke University, March 21, 2014
- PHY 766S - Physics Research Seminar, “*Light-matter interactions at the nanoscale*”  
Department of Physics, Duke University, September 18, 2013
- PHY 766S - Physics Research Seminar, “*Playing with spins and light at the nanoscale*”  
Duke University, September 26, 2012

## **STUDENTS AND POSTDOCS SUPERVISED**

### ***Postdocs***

Thang B. Hoang, 03/2013 – 08/2016 (Currently: Assistant Professor of Physics and Materials Science, Univ. of Memphis)

Gleb M. Akselrod, 09/2013 – 09/2016 (Currently: Intellectual Ventures, declined tenure-track faculty positions at University of California, San Diego and Rochester University)

Andrew Traverso, 03/2016 – present

### ***PhD Students***

Jiani Huang (physics), 04/2013 – present

Qixin Shen (physics), 11/2014 – present

Daniela Cruz (BME), 06/2015 – present

Jon Stewart (ECE), 07/2015 – present

Wade Wilson (ECE), 05/2016 – present

Andrew Boyce (ECE), 06/2016 – present

### ***Master students***

Chao Fang, 01/2014 – 12/2014 (Currently: Ph.D. student at Duke)

### ***Undergraduate students***

Tamra Nebabu, 04/2015 – present

Zhetao Jia, 01/2016 – 05/2016 (Currently: Undergraduate student at Duke)

Andrew Walsworth, 06/2015 – 05/2016 (Currently: Undergraduate student at Duke)

Logan Su, 01/2014 – 05/2015 (Currently: Ph.D. student at Stanford, ECE)

Mack Yi, 11/2012 – 12/2013 (Currently: Software Engineer at Airbnb)

### ***High school students***

Alexander Allen (North Carolina School of Science and Math), 04/2016 – present

### ***Awards & Honors won by students and postdocs supervised***

1. Fritz London Postdoctoral Fellowship, Duke (Andrew Traverso, 2016)
2. 1st place poster prize, "*Southeast Ultrafast conference*", North Carolina State University (Jon Stewart, 2016)
3. 1st place poster prize, "*2016 Fitzpatrick Institute for Photonics Symposium*", Duke (Jon Stewart, 2016)
4. NSF Graduate Fellowship, Honorable Mention (Jon Stewart, 2016)
5. Pratt Research Fellowship, Duke (Tamra Nebabu, 2016)
6. John T. Chambers Scholar, Fitzpatrick Institute for Photonics, Duke (Jiani Huang, 2015)
7. 2015 Pratt-Gardner Graduate Fellowship, Duke (Jon Stewart)
8. John T. Chambers Fellowship, Fitzpatrick Institute for Photonics, Duke (Jon Stewart, 2015)
9. NSF Research Triangle MRSEC Graduate Fellowship (Qixin Shen, 2015)
10. NSF Research Triangle MRSEC Graduate Fellowship (Daniela Cruz, 2015)
11. SMIF Undergraduate User Program Award, Duke (Tamra Nebabu, 2015)
12. SMIF Undergraduate User Program Award, Duke (Andrew Walsworth, 2015)
13. Intelligence Communities Postdoctoral Research Fellowship (Gleb M. Akselrod, 2014)
14. Pratt Research Fellowship, Duke (Logan Su, 2014)
15. University Scholar Award, University Scholars Program, Duke (Tamra Nebabu, 2013)
16. NSF Graduate Fellowship (Daniela Cruz, 2013)
17. Nanoscience Graduate Program Fellowship, Duke (Jiani Huang, 2013)

### **OUTREACH ACTIVITIES**

#### ***To broaden participation of groups underrepresented in STEM fields***

1. Organizer and chair of "*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).
2. "*Women in Physics Group*," Duke University, Faculty Coordinator (2012–present). Restarted group with the goal of increasing the retention and recruitment of graduate and undergraduate students. Organized lunches, meetings with female colloquium speakers, and recruitment events for prospective graduate students with a focus on minorities.
3. "*2015 Conference for Undergraduate Women in Physics*" (CUWiP). Local application and planning committee, organized as part of American Physical Society (APS), (2013–2015).
4. Organizer and instructor for "*Females Excelling More in Math, Engineering, and Science*"

(FEMMES). Outreach activities for 4-6th grade girls from ethnically diverse backgrounds in Durham, NC (2014–present).

5. Mentor meetings with small groups of female graduate and undergraduate students during visits at universities in the United States (2014–present).
6. Participated in the “2016-17 SPIE Women in Optics Planner” to offer advice and encouragement to those considering a career in science, technology, engineering, and mathematics.

#### ***Mentorship and career advice activities***

7. Panelist, “*Future of the Field in Academia and Industry*”, career panel discussions at the Gordon Research Seminar on Plasmonics in Newry, ME (7/2016).
8. Panelist, NSF CAREER proposal writing workshop, Duke University (3/2016).
9. Panelist, NSF Graduate Fellowship proposal workshop, part of Pratt PhD Plus Program, Pratt (9/2015)

#### ***Integration and transfer of knowledge***

10. Numerous interviews with the media resulting in articles and web-based videos to convey research results to the general public and the broader scientific community (2012–present).
11. Involvement of undergraduate and high school students in research, Duke University, six students supervised (2012 – present).
12. Innovations in teaching and transfer of knowledge three-day workshop, American Association of Physics Teachers (2013).
13. Presented ~75 invited talks and seminars at international conferences and universities in the US and abroad.

### **SERVICE TO SCIENTIFIC COMMUNITY**

1. Editorial Advisory Board member for the journal “*ACS Photonics*”.
2. Proposal reviewer for Center for Integrated Nanotechnologies (CINT), jointly operated by Los Alamos and Sandia National Laboratories (2013–present), Air Force Office of Scientific Research (2015–present), Department of Energy (2016–present), and others.
3. Journal Reviewer for *Science*, *Nature Photonics*, *Nature Communications*, *PNAS*, *Advanced Materials*, *Advanced Optical Materials*, *Optics Express*, *Optica*, *Nano Letters*, *Scientific Reports*, *Journal of the American Chemical Society*, *Small* and others (2012–present).
4. Participant in invitation-only workshops and seminars to provide scientific insight and advice to the Department of Defense and the National Science Foundation in the areas of



future directions and strategy for Nanomaterials and Quantum Information Science.

- i. “*Microscale Adaptability*”, Army Science Planning and Strategy Meeting, Aberdeen Proving Ground, Aberdeen, MD, January 11–12, 2016
- ii. “*Workshop on Quantum Information on a Chip*”, organized by the National Science Foundation and the University of Padova, Padova, Italy, October 12–14, 2015
- iii. 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
- iv. “*Center for Distributed Quantum Systems Science Technical Workshop*”, Army Research Laboratory, Adelphi Laboratory Center, Adelphi, MD, June 27, 2014

## UNIVERSITY SERVICE

### ***Current committees***

1. Quantum Science and Technology Faculty Search Committee, ECE and Physics (9/2016 – present)
2. Faculty Budget Advisory Committee, ECE (8/2015 – present)
3. Fitzpatrick Institute for Photonics Executive Committee (9/2015 – present)
4. Fitzpatrick Institute for Photonics, Award Committee, co-chair (9/2015 – present)
5. Faculty Coordinator, “Women in Physics Group” (11/2012 – present)
6. Instructor, “Females Excelling More in Math, Engineering, and Science”, (2014– present)

### ***Past committees***

7. Physics Faculty Recruitment and Search Committee (8/2015 – 07/2016)
8. ECE Undergraduate Studies Committee (UGSC) (2013 – 4/2016)
9. Research Laser Safety Committee (2013 – 4/2016)
10. Committee for Optics and Photonics Seminar Series (2012 – 4/2016)
11. Shared Materials Instrumentation Facility (SMIF) Advisory Committee, (9/2015 – 4/2016)
12. Panelist, NSF CAREER proposal writing workshop, Duke University (3/2016)
13. Panelist, NSF Graduate Fellowship proposal workshop, part of Pratt PhD Plus Program, Pratt (9/2015)
14. ECE Faculty Search Committee, Optics, Duke University (2012 – 2013)
15. Physics Faculty Search Committee, Experimental Condensed Matter Physics, Duke University (2012 – 2013)
16. Physics Graduate Curriculum Committee, Duke University (2012)

## **PROFESSIONAL DEVELOPMENT**

1. New Laser Scientists' Conference, Sponsored by the American Physical Society, Division of Laser Science, Tucson, AZ, October 23-24, 2014
2. National Science Foundation, Grants Conference, Colorado State University, Denver, CO, June 23-24, 2014
3. Workshop for New Physics and Astronomy Faculty, focused on innovations in teaching, organized by the American Association of Physics Teachers, College Park, MD, November 7-10, 2013
4. Workshop "Duke LEADER: Leadership Development for Researchers," Duke University, Durham, NC, February 19-21, 2013

## **PROFESSIONAL MEMBERSHIPS**

- American Physical Society (APS), lifetime member
- The Optical Society (OSA), lifetime member
- Society of Photo-Optical Instrumentation Engineers (SPIE), lifetime member
- Materials Research Society (MRS)
- Institute of Electrical and Electronics Engineers (IEEE)
- European Physical Society (EPS)
- American Chemical Society (ACS)