SEAN P. RODRIGUES

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EDUCATION

Georgia Institute of Technology — Atlanta, GA
Ph.D. in Electrical and Computer Engineering | Optics — August 2018
M.S. in Materials Science and Engineering | Polymer Science — Dec 2015

University of Rochester — Rochester, NY
B.S. in Chemical Engineering — May 2012

RESEARCH INTERESTS

Metamaterials, Photonics, Data Science, Nonlinear Optics, Optogenetics, Active Polymers

AWARDS & DISTINCTIONS

2019 Sigma Xi: Best PhD Thesis Award
2018 Materials Research Society: Graduate Student Award
2018 ECE Graduate Research Assistant Excellence Award
2017 AFRL Data Science Minority Leaders: Research Collaboration Program
2017 IEEE Photonics Travel Grant
2016 SPIE Outreach Grant, 'Day of Light' Workshop
2016 Intel Fellowship
2016 Sigma Xi: Best Master's Thesis Award
2016 Outstanding Service to Georgia's Community Award
2016 GEM Fellowship: Oak Ridge National Labs Sponsored (Offer Declined)
2015 American Physical Society FGSA Travel Grant
2013 NSF Graduate Research Fellowship (NSF GRFP)
2013 GoSTEM Fellowship, awarded twice
2012 GEM Fellowship: DuPont Sponsored
2011 Best poster award at Trends in Nanotechnology Conference
2010 Continuing Scholarship Recipient, Jr. & Sr. Year
2010 Xerox Research Fellow
2010 Ronald E. McNair Post-Baccalaureate Scholar
2009 David T. Kearns Scholarship for Leadership and Diversity
2008 Undergraduate Portable Research Grant
2008 Bausch and Lomb Honorary Science Award
2008 Rush Rhees Scholarship for Academic Excellence

JOURNAL PUBLICATIONS

500 citations, h-index of 11

20. S. Lan, X. Zhang, M. Taghinejad, Sean P. Rodrigues, K.-T. Lee, Z. Liu, W. Cai, "Metasurfaces for near-eye augmented reality," "ACS Photonics," Vol. 6, 864-870 (2019) [Link]

19. M. Taghinejad, H. Taghinejad, Z. Xu, K.-T. Lee, Sean P. Rodrigues, J. Yan, A. Adibi, T. Lian, W. Cai, "Ultrafast control of phase and polarization of light expedited by hot-electron transfer," *Nano Letters,* Vol. 18, 5544-5551 (2018) [Link]

18. Z. Liu, D. Zhu, Sean P. Rodrigues, K.-T. Lee, W. Cai, "Generative model for the inverse design of metasurfaces," *Nano Letters,* Vol. 18, 6570-6576 (2018) [Link]

17. M. Taghinejad, H. Taghinejad, Z. Xu, Y. Liu, Sean P. Rodrigues, K.-T. Lee, T. Lian, A. Adibi, W. Cai, "Hot-electron assisted femtosecond all-optical modulation in plasmonics," *Advanced Materials,* 1704915 (2018) [Link]

16. J. Cai, Z. Zhu, P. F. A. Alkemade, E. van Veldhoven, Q. Wang, H. Ge, Sean P. Rodrigues, W. Cai, W.-D. Lim, "3D Volumetric energy deposition of focused helium ion beam lithography: visualization, modeling, and applications in nanofabrication," *Advanced Materials Interfaces* 1800203 (2018) [Link]

15. Z. Liu, Sean P. Rodrigues, W. Cai, "Simulating the ising model with a deep convolutional generative adversarial network," arXiv:1710.04987 (2017) [Link]

14. Sean P. Rodrigues, S. Lan, L. Kang, Y. Cui, P. W. Panuski, S. Wang, A. M. Urbas, W. Cai, "Intensity-dependent modulation of optically active signals in a chiral metamaterial," *Nature Communications***,** Vol. 8, 14602 (2017) [Link]

13. L. Kang*, Sean P. Rodrigues*, M. Taghinejad*, S. Lan, K.T. Lee, Y. Liu, D. Werner, A. M. Urbas, W. Cai, "Preserving Spin States upon Reflection: Linear and Nonlinear Responses of a Chiral Meta-Mirror," *Nano Letters,* Vol. 17, 7102-7109 (2017) [Link]

12. S. Lan, Sean P. Rodrigues, M. Taghinejad, and W. Cai, "Dark plasmonic modes in diatomic gratings for plasmoelectronics," *Laser & Photonics Reviews*, Vol. 11, 1600312 (2017) [Link]

11. N. Zhang, W. Sun, Sean P. Rodrigues, K. Wang, Z. Gu, S. Wang, W. Cai, S. Xiao, Q. Song, "Highly Reproducible Organometallic Halide Perovskite Microdevices Based on Top-Down Lithography," *Advanced Materials,* Vol. 29, 1606205 (2017) [Link]

10. S. Lan, Sean P. Rodrigues, Y. Cui, L. Kang, W. Cai, "Electrically tunable harmonic generation of light from plasmonic structures in electrolytes," *Nano Letters,* Vol. 16, No. 8, 5074-5079 (2016) [Link]

9. S. Lan, Sean P. Rodrigues, L. Kang, W. Cai, "Visualizing optical phase anisotropy in black phosphorus," *ACS Photonics*, Vol. 3, No. 7, 1176-1181 (2016) [Link]

8. S. Lan, L. Kang, D. T. Schoen, Sean P. Rodrigues, Y. Cui, M. L. Brongersma, W. Cai, "Backward phase-matching for nonlinear optical generation in negative-index materials," *Nature Materials*, Vol. 14, No. 8, 807-811 (2015) [Link]

7. L. Kang, S. Lan, Y. Cui**,** Sean P. Rodrigues, Y. Liu, D. H. Werner, W. Cai, "An active metamaterial platform for chiral responsive optoelectronics," *Advanced Materials*, Vol. 27, No. 29, 4377-4383 (2015) [Link]

6. Sean P. Rodrigues. "Invisible," *Science*, Vol. 348, No. 6241, 1307-1308 (2015) [Link]

5. Sean P. Rodrigues, W. Cai, "Nonlinear optics: Tuning harmonics with excitons," *Nature Nanotechnology*, Vol. 10, No. 5, 387-388 (2015) [Link]

4. Sean P. Rodrigues, Y. Cui, S. Lan, L. Kang, W. Cai, "Metamaterials enable chiral-selective enhancement of two-photon luminescence from quantum emitters," *Advanced Materials*, Vol. 27, No. 6, 1124-1130 (2015) [Link]

3. L. Kang, Y. Cui, S. Lan, Sean P. Rodrigues, W. Cai, "Electrifying photonic metamaterials for tunable nonlinear optics." *Nature Communications*, Vol. 5, 4680 (2014) [Link]

2. Sean P. Rodrigues, S. Lan, L. Kang, Y. Cui, W. Cai, "Nonlinear imaging and spectroscopy of chiral metamaterials," *Advanced Materials*, Vol. 26, No. 35, 6157-6162 (2014) [Link]

1. Y. Cui, L. Kang, S. Lan, Sean P. Rodrigues, W. Cai, "Giant chiral optical response from a twisted-arc metamaterial," *Nano Letters*, Vol. 14, No. 2, 1021-1025 (2014) [Link]

INVITED TALKS

1. *Physics X Seminar*, U. S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC), Huntsville, AL, Jul. 5, 2018

CONFERENCE PRESENTATIONS

9. Sean P. Rodrigues, S. Lan, L. Kang, Y. Cui, P. W. Panuski, S. Wang, A. M. Urbas, W. Cai, "Modulating optically active signals in a chiral metamaterial with varied input intensities," *IEEE Photonics Conference*, WG2, Orlando, FL, Oct. 1 – Oct. 5, 2017
8. Sean P. Rodrigues, S. Lan, L. Kang, Y. Cui, P. W. Panuski, S. Wang, A. M. Urbas, W. Cai, "Intensity-dependent modulation of optically active signals in a chiral metamaterial," *SPIE Photonics West Optoelectronic Materials and Devices*, 10112-10, San Francisco, CA, Jan. 28 – Feb. 2, 2017
7. Sean P. Rodrigues, L. Kang, S. Lan, Y. Cui, Y. Liu, D. Werner, W. Cai, "A chiral metamaterial for chiral responsive optoelectronic transduction," *Conference on Lasers and Electro-Optics (CLEO)*, FW4A.6, San Jose, CA, June 5 – June 10, 2016
6. Sean P. Rodrigues, Y. Cui, S. Lan, L. Kang, W. Cai, "Achiral nanoprobes extract chiral signals from within chiral metamaterials," *Conference on Lasers and Electro-optics (CLEO)*, FTh3D.2, San Jose, CA, June 5 – June 10, 2016
5. Sean P. Rodrigues, Y. Cui, S. Lan, L. Kang, W. Cai, "Enhancing optical signals of chiral metamaterials via nonlinear excitation" *2015 Materials Research Society (MRS) Fall Meeting*, HH2.03, Boston, MA Nov. 29 – Dec 03, 2015
4. L. Kang, S. Lan, Y. Cui, Sean P. Rodrigues, Y. Liu, D. H. Werner, W. Cai, "An active metamaterial platform for chiral responsive optoelectronics," *2015 Materials Research Society (MRS) Fall Meeting*, GG11.02, Boston, MA Nov. 29 – Dec 03, 2015
3. Sean P. Rodrigues, Y. Cui, L. Kang, S. Lan, W. Cai, "Giant chiral active responses from nanoengineered metallic arcs," *IEN User Science and Engineering Review*, Atlanta, Jun 6, 2014
2. Sean P. Rodrigues, W. Zhou, T.W. Odom, "Interaction between dipole emitters and 2D plasmonic nanoparticle arrays," *Trends in Nanotechnology*, Spain, 11/21-11/25, 2011 (Poster)

   -Recipient of "Best Poster Award"

1. Sean P. Rodrigues, K. Savino, M. Z. Yates, "Cationic substitution of hydroxyapatite for hydrogen fuel cell application"
   2011 *National Conference for Undergraduate Research,* Ithaca, NY, 3/31-4/2
   2011 *Xerox Research Fellows Symposium,* Rochester, NY, 7/31
   2010 *Energy for the 21st Century Symposium*, Rochester, NY, 10/11

RESEARCH & DESIGN EXPERIENCE

Toyota Motor Engineering & Manufacturing North America — Ann Arbor, Mi
Electronics Research Senior Scientist — 2012-Ongoing
Lead projects relating to the advancement of display and LIDAR technologies

Electrical and Computer Engineering, *Georgia Institute of Technology* — Atlanta, GA
Graduate Research Fellow — 2012-Ongoing

Investigating metamaterial structures in pursuit of enhanced nanoscale optoelectronic devices. Progressing research in the realm of chiral metamaterial structures.

Materials Science and Engineering, *Georgia Institute of Technology* Atlanta, GA
Master's Student 2012-2014
Harnessed polarization selective functionality of chiral metamaterials for nonlinear signal generation and enhancement of asymmetric optical properties.

DuPont, *Central Research & Development* Wilmington, DE
Research Associate 2012
Analytical separations of byproduct streams created from the production of a renewably sourced biomaterial.

Department of Optical Engineering, *University of Rochester* Rochester, NY
Research Assistant, Dr. Lukas Novotny 2011 - 2012
Redesigned the fabrication process of gold-pyramidal nanoprobes for applications in near field optical spectroscopy including high resolution single molecule imaging.

Materials Science & Engineering Center, *Northwestern University* Evanston, IL
Research Experience for Undergraduates, Dr. Teri W. Odom 2011
Characterized and tuned the interaction between a plasmonic nanoparticle array and a dipole emitting dye for application as a distributed feedback laser.

Department of Chemical Engineering, *University of Rochester* Rochester, NY
Xerox Undergraduate Research Fellow, Dr. Matthew Yates 2010
Designed and implemented experiments to create a dense hydroxyapatite based film by substitution of its unit cell with various cations for application as an electrolyte within a fuel cell.

University of Rochester Biodiesel Rochester, NY
Lab Technician and Project Leader 2009 - 2011

Department of Dermatology, *University of Rochester Medical Center* Rochester, NY
Technical Assistant, Laboratory of Dr. Alice Pentland 2008 - 2009

INVITED WORKSHOPS

2018 São Paulo School of Advanced Science (SPSAS), XVI Jorge André Swieca School on Nonlinear and Quantum Optics, São Paulo, Brazil
2017 NSF Engineered Living Systems Workshop, University of Illinois Urbana Champaign
2014 NextProf Future Faculty Workshop, University of Michigan

TEACHING EXPERIENCE

2015 **Center for Engineering Education and Diversity**, *Georgia Tech*
Created and led capstone projects for HS students to model a human heart

2013-2015 **Meadowcreek High School,** *via GoSTEM Fellowship*
Engineering club advisor and high school teacher, for 2 years

2014 **Center for Education Teaching and Learning**, *Georgia Tech*
Teacher for materials science summer session

2010-2011 **Department of Chemistry**, *University of Rochester*
Workshop Leader: Chemical Concepts, Practices and Systems II, for 2 years

2010-2011 **Department of Chemical Engineering**, *University of Rochester*
Teaching Assistant: Chemical Process Analysis, for 2 years

ACADEMIC MEMBERSHIPS

2016-P	Sigma Xi	2013-P	IEEE Etta Kappa Nu Member
2016-P	SPIE	2011-P	MRS Member

LEADERSHIP ROLES

2013-15	**ECE Ambassadors** Graduate Liaison
2011	**Wake Forest Elevator Business Competition**
2010-11	**Residential Advisor**
2010 | 2009	**UR Rotaract** President | Secretary
2006-09	**Waterfront Director, Lifeguard | Mass Hospital School**
2006	**Eagle Scout**

MEDIA COVERAGE

"New mirror reflects light differently than conventional mirrors," *Phys.org*, November 13, 2017 [Link]

"K-12 Students Take Part in "A Day of Light" Workshop," *Georgia Tech,* May 2, 2017 [Link]

"Metamaterial shows non-linear optical activity," *Electronics Weekly*, April 11, 2017 [Link]

"Chiral metamaterial produces record optical shift under incremental power modulation," *Georgia Tech*, March 1, 2017.
See Also: *LaserFocusWorld, Newswise, Nanowerk, NSF, Air Force Research Labs, EurekAlert!, Phys.org, Photonics.com, ECN, Technology.org* [Link]

"Metamaterial breaks records as power modulates," *Controlled Environments,* March 1, 2017

"ECE Faculty, Staff, and Students Honored at the 2016 Roger P. Webb Awards Program," *Georgia Tech*, April 27, 2016 [Link]

"Intel Participates in Georgia Tech Diversity Activities Over MLK Weekend," *Georgia Tech*, January 20, 2016 [Link]

"Nonlinear optical metamaterial has opposite refractive indices," *Laser Focus World,* June 17, 2015 [Link]

"Nonlinear mirrors' bizarre properties could prove valuable for optical technology," *Tech Times,* June 17, 2015 [Link]

"Theory turns to reality for nonlinear optical metamaterials," *Georgia Tech,* June 15, 2015,
See also: *Newswise, EurekAlert!, Nanowerk* [Link]

"Center of Success," *Rochester Review,* April 15, 2014,