CURRICULUM VITAE

Tim (TJ) LaFave Jr.

Buffalo, NY 14221 tjlafave.com

EDUCATION

Ph.D. Electrical Engineering, 2006, University of North Carolina, Charlotte, NC

M.S. Applied Physics, 2001, University of North Carolina, Charlotte, NC

B.S. Physics, 1996, Illinois Institute of Technology, Chicago, IL

EXECUTIVE SUMMARY

Independent Contractor, July 2024 – present

Researcher (Remote), Jan. 2024 – July 2024, Electrical Engineering, SMU, Dallas, TX

Research Scientist, 2018 – 2023, Dept. of Physics, University at Buffalo, Buffalo, NY

Substitute Lecturer, 2019, Dept. of Physics, University at Buffalo, Buffalo, NY

Research Professor, 2015 – 2018, Southern Methodist University, Dallas, TX

Independent Contractor, 2015 – 2017, Patent Development, Self-Employed, Dallas, TX

Research Scientist, 2014 – 2015, University of Texas at Dallas, Richardson, TX

Guest Lecturer, 2008 – 2015, Dept. of Electrical Engineering, UT-Dallas, Richardson, TX

Research Associate, 2008 – 2013, Dept. of Interdisciplinary Studies, UT-Dallas, Richardson, TX

Postdoctoral Research Scholar, 2007 – 2008, Dept. of Physics, University of Iowa, Iowa City, IA

Postdoctoral Fellow, 2006 – 2007, Dept. of Electrical Engineering, UNC-Charlotte, Charlotte, NC

Graduate Research Assistant, 2001 – 2006, Dept. of Electrical Engineering, UNC-Charlotte, Charlotte, NC

Graduate Teaching Assistant, 2001 – 2003, Dept. of Electrical Engineering, UNC-Charlotte, Charlotte, NC

Graduate Research Assistant, 1998 – 2001, Dept. of Electrical Engineering, UNC-Charlotte, Charlotte, NC

Graduate Teaching Assistant, 1997 – 1999, Dept. of Physics, UNC-Charlotte, Charlotte, NC

Graduate Teaching Assistant, 1996 – 1997, Dept. of Physics, Kent State University, Kent, OH

Academic Office Assistant, 1993 – 1996, Dept. of Humanities, Illinois Institute of Technology, Chicago, IL

Writing Tutor for International Students, Dept. Humanities, 1992 – 1993, IIT, Chicago, IL

Office Assistant, Office of Development, Illinois Institute of Technology, Chicago, IL

TEACHING EXPERIENCE

University at Buffalo, Buffalo, NY

Substitute Lecturer, Department of Physics

- General Physics II, 2019

University of Texas at Dallas, Richardson, TX

Guest Lecturer, Department of Electrical Engineering

- Fields and Waves, 2008 – 2015, Example: http://bit.ly/48i5P3w

University of North Carolina at Charlotte, Charlotte, NC

Graduate Teaching Assistant, Department of Electrical Engineering

- Intro. Engineering Practices II, cleanroom-based microfabrication course, 2001 – 2003
- Systems and Electronics Laboratory, 2000 – 2001

Graduate Teaching Assistant, Department of Physics

- Introductory Physics Laboratory, Algebra- and Calculus-based, 1997 – 1999

Kent State University, Kent, OH

Graduate Teaching Assistant, Department of Physics, 1996 – 1997

- General College Physics Laboratory II and Recitation

- General College Physics Laboratory I and Recitation

Illinois Institute of Technology, Chicago, IL

- Writing Tutor for International Students, Department of Humanities, 1992 – 1993

THESIS COMMITTEES

- MSEE, Sahil Sakpal, *Spatial Division Multiplexing using IG Beams*, SMU, Aug. 2017.
- MSEE, Regan Klein, *Z-Transform Techniques in the Design of MZ Modulators*, SMU, Apr. 2017.
- MSEE, Mehdi Nouri, *Optical Orbital Angular Momentum Metrology*, UT-Dallas, Dec. 2014.

TECHNICAL WRITING/EDITING EXPERIENCE

Independent Contractor, Buffalo, NY, 2024 – present

- Created graphics Transfer Function Library for researchers, students, and professors in their creation of publication quality diagrams. PowerPoint and xFig (original).

University at Buffalo, Department of Physics, 2018 – 2023

- Created user and calibration manuals for a THz microspectrometer used to measure intramolecular vibrations in anisotropic materials like protein, sucrose, and fructose crystals
- Created user manual for Edinburgh CO_2 molecular gas laser used in conjunction with Bruker FTIR
- Created a 45-minute instructional video for a Si-prism based THz quarter waveplate alignment procedure, a weeks-long process converted to 1 hour (trial-tested with an undergraduate student with no optics experience)
- Managed research group web pages using Drupal (markelz.physics.buffalo.edu)
- Created a PowerPoint-based Optics Library for professionals in the creation of publication-quality diagrams. https://markelz.physics.buffalo.edu/node/411

Southern Methodist University, Department of Electrical Engineering, 2015 – 2018

- Created xFig-based transfer function library for professionals in the creation of publication quality diagrams.

Independent Contractor, Dallas, TX

Technical Consultant, 2015-2017

- I researched and developed patent related content and context for an incubator partnership in areas of biomedical spectroscopy and last-mile telecommunications

University of Texas at Dallas, Department of Electrical Engineering, 2008 – 2013

- Developed and implemented comprehensive process travelers to manage fabrication of electro-optic filters in thin film InP waveguides with on-chip active lasers and patented nanophotonic waveguides using resources across several corporate and academic institutions (DARPA-supported research grant)

University of Iowa, Department of Physics, 2006 – 2007

- Created equipment and process user manuals for Microfabrication Lab.

Integrated Electronics Innovations, Inc, Cary, NC, 2002

- Created a commercial website for a specialized microelectronics and optoelectronics equipment manufacturer. (Archived: http://web.archive.org/web/20080427071119/http://iei-inc.com/)

University of North Carolina at Charlotte, Department of Electrical Engineering, 2001 - 2003

- Developed a full set of equipment user manuals for Intro to Engineering Practices II, a newly created semiconductor cleanroom-based course for advanced undergraduate electrical engineering students.
- Creation of extensive web-accessible course materials for Intro to Engineering Practices II used by the course instructor, graduate teaching assistants, and students (a novel concept at the time)
- Creation of in-house ABET-accreditation resources website for Electrical Engineering faculty

Illinois Institute of Technology, Department of Humanities, 1992 – 1996

- Co-developed course materials for newly created masters-level Technical Communications and Information Design (TCID) program including extensive HTML tutorials

- User manual for customer-reported wireless service mapping software, CrossStreets, Empower Geographics
- Operation and safety manual for industrial I-beam rolling tool used to shape I-beams for commercial construction projects, Chicago Metal Rolled
- President and co-founder of the Arts and Literary Society including creation of three annual volumes of the arts and literary journal *bloo*, creation of a weekly poetry reading series *Paisley*, and host of invited guest speakers.
- 1995 Elie Wiesel Prize in Ethics Essay Contest semi-finalist entry for "Developing an Ethical, Technology-Based Society: A Personal Responsibility" selected to represent the University by the Center for the Study of Ethics in the Professions.
- 1993 Dept. of Humanities Annual Writing Contest, Freshmen Essay Award, "Space Station Freedom"

RESEARCH EXPERIENCE

Southern Methodist University, Dallas, TX (remote)

Researcher, Department of Electrical Engineering, January 2024 – July 2024

- Developed square waveguide-based on-chip photonic device structures for photonic integrated circuits with applications in quantum computing.
- Proposed designs for a new optical fiber-to-chip edge coupler compatible with AIM Photonics standard silicon and silicon nitride rectangular waveguide fabrication capabilities based on Ansys HFSS simulations.

University at Buffalo, Buffalo, NY

Research Scientist, Department of Physics, 2018 – 2023

- Developments of a compact anisotropic THz microspectrometer using a THz quantum cascade laser and room temperature THz detector in collaboration with Longwave Photonics
- Devised and implemented a robust calibration procedure for custom-built stationary sample anisotropic THz microspectroscopy (SSATM) instrument
- Identified significant system errors in THz-SSATM instrument for future study
- Created analysis tools (Maple and Igor) for far-field anisotropic THz microscopy (ATM)
- Performed far-field ATM measurements using closed-cycle (liquid He) and flow (liquid nitrogen) cryostats
- Installed and used an Edinburgh far-IR CO_2 molecular gas laser with a Bruker FTIR
- (Remote work in 2020 COVID lockdowns) Identified spectral artifacts arising from subwavelength aperture in measurements of THz light using computational modelling in Ansys HFSS
- Integrated/implemented breadboard-scale SSATM with discrete and continuous orientation-patterned gallium phosphide (OP-GaP) sources in collaboration with Microtech Instruments
- THz spectroscopy of molecular crystals including proteins, sucrose, fructose, and glucose

Southern Methodist University, Dallas, TX

Research Professor, Department of Electrical Engineering, 2015 – 2018

- Developed benchtop and chip-scale compatible architectures for photon qubit-based Bell state oscillators as part of two awarded patents in quantum computing
- Investigated the interaction of twisted light with chiral systems for biomedical applications
- Investigated structured coherent light for telecommunication applications
- Aided in development of holey THz dielectric waveguides for chip-to-chip communication
- Aided in holey THz dielectric vortex fiber development for orbital angular momentum (OAM) applications

UT-Dallas, Richardson, TX

Research Scientist, Department of Electrical Engineering, 2014 – 2015

- Aided in the development of an OAM-based GPON fiber testbed

Research Associate, Department of Electrical Engineering, 2008 – 2013

- I devised a processing method to attach polymer optical fiber invented a polymer optical fiber buds processing method for bundled fibers used in fNIRS research at UT-Southwestern

- EO Polymers. (Intel) Improved processing and spectroscopy of synthesized polymer films.
- Neurophotonics. (DARPA) I optimized fabrication of optical sensors and invented bio- and E-field-compatible packaging for WGM sensors used to study neuronal activity
- PhASER. (DARPA) I created ways to integrate nano- and microscale processing of EO filters in multi-quantum well InP and reduced process time by 75% with improved overall device quality in addition to developing competing travelers to strategically optimize different global fabrication approaches.

University of Iowa, Iowa City, IA

Postdoctoral Research Scholar, Department of Physics, 2007 – 2008

- SLEDS (US ARMY) I performed wet etch studies in GaSb-based materials for LED-based high-temperature infrared scene simulation.

UNC-Charlotte, Charlotte, NC

Department of Electrical Engineering

Graduate and Postdoctoral Researcher, [doctoral advisor: Raphael Tsu], 1997 – 2007

- I discovered correlations between the plum-pudding model and natural atomic electron shell-filling.
- I pursued novel theoretical classical investigations of electrons in quantum dots.
- I developed a comprehensive discrete charge dielectric electrostatics interactions model including a new definition of capacitance appropriate to nanoscale, few-electron capacitance.
- I pursued a novel quantum mechanical model of electrons in quantum dots to include a finite barrier.
- I demonstrated an epitaxial process to yield unique defect-density profiles in Si thin films as studied by FTIR of H-decorated stretching bonds in collaboration with a visiting scientist.
- I assembled UHV-MBEs for metals and Si/Ge, demonstrated an SOI technology with p-doped c-Si over SiO_2, and conducted TEM, SEM, LEED, and RHEED studies.
- I built a dark room to develop photographic plates from older generation TEMs using a nitrogen burst system.

Kent State University, Kent, OH

Graduate Research Assistant, Department of Physics, 1996 – 1997

- I developed LabView code for 2D infrared spectroscopy of liquid crystals.

Illinois Institute of Technology, Chicago, IL

Undergraduate Researcher, Department of Physics, 1995 – 1996

- I fabricated and tested Schottky barrier diode solar cells (supported by SPS and Motorola).

TEACHING EXPERIENCE

University at Buffalo, Buffalo, NY

Substitute Lecturer, Department of Physics

- General Physics II, 2019

University of Texas at Dallas, Richardson, TX

Guest Lecturer, Department of Electrical Engineering

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University of North Carolina at Charlotte, Charlotte, NC

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Illinois Institute of Technology, Chicago, IL

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THESIS COMMITTEES

- MSEE, Sahil Sakpal, *Spatial Division Multiplexing using IG Beams*, SMU, Aug. 2017.
- MSEE, Regan Klein, *Z-Transform Techniques in the Design of MZ Modulators*, SMU, Apr. 2017.
- MSEE, Mehdi Nouri, *Optical Orbital Angular Momentum Metrology*, UT-Dallas, Dec. 2014.

PATENTS

[1] # 11,657,313 (US) Systems and Methods for Preservation of Qubits (cont. of 10,878,333 and 10,579,936)

[2] # 11,080,614 (US) Systems and Methods for Quantum Coherence Preservation of Qubits

PUBLICATIONS

Book Chapters

[1] R. Tsu, T. LaFave Jr., "Role of symmetry in conductance, capacitance, and doping of quantum dots," in *The Wonder of Nanotechnology: Quantum Optoelectronic Devices and Applications*, M. Razeghi, L. Esaki, and K. von Klitzing, eds., (SPIE Press, 2013) pp. 3-38.

Refereed Journal Articles

[1] T. LaFave Jr., "The Snowflake Problem: An introduction to energy minimization problems," *The Physics Teacher*, **63** 252 (2025). doi: 10.1119/5.0168597

[2] D. L. MacFarlane, A. Helmy, H. Shahoei, T. LaFave Jr., M. A. Thornton, E. Stewart, and W. Oxford "Towards the on-chip realization of polarization encoded qubits", *Proc. SPIE 13028, Quantum Information Science, Sensing, and Computation XVI*, 130280E (7 June 2024). doi:10.1117/12.3016742.

[3] K. N. Smith, T. P. LaFave Jr., D. L. MacFarlane, M. A. Thornton, "Higher-radix Chrestenson gates for photonic quantum computation," *Journal of Applied Logics: The IfCoLog Journal of Logics and Their Applications*, 5(9) 1781-1798 (2018). ISBN: 978-1-84890-294-7.

[4] S. Sakpal, G. Milione, M.-J. Li, M. Nouri, H. Shahoei, T. LaFave Jr., S. Ashrafi, D. MacFarlane, "Stability of Ince-Gaussian beams in elliptical core few-mode fibers" *Opt. Lett*. 43(11) 2657-2659 (2018). doi: 10.1364/OL.43.002656

[5] N. Aflakian, T. LaFave Jr., K. K. O, S. Ashrafi, D. MacFarlane, "Design, fabrication and demonstration of a dielectric vortex waveguide in the sub-terahertz region," *Appl. Opt*. **56** 7123 (2017).

[6] N. Aflakian, N. Yang, T. LaFave Jr., K. 0, D. MacFarlane, "Square dielectric THz waveguides," *Opt. Exp.* **24** 14951 (2016). doi: 10.1364/OE.24.014951

[7] T. LaFave Jr., "Discrete transformations in the Thomson problem," *J. Electrostat*. **72** 39 (2014). doi: 10.1016/j.elstat.2013.11.007

[8] T. LaFave Jr., "Correspondences between the classical electrostatic Thomson problem and atomic electronic structure*," J. Electrostat*. **71** 1029 (2013). doi: 10.1016/j.elstat.2013.10.001

[9] B. Cheek, M. Dabkowski, A. El Nagdi, L. R. Hunt, T. P. LaFave Jr., K. Liu, D. L. MacFarlane, V. Ramakrishna, "Analysis of a polynomial system arising in the design of an optical lattice filter useful in channelization," *Acta Appl. Math*. **118** 107 (2012). doi: 10.1007/s10440-012-9680-8

[10] D. L. MacFarlane, M. P. Christensen, K. Liu, T. LaFave Jr., G.A. Evans, N. Sultana, T. W. Kim, J. Kim, J. B. Kirk, N. Huntoon, M. Dabkowski, L. R. Hunt, V. Ramakrishna, "Four-port nanophotonic frustrated total internal reflection coupler," *IEEE Photon. Technol. Lett*. **24** 58 (2012). doi: 10.1109/LPT.2011.2172204

[11] D. L. MacFarlane, M. P. Christensen, A. E. Nagdi, G. A. Evans, L. R. Hunt, N. Huntoon, J. Kim, T. W. Kim, J. Kirk, T. LaFave Jr., K. Liu, V. Ramakrishna, M. Dabkowski, N. Sultana, "Experiment and theory of an active optical filter," *J. Quant. Electron.* **48** 307 (2012). doi: 10.1109/JQE.2011.2174615

[12] T. LaFave Jr., "Discrete charge dielectric model of electrostatic energy," *J. Electrostat*. **69** 414 (2011). doi: 10.1016/j.elstat.2011.06.006.

[13] A. El Nagdi, K. Liu, T. P. LaFave Jr., L. R. Hunt, V. Ramakrishna, M. Dabkowski, D. L. MacFarlane, M. P. Christensen, "Active integrated filters for RF-photonic channelizers," *Sensors* **11** 1297 (2011). doi: 10.3390/s110201297.

[14] N. Sultana, W. Zhou, T. LaFave Jr., D. L. MacFarlane, "HBr based inductively coupled plasma etching of high aspect ratio nanoscale trenches in InP: Considerations for photonic applications," *J. Vac. Sci. B* **27** 2351 (2009). doi: 10.1116/1.3250263

[15] T. LaFave Jr., R. Tsu, "The value of monophasic capacitance of few-electron systems" *Microelectron. J.* **40** 791 (2009). doi: 10.1016/j.mejo.2008.11.035

[16] T. LaFave Jr., R. Tsu, "Capacitance: A property of nanoscale materials based on spatial symmetry of discrete electrons," *Microelectron. J.* **39** 617 (2008). doi: 10.1016/j.mejo.2007.07.105

[17] J. Zhu, T. LaFave Jr., R. Tsu, "Capacitance of few electron dielectric spheres," *Microelectron. J.* **37** 1293 (2006). doi: 10.1016/j.mejo.2006.07.013

Conference Proceedings

[1] T. LaFave, J. Cerne, H. Hui, H. Zeng, & A. Markelz, "THz studies of optoelectronic chalcogenide perovskite thin films," 49th Intl. Conf. on Infrared, Millimeter and THz Waves (IRMMW-THz), Sept. 2024. doi: 10.1109/IRMMW-THz60956.2024.10697556

[2] D. MacFarlane, A. Helmy, H. Shahoei, T. LaFave Jr., M. Thornton, E. Stewart, & W. Oxford, "Towards the On-Chip Realization of Polarization Encoded Qubits," SPIE Defense + Commercial Sensing 2024, National Harbor, MD, Apr. 2024.

[3] T. LaFave, A. W. M. Lee, T.-Y. Kao, A. Markelz, "THz Transmission through Submillimeter Apertures," *IRMMW-THz*, Buffalo, NY, Nov 2020. doi: 10.1109/IRMMW-THz46771.2020.9370923

[4] T. LaFave, D. K. George, A. G. Markelz, I. McNee, V. Kozlov, P. Schunemann, "Stationary Sample Anisotropic THz Spectroscopy Using Discretely Tunable THz Sources," IRMMW-THz, Paris, pp 1-2 (2019). doi: 10.1109/irmmw-thz.2019.8874234

[5] D. K. George, T. J. LaFave, A. G. Markelz, I. McNee, P. Tekavec, V. Kozlov, P. Schunemann, "Tunable compact narrow band THz sources for frequency domain THz anisotropic spectroscopy," *Proc. SPIE 10983, Next-Generation Spectroscopic Technologies XII*, 1098311 2019. doi: 10.1117/12.2519878

[6] M. Nouri, S. Sakpal, H. Shahoei, T. LaFave, S. Ashrafi, D. MacFarlane, "Assessing the ability to demultiplex co-propagating orthogonal modes," 2017 Euro. Conf. Opt. Comm. 1-3.

[7] N. Aflakian, T. LaFave, R. M. Henderson, D. L. MacFarlane, "Square dielectric interconnect for chip-to-chip THz communication," *Wireless and Microwave Circuits and Systems* (WMCS), Symposium, Waco, 1-3 TX (2017).

[8] M. Nouri, H. Shahoie, T. LaFave, S. Ashrafi, D. MacFarlane, "Orbital angular momentum multiplexing using Low-Cost VCSELs for Datacenter applications," Frontiers in Optics, FW5D.5 (2016).

[9] H. Kumar, H. Yao, T. Ei, N. Ashrafi, T. LaFave Jr., S. Ashrafi, D. L. MacFarlane, R. Henderson, "Physical phaseplate for the generation of a millimeter-wave Hermite-Gaussian beam," *2016 IEEE Radio and Wireless Symp.* (RWS) 234 (2016).

[10] D. L. MacFarlane, M. P. Christensen, A. E. Nagdi, G. A. Evans, L. R. Hunt, N. Huntoon, J. Kim, T. W. Kim, J. Kirk, T. P. LaFave, K. Liu, V. Ramakrishna, M. Dabkowski, N. Sultana, "Two dimensional optical lattice filters with gain: Fabrication and experimental results," *Quant. Electronics Conf. & Lasers and Electro-optics* (CLEO) 1018 (2011).

[11] D. L. MacFarlane, M. P. Christensen, L. R. Hunt, J. Kim, T. W. Kim, T. P. LaFave Jr., K. Liu, A. E. Nagdi, N. Sultana, V. Ramakrishna, M. Dabkowski, "Active Optical Lattice Filters with Nanophotonics Four-Port Couplers," *15th OptoElectron. and Comm. Conf.* (OECC2010) *Tech. Dig.* July 2010 7D3-4 (2010).

[12] M. P. Christensen, D. L. MacFarlane, L. R. Hunt, J. Kim, T. W. Kim, T. P. LaFave, K. Liu, A. El Nagdi, N. Sultana, V. Ramakrishna, N. Huntoon, M. Dabkowski, "Active lattice filter with nanophotonic FTIR-couplers for integrated photonic channelizer," *Photon. Global Conf.* (PGC) 1 (2010).

[13] D. L. MacFarlane, L. R. Hunt, V. Ramakrishna, T. J. LaFave, W. Zhou, N. Sultana, A. Stark, "Chip-scale analog optical signal processing," *Conf. Proc. LEOS* 437 (2008).

[14] T. LaFave Jr. R. Tsu "A new definition of capacitance of few electron systems," *PIERS Proc.* Hangzhou, China, March 24-28, 1269 (2008).

Other Publications

[1] T. LaFave Jr., "'Quantum physics' doesn't make the Sun shine," Physics Today **76**(7) 12 (2023). doi: 10.1063/PT.3.5263

[2] T. LaFave Jr., "Pseudoscience versus science," Physics Today, **69**(11) 10-11, (2016).

TALKS

Invited

[1] "Discovering the geometric nature of the periodic table of atoms," LeMoyne College, 2018.

[2] "Discovering the geometric nature of the periodic table of atoms," Roanoke College, 2018.

[3] "Interaction of electrons in a nanosphere," Superlattice Workshop, University of North Carolina at Charlotte, May 5-7, 2013.

[4] "Capacitance of dielectric spheres in the absence of metal contacts: A classical model of discrete electrons for nanoscale materials and devices," NIST, Boulder, CO, Dec. 15, 2006.

Conferences

[1] "THz and Mid-Infrared Linear Dichroism in the High Tc Superconductor La2-xSrxCu04, *THz IRMMW, 48th Conf. on Infrared Millimeter and THz Waves*, Montreal, Quebec, Canada, 2023. doi: 10.1109/IRMMW-THz57677.2023.10298921

[2] "Crystal Symmetry Effects on Protein Structural Vibrational Signatures," *THz IRMMW, 48th Conf. on Infrared Millimeter and THz Waves*, Montreal, Quebec, Canada, 2023

[3] "Multivalued electro optic response in near-field THz polarimetry," *APS March Meeting*, Las Vegas, NV, 2023.

[4] "Intramolecular structural vibrations of triose phosphate isomerase," *APS March Meeting*, Las Vegas, NV 2023.

[5] "Photo-switching in crystalline OCP," *APS March Meeting*, Chicago, IL, 2022.

[6] "Terahertz microspectroscopy: far-field fidelity degradation and recovery," *APS March Meeting*, Chicago, IL, 2022.

[7] "A Radix-4 Chrestenson Gate for Optical Quantum Computation," *IEEE International Symposium on Multiple-Valued Logic* (ISMVL), Linz Austria (May 16-18, 2018).

[8] "Single Qubit Quantum Ring Structures and Applications," *Southwest Quantum Information and Technology*, 20th Annual SQuInT Workshop, (2018).

[9] "Single qubit quantum ring oscillator and applications for storage and true random number generation," *Intl. Workshop on Quant. Sim. & Comp*., Bilbao, Spain, 2018.

[10] "Assessing the ability to demultiplex co-propagating orthogonal modes," *European Conference on Optical Communications* (ECOC), Gothenburg, Sweden, 2017.

[11] "Square dielectric interconnect for chip-to-chip THz communication," IEEE Texas Symp. Wireless and MW. Circ. & Sys. 2017.

[12] "Design and implementation of a photonic quantum storage device," *IBM ThinkQ Conf.*, 2017.

[13] "Single photon quantum state oscillator, "Single Photon Workshop, Boulder CO, 2017

[14] "Fabrication and demonstration of vortex dielectric THz waveguide," OSA Design Fabrication Conference, Denver, CO 2017.

[15] "Orbital angular momentum multiplexing using low-Cost VCSELs for datacenter applications," *FIO/LS*, Rochester, NY Oct 17-21, 2016.

[16] "Square holey cladding dielectric THz waveguides for chip-to-chip communication," *FiO/LS*, Rochester, NY Oct. 17-21, 2016.

[17] "Physical phaseplate for the generation of a millimeter-wave Hermite-Gaussian beam," *IEEE Radio and Wireless Week*, Austin, TX, Jan. 24-27, 2016.

[18] "Aryl Ether Fluoropolymers: Materials for Hole Transport and Electro-optic Applications," *Energy Summit 2013: Center for Energy Harvesting Materials and Systems (CEHMS)*, Jan. 29-31, Richardson, TX, 2013.

[19] "Active optical lattice filters with nanophotonic four-port couplers," *15th OptoElectronics and Communications Conference*, July 5-9, Sapporo, Japan, 2010.

[20] "Chip-scale analog optical signal processing," *21st Annual Meeting of the IEEE, LEOS* 2008, Nov. 9-13, Newport Beach, CA, 2008.

[21] "Lateral epitaxial overgrowth of Si and SiGe on SiO_2 using buried low-temperature ($T_s < 500^{\circ}C$) solid metal mediated epitaxy," *MRS Symp. A*, Nov. 26-28, Boston, 2001.

[22] "Fabrication of buried oxide structures at low temperature ($T_s < 500^{\circ}C$) using solid-metal-mediated molecular beam epitaxy," Presentation, *AVS 1st Intl. Conf. on Microelectronics and Interfaces*, Feb. 7-11, Santa Clara, CA, 2000.

[23] "Integrated shallow-junction *p*-type doping and epitaxial metallization of Si at low-temperatures ($T_s < 500^{\circ}C$) using solid-metal mediated molecular beam epitaxy," *AVS 2nd Intl. Conf. Adv. Mat. And Proc. Microelectron*., Feb. 7-11, Santa Clara, CA, 2000.

[24] "Buried low-temperature ($T_s < 500^{\circ}C$) lateral epitaxial overgrowth of Si on SiO_2 using solid metal mediated epitaxy," *AVS 47th Intl. Symp*., Oct. 2-6, 2000, Boston, 2000.

Departmental Talks

[1] "Classical atoms and quantum dots: When size doesn't matter," SMU, Oct. 22-23, 2015.

[2] "A new classical electrostatic approach to ground state energy, capacitance and atomic structure," University of Texas at Dallas, EE Seminar Series, Nov. 7, 2008.

SERVICE TO PROFESSION

Peer Journal Reviewer

Am. J. Phys. (2024+)	*J. Appl. Phys.* (2024+)	*The Physics Teacher* (2022+)
J. Comp. Phys. (2014+)	*Phys. Lett. A* (2014+)	*Opt. Mat. Exp*. (2013+)
Opt. Express (2012+)	*Opt. Lett*. (2012+)	*Appl. Opt.* (2011+)

Mentor

Adopt-A-Physicist, sponsored by AIP/SPS, APS, AAPT, 2009-2018.

Science Fair Judge:

WNY Science and Engineering Science Fair, 2019.

AWARDS

Amherst, Williamsville, Pendleton, NY, 2022

- "*Ripple*" Earth Day Photo Contest Winner

Southern Methodist University, Dallas, TX

- Dean's Award, Research Day, SMU, Feb. 10, 2016

University of North Carolina at Charlotte, Charlotte, NC

- Research Award Finalist (2^{nd}), 2001

Illinois Institute of Technology, Chicago, IL

- Clinton E. Stryker Distinguished Services Award for Leadership, 1995
- Freshmen Essay Award, Department of Humanities Annual Writing Contest, 1993
- Molley Cohen Poetry Award, Department of Humanities Annual Writing Contest, 1993

PROFESSIONAL MEMBERSHIP

- American Association of Physics Teachers (AAPT)
- American Physical Society (APS), Society of Physics Students (SPS)
- Institute of Electrical and Electronics Engineers (IEEE)
- Optical Society of America (OSA)
- Sigma Pi Sigma, National Physics Honor Society, Apr. 23, 1999