Dennis W. Prather, Ph.D.
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RESEARCH INTEREST:

My research involves the development and application of integrated electronic and photonic devices into novel RF systems for wireless networks/communications, waveform synthesis, high-end transmitters and receivers, passive/active RF imaging, and Radar. Particular aspects of my research include the development of fabrication and integration processes necessary for the demonstration of state-of-the-art RF-photonic devices such as: ultra-high bandwidth modulators, silicon photonic RF sources, photonic crystal chip-scale routers, meta-material antennas, and integrated RF-Photonic phased arrays. This work has been maintained by a funding level of over $50M by sponsors including NSF, AFOSR, DARPA, ONR, ARO, as well as many industrial sponsors and has resulted in over 750 technical publications (h-index: 53, Google Scholar; Total Citations: >13,350, Since 2020: >3,700), 72 patents, and 16 books/chapters.

EDUCATION:

Ph.D. in Electrical Engineering, University of Maryland 1997,
Dissertation: "Analysis and synthesis of finite aperiodic diffractive optical elements using rigorous electromagnetic models"

M.S. in Electrical Engineering, University of Maryland 1992,
Thesis: "An acousto-optic Fourier plane image processor with applications to morphology"

B.S.E.E. University of Maryland 1989

EXPERIENCE:

Named Professor, Engineering Alumni Distinguished Professor, Department of Electrical and Computer Engineering, University of Delaware, Endowed as the College of Engineering Distinguished Professor (4/07-current), Professor (9/05 – 4/07), Associate Professor (with tenure) 9/00-9/05, Assistant Professor 8/97-8/00. In addition to teaching undergraduate and graduate level courses in electromagnetics, signal processing, and optics, I lead a research group focused on RF-photonic devices and their integration into high performance computing and RF systems. As such, my research focuses on system level drivers and the underlying technologies needed to address them. On the system level we investigate ultra-wide band systems for wireless networks and communications, active/passive imaging in the RF spectral domain and on the computing side we are working on coherent photonic links for ultra-dense data multiplexing. On the device level we investigate the theoretical and experimental aspects of active and passive nano-photonic elements and their integration into various subsystems. To achieve this, we develop and refine coupled computational electromagnetic and quantum mechanical models as well as the associated nanofabrication (with a specialty in electron beam lithography) and integration processes necessary for their realization and demonstration. Notable devices include subwavelength structures, photonic crystal devices, high frequency optical modulators, meta-materials, tunable lasers, phase-locked receivers, and RF-Photonics.

President and Co-Founder, Phase Sensitive Innovations, (2/07-Present). In 2007 I started PSI with a team of extremely talented engineers. PSI's research is to develop and transition RF Photonics technology that includes device level products such as high bandwidth and high efficiency electro-optic modulators, high output current photon-diodes, and unique RF communication and data link systems into the commercial market. While we have demonstrated the largest bandwidth point-to-point link, we have also developed unique phased array Tx/Rx systems that offer the ability to perform spatial processing prior to signal detection. This offers the ability to perform orthogonal sectoring for communication and sensing channels that improves overall system performance by an upper bound of more than 40dB. These systems are being actively transitioned to the commercial communications sector as well as the DoD.

Electronics Engineer, GS-14, 4/90-8/97, US Army Research Laboratory (ARL), Adelphi, MD. As a research scientist in the Optics Branch at ARL, I performed fundamental research on both optical devices and systems for information processing and distribution. My efforts in devices concentrated on the modeling, design, and fabrication of holographic and diffractive optical elements (in both the scalar and vector regime) and their integration with active opto-electronic devices, such as IR Focal Plane Arrays and VCSELs. My efforts in systems concentrated on early vision-based processors and modular optical interconnects for high performance computing.

US Navy (Retired), USNR, CAPT (Engineering Duty Officer, O-6), 6/82-10/2020, In the US Naval Reserve Engineering Duty Program, I performed and coordinated research projects for the US Navy. In this capacity I was the Commanding Officer (RESDET) at the Supervisor of Shipbuilding (SUPSHIP), Gulf Coast and led the acquisition, construction, certification, and transition of new Naval ships. Previous assignments were with Program Executive Office of Naval Sea Systems Command, where I led a team of engineers in the development of surface sensors and Radar systems. I was also assigned to the Office of Naval Research where I served as the Chairman of the NATO Technical Group for Advanced Imaging. Additional projects included: design and fabrication of photonic crystal devices in GaN and Diamond, design of subwavelength microwave and millimeter imaging lenses, the design and fabrication of computer-generated holograms for use in acousto-optic based passive direction-finding systems, measurement of RF fields and evaluation of technical data for Hazards of Electromagnetic Radiation to Ordnance (HERO).

HONORS / APPOINTMENTS:

Appointed to Scientific Advisory Board, AIM Photonics Manufacturing Institute, January 2025-Present
Subject Matter Expert (SME) Speaker, DARPA Microsystems Exploratory Council, July 2024
Subject Matter Expert (SME) Speaker, MITRE Photonics Conference, October 2024
Subject Matter Expert (SME) Speaker, NSF ERVA Visioning Event: Strategic Engineering for Next-Generation Wireless Competitiveness, June 2024
Keynote Speaker, IEEE Computational Imaging using Synthetic Arrays, May 2024
Inducted for Fellow, Military Sensing Symposia, February 2023

Appointed to Leadership Council, AIM Photonics Manufacturing Institute, January 2022-2024
Inducted **Fellow** of the Institute for Electrical and Electronics Engineers (IEEE), January 2020
Appointed to the Leadership Council, AIM Photonics Manufacturing Institute, 2019-2022
Keynote Engineering Speaker, International Photonic Systems Roadmap, MIT, November 2019
UD Graduate Mentor Award (one award given University wide), 2018
Inducted **Fellow** of the National Academy of Inventors, April 2018
Plenary Speaker at Military Radar Summit, 2016
Plenary Speaker at IEEE Global Signal and Information Processing Conference, 2015
Keynote Speaker, DoD Workshop on Metamaterial Enabled Applications, 2011
Associate Editor Photonics Technology Letters, 2009-2012
Appointed IEEE Senior Member, 2009
Semi-Finalist NSSEFF (top 20 out of 1,000), 2008
Chair NATO SET-083, Commander, USN, 2007
Director Nanotechnology Council, University of Delaware, 2007
Endowed Professor: Distinguished Engineering Alumni Professor, 2006 - present
Inducted **Fellow** of the Optical Society of America (OSA), now Optica, 2005
Inducted **Fellow** of the Society for Photo-Instrumentation Engineers (SPIE), 2004
Associate Editor for Physical Optics, Journal of Optical Engineering, 2002
Integrated Photonics Research Subcommittee Chairman on Micro- and Nano-Photonics, 2002
OSA Fraunhofer Award Committee, 2001
Outstanding Junior Faculty in the College of Engineering, 2000
College of Engineering Teaching Award, 2000
William J. Kastner Naval Engineering Excellence Award, US Navy, 2000
U.S. Naval Commendation Medal, for Microwave Lens Design, 2000
National Science Foundation CAREER Award, 1999
U.S. Naval and Marine Corp Achievement Medal, for Technical Achievement, 1999
Office of Naval Research Young Investigator Award, 1999
Topical Editor (Diffractive Optics), Applied Optics, 1999
Editor, SPIE Milestone Series on Subwavelength Diffractive Optics, 1999

PROFESSIONAL ACTIVITIES:
IEEE Computational Imaging using Synthetic Arrays, (IEEE CISA) Technical Program Committee, *Track Chair of Wideband Arrays, 2024*
IEEE Military Communications (MILCOM) Technical Program Committee, *Waveforms and Signal Processing Track, 2023*
IEEE International Microwave Symposium, Subcommittee: *Terahertz and photonic integrated circuits 2022*
Conference Chair, RF and Millimeter-Wave Photonics, SPIE 2010-2022
Conference Chair, Photonic Crystal Materials and Devices IV, SPIE 2005-2010
CLEO subcommittee on Optical Materials, Fabrication and Characterization, CLEO 2004-2021
Conference Co-Chairman and Organizer, OSA new Topical Meeting on Nano-Photonics, 2005

Short course instructor: "Photonic Crystals" CLEO, 2002-2005
Conference Chair, Quantum Sensing and Information, SPIE 2003-05
Conference Chair, Micromachining and Microfabrication, SPIE 2002-05
Conference Chair, First International Conference on Group IV Photonics, sponsored by IEEE LEOS, 2004
Conference Chair, Diffractive and Holographic Technologies, SPIE 2000 and 2001
Topical editor on Physical Optics, Journal of Optical Engineering, 2001
Presider, Symposium on Optical Interconnects - OSA Annual Meeting 1999
Organizer, Symposium on Diffraction Theory and Coherence - OSA Annual Meeting 1999
OSA Topical Meeting on Diffractive Optics and Micro-Optics, program committee member, 1999
Organizer, Symposium on Subwavelength Diffractive Optics - OSA Annual Meeting 1998
Holographic and Diffractive Optics Technology - program committee member, SPIE 1996-99
Modeling and Design - program chair, SPIE Conference on Holographic and Diffractive Optics Technology 1996-98
Panelist, SPIE Workshop on Holographic and Diffractive Optics, 1997 and 1998
Micromachine Technology for Diffractive and Holographic Optics, program committee member, SPIE 98-99
U.S. Army Fellowship, "Visiting Scientist," summer 1998 and 1999
Panelist, OSA Symposium on Subwavelength Structured Surfaces: What Does the Future Hold? 1998
Member, Eta Kappa Nu (Electrical Engineering Honor Society)
Faculty Advisor, IEEE Student Chapter University of Delaware 1998-99
Member, Optical Society of America
Member, Society of Photo-Instrumentation Engineers
Member, Institute for Electrical and Electronic Engineers
Teach Scalar and Vector Diffraction Theory at the Georgia Institute of Technology short course on Diffractive Optics
Teach short course on Diffractive Optics, SPIE Photonics West 2000

REFEREED JOURNAL PUBLICATIONS (263 total) *Total Citations: 13,324 and h-Index: 53 (Google Scholar)*

2025

1. X. Zhu, M. Moller de Freitas, S. Shi, P. Yao, F. Wang, C. Cullen, M. Hinkle, and **D.W. Prather**, "Folded Sub-1V V_π Thin Film Lithium Niobate Phase Modulator," *IEEE Photonics Technology Letters*, Vol. 17, No. 5 March (2025).
2. M. Moller de Freitas, X. Zhu, Md S. Ullah, S. Shi, P. Yao, G. Schneider and **D.W. Prather**, "Monolithically Integrated Ultra-Wideband Photonic Receiver on Thin Film Lithium Niobate," *Nature Communications Engineering,* https://doi.org/10.1038/s44172-025-00393-7, (2025).
3. X. Zhu, M. Moller de Freitas, S. Shi, R. Xue, P. Yao, and **D.W. Prather**, "Capacitive Loaded Traveling Wave Electrodes on Thin Film Lithium Niobate for sub-THz Operation," *Optica, Optical Materials Express*, Vol. 15, No. 3, pp. 513-521, March (2025).
4. I. Isti, X. Zhu, M. Moller de Freitas, P. Yao, J. Hossain, S. Shi, G. Schneider, **D.W. Prather**, "Fabrication and Optical Communication of Low-Loss Barium Titanate

Waveguides," *IEEE Photonics Technology Letters*, Vol. 37, No. 19, pp. 1104-1104, October (2025).

5. H.I. Sinigaglio, J. Murakowski, and **D.W. Prather**, "Microwave-Photonic Radiometer for Atmospheric Sensing, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Vol. 18, pp. 13100-13111 (2025).
6. S. Park, H. Zhao, T. Zhama, Z. Chen, Y Zhang, X. Zhu, **D.W. Prather**, J. Kolodzey, Y. Zeng, "Uncooled GeSn MWIR Photodetectors Using Fully Relaxed Thin Triple-Step Buffer," *Advanced Materials Technologies*, 10.1002/admt.202500455, (2025).
7. S. Shi, F. Wang, G.J. Schneider, C.A. Schuetz, J. Abney, D. Marinucci, P. Yao, C. Harrity, and **D.W. Prather**, "Photonically Assisted 2D Transmit Array Using Fourier Optic-based Beamformer, *IEEE Microwave Theory and Techniques*, accepted for publication (2025).
8. H.I. Sinigaglio, J. Murakowski, T. Creazzo, G. Schneider, and **D.W. Prather**, "Passive Angle of Arrival Detection Using Antenna Array and Photonic Integrated Circuit," *IEEE Microwave Theory and Techniques*, accepted for publication (2025).
9. S.I. Chowdhury, H. Sinigaglio, MD S. Ullah, S. Shi, X.F. Qi, J.N. Mait, G. Schneider, J. Murakowski, and **D.W. Prather**, "Coherently Distributed RF Antenna Arrays using Photonic Links," *Optics Express*, accepted for publication (2025).
10. H.I. Sinigaglio, M. Gehl, J. Murakowski, T. Creazzo, and **D.W. Prather**, "Photonic Integrated Circuits for Angle-of-Arrival and Frequency Estimation," submitted for review, *IEEE XXX*, (2025).

2024

11. J. Murakowski, A. Hallak, A. Mercante, M. Zablocki, T. Creazzo, S. Shi, K. Shreve, M. Gallion, C. Creavin, C. Harrity, M. Gehl, M. Ogut, S. Brown, S. Misra, P. Kangaslahti, E. Kittlaus, and **D.W. Prather**, "Ultra-Wideband RF-Photonics Technology for Microwave Spectrometry," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Vol. 17 (2024).
12. S. Shi, F. Wang, J. Abney, Z. Aranda, G. Schneider, C. Schuetz, C. Harrity, M. Zablocki, S. Dontamsetti, R. Lawrence, and **D.W. Prather**, "Ultrawideband Modular RF Frontend Development for Photonically-Enabled Imaging Receiver," *IEEE Microwave and Wireless Technology Letters*, Vol. 34, No. 6, June 2024.
13. X. Zhu, M. de Freitas, S. Shi, A. Mercante, P. Yao, F. Wang, C. Cullen, and **D.W. Prather**, "Ultra-Wideband Dual-Output Thin-Film Lithium Niobate Intensity Modulator," *Invited Paper: IEEE Journal of Selected Topics in Quantum Electronics,* Vo. 30, No. 4, July/August 2024.

2023

14. T. Creazzo and **D.W. Prather**, "Photonic Integrated Circuits: Silicon-Adjacent Devices for High Beam-Bandwidth Communication and Sensing," *Invited Paper IEEE Comm. Soc. Technology News*, (November 1, 2023).
15. **D. W. Prather**, J.A. Murakowski , C.A. Schuetz , S. Shi ,G.J. Schneider , C. Harrity, Z.D. Aranda, D. Marinucci, A. Hallak, M. Zablocki, M. Gallion, S. Dontamsetti , B.J. Goodman, J. Semmel, and R. Lawrence, *Invited Paper* "Millimeter-Wave and Sub-THz Phased-Array Imaging Systems," *Invited Paper: IEEE Journal of Selected Topics in Quantum Electronics,* Vol. 29, No. 5 September/October (2023).
16. **D.W. Prather**, S. Galli, G.J. Schneider, S. Shi, J.A. Murakowski, X.F. Qi, and S.A. Schuetz "Fourier-Optics Based Opto-Electronic Architectures for Simultaneous

Multi-Band, Multi-Beam, and Wideband Transmit and Receive Phased Arrays," *IEEE Access*, Vol. 11 pp. 18082-18106 (2023).

17. W. Beardell, J. Murakowski, G. Schneider, and **D.W. Prather**, "Array-Beamspace Mapping for Planar Two-Dimensional Beamforming," *IEEE Access* Vol. 11 pp. 77716 – 77728 (2023).
18. J. Bai, Y. Shen, P. Yao, D. Chen, M. Konkol, B. Guo, X. Guo, V. Carey, J. Campbell, and **D. W Prather**, "Thermal Dissipation Enhancement in Flip-Chip Bonded Uni-Traveling Carrier Photodiodes," *Optics Letters*, Vol. 48, No. 19, pp. 5157-5160, (2023).

2022

19. W.L. Beardell, C.J. Ryan, G.J. Schneider, J. Murakowski, and **D.W. Prather**, "Microwave Photonic Direction-Finding Spectrometer," *Journal of Lightwave Technology*, pp. 3057-3064, vol. 41 (2022).
20. P. Yin*, V.A. Carey*, T. Creazzo, P. Yao, M.R. Konkol, **D.W. Prather**, and S. Preble, "Hybrid Integration Method for III-V Photodiode Using Bi-Layer Silicon Nitride Grating Coupler," submitted for review *Opt. Express* (2022).
21. S. Nelan, A. Mercante, C. Hurley, S. Shi, P. Yao, B. Shopp, and **D.W. Prather**, "Compact thin film lithium niobate folded intensity modulator using a waveguide crossing," *Opt. Express* 30, pp. 9193-9207 (2022).
22. S. Nelan, A. Mercante, S. Shi, P. Yao, E. Shahid, B. Shopp, C. Hurley, M. Zablocki, and **D.W. Prather**, "Ultra-high extinction dual-output folded thin-film lithium niobate intensity modulator," *IEEE Access* Vol. 10 pp. 100300 – 100311 (2022).
23. S. Nelan, A. Mercante, S. Shi, P. Yao, E. Shahid, B. Shopp, and **D.W. Prather**, "Integrated lithium niobate intensity modulator on a silicon handle with slow-wave electrodes," *IEEE Photonics Technology Letters*, VOL. 34, NO. 18, pp. 981-984, (2022).
24. X. Zhu, S. Nelan, A. Mercante, S. Shi, P. Yao, B. Shopp, and **D.W Prather**, "Phase modulation using titanium dioxide strip on lithium niobate," *Optical Materials Express,* Vol. 12, No. 8, pp. 3296-3302, (2022).
25. W. Beardell, B. Mazur, C. Ryan, G. Schneider, J. Murakowski and **D.W. Prather**, "RF-Photonic Spatial-Spectral Channelizing Receiver," *Journal of Lightwave Technology*, vol. 40, no. 2, pp. 432-441, (2022).
26. V.A. Carey, M.R. Konkol, C.E. Harrity, E.L. Shahid, C.A. Schuetz, P. Yao, and **D.W. Prather**, "W-Band Pulse Generation Using Phase-Locked Lasers and High- Power Photodiode," *IEEE Photon. Technol. Lett.*, Vol. 34, No. 12, pp. 645-648 (2022).

2021

27. V. A. Carey, M.R. Konkol, S. Shi, A. J. Mercante, K. Shreve, A. A. Wright, C. A. Schuetz, **D. W Prather,** "Millimeter Wave Photonic Tightly Coupled Array," *IEEE Transactions on Antennas and Propagation*, Vol. 69, No. 8, pp. 4488-4505, (2021).
28. C. J. Ryan, W. L. Beardell, J. Murakowski, G. J. Schneider, and **D. W. Prather**, "Instantaneous Microwave-Photonic Spatial-Spectral Channelization via k-Space Imaging," *Optics Express,* Vol. 29, No. 13, pp. 19928-19944, (2021).
29. N. Jagatpal, A. J Mercante, ANR Ahmed, **D. W. Prather,** "Thin film lithium niobate electro-optic modulator for 1064 nm wavelength," *IEEE Photonics Technology Letters*, Vol. 33, No. 5, pp. 271-274, (2021).

2020

30. ANR Ahmed, S. Shi, A. Mercante, S. Nelan, P. Yao, and **D.W. Prather**, "High-Efficiency Lithium Niobate Modulator for K-Band Operation," *APL Photonics*, Vol. 5, No. 9, pp. 091302, (2020).
31. C. J. Ryan, W. L. Beardell, J. Murakowski, D. D Ross, G. J. Schneider, **D. W. Prather**," Log-periodic temporal apertures for grating lobe suppression in k-space tomography," *Optics Express*, Vol. 28, No. 11, pp. 15969-15983, (2020).
32. **D.W. Prather**, S. Shi, M.R. Konkol, G.J. Schneider, J.A. Murakowski, P. Yao, C.A. Schuetz, "Optically-Driven, RF Transmit Phased Array Antennas for Mobile Communications and Wireless Networks," *Wiley Encyclopedia Electrical and Electronics Engineering*, Chapter: *Microwave Theory and Techniques*, https://doi.org/10.1002/047134608X.W8409, (2020). Online ISBN: 9780471346081
33. ANR Ahmed, S. Shi, S. Nelan, S. Shi, P. Yao, A. Mercante, and **D. W Prather**, "Subvolt electro-optical modulator on thin-film lithium niobate and silicon nitride hybrid platform," *Optics Letters*, Vol. 45, No. 5, pp. 1112-1115, (2020).

2019

34. ANR Ahmed, S. Shi, A. Mercante, **D. W Prather**, "High-performance racetrack resonator in silicon nitride-thin film lithium niobate hybrid platform," *Optics Express*, Vol. 27, No. 21, pp. 30741-3075, (2019).
35. ANR Ahmed, S. Shi, M. Zablocki, P. Yao, **D.W Prather**, "Tunable hybrid silicon nitride and thin-film lithium niobate electro-optic microresonator," *Optics Letters*, v. 44, issue 3, pp. 618-621, (2019).
36. F. Wang, S. Shi, **D. W. Prather**, "Microwave Photonic Link with Improved SFDR Using Two Parallel MZMs and a Polarization Beam Combiner," *Journal of Lightwave Technology*, v. 37, issue 24, pp. 6156 – 6164 (2019).
37. P. Cui, A. Mercante, G. Lin, J. Zhang, P. Yao, **D. W. Prather**, Y. Zeng, "High-performance InAlN/GaN HEMTs on silicon substrate with high $f_T \times L_g$," *Applied Physics Express*, v. 12, issue 10, pp. 104001
38. C. Ryan, D. Ross, J. Murakowski, G. Schneider, **D.W Prather**, "Kalman Filter Accelerated K-space Tomography," *IEEE Journal of Lightwave Technology*, v. 37, issue 3, pp. 942-948, (2019).
39. F. Wang, S. Shi, **D. W. Prather**, "LTE signal transmission over a linearized analog photonic link with high fidelity," *IEEE Photonics Journal*, v. 11, issue 5, pp. 1-9, (2019).

2018

40. A. Mercante, S. Shi, P. Yao, L. Xie, R. Weikle, **D.W Prather**, "Thin film lithium niobate electro-optic modulator with terahertz operating bandwidth," *Optics express*, v. 26, issue 11, pp. 14810-14816, (2018).
41. Y. Zhang, R. Martin, S. Shi, A. Wright, P. Yao, K. Shreve, D. Mackrides, C. Harrity, and **D.W Prather**, "95-GHz Front-End Receiving Multichip Module on Multilayer LCP Substrate for Passive Millimeter-Wave Imaging," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, v. 8, issue 12, pp. 2180 - 2189, (2018).
42. D. Ross, J. Murakowski, C. Ryan, G. Schneider, **D.W Prather**, "Compressive k-Space Tomography," *IEEE Journal of Lightwave Technology*, v. 36, issue 19, pp. 4478 - 4485, (2018).

43. J. Deroba, G. Schneider, C. Schuetz, and **D.W. Prather**, "Tapered Multi-beam Arrays via an Optically Power-efficient Photonic Architecture," *IEEE Journal of Lightwave Technology*, v. 54, issue 6, pp. 2746-2761, (2018).
44. M. Konkol, D. Ross, S. Shi, C. Harrity, A. Wright, C. Schuetz, and **D. W Prather**, "Photonic Tightly Coupled Array," *IEEE Transactions on Microwave Theory and Techniques*, v. 66, issue 5, pp. 2570-2578, (2018).
45. D. Ross, J. Murakowski, C. Ryan, G. Schneider, **D. W Prather**, "Passive Three-Dimensional Spatial-Spectral Analysis Based on k-Space Tomography," *IEEE Photonics Technology Letters*, v. 30, issue 9, pp. 817-820, (2018).
46. C. Schuetz, C. Harrity, G. Schneider, J. Murakowski, S. Shi, J. Deroba, and **D.W Prather**, "A Promising Outlook for Imaging Radar: Imaging Flash Radar Realized Using Photonic Spatial Beam Processing," *IEEE Microwave Magazine*, v. 19, issue 3, pp. 91-101, (2018).
47. J. Deroba, G. Schneider, C. Schuetz, and **D.W Prather**, "Multifunction Radio Frequency Photonic Array with Beam-Space Down-Converting Receiver," *IEEE Trans. On Aerospace and Electronic Systems*, v. 54, no. 6, pp. 2746-2761, (2018).
48. ANR Ahmed, A. Mercante, S. Shi, P. Yao, **D.W Prather**, "Vertical mode transition in hybrid lithium niobate and silicon nitride-based photonic integrated circuit structures," *Optics letters*, Vol. 43, Issue 17, pp. 4140-4143, (2018).
49. G. Schneider, J. Murakowski, S. Shi, M. Kermalli, S. Galli, XF Qi, **D.W Prather**, "Multiuser-MIMO Transmitter Based on Optical Polar-Vector Modulators," *IEEE Photonics Technology Letters*, Vol. 30, Issue 21, pp. 1834-1837, (2018).

2017

50. Y. Zhang, S. Shi, R. D Martin, P. Yao, F. Wang, **D.W. Prather,** "Ultra-Wideband Via-less Microstrip Line-to-Stripline Transition in Multilayer LCP Substrate for E - and W -Band Applications," *IEEE Microwave and Wireless Components Letters*, v. 27, pp 1101-1103, (2017).
51. **D.W. Prather**, "Toward Holographic RF Systems for Wireless Communications and Networks," *IEEE Comm. Soc. Technology News*, (June 2016) [Online] Available: https://www.comsoc.org/publications/ctn/5g-moves-light-holographic-massive-mimo.
52. Y. Zhang, F. Wang, S. Shi, R. D Martin, P. Yao, **D. W. Prather**, "Ultra-Wideband Microstrip Line-to-Microstrip Line Transition in Multilayer LCP Substrate at Millimeter-Wave Frequencies," *IEEE Microwave and Wireless Components Letters*, v. 27, pp 873-875, (2017).
53. **D.W. Prather**, S. Shi, G. Schneider, P. Yao, C. Schuetz, J. Murakowski, and J. Deroba, "Optically-Upconverted, Spatially-Coherent Phased Array Antenna Feed Networks for Beam-Space MIMO in 5G Cellular Communications," *IEEE Transactions on Antennas and Propagation*, v. 65, issue 12, pp. 6432-6443, (2017).
54. Y. Zhang, S. Shi, R. D Martin, A. A Wright, P. Yao, K. Shreve, C. Harrity, and **D.W. Prather**, "Packaging of High-Gain Multichip Module in Multilayer LCP Substrates at W-Band," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, pp 1-8, (2017).
55. D. D. Ross, M. R. Konkol, S. Shi, C. E. Harrity, A. A. Wright, C. A Schuetz, and **D.W. Prather**, "Low-Profile, High-Power Optically Addressed Phased Array Antenna," *IEEE Journal of Lightwave Technology*, v 35, pp 3894-3900, (2017).

56. J. Murakowski, G. J. Schneider, S. Shi, C. A. Schuetz, and **D. W. Prather**, "Photonic probing of radio waves for k-space tomography," *Optics Express*, v 25, pp 15746-15759, (2017).
57. J. Deroba, G. Schneider, C. Schuetz, and **D. W. Prather,** "Smart Antenna Using Element-Level Photonic Up-Conversion to Generate an Apodized Beam-Space for Increased Spatial Isolation," *IEEE Antennas and Wireless Propagation Letters*, v16, pp 2274 - 2277, (2017).
58. M. Konkol, D. Ross, K. Shreve, C. Harrity, S. Shi, C. Schuetz, and **D. W. Prather,** "High-Power, Aperture Coupled Photonic Antenna," *IEEE Photonics Technology Letters*, v 29, pp 1207 - 1210, (2017).
59. F. Wang, S. Shi, G. Schneider, P. Yao, C. Schuetz, J. Murakowski, X. Qi, M. Kermalli, X. Liu, and **D. W. Prather,** "Photonic Generation of High-Fidelity RF Sources for Mobile Communications," *IEEE Journal of Lightwave Technology*, v PP, pp 1-1, (2017).
60. M. Konkol, D.D. Ross, S. Shi, C.E Harrity, A. A. Wright, C. A. Schuetz, and **D. W. Prather**, "High-Power Photodiode-Integrated-Connected Array Antenna," *IEEE Journal of Lightwave Technology*, v 35, pp 2010-2016, (2017).
61. U. J Nsofor, P. L Yao, S. Shi, and **D. W Prather**, "Passive Tuning of Optical Couplers Using a Thin-Film Cladding Material," *IEEE Photonics Technology Letters*, v 29, pp 775-778, (2017).
62. Y. Zhang, S. Shi, R. D Martin, and **D. W Prather,** "Broadband SIW-to-Waveguide Transition in Multilayer LCP Substrates at W-Band," *IEEE Microwave and Wireless Components Letters*, v 27, pp 224-226, (2017).
63. Y. Zhang, S. Shi, R. D Martin, and **D. W Prather**, "Slot-Coupled Directional Filters in Multilayer LCP Substrates at 95 GHz," *IEEE Transactions on Microwave Theory and Techniques,* v 65, pp 476-483, (2017).
64. J. N. Mait, C. Harrity, R. D. Martin, C. A. Schuetz, S. Shi, and **D. W Prather,** "Minimum bias image processing with a distributed-aperture millimeter-wave imager,*" Applied Optics*, v 56, pp A52-A61, (2017).

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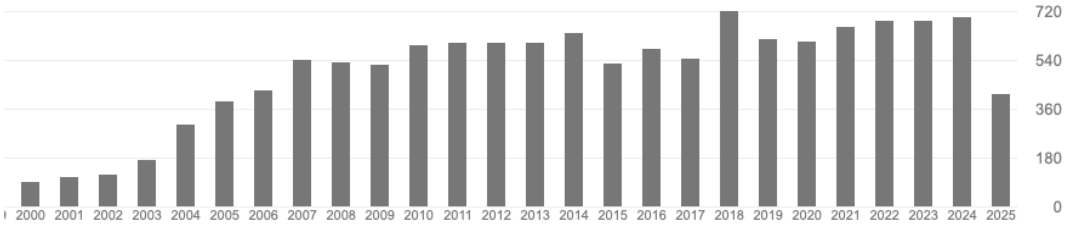

Figure 1. Histogram of the Number of Citations per Year for total of 13,324 for an h-index of 53.

CONFERENCE PUBLICATIONS *(Invited) (66 total)*

1. **D.W. Prather**, "Non-Electronic RF Devices and Systems (NERDS)," *IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, August (2025).
2. P. Yao, M. Konkol, F. Wang, M. Zablocki, T. Creazzo, J. Macaluso, C. Newkirk, P. Kelly, and **D.W. Prather**, "From Photonic Link to Photonic LNA," *IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, August (2025).
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14. **D.W. Prather**, "RF Photonics, Overview and New Opportunities," *IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, August (2020).
15. **D.W. Prather** and T. Creazzo, "Integrated, Chip-Scale RF Beamformer for an Optically-Fed Transmit Phased Array Antenna," *IEEE AVFOP*, Nov (2019).
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17. C. Schuetz, T. Dillon, C. Harrity, J. Murakowski, G. Schneider, S. Shi, and **D.W. Prather,** "Photonic Techniques for Imaging in the Microwave/Millimeter-wave Spectrum," *IEEE International Photonics Conference*, October (2019).
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(1) Xiang Gao, MEE, (January 2000), "Fabrication and Experimental Characterization of Meso-Scopic Diffractive Optical Elements."
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(3) Saurabh Lohokare, MEE, (May 2002), "Fabrication and Integration of Photodetectors and CMOS Receivers."
(4) James Durbano, MEE, (May 2002), "Architecture for Reconfigurable Processors using FPGAs."
(5) Ao Jiang, MEE, (August 2003), "Finite-Difference Time-Domain Method on Parallel Architecture using Message Passing Interface."
(6) Yan Xu, MEE, (August 2003), "Fabrication of Three-Dimensional Opal and Inverse Opal Structures for Photonic Crystals."
(7) Fernando Ortiz, MEE, (May 2003), "Design OF FPGA-Oriented Floating-Point Adders and Multipliers in VHDL."
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(9) John Humphry, MEE, (May 2004), "Issues in Accelerating the Finite-Difference Time-Domain Method with Field-Programmable Gate-Arrays."
(10) Jin Ge, MEE, (May 2004), "Parallel implementation of finite-difference time-domain algorithm for the analysis of optical elements."
(11) Eric Kelmelis, MEE, (May 2004), "Design and Implementation of CAD Environment for Electromagnetic Analysis."
(12) Binglin Miao, MEE, (August 2004), "Design, fabrication, and characterization of Microring Resonators used in Micro Gyroscopes."
(13) Peterson Curt, MEE, (June 2005), Development of Hardware Acceleration for Electromagnetic Computations.
(14) Timothy Hwang, MEE, (December 2006), "Design, Characterization, and Fabrication of Microwave and Millimeter-Wave Antennas."
(15) Michael Bodner, MEE, (May 2007), FPGA implementation of the method of moments.
(16) Dan Price, MEE, (August 2007), Design and implementation of a graphic processing unit (GPU) accelerator for electromagnetics.
(17) Jay Gupta, MEE, (January 2009), Millimeter wave modulator fabrication.
(18) Lee Stein, MEE, (June 2009), Millimeter Wave Imaging.
(19) Jesse Samluk, MEE, (January 2010), Fabrication of a scanning millimeter wave imaging system.
(20) Jerico Sabas, MEE, (June 2010), Millimeter wave integration.
(21) James Bonnett, MEE, (May 2015), Development and Implementation of an FPGA-Based Control System for a Passive, Distributed Aperture millimeter-wave imaging System
(22) Ugochukwu Nsofor, (May 2015), Design and Fabrication of a Recycled Carrier Modulator
(23) Andrew Wright, MEE, (December 2015), mmW Amplifier Design
(24) Brock Overmiller, MEE, (May 2016), Imaging Receiver for Wireless Communications
(25) Dylan Ross, MEE (May 2016), Optically Fed Tightly Coupled Array
(26) Christopher Cullen, MEE, (August 2018), Design and Fabrication of a Single Line IQ Modulator

(27) Morgan McElhiney, MEE., (June 2018), Development of Narrowband Perfect Absorbers for LWIR
(28) Kyle Linderman, MEE. (July 2017) Fabrication of Millimeter wave Modulators
(29) Brandon Stacy, MEE. (July 2018), RF Antenna Design
(30) Andrew Barrett, MEE. (July 2020), RF Systems
(31) Aashiv Patel, MEE. (July 2020), RF Systems
(32) W. L. Beardell, (Summer 2020), Coherent Optical Processors
(33) Navarun Jagaptal, MEE. (July 2021), Silicon photonics
(34) Cooper Hurley, (Summer 2021), Silicon photonics
(35) Alex Fox, (Summer 2024), High frequency photodetectors
(36) Saheed Ullah, (Summer 2025), Coherent Uplink and Downlink Communications in RF-Photonic Distributed MIMO Systems for 6G mmWave

Graduated Doctoral Students (42)

(1) Bjoern Rosner, Ph.D., (May 2002), "Near-field Microscopy from the microwave to the visible."
(2) Ahmed Sharkawy, Ph.D., (November 2002), "Design and analysis of photonic crystal devices for next generation telecommunication systems."
(3) David Pustai, Ph.D., (August 2004), "Realizing Functional Two-Dimensional Photonic Crystal Devices."
(4) Saurabh Lohokare, Ph.D., (August 2004), "A Novel Conductive-Polymer-Based Integration Process for High-Performance Flip-Chip Packages."
(5) Caihua Chen, Ph.D., (August 2004), "Dispersion Engineering of Photonic Crystal Devices."
(6) James Durbano, Ph.D., (August 2004), "Development of an FPGA-Based Architecture Enabling the Hardware Implementation of a Three-Dimensional Finite-Difference Time-Domain Algorithm for the Analysis of Electromagnetic Propagation."
(7) Sriram Venkataraman, Ph.D., (May 2005), "3D Stacked Integration of VCSEL and CMOS Drivers."
(8) Xiang Gao, Ph.D., (June 2005), "Development of Psuedo-Spectral Time-Domain electromagnetic computational methods for nano-photonic devices."
(9) Fernando Ortiz, Ph.D., (June 2006), "Design and fabrication of accelerated electromagnetic computational architectures."
(10) Zhaolin Lu, Ph.D., (December 2006), "Design and fabrication of high efficiency coupling structure for photonic crystal devices."
(11) Chunchen Lin, Ph.D., (June 2006), "Fabrication of Integrated Optical Waveguides."
(12) Yao Peng, Ph.D., (June 2007), "Fabrication of MEMS Structures."
(13) Christopher A. Schuetz, (Summer 2007) "Optical Techniques for Millimeter Wave Detection and Imaging."
(14) Thomas Dillon, Ph.D., (June 2008), "Design and fabrication of grayscale masks using electron beam lithography."
(15) Iftekar Mirza, Ph.D., (June 2009), "Development of Dispersion Models for Left-Handed Media."
(16) Brandon Redding, Ph.D. (June 2010), "Development of a quantum modeling code for quantum dots."
(17) Timothy Creazzo, Ph.D. (October 2010), "Silicon nanocrystal devices for silicon photonics."

(18) Elton Marchena, Ph.D. (October 2010), "Design, fabrication, and characterization of novel microcavities for silicon-based light emitters."
(19) Rownak Shireen, Ph.D. (October 2010), "Design and characterization of W-band modules for millimeter wave imaging."
(20) Neil Dutta, Ph.D., (August 2011), "Large area CMOS compatible near IR metamaterials."
(21) James Mutitu, Ph.D., (Spring 2012), "Design and characterization of light trapping mechanisms for high efficiency solar cells."
(22) Yuehao Wu, Ph.D., (Summer 2012), "Compressive Optical Imaging Systems."
(23) Mathew Zablocki, Ph.D., (Summer 2012), "Development of Chip-Scale Optical Interconnects Using Silicon Membranes."
(24) John Wilson, Ph.D., (Summer 2012), "Design and Phenomenology of a Polarization Sensitive Passive Millimeter Wave Sensor Based on Optical Up-Conversion."
(25) Jain Bai, Ph.D., (Summer 2014), "Optically Addressed Ultra-Wideband Phased Antenna Array."
(26) David Grund, Ph.D., (Summer 2014), "Narrow Linewidth Ultra-Wideband Tunable Optical RF Synthesizer."
(27) Julien Macario, Ph.D., (Fall 2014), "Millimeter Wave Integration."
(28) David Eng, Ph.D., (December 2015), "Organic-Based Electro-Optic Modulators for Microwave Photonic Applications."
(29) Yifei Zhang, Ph.D. (May 2016), "Millimeter Wave Antenna Design using Liquid Crystal Polymers."
(30) Joseph Deroba, Ph.D., (August 2017), "Radar Architectures and Processing."
(31) Matthew Konkol, Ph.D. (August 2017), "RF Photonic Devices design and fabrication."
(32) Andrew Mercante, Ph.D. (August 2018), "Design and Fabrication of Broadband Thin-Film Lithium Niobate Phase Modulators"
(33) Dylan Ross, Ph. D (August 2018), "RF Photonic Apertures"
(34) Fuquan Wang, Ph.D., (August 2019), "Linearization of Analog Photonic Links"
(35) Abu Naim Rakib Ahmed, (September 2020), "Hybrid Thin-Film Lithium Niobate-Silicon Nitride Photonics"
(36) Stephen Kozacik, Ph.D., (September 2020), "Design and Implementation of Real-Time Turbulence Mitigation and Characterization Systems"
(37) C. J. Ryan, (Spring 2021) "Microwave Photonic Spatial-Spectral Imaging"
(38) Sean Nelan, Ph.D. (July 2022), "Design and Fabrication of Thin-Film Lithium Niobate Photonic Devices"
(39) Victoria Carey, Ph.D. (August 2022), "High-Power Photodiodes in Millimeter-Wave Photonic System"
(40) William Beardell, Ph.D. (August 2022), "Spatial-Spectral Imaging with Microwave Photonic Arrays"
(41) Chris Zhu, Ph.D. (December 2024), "Thin-Film Lithium Niobate Photonics"
(42) Hannah Sinigaglio, Ph.D. (July 2025), "Photonics for Microwave Radiometric Sensing:

Current Graduate Doctoral Students (14)

(1) Christopher Cullen, (2021 – current), TFLN
(2) Marco Moller de Freitas, (2021- current), 3D Nanoimprinted Photonic Devices
(3) Shadia Chowdhury, (2022-current), TBD
(4) Saheed Ullah (2023-current), TBD
(5) Ifaz Isti (2023-current), TBD

(6) Farhan Jawad (2023-current), TBD
(7) Yash Kabra (2024-current), TBD
(8) Aiswarya Nair (2024-current), TBD
(9) Umme Afruz (2024-current), TBD
(10) Gboluwaga Awogbami (2024-current), TBD
(11) Noah Butler (2024-current), TBD
(12) Afam Madu (2024-current), TBD
(13) Adnan Kahn (2025-current), TBD
(14) Tofayel Karim (2025-current), TBD