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Nationality: USA

Clearance: SECRET

1 Higher Education

2011 Ph.D. in Electrical Engineering, University of Colorado at Boulder
2008 M.S. in Electrical Engineering, University of Colorado at Boulder
2003 B.S. in Electrical Engineering, Seattle Pacific University

2 Previous Positions

2012-2015 Member Technical Staff, MIT Lincoln Laboratory, Lexington, MA, USA
2003-2006 Hardware Design Engineer, Ballard Technology, Inc., Everett, WA, USA

3 Scholarships & Fellowships

2006-2008 National Institute of Standards and Technology, Professional Research Experience Program Fellowship
2009 MIT Lincoln Laboratory Graduate Student Fellowship
1999-2003 Seattle Pacific University Trustees Scholarship

4 Distinctions, Honors, and Awards

2017-present Elected Member, U.S. National Committee for the International Union for Radio Science (URSI) Commission D: Electronics and Photonics
2016 Keysight RF System Award for ECEDHA
2014 MIT Lincoln Laboratory Communications Workshop, Outstanding Presentation “coin”

5 Books & Monographs

N/A

6 Refereed Publications

6.1 REFEREED JOURNAL ARTICLES—SUBMITTED AND IN PREPARATION

- i. N.J. Estes and **J.D. Chisum**, "Nonlinearity and Memory Effects in Phase-Change Switches," in preparation.
- ii. D. Connelly and **J.D. Chisum**, "On the Suitability of VO₂ for Reconfigurable Millimeter-wave Circuits," in preparation.

6.2 REFEREED JOURNAL ARTICLES—PUBLISHED

- iii. **J.D. Chisum** and Z. Popovic, "Performance Limitations and Measurement Analysis of a Near-Field Microwave Microscope for Nondestructive and Subsurface Detection," *IEEE Trans. Microw. Theory Techn.*, vol. 60, no. 8, pp. 2605-2615, Aug. 2012. <http://ieeexplore.ieee.org/abstract/document/6222358/>
- iv. **J.D. Chisum**, E.N. Grossman, and Z. Popovic, "A General Approach to Low Noise Readout of Terahertz Imaging Arrays," *Rev. Sci. Instrum.*, vol. 82, no. 6, pp. 065106, Jun. 2011. <http://aip.scitation.org/doi/full/10.1063/1.3599419>
- v. V. Viikari, **J. Chisum**, and H. Seppa, "Wireless passive photo detector for insect tracking," *Microw. Opt. Technol. Lett.*, vol. 52, no. 10, pp. 2312-2315, Oct. 2010. <http://onlinelibrary.wiley.com/doi/10.1002/mop.25427/full>

6.3 REFEREED CONFERENCE PUBLICATIONS—SUBMITTED AND IN PREPARATION

- i. J. Merritt IV and **J. Chisum**, "Improvement of SNR using Cross-Correlation for Clustered Incoherent Sensor Networks," submitted to RWW 2018.

6.4 REFEREED CONFERENCE PUBLICATIONS—PUBLISHED

- ii. W. Bai and **J. Chisum**, "A Compact, Wide Field-of-View Gradient-index Lens Antenna for Millimeter-wave MIMO on Mobile Devices," to be presented at the 86th IEEE Veh. Technol. Conf., Fall 2017, Toronto, Canada, Sept 24-27, 2017.
- iii. N. Garcia, W. Bai, T. Twahirwa, D. Connelly, **J. Chisum**, "Silicon Micromachined High-contrast Artificial Dielectrics for Millimeter-wave Transformation Optics Antennas," presented at 2017 IEEE Int. Symp. on Antennas and Propag., San Diego, California, July 9-14, 2017.
- iv. N. Kleber, A. Termos, G. Martinez, J. Merritt, B. Hochwald, **J. Chisum**, A.D. Striegel, J.N. Laneman, "RadioHound: A Pervasive Sensing Platform for Sub-6 GHz Dynamic Spectrum Monitoring", Presented at 2017 IEEE Dynamic Spectrum Access Networks (DySPAN), Baltimore MD, March 6-9, 2017. <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=>

- v. A. Bolstad, J. Vian, **J. Chisum**, Y. Suh, “An Array-based Compressed Sensing Receiver Architecture,” Proceedings of the 2016 IEEE International Symposium on Phased Array Systems and Technology, Oct 18-21 2016, Waltham MA. <http://ieeexplore.ieee.org/document/7832659/>
- vi. **J.D. Chisum**, and Z. Popovic, “A Scanning Lock-in Vector Near-field Probe for Noise Limited Microwave Measurements,” presented at the 2010 IEEE Antennas and Propagation Society International Symposium (AP-S/URSI), IF414.9, Toronto, Canada, July 2010
- vii. A. Imtiaz, T.M. Wallis, S.H. Lim, **J. Chisum**, Z. Popovic, and P. Kabos, “Near-field antenna as a Scanning Microwave Probe for characterization of materials and devices,” Proceedings of the Fourth European Conference on Antennas and Propagation (EuCAP), 2010, Barcelona, Spain, pp.1-3, April 12-16 2010. <http://ieeexplore.ieee.org/document/5505692/>
- viii. **J.D. Chisum**, M. Ramirez, and Z. Popovic, “Planar Circuits for Non-contact Near-Field Microwave Probing,” IEEE MTT-S European Microwave Conference digest, pp. 802-805, Sept. 29 2009. <http://ieeexplore.ieee.org/document/5295982/>
- ix. C. Dietlein, **J. Chisum**, M. Ramirez, E. Grossman, and Z. Popovic, “Integrated microbolometer antenna characterization from 95–650 GHz,” MTT-S International Microwave Symposium digest, pp. 1165, June 2007. <http://ieeexplore.ieee.org/document/4264036/>
- x. E.N. Grossman, C.R. Dietlein, **J. Chisum**, A. Luukanen, J.E. Bjarnason, E.R. Brown, “Spectral decomposition of ultrawideband terahertz imagery,” in the Proc. of the SPIE, vol. 6548, pp. 654807-1-654807-8, April 09, 2007. <http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=1302144>

7 Unrefereed Publications¹

- i. J. Merritt IV, C. Dietlein, **J. Chisum**, “Collaborative and Responsive Sensors for Low-cost Spectrum Sensing and Geolocation,” Proc. of the 9th NATO Mil. Sens. Symp. (SET-241), Quebec City, Canada, June 2, 2017. <https://www.sto.nato.int/publications/STO%20Meeting%20Proceedings/STO-MP-SET-241/MP-SET-241-13-4.pdf>
- ii. K. Gao, N.J. Estes, B. Hochwald, **J. Chisum**, J.N. Laneman, “Power-Performance Analysis of a Simple One-Bit Transceiver,” Proc. of the 2017 Inf. Theory and Appl. Workshop, San Diego CA, Feb. 12-17 2017. http://ita.ucsd.edu/workshop/17/files/paper/paper_108.pdf

¹Conference papers which have undergone significant peer review (typically three or more reviewers) but have not undergone the iterative editorial arbitration process are listed as “Reviewed Conference Publications” in the the “Unrefereed” category.

- iii. N. Estes, **J. Chisum**, “Sub-surface Spatial Resolution of a Near-field Scanning Microwave Microscope,” Proceedings of the 2016 NAECON-OIS Conference, Dayton OH, July 2016. <http://ieeexplore.ieee.org/document/7856850/>

8 Other Publications

- i. (Patent Application) ”Methods and Apparatus for Array-based Compressed Sensing,” #WO 2016186998 A1, May 13, 2016. <https://www.google.com/patents/WO2016186998A1?cl=en>
- ii. (Patent Application) “Spin-Wave-Based Microwave Spectrum Analyzer”, #62/298,422 filed February 22, 2016

9 Invited Lectures and Addresses

August, 2017	Qualcomm, San Diego – “Silicon Micromachined Millimeter-wave Transformation Optics Antennas”
July, 2016	Panelist at the NavSea Warfare Center Crane, Microelectronics Integrity Meeting – “Sub-surface Spatial Resolution of Scanning Near-field Microwave Microscope”
May, 2015	Presenter at CS-MANETCH 2015 Workshop – “RF for Device and Fab Engineers: Power Amplifier Design”

10 Grants and Sponsored Programs

Total funding: \$1.93M (2015-present)
Total+Recommending funding: \$2.7M (2015-present)
Lead PI funding: \$1.2M (2015-present)

10.1 EXTERNAL FUNDING

- i. (Recommended for funding) Wideband Wireless Communications with Low-Power Transceiver-Cell Circuits
 - Principle investigators: Bertrand Hochwald (lead), Jonathan Chisum, J. Nicholas Lane-man
 - Sponsor: National Science Foundation, ECCS - SpecEES
 - Proposed budget: \$650,000
 - Proposed Duration: 08/15/2017-08/14/2020
 - Role: Conceived of low-power millimeter-wave transceiver designs, co-wrote proposal, responsible for concept, design, fabrication, and demonstration of highly efficient millimeter-wave transceiver integrated circuits in GaN for massive-MIMO transceivers, co-develop metrics and interfaces for optimizing power dissipation versus system performance
- ii. (Recommended for funding) Assessment of and Improvements to Sub-surface Resolution of Scanning Near-field Microwave Microscope

- Principle investigators: Jonathan Chisum (lead), Anthony Hoffman
 - Sponsor: DARPA MTO
 - Proposed budget: \$113,660
 - Proposed Duration: 12 months
 - Role: Conceived of concept, wrote proposal, responsible for all aspects of team management, developed sub-surface resolution theory, oversee measurements and simulations, oversee EM/device simulations for method one, co-advise (with Professor Hoffman) on coupled EM/optical simulations for method two
- iii. Chip-Scale Microwave Frequency Spectrum Analyzer Using Spin-Wave Diffraction and Interference
- Principle investigators: Wolfgang Porod (lead), Jonathan Chisum, Gary Bernstein
 - Sponsor: National Science Foundation, ECCS - SpecEES
 - Total budget: \$690,000
 - Duration: 09/01/2017-08/31/2020
 - Role: Co-conceived of microwave application of magnetic thin-film lenses, co-wrote proposal, oversee microwave modeling of magnetic structures, co-design spin-wave launches and detectors for interfacing with microwave systems
- iv. Artificial Media for Low-cost Millimeter-wave Multi-beam Antennas - Phase II
- Principle investigator: Jonathan Chisum
 - Sponsor: National Science Foundation, BWAC I/UCRC
 - Total budget: \$40,000
 - Duration: 08/01/2017-07/31/2018
 - Role: Conceived of concept and method, wrote proposal, developed design method, solely responsible for management of program, oversee design and realization of lenses
- v. Artificial Media for Low-cost Millimeter-wave Multi-beam Antennas - Phase I
- Principle investigator: Jonathan Chisum
 - Sponsor: National Science Foundation, BWAC I/UCRC
 - Total budget: \$40,000
 - Duration: 08/01/2016-07/31/2017
 - Role: Conceived of concept and method, wrote proposal, developed fabrication technology, developed measurement method, solely responsible for management of program
- vi. Distributed Electromagnetic Emitter Localization with Power Measurements
- Principle investigators: Jonathan Chisum (lead), Bertrand Hochwald
 - Sponsor: Department of the Army (ARL)
 - Total budget: \$65,375
 - Duration: 05/31/2016-07/31/2016
 - Role: Co-conceived of concept, wrote proposal, managed ND team, co-developed methods, co-wrote reports, represented team to Army sponsor

vii. DURIP: Wideband time-domain millimeter-wave device and channel characterization testbed

- Principle investigators: Jonathan Chisum (lead), Bertrand Hochwald, Patrick Fay, Tom Pratt
- Sponsor: Department of the Navy (ONR)
- Total budget: \$326,573
- Duration: 07/15/2016-07/14/2017
- Role: Conceived of concept, wrote proposal, executed development of testbed, operator of testbed, wrote reports to sponsor, solely managed ND effort and execution

viii. Distributed Spectrum Sensing with Collaborative and Responsive Nodes

- Principle investigator: Jonathan Chisum (lead)
- Sponsor: Department of the Army (ARO)
- Total budget: \$764,787
- Duration: 07/05/2016-07/04/2021
- Role: Conceived of concept, wrote proposal, fully responsible for managing team and executing, report to sponsor

10.2 STUDENT INSTITUTIONAL FELLOWSHIPS

2016	Nicolas Garcia, NDnano Undergraduate Research Fellowship
2017-2018	Nicolas Garcia, ND Remick Fellowship
2017-2021	John Merritt, ND Schmitt Fellowship
2017-2021	Nicholas Estes, ND Schmitt Fellowship

10.3 STUDENT EXTERNAL FELLOWSHIPS/AWARDS

Nicholas Estes, IMS 2017 Graduate Student Challenge, 1st prize
Travel grants - 2017 IEEE MTT-S Graduate Student Fellowship: Nicholas Estes, David Connelly, John Merritt

11 Master's Theses Directed

N/A

12 Doctoral Dissertations Directed

12.1 CURRENT DOCTORAL ADVISING

Nicholas Garcia (1st year Ph.D.)
John Merritt IV (2nd year Ph.D.)
Nicholas Estes (2nd year Ph.D.)
David Connelly (2nd year Ph.D.)
Wenlong Bai (2nd year Ph.D.)

13 Professional Memberships

- i. Institute of Electrical and Electronics Engineers (IEEE), Member, #80610594
- ii. American Physical Society (APS), Member, #61035863
- iii. U.S. National Committee for the International Union for Radio Science (URSI)
 - Elected Member URSI Commission D: Electronics and Photonics (2017-present)
 - Incoming-Secretary, URSI Commission D: Electronics and Photonics (2018-2020)

14 Other Notable Contributions

14.1 SERVICE TO THE PROFESSION

- 2018-2020 Incoming-Secretary, USNC-URSI Commission D
- 2011-present Reviewer: IEEE Transactions on Microwave Theory and Techniques, IEEE Microwave and Wireless Component Letters, AIP Review of Scientific Instruments, IET Electronics Letters, and MDPI Sensors Journal
- 2015 TPC Member, IEEE Vehicular Technologies Conference September 2015
- 2015 Northern Indiana Science and Engineering Fair Judge

14.2 SERVICE TO THE DEPARTMENT/UNIVERSITY

- 2017 EE Department Undergraduate Committee
- 2016 EE Department Graduate Admissions Committee
- 2015-2018 Undergraduate class mentor, EE class of 2018

14.3 UNDERGRADUATE RESEARCH ADVISING

- 2015-2016 Kenneth Harkenrider: Design and stabilization of non-Foster circuits
- 2016-2017 Anthony Calvo: High-power non-Foster circuits
- 2016-2017 Andre Magill: High-power non-Foster circuits
- 2016-2017 Thibault Twahirwa: Silicon microfabrication DRIE process development, millimeter-wave lens antenna design, millimeter-wave passive feed circuits

14.4 COURSES DEVELOPED

- i. EE87031: Active Microwave Circuits for Wireless Applications
 - Description: Advanced microwave circuit design taught from the perspective of wireless communications. The first third of the course covers transceiver design and system analysis (gain, noise figure, linearity cascade analysis). Students their system design in the lab and learn advanced microwave measurements to characterize a complete superheterodyne transceiver based on a custom lab kit developed in collaboration with X-Microwave (<https://www.xmicrowave.com/>). The second two-thirds of the course systematically develops theory and design methods for the key circuit components of the transceiver (e.g., LNA, HPA, mixer, oscillator) and students design, fabricate, and measure each component.
 - Years taught: Fall 2015 (previously titled “Microwave Power Amplifier Design and Fabrication”), Fall 2016, Fall 2017 (up-coming)

- Composite CIF: 4.6/5.0

ii. EE67598: (Special Topics) Microwave Calibration

- Description: The course began with a literature review of the history of microwave network calibration. Then the students implemented the main calibration methods used today—they developed their own Matlab code to realize the calibration methods and design and fabricated their own calibration standards to validate their code. Methods included SOLT, TRL, and others. The course also examined port/fixture de-embedding methods.
- Years taught: Spring 2017
- Composite CIF: 4.7/5.0

iii. EE87034: Microwave Photonics

- Description: Co-developed and co-taught a reading and proposal writing course with Professor Anthony Hoffman focusing on the intersection of our two disciplines: microwaves (Chisum) and photonics (Hoffman).
- Years taught: Fall 2016
- Composite CIF: 4.6/5.0

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<https://engineering.nd.edu/profiles/jchisum/@/download/resume>