



Dr. David Ricketts

Clearance: Secret

Professional Summary

Accomplished Professor of Electrical and Computer Engineering with over 20 years of combined academic and industry experience, specializing in innovation, technology commercialization, and advanced electrical systems. Ph.D. graduate from Harvard University with extensive roles including Innovation Fellow at Harvard and Expert-in-Residence at Harvard Innovation Lab. A proven leader in cross-functional team management with a substantial track record of partnering with tech giants like Mastercard and Google. Actively engaged in spearheading over 500 company pitches and innovation strategies. Notably led a DARPA-funded team at Carnegie Mellon University to develop sub-10 nm MEMS cantilever arrays for quantum electronic devices, showcasing strong leadership in managing complex, high-stakes projects. Collaborated with a 13-member team at MIT under the DARPA ELASTx program to innovate in mm-wave applications, further demonstrating deep expertise in cutting-edge technology and strategic planning. Seeking to leverage a profound technical background and pioneering approach to drive forward-thinking solutions in a challenging new role.

Core Competencies

Technical Consulting and Infrastructure Development, Research and Development, Digital and System Engineering, Strategic Planning, Innovation and Entrepreneurship Development, Nanotechnology and MEMS Devices, Wireless and Power Systems, Strategic Planning and Advisory, Global Collaboration and Outreach, RFID, Techno-economic Analyses

Work Experience

Academic and Industry Experience

Datalytica, Program and Technical Consultant, 2022 – Present

- SETA (Systems Engineer and Technical Assistant)

North Carolina State University, Full Professor of Electrical and Computer Engineering, 2012 - Present

- Conducted research on the application of physical phenomena to enhance the functionality of electrical devices, circuits, and systems, specializing in ultra-fast electronics and microwave systems within the field of electrical engineering.

Massachusetts Institute of Technology, Visiting Researcher, 2012 - 2013

- Collaborated with a 13-member team on the DARPA ELASTx program, focusing on the development of cutting-edge power amplifier (PA) and power combining systems for mm-wave applications in the Q-W band.

Harvard University, Associate (2010) and Visiting Associate Professor (2012), 2010 - Present

- Conducted interdisciplinary research with graduate students at the School of Engineering and Applied Science and the Harvard Business School, examining the role of the individual in innovation and knowledge creation in



science and creativity. This work supports scholarly research and aids in the development of educational materials for courses at Harvard.

Carnegie Mellon University, Assistant Professor of Electrical and Computer Engineering Assistant Professor, 2006 - 2012

- Led a 15-member DARPA team as Principal Investigator in the "Tip-directed Field-emission Assisted Nanofabrication" project, developing MEMS cantilever arrays for nanoscale patterning (< 10 nm) on Si and Ti surfaces, targeting applications in quantum electronic devices.
- Conducted extensive interdisciplinary research in circuits, systems, and sensing, including collaboration with MIT on a significant DARPA program aimed at advancing high-speed circuits and energy solutions.
- Developed and revamped multiple courses at Carnegie Mellon University (CMU) in areas such as device physics, circuit design, and innovation in science.
- Initiated and led a new outreach program in partnership with Disney Animal Kingdom focused on animal conservation.

Harvard University, Research Assistant (PhD), 2004 - 2006

- Specialized in doctoral research on ultrafast electronics, focusing on nonlinear wave and soliton-based electronics, as well as nanowire-based circuits.
- Developed the pioneering electrical soliton mode-locked oscillator, marking a significant milestone in the field.
- Innovated the first chip-scale mode-locked oscillator across all fields, enhancing compact electronic device capabilities.
- Collaborated with the Lieber group to create the fastest integrated nanowire circuit to date, pushing the boundaries of circuit performance and integration.
- Conducted advanced studies on phase noise analysis and stochastic resonance, contributing to the understanding of noise effects in electronic systems.

Harvard University, Staff Research Assistant, 2003 - 2004

- Supported research efforts in high-speed electronics.

Academic Innovation & Entrepreneurship

Harvard University Innovation Lab (iLab), Expert-In-Residence, 2018 – 2019

- Worked with Harvard student startups to develop technology, market, business plan and funding. Harvard Innovation Lab is in partnership with the Harvard Business School.

Harvard University School of Engineering and Applied Science, Technology and Entrepreneurship Center, Innovation Fellow and Visiting Associate Professor, 2010 – Present

- Developed and teach Innovation and Entrepreneurship in Engineering and Science in the Paulson School of Engineering, where Mark Zuckerberg and Bill Gates went to school.
- Taught over 2000 Harvard students (undergraduate & graduate) on innovation and entrepreneurship, with a focus on technological innovation and commercialization.
- Interfaced with industry VCs to conduct > 500 company pitches in science and technology.
- Lead multi-year innovation programs with Fortune 500 companies.



Innovation & Entrepreneurship

CleanTech, 2021

- Worked with the City of San Diego and Carlsbad CA and developed an innovation education and leadership program with CleanTech, a non-profit focused on advancing regional innovation excellence.
- Developed and delivered ongoing innovation masterclasses and work with civic leaders on innovation strategy.

Motus, 2021

- Worked with executive leadership to define innovation education and provided multiple masterclasses to workforce.

Mastercard, NY & London, 2018

- Multi-faceted partnership with President and Chief Commercialization Officer, Chief People Officer (HR), Mastercard Labs and Become Index.
- Worked with product development teams in Enterprise Partnerships to define new market opportunities and technology and collaborate with partners for commercialization.
- Lead multiple innovation masterclass with executive and product development teams, including session for 20k wide employees of Mastercard with the Chief People Officer.
- Collaborated with Mastercard and HBS for the development and dissemination of new international innovation index.

Dublin City Council, 2018

- Collaborated with the Chief Executive Officer and his executive staff to develop an innovation framework and strategy for the 6500 employees of Dublin City Council.
- Partnered with international companies (Google, Accenture, Facebook, Mastercard) to build a cohesive innovation ecosystem. This was the first formal innovation Framework for Ireland and has been shared throughout the US and Europe as a new model for innovation.

Tech Titans, 2018

- Tech Titans is the largest technology association in the Dallas area with over 230 technology companies and reaching 250k technology workers.
- Worked with executive staff to define innovation strategy which led to the creation of the Tech Titans Innovation Collider, a virtual innovation collaboration space.
- Provided masterclasses and innovation education.

Pioneer Natural Resources, 2017 - 2019

- Collaborated on new technology identification and application to corporate strategy.
- Worked with Director of Innovation to create technology evaluation and transfer process to drive commercial impact and transfer to field for natural resource production.



- Lead innovation masterclasses and leadership training.

Zebra, 2017

- Convened innovation summit on the Intelligent Enterprise with major US and International Companies (Target, General Electric, Whirlpool, Google).
- Collaborated in developing Zebra's third annual Intelligent Enterprise Index: a global survey that measures where companies are on the journey to becoming an "intelligent enterprise" — one that connects the physical and digital worlds to drive innovation through real-time guidance, data-powered environments and collaborative mobile workflows.

Dell, 2015-2016

- Led the creation of an innovation index for Dell's Women Entrepreneurship Network (DWEN).
- Convened 40 women entrepreneurs in a bespoke summit to foster collaboration and share best practices.
- Collaborated with Dell Chief Innovation Officer and Chief Technology Officer, convened technology and civic leaders to explore the role of technology transfer and innovation in the public sector in the 2015 Enabling Economies for the Future summit.

Web.com, 2016

- Developed innovation index for small business based on innovation research and commercial needs of Web.com.
- Worked directly with CEO to develop key commercialization areas and innovation targets for index. Index was launched globally in 2016.

Industry Experience & Technology Leadership

ON Semiconductor, Advanced System Engineering Manager, 2002-2003

- Directed a highly skilled team of system engineers to develop next generation technology for multi-phase power management ICs for Intel and AMD microprocessors.
- Initiated 10 new products in first 12 months and generated eight new patent/IP disclosures in first 6 months.
- Responsible for the development of new IP for the product line and the investigation of emerging technologies for acquisition.

ON Semiconductor, Manager of New Product Development, 2000-2002

- Responsible for 6 product development teams consisting of technical members across design, test, application engineering and layout.
- Oversaw the development of over 20 power management ICs in bipolar, CMOS and BiCMOS technologies.
- Responsible for ensuring technical excellence in design and system engineering as well as mentoring engineering staff.

Renaissance Design, Inc., Principal Consultant, 1999 - 2001

- Provided design and system engineering services for the power management semiconductor industry.
- Led the system architecture and transistor level design of a custom 2-stage dc-ac inverter. Used Verilog to develop an all-digital controller which enhanced controller functionality and robustness.



- Designed system supervisory circuitry and peripherals, including a 5V LDO, ac line sense, current sense and protection, etc.

APC, IC Technology Unit Manager/ Staff IC Designer, 1999 - 2001

- Responsible for the development of custom power management ICs for uninterruptible power supplies (UPS).
- Developed a custom controller for push-pull dc-ac inverters, an 8-bit A/D supervisory IC for sine wave inverters, and a next generation sine-wave inverter controller.
- Designed utilized bipolar, CMOS and BiCMOS technologies.

Awards

- Best Paper Award, IEEE Asia-Pacific Microwave Conference 2016.
- Certificate of Teaching Excellence, Derek Bok Center, Harvard University, 2013
- NSF CAREER Award, 2011: Spin-torque Oscillator Arrays. 13% funding rate in 2011.
- Wimmer Teaching Fellow, Carnegie Mellon University, 2009: One of five fellows selected on a university-wide basis. Award is for development of educational content for new courses.
- George Tallman Ladd Research Award 2009: Awarded to the two junior faculty in the College of Engineering at CMU for outstanding Research.
- National Academy of Engineers Frontiers of Engineering Education Recipient, 2009: Visualization of E&M for undergraduate course.
- DARPA Young Faculty Award, 2008: Spin-torque oscillators for agile RF systems.
- McGraw-Hill Yearbook of Science and Technology, 2008: Research on solitons selected as top research highlight for 2008.

Journal Articles (More Available Upon Request)

- J. Shen and D. S. Ricketts, "Compact W-Band "Swan Neck" Turnstile Junction Orthomode Transducer Implemented by 3-D Printing," in IEEE Transactions on Microwave Theory and Techniques, vol. 68, no. 8, pp. 3408-3417, Aug. 2020
- D. S. Ricketts, E. Shi, X. Li, N. Sun, O. O. Yildirim and D. Ham, "Electrical Solitons for Microwave Systems: Harmonizing Nonlinearity and Dispersion with Nonlinear Transmission Line," in IEEE Microwave Magazine, vol. 20, no. 4, pp. 123-134, April 2019.
- D. S. Ricketts, "A modern 16-qam digital radio you can design and build at home [application notes]," IEEE Microwave Magazine, vol. 21, no. 7, pp. 10-22, 2020.
- W. C. Harris, D., D. Stancil, and David S. Ricketts, "Improved wireless power transfer efficiency with non-perfect lenses," Applied Physics Letters 114:14, April 2019.
- D. S. Ricketts, J. Shen, J. Dunn, "Expanding the Antenna Frontier with Antenna Synthesis and 3D Printing", (Cover article), Microwave Engineering Europe, Sept. 2018.

Books/ Book Chapters

- *Radio System Design*, **D. S. Ricketts**, Ingram Spark, 2015.
- Electrical Solitons: Theory, Design and Applications*, **D. S. Ricketts** and D. Ham, CRC Press, 2010.



- *The Designers Guide to Jitter in Ring Oscillators*, J. A. McNeill and **D. S. Ricketts**, Springer Verlag, 2009.
- **D. S. Ricketts**, Xiaofeng Li, and Donhee Ham, "Soliton Electronics," in *Circuits for Emerging Technologies - CMOS and beyond*, CRC Press 2008.
- X. Li, **D. S. Ricketts**, and D. Ham, "Solitons in electrical networks," *McGraw-Hill 2008 Yearbook of Science and Technology*, McGraw-Hill, 2008.

Conference Articles (More Available Upon Request)

- J. Besnoff, D. S. Ricketts, Y. Buchbut, G. Castillo, M. Laifendfeld and K. Scheim, "Smart wireless power: A wireless power and bi-directional LIN communication system," 2017 IEEE International Conference on Microwaves, Antennas, Communications and Electronic Systems (COMCAS), Tel-Aviv, 2017, pp. 1-3.
- J. Shen, D. P. Parekh, M. D. Dickey and D. S. Ricketts, "3D Printed Coaxial Transmission Line Using Low Loss Dielectric and Liquid Metal Conductor," 2018 IEEE/MTT-S International Microwave Symposium - IMS, Philadelphia, PA, 2018, pp. 59-62.
- J. Shen and D. S. Ricketts, "Advances in 3D additive manufacturing for complex mm-wave components and sub-systems." IEEE Radio Wireless Week, Jan 2020.
- J. Shen, M. Abbasi, and David S. Ricketts, "3D Printed Antennas: Enabling Complex Antenna Structures," USNC-URSI, Jan 2018.
- J. Besnoff, Y. Buchbut, K. Scheim and D. S. Ricketts, "A 50% Fractional Bandwidth, Wireless Power Communication System Achieving 6.78 Mbps at 13.56 MHz Carrier," 2018 48th European Microwave Conference (EuMC), Madrid, 2018, pp. 178-181.

Academic Workshops and Short Courses (More Available Upon Request)

- "Build a 950 MHz Radar in a Day," IEEE International Microwave Symposium, Boston, MA, June 2019.
- "Design, Fabricate, and Test Your Own Microwave Component," Industry Workshop, IEEE International Microwave Symposium, Boston, MA, June 2019.
- "5th European Microwave Student and Doctoral Schools: Build a Modern Digital Radio," IEEE European Microwave Week, Paris, France, October 2019.
- "Frequency-Modulated Continuous Wave Radar in 1-Day," European Microwave Week, Utrecht, NL, 2020.
- "Build a 950 MHz Radar in a Day," European Microwave Week, London, 2021 (Held April 2022).
- "Build a 16 QAM Radio – Student Design Competition," IEEE International Microwave Symposium, Philadelphia, PA, June 2018.
- "Design, Fabricate, and Test Your Own Microwave Component," Industry Workshop, IEEE International Microwave Symposium, Philadelphia, PA, June 2018.
- "4th European Microwave Student and Doctoral Schools: Build a Modern Digital Radio," IEEE European Microwave Week, Madrid, Spain, September 2017.

Patents

- Ricketts, *et.al* U.S. Patent No. 8,154,354 "Nonlinear pulse oscillator methods and apparatus".
- Ricketts, *et. al* U.S. Patent No. 7,339,440 "Nonlinear pulse oscillator methods and apparatus"



- Arumugam, *et. al* U.S. Patent No. 9,625,247 “Systems and methods for position tracking using magnetoquasistatic fields”

Invited and Contributed Talks

- “State of the art and future of high-speed wireless transceivers: Opportunities and challenges for near-THz communication,” CMOS Emerging Technologies Conference, Plenary, May 2015.
- “Enabling Rapid Innovation in Nanomanufacturing,” ENRI NSF workshop keynote, Napa, CA, August 2013.
- “Watt-level, Highly Efficient, Fully Integrated all-Silicon Linear Power Amplification for mm-Wave Radar and Communications,” University of Delft, Netherlands, 2014.
- “High-speed GaN RF DC-DC Converter design,” Power America Webinar, NCSU, October 2018.
- “Enhancing, Shaping and Steering WPT Fields,” WPT NSF ERC Industry Workshop, Alexandria, VA, December 2018.

Education

Harvard University 2006, Doctor of Philosophy (PhD)

Thesis: Electrical Soliton Mode Locking

Worcester Polytechnic Institute 1997, Master of Science Electrical Engineering (MSEE)

Thesis: A 622 MHz Frequency Synthesizer

Worcester Polytechnic Institute 1995, Bachelor of Science Electrical Engineering (BSEE)

Thesis: Development Methodology and Control Systems in a NASA GASCAN project.