Taylor W. Barton

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Education

Massachusetts Institute of Technology

Doctor of Science, Electrical Engineering, September 2012. Thesis: Phase manipulation for efficient radio frequency transmission. Advisor: Prof. James K. Roberge.

Electrical Engineer, June 2010.

Master of Engineering, Electrical Engineering and Computer Science, February 2008. Thesis: Stabilizing the dual inverted pendulum: a practical approach. Advisor: Prof. James K. Roberge.

Bachelor of Science, Electrical Engineering and Computer Science with minor in German, June 2006.

Professional Appointments

Associate Professor, The University of Colorado Boulder — *July 2021–present*
Department of Electrical, Computer, and Energy Engineering

Lockheed Martin Faculty Fellow — *July 2017–present*

Assistant Professor, The University of Colorado Boulder — *August 2016–June 2021*
Department of Electrical, Computer, and Energy Engineering

Faculty Fellow, US Air Force Summer Faculty Fellowship Program — *June–July 2016 and June–August 2015*
Advisor: Paul Watson, Sensors Directorate

Assistant Professor, The University of Texas at Dallas — *August 2014–August 2016*
Department of Electrical Engineering, Erik Jonsson School of Engineering and Computer Science

Post-doctoral Associate, MIT Microsystems Technology Laboratories — *February 2013–July 2014*
Advisor: Tomás Palacios

Consultant, Eta Devices — *January–February 2013*
Full-time engineering consulting at Eta Devices, an international company and MIT spin-out in the mobile communications industry (now Nokia).

Visiting Lecturer, MIT EECS — *September 2012–January 2013*
Lecturer for Solid State Circuits (6.301) at MIT.

Awards/ Honors

Provost's Faculty Achievement Award at the University of Colorado Boulder, in recognition for achievements in the area of radio frequency (RF) and microwave active circuit design, Oct. 2023.

2023 IEEE Microwave Theory and Techniques Society Outstanding Young Engineer Award for outstanding early career achievements in high-efficiency and reconfigurable power amplifiers, June 2023.

NSF CAREER Award, for proposal titled "CAREER: Analog-assisted transceivers for next-generation millimeter-wave systems," Feb. 2019.

Top 11 Assistant Professors, with highest research performance in the College of Engineering and Applied Science during the 2017 calendar year, May 2018.

Outstanding Junior Faculty Award, University of Colorado Boulder ECEE Department, May 2018.

Air Force Office of Sponsored Research Young Investigator Program (AFOSR YIP) awarded for proposal titled "Reconfigurable Transmitters for Test & Evaluation with Integrated Thermal Monitoring and Control," March 2018.

Engineering New Professor Award at The University of Colorado Boulder College of Engineering and Applied Science, April 2016.

Goodwin Medal for conspicuously effective teaching at MIT, May 2011.

Analog Devices Outstanding Student Designer Award for excellence in integrated circuit design, Feb. 2011

Second place student paper award at IEEE PAWR conference, Jan. 2011.

Frederick C. Hennie III Teaching Award for teaching excellence at MIT. May 2008.

David Adler Memorial MEng Thesis Prize for thesis titled "Stabilizing the Dual Inverted Pendulum: A Practical Approach." Second place award, May 2008.

Awards with Students

High Power Amplifier Student Design Competition 2020, held by IEEE MTT-12 technical sub-committee, team placed second out of eleven: Devon Donahue, Michelle Pirrone, William Sear, Oct. 2020.

Student Poster Competition third place award at the IEEE Texas Symposium on Wireless and Microwave Circuits and Systems, Devon Donahue, May 2020.

High Power Amplifier Student Design Competition at 2019 IEEE International Microwave Symposium, team placed second out of nine: William Sear, Ryan Swanson, Devon Donahue, June 2019.

ECEE Department Dissertation Award, for PhD dissertation "Advanced load modulated power amplifier architectures," Prathamesh Pednekar, May 2019.

Student Paper Competition Nomination at 2019 IEEE Radio Wireless Week 2019 (20 papers nominated), for paper "A 2-GHz sampled line impedance sensor for power amplifier applications with varying load impedance," Devon Donahue, Jan. 2019.

Best Overall Paper at 2017 IEEE Compound Semiconductor IC Symposium, for paper "A fully-integrated S/C band transmitter in 45nm CMOS / 0.2um GaN architecture in DAHI technology," led by OSU student Matthew LaRue, Oct. 2018.

Student Paper Competition Nomination at IEEE MTT-S International Microwave Symposium (24 papers nominated from approximately 300 submissions), for paper "RF-input load modulated balanced amplifier," Prathamesh Pednekar, June 2017.

First Place Student Paper Award at IEEE PAWR conference for paper "Experimental characterization and control of a four-way non-isolating power combiner," Prathamesh Pednekar, Jan. 2016.

Teaching Experience

University of Colorado Boulder

Electromagnetic Fields and Waves (ECEN 3400)
- 28 students — *Fall 2021*

Electromagnetic Waves (ECEN 3410)
- 25 students, co-taught with Zoya Popovic, no FCQs reported Spring 2020 semester — *Spring 2020*
- 40 students, Course overall 5.43/6.0, Instructor overall 5.81/6.0 — *Fall 2019*

Microelectronics (ECEN 3250)
- 61 students, Course overall 5.46/6.0, Instructor overall 5.72/6.0 — *Spring 2018*

Microwave Lab (ECEN 4634/5634)
- 16 students, Course and instructor overall A rating — *Fall 2023*
- 34 students, Course overall 5.04/6.0, Instructor overall 5.65/6.0 — *Fall 2018*
- 31 students, Course overall 5.26/6.0, Instructor overall 5.63/6.0 — *Fall 2017*
- 32 students, Course overall 5.33/6.0, Instructor overall 5.62/6.0 — *Fall 2016*

Active Microwave Circuits (ECEN 5014)
- 25 students — *Spring 2022*

RF Power Amplifiers (ECEN 5024)

Newly developed graduate-level course on RF power amplifiers and their applications.
- 17 students, Course & instructor overall A rating — *Spring 2023*
- 23 students, Course & instructor overall A rating — *Spring 2021*
- 19 students, Course overall 5.63/6.0, Instructor overall 6.0/6.0 — *Spring 2019*
- 26 students, Course overall 5.30/6.0, Instructor overall 5.50/6.0 — *Spring 2017*

The University of Texas at Dallas

Electrical Network Analysis (EE/TE/CE 3301)
- 44 students, Course overall 4.15/5.0, Instructor overall 4.32/5.0 — *Spring 2016*

Power Electronics (EEPE 6354)
- 38 students, Course overall 4.15/5.0, Instructor overall 4.10/5.0 — *Fall 2015*

Special Topics in RF and Microwave Systems: RF Power Amplifiers (EERF 7V89)
- 21 students, Course overall 4.06/5.0, Instructor overall 4.25/5.0 — *Spring 2015*

Massachusetts Institute of Technology
Visiting Lecturer

Solid-State Circuits (6.301) *Fall 2012*

Lecturer

RF Systems and Circuit Design (6.978) *Fall 2010*

Recitation Instructor *Fall 2008 - Spring 2012*

Advanced Circuit Techniques (6.331) Fall 2011, Fall 2013 (co-instructor); Feedback Systems (6.302) Spring 2009, Spring 2010, and Spring 2012; Solid State Circuits (6.301) Fall 2008 and Fall 2010.

Journal Publications (my students and post-docs underlined)

Publication conventions: The first author is typically the lead graduate student or post-doc, last author is lead faculty (typically also PI on the grant that funded the work). A second-to-last faculty author indicates collaboration, with middle authors as more minor contributors.

[26] M. Pirrone, E. Dall'Anese, T. Barton, "Data-Driven Optimization Strategies for Tunable RF Systems," *IEEE Transactions on Microwave Theory and Techniques*, accepted 2023.

[25] D. Donahue, T. Barton, "Power detector performance and placement effects on measurement accuracy in sampled-network reflectometry," *IEEE Transactions on Microwave Theory and Techniques*, vol. 72, no. 1, pp. 194–211, Jan. 2024.

[24] W. Sear, T. Barton, "Load modulating loop combiner for linear power amplification." *IEEE Microwave and Wireless Components Letters*, vol. 33, no. 2, pp. 185–187, Feb. 2023.

[23] K. Vivien , P. de Falco, O. Venard, G. Baudoin, P. Pierre-Charles-Felix, T. Barton, "Linear load modulated balanced amplifier design method based on complex impedance trajectories." *IEEE Journal of Microwaves*, vol. 2, no. 1, pp. 199-213, Jan. 2022, doi: 10.1109/JMW.2021.3129168.

[22] D. Martin, T. Barton, "Inphasing signal component separation for an X-band outphasing power amplifier," *IEEE Transactions on Microwave Theory and Techniques*, vol. 69, no. 3, pp. 1661-1674, March 2021, doi: 10.1109/TMTT.2021.3052798.

[21] W. Sear, T. Barton, "Wideband IMD3 suppression through negative baseband impedance synthesis," *IET Microwaves, Antennas, & Propagation*, vol. 15, pp. 728-743, March 2021, https://doi.org/10.1049/mia2.12075

[20] D. Fishler, Z. Popovic, T. Barton, "Supply modulation behavior of a Doherty power amplifier." *IEEE Journal of Microwaves*, vol. 1, no. 1, pp. 508-512, Jan. 2021. doi: 10.1109/JMW.2020.3039421.

[19] D. Donahue, P. de Falco, T. Barton, "Power amplifier with load impedance sensing integrated into the output matching network." *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 67, no. 12, pp. 5113-5124, Dec. 2020. doi: 10.1109/TCSI.2020.2999019.

[18] J. Estrada, E. Kwiatkowski, A. López-Yela, M. Borgoñós-García, D. Sagovia-Vargas, T. Barton, Z. Popović, "An RF-harvesting tightly-coupled rectenna array tee-shirt with greater than octave bandwidth." *IEEE Transactions on Microwave Theory and Techniques*, vol. 68, no. 9, pp. 3908-3919, Sept. 2020. doi: 10.1109/TMTT.2020.2988688. **Named 'Best Reading Paper of the Issue' for having highest number of full text views on IEEExplore in Early Access.**

[17] W. Sear, T. Barton, "Power amplifier stabilization through out-of-band feedback." *IEEE Microwave and Wireless Components Letters*, vol. 30, no. 8, pp. 768-771, Aug. 2020. doi: 10.1109/LMWC.2020.3002727.

[16] D. Martin, P. de Falco, M. Roberg, G. Lasser, T. Barton, "An 18–38 GHz K/Ka-band reconfigurable Chireix outphasing GaAs MMIC power amplifier." *IEEE Transactions on Microwave Theory and Techniques*, vol. 68, no. 7, pp. 3028-3038, July 2020. doi: 10.1109/TMTT.2020.2992029.

[15] C. Cooke, K. M. K. J. Leong, A. Escorcia, K. Nguyen, X. B. Mei, J. Arroyo, T. Barton, D. Wu, W. Deal, "A 220 GHz InP HEMT direct detection polarimeter," *IEEE Transactions on Microwave Theory and Techniques*, vol. 67, no. 12, pp. 5191-5201, Dec. 2019, doi: 10.1109/TMTT.2019.2944908.

[14] T. Cappello, P. Pednekar, C. Florian, S. Cripps, Z. Popovic, T. Barton, "Supply- and load-modulated balanced amplifier for efficient broadband 5G systems." *IEEE Transactions on Microwave Theory and Techniques*, vol. 67, no. 7, pp. 3122-3133, July 2019, doi: 10.1109/TMTT.2019.2915082.

[13] T. Cappello, A. Duh, T. Barton, Z. Popovic, "A dual-band dual-output power amplifier for carrier aggregation." *IEEE Transactions on Microwave Theory and Techniques*, vol. 67, no. 7, pp. 3134-3146, July 2019, doi: 10.1109/TMTT.2019.2895534.

[12] H.-C. Chang, Y. Hahn, P. Roblin, T. Barton, "New mixed-mode design methodology for high-efficiency outphasing Chireix amplifiers." *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 66, no. 4, pp. 1594-1607, April 2019, doi: 10.1109/TCSI.2018.2882770.

[11] P. Pednekar, W. Hallberg, C. Fager, T. Barton, "Analysis and design of a Doherty-like RF-input load modulated balanced amplifier." *IEEE Transactions on Microwave Theory and Techniques*, vol. 66, no. 12, pp. 5322-5335, Dec. 2018, doi: 10.1109/TMTT.2018.2869571.

[10] T. Cappello, T. Barton, C. Florian, M. Litchfield, Z. Popovic, "Multi-level supply-modulated Chireix outphasing with continuous input modulation." *IEEE Transactions on Microwave Theory and Techniques*, vol. 65, no. 12, pp. 5231-5243, Dec. 2017, doi: 10.1109/TMTT.2017.2756038.

[9] P. Pednekar, E. Berry, T. Barton, "RF-input load modulated balanced amplifier with octave bandwidth," *IEEE Transactions on Microwave Theory and Techniques*, vol. 65, no. 12, pp. 5181-5191, Dec. 2017, doi: 10.1109/TMTT.2017.2748123.

[8] P. de Falco, P. Pednekar, K. Mimis, S. Ben Smida, G. Watkins, K. Morris, T. Barton, "Load modulation of harmonically tuned amplifiers and application to outphasing systems." *IEEE Transactions on Microwave Theory and Techniques*, vol. 65, no. 10, pp. 3596-3612, Oct. 2017, doi: 10.1109/TMTT.2017.2731769.

[7] T. Barton, A. Jurkov, P. Pednekar, D. Perreault, "Multi-way lossless outphasing system based on an all-transmission-line combiner." *IEEE Transactions on Microwave Theory and Techniques*, vol 64, no. 4, pp. 1313-1326, March 2016, doi: 10.1109/TMTT.2016.2531691.

[6] T. Barton, "Not just a phase: Outphasing power amplifiers." *IEEE Microwave Magazine*, vol. 17, no. 2, pp. 18-31, Feb. 2016, doi: 10.1109/MMM.2015.2498078.

[5] T. Barton, D.J. Perreault, "Theory and implementation of RF-input outphasing power amplification." *IEEE Transactions on Microwave Theory and Techniques*, vol. 63, no. 12, pp. 4273-4283, Dec. 2015, doi: 10.1109/TMTT.2015.2495358.

[4] T. Barton, J. Gordonson, D. Perreault, "Transmission line resistance compression networks and applications to wireless power transfer." *IEEE Journal for Emerging and Selected Topics in Power Electronics*, vol. 3, no. 1, pp. 252-260, March 2015, doi: 10.1109/JESTPE.2014.2319056.

[3] T. Barton, D. Perreault, "Four-way microstrip-based power combining for microwave outphasing power amplifiers." *IEEE Transactions on Circuits and Systems–I:Regular Papers*, vol. 61, no. 10, pp. 2987-2998, Oct. 2014, doi: 10.1109/TCSI.2014.2321203.

[2] T. Barton, J. Dawson, D. Perreault, "Experimental validation of a four-way outphasing combiner for microwave power amplification." *IEEE Microwave and Wireless Components Letters*, vol. 23, no. 1, pp. 28-30, Jan. 2013, doi: 10.1109/LMWC.2012.2236084.

[1] P. Godoy, S. Chung, T. Barton, D. Perreault, J. Dawson, "A 2.4-GHz, 27-dBm asymmetric multilevel outphasing power amplifier in 65-nm CMOS." *IEEE Journal of Solid-State Circuits*, vol. 47, no. 10, pp. 2372-2384, Oct. 2012, doi: 10.1109/JSSC.2012.2202810.

Refereed Conference Publications (my students and post-docs underlined)

[71] G. Gomez, D. Donahue, R. Macfarland, T. Barton, "An all-analog sampled-line VSWR sensor," *IEEE Radio Wireless Week*, San Antonio, TX, Jan. 2024 pp. 1–4. (To appear)

[70] M. Mahsud, P. Pendekar, T. Barton, "A compact 6–12 GHz MMIC power amplifier," *IEEE Radio Wireless Week*, San Antonio, TX, Jan. 2024 pp. 1–4. (To appear)

[69] W. Sear, T. Barton, "A GaN gain enhancement PA with peak power combining," *International Microwave Symposium*, San Diego, CA, June 2023, pp. 1–4.

[68] A. Der, T. Barton, "Dual-band and frequency-reconfigurable power amplifiers," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, San Diego, CA, March 2023, pp. 1–2.

[67] M. Pirrone, E. Dall'Anese, T. Barton, "Autonomous STAR front-end with intelligent interference cancellation," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, San Diego, CA, March 2023, pp. 1–2.

[66] G. Giesbrecht, T. Barton, "Device figure of merit for load modulated power amplifier technology selection," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, San Diego,

CA, March 2023, pp. 1–2.

[65] W. Sear, N. Biesterfeld, S. Bayaskar, T. Barton, "An inter-stage filter network for distortion reduction in concurrent dual-band power amplifier operation," *Asia-Pacific Microwave Conference*, Yokohama, Japan, Nov. 2022, pp. 1–4.

[64] D. Donahue, T. Barton, "The w-plane as a graphical representation of sampler configuration in a sampled-network reflectometer." *Automatic Radio Frequency Techniques Group (ARFTG)*, Denver, CO, June 2022, pp. 1–5.

[63] M. Pirrone, E. Dall'Anese, T. Barton, "Zeroth-order optimization for varactor-tuned matching network." *IEEE MTT-S International Microwave Symposium*, Denver, CO, June 2022, pp. 1–4.

[62] D. Donahue, P. Zurek, Z. Popovic, T. Barton, "An X/Ku dual-band GaAs MMIC power amplifier with integrated load impedance sensing." *IEEE MTT-S International Microwave Symposium*, Denver, CO, June 2022, pp. 1–4.

[61] W. Sear, D. Donahue, M. Pirrone, T. Barton, "Bias and bias line effects on wideband RF power amplifier performance," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Clearwater Beach, FL, April 2022, pp. 1–4.

[60] A. Romano, T. Sonnenberg, S. Verploegh, T. Barton, Z. Popovic, "A W-band GaN MMIC continuous 90-degree reflective phase shifter," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Clearwater Beach, FL, April 2022, pp. 1–4.

[59] A. Der, W. Sear, T. Barton, "Effect of switch figure of merit on frequency-reconfigurable power amplifier performance," *IEEE European Microwave Inegrated Circuits Conference*, London, UK, April 2022, pp. 1–4.

[58] N. Tawa, P. de Falco, O. Kazuya, T. Barton, T. Kaneko, "A 3.5-GHz 350-W Black-Box Desig Doherty Amplifier without using Transistor Models," *IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*, Online conference, Dec. 2021, pp. 1–4.

[57] A. Der, W. Sear, Z. Popovic, G. Lasser, T. Barton, "A S-C / K-band reconfigurable GaAs MMIC power amplifier for 5G applications," *IEEE MTT-S International Microwave Symposium*, Atlanta, GA, June 2021, pp. 1–4.

[56] D. Donahue, T. Barton, "Power amplifier load impedance sensing for phased arrays," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, online, Mar. 2021, pp. 1–4.

[55] D. Martin, G. Lasser, Z. Popovic, T. Barton, "An 18–38 GHz GaAs MMIC Reconfigurable Outphasing Power Amplifier," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, online, Mar. 2021, pp. 1–4.

[54] K. Vivien, P. de Falco, P. Pierre-Charles-Felix, O. Venard, G. Baudoin, T. Barton, "Load modulated balanced amplifier designed for AM-PM linearity," *European Microwave Conference*, Jan. 2021, pp. 1–4.

[53] S. Bayaskar, P. de Falco, T. Barton, "A 2.4/3.5 GHz dual-band power amplifier with filter-based bias network and SRFT matching networks," *European Microwave Conference*, Jan. 2021, pp. 1–4.

[52] D. Donahue, T. Barton, "Multi-port reflectometry applied to a varactor-tuned sampled-line," *Automatic Radio Frequency Techniques Group (ARFTG)*, online, August 2020, pp. 1–4.

[51] E. Kwiatkowski, C. Rodenbeck, T. Barton, Z. Popovic "Power-combined rectenna array for X-band wireless power transfer," *International Microwave Symposium*, online, August 2020, pp. 1–4.

[50] C. Cooke, K. Leong, K. Nguyen, A. Escorcia, X.B. Mei, J. Arroyo, T. Barton, C. Du Toit, G. De Amici, D. Wu, W. Deal "A 680 GHz direct detection dual-channel polarimetric receiver," *International Microwave Symposium*, online, August 2020, pp. 1–4.

[49] P. de Falco, W. Hallberg, T. Barton, "Load modulated RF amplifiers for wireless communications," *IEEE Texas Symposium on Microwave and Wireless Circuits and Systems*, online, May 2020, pp. 1–6.

[–] D. Donahue, T. Barton, "Power amplifier load impedance sensing for phased arrays," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, San Diego, CA, Mar. 2020, pp. 1–4 (accepted, conference cancelled due to coronavirus).

[–] D. Martin, G. Lasser, Z. Popovic, T. Barton, "A 20–35 GHz reconfigurable outphasing power amplifier

in 100-nm GaAs," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, San Diego, CA, Mar. 2020, pp. 1–4 (accepted, conference cancelled due to coronavirus).

[48] D. Donahue, M. Roberg, Z. Popovic, T. Barton, "An X-band sampled-line impedance sensor in 250-nm GaAs," *IEEE Topical Conference on RF/Microwave Power Amplifiers for Radio and Wireless Applications (PAWR)*, San Antonio, TX, Jan. 2020, pp. 1–3, doi: 10.1109/PAWR46754.2020.9035993.

[47] W. Sear, A. Der, T. Barton, "Amplifier input matching for NF–gain–linearity compromise," *IEEE Topical Conference on RF/Microwave Power Amplifiers for Radio and Wireless Applications (PAWR)*, San Antonio, TX, Jan. 2020, pp. 1–3, doi: 10.1109/PAWR46754.2020.9035994.

[46] D. Martin, M. Roberg, Z. Popovic, T. Barton, "A 6–12 GHz reconfigurable transformer-based outphasing combiner in 250-nm GaAs," *IEEE BiCMOS and compound semiconductor integrated circuits and technology symposium (BCICTS)*, Nashville, TN, Nov. 2019, pp. 1–3, doi: 10.1109/BCICTS45179.2019.8972771.

[45] A. Duh, M. Duffy, W. Hallberg, M. Pinto, T. Barton, Z. Popovic, "A 10.8-GHz GaN MMIC load-modulated amplifier," *IEEE European Microwave Conference*, Paris, France, Sept. 2019, pp. 1–4, doi: 10.23919/EuMC.2019.8910923.

[44] J. Estrada, E. Kwiatkowski, A. López-Yela, M. Borgoñós-García, D. Sagovia-Vargas, T. Barton, Z. Popović, "An octave bandwidth RF harvesting tee-shirt," *IEEE Wireless Power Week*, London, UK, June 2019, pp. 1–4, doi: 10.1109/WPTC45513.2019.9055642.

[43] D. Donahue, P. de Falco, T. Barton, "Impedance sensing integrated directly into a power amplifier output matching network," *IEEE MTT-S International Microwave Symposium*, Boston, MA, June 2019, pp. 983–986, doi: 10.1109/MWSYM.2019.8700868.

[42] W. Sear, T. Barton, "A baseband feedback approach to linearization of a UHF power amplifier," *IEEE MTT-S International Microwave Symposium*, Boston, MA, June 2019, pp. 75–78, doi: 10.1109/MWSYM.2019.8700736.

[41] C. Cooke, A. Escorcia, X. Bing Mei, T. Barton, M. Vega, D. Wu, W. Deal, "A 220 GHz dual channel LNA front-end for a direct detection polarimetric receiver," *IEEE MTT-S International Microwave Symposium*, Boston, MA, June 2019, pp. 508–511, doi: 10.1109/MWSYM.2019.8701101.

[40] B. Baker, T. Quach, W. Gouty, A. Mattamana, T. Barton, "Frequency-reconfigurable power amplifier using active matching for L, S, and C band," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, Alberquerque, NM, March 2019, pp. 1–2.

[39] D. Donahue, T. Barton, "A 2-GHz sampled line impedance sensor for power amplifier applications with varying load impedance," *IEEE Topical Conference on RF/Microwave Power Amplifiers for Radio and Wireless Applications (PAWR)*, Orlando, FL, Jan. 2019, pp. 1–3, doi: 10.1109/PAWR.2019.8708724. **Nominated for student paper competition award**.

[38] D. Fishler, T. Cappello, W. Hallberg, T. Barton, Z. Popovic "Supply modulation of a Doherty power amplifier," *IEEE European Microwave IC Symposium*, Madrid, Spain, Sept. 2018, pp. 519–522, doi: 10.23919/EuMC.2018.8541618.

[37] D. Martin, T. Cappello, T. Barton, "An X-band RF-input outphasing power amplifier," *IEEE International Microwave Symposium*, Philadelphia, PA, June 2018, pp. 308-311, doi: 10.1109/MWSYM.2018.8439432.

[36] T. Cappello, P. Pednekar, C. Florian, Z. Popovic, T. Barton, "Supply modulation of a broadband load modulated balanced amplifier," *IEEE International Microwave Symposium*, Philadelphia, PA, June 2018, pp. 304–307, doi: 10.1109/MWSYM.2018.8439462.

[35] D. Martin, T. Barton, "X band MMIC design for RF-input outphasing," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, Miami, FL, March 2018, pp. 1–4.

[34] M. Duffy, G. Lasser, T. Barton, Z. Popovic, "Broadband supply modulation for RF transmitter efficiency enhancement," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, Miami, FL, March 2018, pp. 1–4.

[33] M. LaRue, T. Barton, M. Belz, S. Rashid, B. Dupaix, T. James, W. Gouty, P. Watson, T. Quach, W. Khalil, "A multifunction transmitter based on a fully-digital CMOS/GaN architecture in DAHI technology," *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, Miami, FL, March

2018, pp. 1–4.

[32] A. Duh, S. Rahimizadeh, T. Barton, Z. Popovic, "A 3.5/5.9-GHz dual-band output matching network for an efficiency-optimized multiband power amplifier," *IEEE Topical Conference on RF/Microwave Power Amplifiers for Radio and Wireless Applications (PAWR)*, Anaheim, CA, Jan. 2018, pp. 75–78, doi: 10.1109/PAWR.2018.8310072.

[31] M. LaRue, B. Dupaix, S. Rashid, T. Barton, S. Dooley, P. Watson, T. Quach, and W. Khalil, "A fully-integrated S/C band transmitter in 45nm CMOS / 0.2um GaN heterogeneous technology," *IEEE Compound Semiconductor Integrated Circuit Symposium*, Miami, FL, October 2017, pp. 1–4, doi: 10.1109/CSICS.2017.8240477. **Won Best Overall Paper at CSICS 2017.**

[30] P. Brehm and T. Barton, "Modeling and analysis of the frequency dependence of class-E outphasing," *IEEE International Conference on Advanced Technologies, Systems and Services in Telecommunications*, Nis, Serbia, October 2017, pp. 170–173, doi: 10.1109/TELSKS.2017.8246256.

[29] T. Quach, P. Watson, B. Dupaix, T. Barton, M. LaRue, W. Gouty, W. Khalil, "Wideband high-efficiency digital power amplifier in GaN," *European Microwave Integrated Circuits Conference*, Nuremburg, Germany, October 2017, pp. 192–195, doi: 10.23919/EuMIC.2017.8230692.

[28] H. Nguyen, T.W. Barton, "Linearity Characterization of RF-input Chireix outphasing power amplifier," *32nd International Union of Radio Science (URSI) General Assembly and Scientific Symposium*, Montreal, Canada, August 2017, pp. 1–4, doi: 10.23919/URSIGASS.2017.8105257.

[27] P. Pednekar, T.W. Barton, "RF-input load modulated balanced amplifier." *IEEE MTT-S International Microwave Symposium 2017*, Honolulu, HI, June 2017, pp. 1730–1733, doi: 10.1109/MWSYM.2017.8058977. **Nominated for student paper competition.**

[26] T. Capello, C. Florian, T. Barton, M. Litchfield, Z. Popovic, "Multi-level supply-modulated Chireix outphasing for LTE signals." *IEEE MTT-S International Microwave Symposium 2017*, Honolulu, HI, June 2017, pp. 1846–1849, doi: 10.1109/MWSYM.2017.8059012.

[25] M. Duffy, J. Vance, G. Lasser, M. Olavsbråten, T. Barton, Z. Popovic, "Bandwidth-reduced supply modulation of a high-efficiency X-band GaN MMIC PA for multiple wideband signals." *IEEE MTT-S International Microwave Symposium 2017*, Honolulu, HI, June 2017, pp. 1850–1853, doi: 10.1109/MWSYM.2017.8059013.

[24] P. Roblin, T. Barton, H-C. Chen, C. Liang, W. Sear, "Design of a 4-way Chireix amplifier using a nonlinear embedding device model." *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Cocoa Beach, FL, April 2017, pp. 1–5, doi: 10.1109/WAMICON.2017.7930280.

[23] B. Baker, T. Barton, C. Thompson, "Simulated design methodology for an 80-meter Doherty amplifier using MOSFET active devices." *IEEE Texas Symposium on Wireless and Microwave Circuits and Systems*, Waco, TX, March 2017, pp. 1–4, doi: 10.1109/WMCaS.2017.8070692.

[22] U. Awais, T. Barton, "High PSR low drop-out regulator with isolated replica feedback ripple cancellation technique." *IEEE Dallas Circuits and Systems Conference*, Arlington, TX, Oct. 2016, pp. 1–4, doi: 10.1109/DCAS.2016.7791139.

[21] **(Invited paper)** S. Hary, T. Barton, J. Ebel, "Reconfigurable RF components for multifunction RF systems." *IEEE Compound Semiconductor IC Symposium*, Austin, TX, Oct. 2016, pp. 1–4, doi: 10.1109/CSICS.2016.7751062.

[20] P. Pednekar, T. Barton "Dual-band Chireix combining network." *IEEE MTT-S Texas Symposium on Microwave and Wireless Circuits and Systems*, Waco, TX, March 2016, pp. 1–4, doi: 10.1109/WMCaS.2016.7577486.

[19] S. Nelson, C. Ison, S. Cooper, D. Grecu, T. Barton, L. Baier, K. O, "Efficient, linear RF-input outphasing mm-wave power amplifiers." *Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, Orlando, FL, March 2016, pp. 1–4.

[18] N. Faraji, T. Barton, "An RF-input Chireix outphasing power amplifier." *IEEE Topical Conference on Power Amplifiers for Wireless and Radio Applications (PAWR)*, Austin, TX, Jan. 2016, pp. 11–14, doi: 10.1109/PAWR.2016.7440129.

[17] P. Pednekar, L. Deng, T. Barton, "Experimental characterization and control of a four-way non-isolating

power combiner." *IEEE Topical Conference on Power Amplifiers for Wireless and Radio Applications (PAWR)*, Austin, TX, Jan. 2016, pp. 8–10, doi: 10.1109/PAWR.2016.7440128. **Won first place in student paper competition.**

[16] **(Invited paper)** T. Barton, "Efficiency first: outphasing architectures for power amplification of high-PAPR signals." *IEEE Compound Semiconductor IC Symposium*, New Orleans, LA, Oct. 2015, pp. 1–4, doi: 10.1109/CSICS.2015.7314498.

[15] T. Barton, D. Perreault, "An RF-input outphasing power amplifier with RF signal decomposition network." *IEEE MTT-S International Microwave Symposium*, Phoenix, AZ, May 2015, pp. 1–4, doi: 10.1109/MWSYM.2015.7166725.

[14] J. McFarland, T. Barton, "Bandwidth of transmission-line resistance compression networks for microwave outphasing transmitters." *IEEE MTT-S Texas Symposium on Wireless and Microwave Circuits and Systems*, Waco, TX, April 2015, pp. 1–4, doi: 10.1109/WMCaS.2015.7233209.

[13] T. Barton, J. Gordonson, D. Perreault, "Transmission-line resistance compression networks for GHz rectifiers." *IEEE MTT-S International Microwave Symposium 2014*, Tampa, FL, June 2014, pp. 1–4, doi: 10.1109/MWSYM.2014.6848381.

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[11] T. Barton, J. Dawson, D. Perreault, "Four-way lossless outphasing and power combining with hybrid microstrip/discrete combiner for microwave power amplification." *IEEE MTT-S International Microwave Symposium*, Seattle, WA, June 2013, pp. 1–4, doi: 10.1109/MWSYM.2013.6697624.

[10] T. Barton, M. Alvira, "A Discrete-component 2D-array wind sensor without moving parts for a robotic sailboat." *Proceedings of the 5th International Robotic Sailing Conference*, Cardiff, Wales, Sept. 2012, pp. 95–104.

[9] M. Alvira, T. Barton, "Small and inexpensive single-board computer for autonomous sailboat control." *Proceedings of the 5th International Robotic Sailing Conference*, Cardiff, Wales, Sept. 2012, pp. 105–116.

[8] T. Barton, M. Alvira, "An advanced level radio-frequency circuit course with laboratory and design exercises that emphasize complete system performance." *IEEE Frontiers in Education*, Rapid City, SD, Oct. 2011, pp. S4G-1–S4G-6, doi: 10.1109/FIE.2011.6142952.

[7] T. Barton, S. Chung, P. Godoy, J. Dawson, "A 12-bit resolution, 200-MSample/second phase modulator for a 2.5-GHz carrier with discrete carrier pre-rotation in 65-nm CMOS." *IEEE Radio Frequency Integrated Circuits Symposium*, Baltimore, MD, June 2011, pp. 1–4, doi: 10.1109/RFIC.2011.5940597.

[6] P. Godoy, S. Chung, T. Barton, D. Perreault, J. Dawson, "A highly efficient 1.95-GHz, 18-W asymmetric multilevel outphasing transmitter for wideband applications" *IEEE MTT-S International Microwave Symposium*, Baltimore, MD, June 2011, pp. 1–4, doi: 10.1109/MWSYM.2011.5972660.

[5] P. Godoy, S. Chung, T. Barton, D. Perreault, J. Dawson, "A 2.5-GHz asymmetric multilevel outphasing power amplifier in 65-nm CMOS" *IEEE Topical Conference on Power Amplifiers for Wireless and Radio Applications*, Phoenix, AZ, Jan. 2011, pp. 57–60, doi: 10.1109/PAWR.2011.5725372. **Received second place in student paper competition.**

[4] S. Chung, P. Godoy, T. Barton, J. Dawson, D. Perreault, "Asymmetric multilevel outphasing transmitter using class-E PAs with discrete pulse width modulation." *IEEE MTT-S International Microwave Symposium*, Anaheim, CA, May 2010, pp. 264–267, doi: 10.1109/MWSYM.2010.5514707.

[3] T. Barton, "Stabilizing the dual inverted pendulum." *IFAC Symposium on Advances in Control Education*, Kummamoto, Japan, Oct. 2009, pp. 113–188.

[2] K. Lundberg, T. Barton, "History of inverted-pendulum systems." *IFAC Symposium on Advances in Control Education*, Kummamoto, Japan, Oct. 2009, pp. 131–135.

[1] S. Chung, P. Godoy, T. Barton, E. Huang, D. Perreault, and J. Dawson, "Asymmetric multilevel outphasing architecture for multi-standard transmitters." *IEEE Radio Frequency Integrated Circuits Symposium*, Boston, MA, June 2009, pp. 237–240, doi: 10.1109/RFIC.2009.5135530.

Book Chapter

T. Barton, P. de Falco, "Chapter 4: Outphasing power amplifiers", in *Radio Frequency and Microwave Power Amplifiers Volume 2*, The Institution of Engineering and Technology (IET), pp. 175–223, August 2019.

Patents

T.W. Barton, W. Sear, "Load Modulating Loop Combiner for Linear Power Amplifier," U.S. Patent Application, filed Feb. 2022.

T.W. Barton, W. Sear, "Out-of-band compensation of electronic active device," U.S. Patent No. US20210218423A1, awarded August 2022

T.W. Barton, P.H. Pednekar, "RF-input load modulated balanced amplifier," U.S. Patent No. 10,404,224 B2, Sept. 3, 2019.

D.J. Perreault, T.W. Barton, "RF-input outphasing power amplifier," U.S. Patent No. 9,912,303, June 3, 2018.

D.J. Perreault, A.S. Jurkov, T.W. Barton, "Multiway lossless power combining and outphasing incorporating transmission lines." U.S. Patent No. 9,141,832, September 22, 2015.

Workshops & Short Courses

"GaN and GaAs Power Amplifier Design for Arrays" presentation in Workshop titled, "WSJ: mm-Wave and sub-THz PA Design for Next-Gen Wireless and Sensing Applications," at *IEEE Radio Frequency Integrated Circuits Symposium*, June 2023.
"Analog Linearization of High-Efficiency PAs for Broadband Signals" presentation with Z. Popovic in Workshop titled "High-Efficiency Linear Power Amplifiers for High Bandwidth, High PAR Signals," at *European Microwave Week*, January 2021.

"Analog Design Techniques for Massive Communication" presentation in Workshop titled "Summer Research MicroWorkshop: Big Problems in Circuit Design" at *Harvey Mudd College*, July 2020.

"Analog Techniques for Efficiency Enhancement" presentation in Workshop titled "The Analog vs. Digital Battle — A Fight of Paradigms to Optimize Systems & PA Solutions for Wireless Infrastructure in 5G and Beyond" at *IEEE MTT-S International Microwave Symposium*, June 2019.

"Broadband PAs for Concurrent Signals" presentation with Z. Popovic in Workshop titled "Measurement and Design Techniques for Next-Generation Communication Systems" at *IEEE MTT-S International Microwave Symposium*, June 2019.

"Load and Supply Modulation Techniques for Next-Generation Radio" presentation in Workshop titled "5G New Radio: The Prospects for GaN from Devices to Systems" at *IEEE Radio Wireless Week*, Jan. 2019.

"Wideband Efficient Power Amplification Based on Load and Supply Modulation" presentation in Workshop titled "Broadband Power Amplifiers for Wireless Applications" at *IEEE European Microwave Conference*, Sept. 2018.

"Load Modulation Techniques for Efficient Power Amplifiers." presentation in Workshop titled "Recent Advances in Efficiency and Linearity Enhancement Techniques for RF Power Amplification" at *IEEE MTT-S International Microwave Symposium*, June 2018.

"Modern Outphasing: Potential and Pitfalls." presentation in Workshop titled "Non-Doherty Load Modulated Power Amplifiers" at *IEEE MTT-S International Microwave Symposium*, June 2017.

"Power Amplifier Efficiency Enhancement Techniques based on Load Modulation" Workshop presentation at *IEEE Texas Symposium on Wireless and Microwave Circuits and Systems*, March 2017.

"Outphasing Power Amplifiers: Analysis, Design, and Measurement" in Short Course titled "PA Design Techniques for Future Wireless Systems" at *88th ARFTG Microwave Measurement Conference*, Dec 2016.

"Outphasing: Analysis and Design" in Short Course titled "Intro to PA Design" at *IEEE MTT-S International Microwave Symposium*, May 2016.

"Outphasing Techniques for High-PAPR Signals" in workshop titled "Digital and Analog Techniques for Power-Efficiency Enhancement in Wireless Transmitters" at *IEEE Radio Frequency Integrated Circuits Symposium 2015*, May 2015.

"Power Amplifiers Based on Outphasing and Multi-Way Power Combining" in workshop titled "Efficient PAs and Transmitters for High Peak-to-Average Power Ratio (PAPR) Signals" at *IEEE MTT-S International Microwave Symposium 2014*, June 2014.

Professional Service

Member of MTT-12 Microwave High-Power Techniques Technical Committee 2017-present
Vice-chair 2022-present

Conference program committees:

Co-chair of the Student Design Competition for *International Microwave Symposium 2022* 2020-2022

Technical Paper Review Committee member, *Radio Wireless Week* 2019-present

Paper Review Panel member, *European Microwave Week (EuMW)* 2018-present

Technical Paper Review Committee member, *MTT-S International Microwave Symposium (IMS)* 2016-present
TPRC sub-committee Chair, SC-16: $>$ 10W Power Amplifiers, 2022-2024
TPRC sub-committee Chair, SC-18: High-power MHz, RF and microwave amplifiers, 2021-2022
TPRC sub-committee Vice Chair, SC-18: HF, UHF, VHF Circuits and Systems, 2018-2019

Technical Program Committee member, *BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)* 2015-2022
Conference previously known as *Compound Semiconductor IC Symposium (CSICS)*, 2015-2018

Technical Program Committee Member *Texas Wireless & Microwave Circuit & Systems Symp.* 2015-2017
Technical Program Committee Chair, 2016-2017

Technical Program Committee Member, *IEEE Wireless Power Transfer Conference* 2015

Technical Program Committee member for the *Texas Workshop on Integrated System Exploration* 2015

Program Committee member for the *International Robotic Sailing Conference* 2014–2016

Chaired Sessions and panels:

International Microwave Symposium:
Session Co-Chair, VHF/UHF Components and Analog Signal Processing (2018)
Session oraganizer and Co-Chair, Focus Session: Non-Doherty Load Modulated Power Amplifiers (2018)
Session Co-Chair, Power Amplifiers and Instrumentation for HF, VHF, and UHF (2017)

IEEE Topical Conference on Power Amplifiers for Radio and Wireless Applications (PAWR):
Session Chair, RF Power Amplifier Technology (2019)

BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium, formerly *Compound Semiconductor IC Symposium*:
Session Chair, Power Amplifiers and Supporting Circuits (2018)
Session Chair, High-Power Amplifier Technology Session, (2016)
Panel Organizer, "Reconfigurable RF Systems: Fact or Fiction?" (2016)

Texas Wireless & Microwave Circuit & Systems Symposium
Session Chair, Active Circuits and RF Systems Session (2015)

Other:

Proposal review for MTT-S undergraduate scholarships 2019

Proposal review for Army Research Office (ARO), Engineering Sciences Division 2018

Program chair, *IEEE Microwave Theory and Techniques Society* Dallas chapter 2016

Student activities chair, *IEEE Microwave Theory and Techniques Society* Dallas chapter 2014–2015

Seminar Series Organizer, Texas Analog Center for Excellence (TxACE) eSeminar Series 2015-2016

Journal reviewer for *IEEE Transactions on Microwave Theory and Techniques*, *IEEE Microwave and Wireless Components Letters*, *IEEE Journal of Solid-State Circuits*, *IEEE Microwave Magazine*, *IEEE Transactions of Circuits and Systems*, and *IEEE Journal for Emerging and Selected Topics in Power Electronics*

University Service

CEAS Dean Search Committee, CU Boulder College of Engineering F'2021–S'2022

Search Committee, CU Boulder ECEE Department F'2021–S'2022

Executive Committee, CU Boulder ECEE Department S'2021

Strategic Planning Committee, CU Boulder ECEE Department (*in absentia* F'2020) F'2020-present
Vice Chair, F'2021–present

	CEAS Faculty Governance Committee, CU Boulder College of Engineering & Applied Science	F'2019-S'2020
	Executive Committee, CU Boulder ECEE Department	S'2018-S'2020
	Search Committee, CU Boulder ECEE Department	F'2017
	Ad-hoc Facilities Committee, CU Boulder ECEE Department	F'2016–S'2017
	EE Graduate Committee, UT Dallas EE Department	F'2015–S'2016
	Ph.D. Program Committee, UT Dallas EE Department	F'2014–S'2015

Professional Memberships

IEEE Senior Member

IEEE Microwave Theory and Techniques Society

MTT-S TC-12 (High-Power Techniques Committee)

IEEE Women in Engineering

IEEE Young Professionals

Union Radio-Scientifique Internationale (URSI) Commission D