

ABBAS SEMNANI

Contact Information

Electrical Engineering & Computer Science Department
The University of Toledo
1610 N. Westwood Ave., MS 308
Toledo, OH 43606-3390, USA

Phone: +1 (419) 530-8150
abbas.semnani@utoledo.edu
Office: Nitschke Hall (NI) 2031
<https://www.semnani-arpl.com>

Research Interests

Applied Electromagnetics and Plasma Science

high-power microwaves, reconfigurable RF electronics, tunable and small antennas, microwave plasma sources, plasma metamaterials, plasma medicine, laser-plasma accelerators

The overarching objective: Bridging fundamental and applied research on electromagnetic-plasma-material interactions to translate fundamental physics into transformative technologies for communications, energy, defense, biomedical, and environmental systems.

Appointments

The University of Toledo

- Associate Professor of EECS 2023-present
 - Director of the UToledo Provost’s “*Plasma-EM-Material Interactions Research Initiatives*”
Broadening EM-plasma-material research scope through diverse collaborations and external stakeholder engagement.
- Assistant Professor of EECS 2019-2023
 - Director of the “*Adaptive Radiofrequency and Plasma Lab (ARPL)*”
Founder of ARPL, equipped with state-of-the-art instrumentation, for research, educational, and outreach activities in applied electromagnetics and plasma.

Purdue University

- Research Assistant Professor 2017-2019
- Senior Research Scientist 2015-2017
- Postdoctoral Research Associate 2012-2015

Research Grants *Total research funding (PI share) of ~\$3.3M across 10 awards since 2019.*

Current

- “Tunable plasma-based lumped element nonlinear transmission lines,” Office of Naval Research (ONR), N00014-25-1-2416, \$782k, (Co-PI, \$388k), 2025-2028.
- “Resonant microwave plasma sources to improve the efficiency of compact plasma-based accelerators,” U.S. Department of Energy (DOE), DE-SC0025743, \$647.5k, (Single PI), 2025-2028.
- “Design and simulation of a HF plasma electrically small antenna,” DeployX Inc/Red Cell Partners, \$25k, (Single PI), 2025.
- “Phase I: Secure wireless data transfer for tactical vehicles using plasma-enhanced electrically small antennas,” Army SBIR, \$250k, (Co-PI, \$35k), 2025-2026.
- “CAREER: Novel microplasmas for highly compact and versatile RF electronics,” National Science Foundation (NSF), ECCS-2337815, \$556k, (Single PI), 2024-2029.
- “SMART Hub: Hub for spectrum management with adaptive and reconfigurable technology,” Army Research Lab (ARL), \$4.6M, (Co-PI, \$121k), 2024-2026.

Pending

- “DURIP: A near-field characterization system for electrically small, high-power, and super-directive antennas,” Office of Naval Research (ONR), \$400k, (Single PI), 2026-2027.

- “High-density, low-mobility plasmas: unlocking a new regime for extreme wave control,” Moore Foundation Experimental Physics Investigators (EPI) Initiative, \$1.3M, (Single PI), 2026-2029.
- “Ultra-fast, high-power, and high-isolation microwave plasma limiters,” Office of Naval Research (ONR), \$611k, (Single PI), 2026-2029.
- “Low-collisional plasmas for ultrawideband and electronically tunable phase control,” DARPA DSO Pitch Day, \$400k, (Single PI), 2026.
- “Plasma-enhanced electrically small antennas for communications on hypersonic systems through the plasma sheath,” Air Force Phase I STTR, \$100k, (Co-PI, \$35k), 2026.
- “Plasma-enhanced electrically small antennas (PE-ESAs) for the proliferated warfighter space architecture,” Space Development Agency Phase I STTR, \$305k, (Co-PI, \$145k), 2026.

Completed

- “Ultra-wideband and highly efficient plasma-matched small HF antennas,” Office of Naval Research (ONR), N00014-21-1-2449, \$394k, (Single PI), 2021-2025.
- “Ultra-high efficiency microwave plasma for extreme low-power applications,” National Science Foundation (NSF), ECCS-2102100, \$365k, (Single PI), 2021-2025.
- “Reconfigurable plasma protection against high power microwaves,” Office of Naval Research (ONR), N00014-21-1-2441, \$764k, (Co-PI, \$375k), 2021-2025.
- “Plasma Impedance Matching Networks,” Lockheed Martin Corp., 4105131951, \$349k, (Single PI), 2021-2023.
- “Wideband and high-power reconfigurable plasma matching network for compact and efficient phased array emitters,” Office of Naval Research (ONR), N00014-19-1-2549, \$1.96M, (Co-PI, \$60k), 2019-2022.
- “Real-time optimization of fundamental and harmonic load impedances, source impedance, input power, and bias,” NSWC Crane, N00164-19-1-1002, \$200k, (Co-PI, \$10k), 2019-2020.
- “Plasmas for low noise reconfigurable RF systems,” National Science Foundation (NSF), ECCS-1619547, \$360k, (Co-PI), 2016-2019.
- “Reconfigurable power amplifier and filter technology for real-time adaptive next generation radar,” Army Research Lab (ARL), W911NF-16-2-0054, \$873k, (Co-PI), 2016-2018.
- “Plasma-tunable radio-frequency elements,” Lockheed Martin Aeronautics Company, 6574009847, \$70k, (Co-PI), 2017.

Awards

- The UToledo’s College of Engineering Dean’s Research Fellow, 2025
- The UToledo’s College of Engineering Excellence in Research Award, 2025
- The NSF CAREER Award, 2024
- The NASA Glenn Faculty Fellowship Award (NGFFA) for the research project “Plasma-assisted communications for re-entry and hypersonic applications,” 2022
- The IEEE MTT “Tatsuo Itoh” Award for the paper “An Electronically Tunable High-Power Impedance Tuner with Integrated Closed-Loop Control”, 2019

Education

- K. N. Toosi University of Technology
 Ph.D., Electrical and Computer Engineering, 2009
- Thesis: Time-Domain Electromagnetic Inverse Scattering
 - Ph.D. Visiting Scholar, Aristotle University of Thessaloniki, 2008
- M.Sc., Electrical and Computer Engineering, 2002

University of Tehran

B.Sc., Electrical and Computer Engineering, 2000

Group Members Research Faculty

- Muhammad Rizwan Akram, started Nov. 2022, *Physics and applications of EM-plasma interactions*

Ph.D. Students

- Kushagra Singhal, from Fall 2022, *Efficient microwave plasma lines for material processing*
- Nida Zahara Kazmi, from Spring 2025, *Manipulating plasma EM properties for advanced applications*
- Tahir Azam, from Spring 2025, *Power-efficient microwave plasma lines for laser-plasma accelerators*
- Parham Heidarzadeh, from Spring 2026, *Time-domain techniques in EM-plasma interactions*
- Neelam Qadeer, from Spring 2026, *Plasma-based NLTL systems*

M.Sc. Students

- Mohammadali Parsaei, from Fall 2023, *3-D split ring resonators for microwave plasma jet applications*
- Aaron Puterbaugh, from Spring 2026, *Resonant microwave plasmas in reduced pressure background*

Undergraduate Student

- Anuja Dhumma

Alumni

- Kazi Sadman Kabir, Ph.D., 2020-2025, *Low-power resonant microwave plasmas for biomedical applications*
- Sandeep Narasapura Ramesh, Ph.D., 2020-2024, *Theory and design of frequency selective plasma limiters*
- Krushna Kanth Varikuntla, Postdoctoral Associate, 2021-2023, *Plasma frequency selective surfaces*
- Samsud Moon, M.Sc., 2021-2023, *Magnetic control of electrons mobility in capacitively coupled plasmas*
- Md Tanvir Ahmed, MSc., 2021-2023, *Absorptive frequency selective surfaces*
- Taylor Ann Buckey, Undergraduate Researcher, Spring 2024
- Will Cherry, Undergraduate Co-op, Summer 2025
- Adam Abed, Undergraduate Co-op, Summer 2023
- Amina Lokhandwala, Undergraduate Researcher, Spring 2022

Teaching Experience

The University of Toledo

- EECS3440, Electronics Laboratory F 2019, S 2020, F 2020, F 2022, F 2023
- EECS3710, Electromagnetics I F 2020, F 2021, F 2022, F 2023, F 2024, F 2025
- EECS3720, Electromagnetics II S 2021, S 2023, S 2024, S 2025
- EECS5930, Electrical Engineering & Computer Science Seminar S 2022

Purdue University

- Guest Lecturer, “Electrical Circuits” F 2012
- Mentor of the “Wireless Power Transfer” team F 2012

K. N. Toosi University of Technology

- Instructor, “Differential Equations” and “Engineering Mathematics” 2009-2011

Invited Talks & Seminars

- T22. **A. Semnani**, “Electromagnetic-plasma interactions: From fascinating physics to real-world applications,” *Radiation Lab/MIPSE Seminar, The University of Michigan*, October, 2025.
- T21. **A. Semnani**, “EM-plasma interactions for high-power microwaves,” *Naval Surface Warfare Center, Crane Division (NSWC Crane)*, April, 2025.
- T20. **A. Semnani**, “EM-plasma interactions: Fascinating physics with a wide range of applications,” *ElectroScience Laboratory, The Ohio State University*, April, 2025.
- T19. **A. Semnani**, “EM-plasma interactions for high-power microwaves and efficient plasma generators,” *ECSE Department Colloquium, Case Western Reserve University*, October, 2024.
- T18. **A. Semnani**, S. N. Ramesh, K. Singhal, and M. R. Akram, “Synergies of plasma-electromagnetic interaction in RF electronic applications,” *77th Annual Gaseous Electronics Conference (GEC)*, October, 2024.
- T17. **A. Semnani**, “EM-plasma interactions: Innovations in high-power microwaves and highly efficient plasma generators,” *GEDC Distinguished Lecture Series, Georgia Institute of Technology*, September, 2024.
- T16. **A. Semnani**, “Reconfigurable plasma electronics: principles and applications,” *AVS Michigan Chapter Spring Symposium*, June 2023.
- T15. **A. Semnani**, “A plasma-based absorptive topology for frequency selective protections,” *57th Annual Microwave Power Symposium (IMPI 57)*, June 2023.
- T14. **A. Semnani**, “Low-power cold plasma generators for cancer treatment,” *UToledo Department Of Urology*, November 2022.
- T13. **A. Semnani**, “Research overview of the adaptive radiofrequency and plasma lab (ARPL),” *Collins Aerospace*, November 2021.
- T12. **A. Semnani**, “Low-temperature plasma for reconfigurable RF electronics,” *UToledo Department of Physics and Astronomy Colloquium*, Toledo, OH, September 2021.
- T11. **A. Semnani**, “Low-temperature plasma for high-power RF electronics,” *UToledo EECS graduate Seminar Series*, Toledo, OH, March 2021.
- T10. **A. Semnani**, “Adaptive radiofrequency and plasma lab (ARPL),” *AFRL at Wright-Patterson Air Force Base*, Dayton, OH, January 2020.
- T9. **A. Semnani**, S. Macheret, and D. Peroulis, “Plasma metamaterial: A potential solution for wideband electrically-small antennas,” *10th International Workshop on Microplasmas (IWM-10)*, Kyoto, Japan, May 2019.
- T8. **A. Semnani**, S. Macheret, and D. Peroulis, “Microwave microplasma: From destructive power-limiting effects to promising high-power tuning applications,” *9th International Symposium on Plasma Nanoscience and Nanotechnology (iPlasmaNano-IX)*, New Buffalo, MI, August 2018.
- T7. **A. Semnani**, S. Macheret, and D. Peroulis, “Low-temperature plasma for high-power microwave tuning,” *IEEE International Microwave Workshop Series on Advanced Materials and Processes (IMWS-AMP)*, Pavia, Italy, September 2017.
- T6. **A. Semnani**, and D. Peroulis, “Cold plasma-enabled tunable RF devices,” *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Clearwater, FL, April 2016.

- T5. **A. Semnani**, “From graduate school to the job market; My story as an IEEE-MTT Member,” *Graduates of the Last Decade (GOLD) Session, IEEE International Microwave symposium (IMS)*, Tampa, FL, June 2014.
- T4. **A. Semnani** and D. Peroulis, “Radio frequency gas breakdown and micro/nano-plasma formation in high-power evanescent-mode cavity resonators,” *General Assembly and Scientific Symposium of the International Union of Radio Science (URSI-GASS)*, Beijing, China, August 2014.
- T3. **A. Semnani** and D. Peroulis, “High frequency gas breakdown and microplasma formation in evanescent-mode cavity resonators,” *Annual Meeting of the Electrostatics Society of America (ESA)*, Notre Dame, IN, June 2014.
- T2. D. Peroulis and **A. Semnani**, “RF discharges phenomena in miniaturized RF MEMS cavity-based filters,” *66th Annual Gaseous Electronics Conference (GEC)*, Princeton, NJ, 2013.
- T1. **A. Semnani**, “Time Domain Inverse Scattering,” Aristotle University of Thessaloniki, Thessaloniki, Greece, November 2008.

Professional Services

- Technical Committee Member of the *IEEE International Power Modulator and High Voltage Conference (IPMHVC)*, Indianapolis, IN, 2024
- Selection Committee Member of the *University of Michigan Prize for Excellence in Plasma Science and Engineering*, 2023 and 2024
- Local Organization Committee Member of the *Gaseous Electronics Conference (APS GEC)*, Ann Arbor, MI, 2023
- Program Committee Member of the *American Physical Society Division of Plasma Physics (APS DPP)*, 2021
- Technical Committee Member of the *IEEE Radio & Wireless Week (RWW)*, 2017
- Guest Editor of the *IEEE Microwave Magazine* December 2016 special issue
- Reviewer for many journals, including:
IEEE Transactions on Plasma Science, IEEE Transactions on Microwave Theory and Techniques, IEEE Transactions on Antennas and Propagation, IEEE Transactions on Geoscience and Remote Sensing, IEEE Transactions on Very Large Scale Integration Systems, IEEE Transactions on Circuits and Systems II, IEEE Antennas and Wireless Propagation Letters, IEEE Geoscience and Remote Sensing Letters, IEEE Electron Device Letters, Journal of Applied Physics, Physics of Plasmas, Plasma Sources Science and Technology, Applied Physics Letters, Journal of Physics D: Applied Physics, Optics Letters, Europhysics Letters, Electronics Letters, and *John Wiley & Sons*

Professional Affiliations

- IEEE Senior Member
- IEEE Nuclear and Plasma Sciences
- IEEE Antennas and Propagation
- IEEE Microwave Theory and Techniques
- IEEE Geoscience and Remote Sensing
- American Physical Society (APS)

Book Chapters

- B2. **A. Semnani** and M. Kamyab, “A hybrid method for solving 2-D inverse scattering problems,” *Ultra-Wideband, Short Pulse Electromagnetics 9*, Eds.: F. Sabath, D. V. Giri, F. Rachidi, and A. Kaelin, Springer, Germany, pp. 89-99, 2010, ISBN: 978-0-387-77844-0.
- B1. **A. Semnani** and M. Kamyab, “Solving inverse scattering problems using truncated cosine Fourier series expansion method,” *Advanced Microwave Circuits and Systems*, Ed.: V. Zhurbenko, In-Tech, Croatia, pp. 455-470, 2010, ISBN: 978-953-307-087-2.

Patents

- P1. **A. Semnani** and K. S. Kabir, “Power-efficient microwave plasma jet based on evanescent-mode cavity technology,” US Patent, US2023/0178868A1, 2023.
- P2. **A. Semnani** and M. R. Akram, “A power-efficient microwave plasma jet based on a dielectric anapole structure,” US Patent, US2025/0311081A1, 2025.
- P3. S. N. Ramesh and **A. Semnani**, “Absorptive and frequency-selective plasma limiters,” US Patent. (pending)
- P4. **A. Semnani** and Kushagra Singhal, “Plasma matching for wideband electrically small antennas,” US Patent. (pending)
Has been licensed, currently working on an Army SBIR Phase I project.
- P5. M. R. Akram and **A. Semnani**, “Super-directive Huygens antennas based on crossed electric and magnetic dipoles,” US Patent. (pending)

Journal Publications

Pending

- J43. K. S. Kabir, K. Singhal, and **A. Semnani**, “The effect of frequency on chemical species of EVA cavity-based microwave plasma jets,” *IEEE Transactions on Plasma Science*. (to be submitted)
- J42. K. K. Varikuntla, T. Ahmed, and **A. Semnani**, “A plasma-based adaptive waveguide absorptive limiter for high-power microwaves,” *IEEE Transactions on Microwave Theory and Techniques*. (to be submitted)
- J41. M. R. Akram and **A. Semnani**, “An energy-efficient atmospheric plasma jet line based on a dielectric microwave anapole source,” *IEEE Transactions on Plasma Science*. (under review)
A 2-cm atmospheric plasma line with only 1 W of input power at 1 GHz, >95% efficiency.
- J40. S. N. Ramesh, K. Singhal, and **A. Semnani**, “An evanescent-mode cavity-based frequency-selective plasma limiter,” *IEEE Transactions on Microwave Theory and Techniques*. (under review)
- J39. M. R. Akram and **A. Semnani**, “A Huygens antenna element based on crossed electric and magnetic dipoles,” *IEEE Transactions on Antennas and Propagation*. (under review)
A printed antenna element with >8.5 dBi gain and an aperture efficiency of (>90%).

Published

- J38. M. R. Akram and **A. Semnani**, “High-power microwave limiter using a self-actuated plasma-based electromagnetically-induced-transparency topology,” *Physical Review Applied*, 24, 044062, 2025.
- J37. G. Shaffer, W. J. D. Johnson, T. R. Jones, **A. Semnani**, and D. Peroulis, “Continuously reconfigurable and high-efficiency 70 W power amplifiers for 1-5 GHz,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 73, no. 9, pp. 6825-6835, September 2025.
- J36. K. S. Kabir and **A. Semnani**, “Capacitive-tuned SIW evanescent-mode cavity for resonant microwave plasma jet,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 73, no. 9, pp. 6799-6808, September 2025.
The first frequency-tunable atmospheric-pressure microwave plasma jet.
- J35. M. R. Akram and **A. Semnani**, “Non-radiating resonances: anapoles enabling highly-efficient plasma jets within dielectric structures,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 73, no. 1, pp. 352-360, January 2025.
A power-efficient (>93%) microwave plasma jet utilizing dielectric anapole technology.
- J34. S. N. Ramesh and **A. Semnani**, “A plasma-loaded resonator for integrated filter-limiter applications,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 72, no. 12, pp. 6933-6942, December 2024.
- J33. S. Mahajan, H. Wang, A. M. Loveless, **A. Semnani**, A. Venkatraman, and A. L. Garner, “Scaling laws for AC gas breakdown in microscale Gaps,” *Journal of Applied Physics*, 135, 243301, 2024.

- J32. M. R. Akram and **A. Semnani**, "A microwave anapole source based on electric dipole interactions over a low-index dielectric," *Physical Review Applied*, 21, 054051, 2024.
A novel microwave anapole based on electric dipole interactions in a low-index dielectric.
- J31. G. Shaffer, J. Johnson, T. R. Jones, **A. Semnani**, and D. Peroulis, "Resonant impedance tuners: theory, design, power handling, and repeatability," *IEEE Transactions on Microwave Theory and Techniques*, vol. 72, no. 3, pp. 1859-1876, March 2024.
- J30. S. N. Ramesh and **A. Semnani**, "Theory and design of frequency-selective absorptive microwave plasma limiters," *IEEE Transactions on Microwave Theory and Techniques*, vol. 72, no. 2, pp. 1225-1233, February 2024.
An absorptive limiter with >2% selectivity, >50 dB isolation, and >100 W power handling.
- J29. **A. Semnani** and K. S. Kabir, "A highly-efficient microwave plasma jet based on evanescent-mode cavity-resonator technology," *IEEE Transactions on Plasma Science*, vol. 50, no. 10, pp. 3516-3524, October 2022.
An EVA cavity-based atmospheric pressure plasma jet with over 80% power efficiency.
- J28. S. N. Ramesh and **A. Semnani**, "A comprehensive circuit modeling approach for self-sustained capacitively-coupled microwave plasmas," *IEEE Transactions on Plasma Science*, vol. 49, no. 9, pp. 2690-2699, September 2021.
- J27. **A. Semnani**, B. Baskaran, and D. Peroulis, "Microwave wireless powering of sensed agricultural tiles," *IEEE Transactions on Antennas and Propagation*, vol. 69, no. 5, pp. 2913-2920, May 2021.
- J26. H. An, Z. Yin, C. Mitchell, **A. Semnani**, A. R. Hajrasouliha, and M. Hosseini, "Nanodiamond ensemble-based temperature measurement in living cells and its limitations," *Measurement Science and Technology*, 32, 015701, 2021.
- J25. Z. Vander Missen, **A. Semnani**, and D. Peroulis, "Plasma-based power limitation for highly linear MEMS switch protection and isolation enhancement," *IEEE Access*, vol. 8, pp. 173103-173111, 2020.
- J24. V. Podolsky, **A. Semnani**, and S. O. Macheret, "Experimental and numerical studies of a tunable plasma antenna sustained by RF power," *IEEE Transactions on Plasma Science*, vol. 48, no. 10, pp. 3524-3534, October 2020.
- J23. A. Dockendorf, A. Egbert, E. Langley, C. Calabrese, J. Alcala-Medel, S. Rezayat, Z. Hays, C. Baylis, A. Martone, E. Viveiros, K. Gallagher, **A. Semnani**, and D. Peroulis, "Fast optimization algorithm for evanescent-mode cavity tuner optimization and timing reduction in software-defined radar implementation," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 56, no. 4, pp. 2762-2778, August 2020.
- J22. **A. Semnani**, G. S. Shaffer, Y.-C. Wu, and D. Peroulis, "High-power impedance tuner utilizing substrate-integrated evanescent-mode cavity technology and external linear actuators," *IET Microwaves, Antennas and Propagation*, vol. 13, no. 12, pp. 2067-2072, October 2019.
- J21. **A. Semnani**, M. D. Sinanis, and D. Peroulis, "An evanescent-mode cavity-backed high-power tunable slot antenna," *IEEE Transactions on Antennas and Propagation*, vol. 67, no. 6, pp. 3712-3719, June 2019.
- J20. **A. Semnani**, S. Macheret, and D. Peroulis, "A quasi-absorptive microwave resonant plasma switch for high-power applications," *IEEE Transactions on Microwave Theory and Techniques*, vol. 66, no. 8, pp. 3798-3806, August 2018.
- J19. C. Qu, P. Tian, **A. Semnani**, M. J. Kushner, "Properties of arrays of microplasmas: application to control of electromagnetic waves," *Plasma Sources Science and Technology*, vol. 26, no. 10, 105006, 2017.
- J18. **A. Semnani**, M. A. Khater, Y. C. Wu, and D. Peroulis, "An electronically-tunable high-power impedance tuner with integrated closed-loop control," *IEEE Microwave and Wireless Components Letters*, vol. 27, no. 8, pp. 754-756, August 2017.
Recipient of the 2019 "Tatsuo Itoh" Award for the best IEEE MWCL paper of the year.
- J17. **A. Semnani**, S. Macheret, and D. Peroulis, "A high-power widely-tunable limiter utilizing an evanescent-mode cavity resonator loaded with a gas discharge tube," *IEEE Transactions on Plasma Science*, vol. 44, no. 12, pp. 3271-3280, December 2016.

- J16. **A. Semnani**, D. Peroulis, and S. Macheret, "Plasma-enabled tuning of a resonant RF circuit," *IEEE Transactions on Plasma Science*, vol. 44, no. 8, pp. 1396-1404, August 2016.
An experimental validation of our proposed plasma varactor concept.
- J15. S. Tholeti, **A. Semnani**, D. Peroulis, and A. Alexeenko, "Dark-to-arc transition in field emission dominated atmospheric microdischarges," *Physics of Plasmas*, 22, 083508, 2015.
- J14. **A. Semnani** and D. Peroulis, "Contribution of ions in radio frequency properties of atmospheric pressure microgaps," *Applied Physics Letters*, 105, 253105, 2014.
- J13. **A. Semnani** and D. Peroulis, "Evaluation of RF micro-discharge regimes in the performance of evanescent-mode cavity resonators," *IET Electronics Letters*, vol. 50, no. 17, pp. 1244-1246, August 2014.
- J12. S. Ebadi and **A. Semnani**, "Mutual coupling reduction in waveguide slot array antennas using electromagnetic band-gap (EBG) structures," *IEEE Antennas and Propagation Magazine*, vol. 56, no. 3, pp. 68-79, June 2014.
- J11. **A. Semnani**, K. Chen, and D. Peroulis, "Microwave gas breakdown in tunable evanescent-mode cavity resonators," *IEEE Microwave and Wireless Components Letters*, vol. 24, no. 5, pp. 351-353, May 2014.
- J10. **A. Semnani**, A. Venkatraman, A. Alexeenko, and D. Peroulis, "Frequency response of atmospheric pressure gas breakdown in micro/nanogap," *Applied Physics Letters*, 103, 063102, 2013.
Theorized various high-frequency discharge regimes and the concept of critical frequency.
- J9. **A. Semnani**, A. Venkatraman, A. Alexeenko, and D. Peroulis, "Pre-breakdown evaluation of gas discharge mechanisms in microgaps," *Applied Physics Letters*, 102, 174102, 2013.
- J8. D. Oloumi, S. Ebadi, A. Kordzadeh, **A. Semnani**, P. Mousavi, and X. Gong, "Miniaturized reflectarray unit cell using fractal-shaped patch-slot configuration," *IEEE Antennas and Wireless Propagation Letters*, vol. 11, pp. 10-13, 2012.
- J7. **A. Semnani**, I. T. Rekanos, M. Kamyab, and M. Moghaddam, "Solving inverse scattering problems based on truncated cosine Fourier and cubic B-spline expansions," *IEEE Transactions on Antennas and Propagation*, vol. 60, no. 12, pp. 5914-5923, Dec. 2012.
- J6. **A. Semnani**, I. T. Rekanos, M. Kamyab, and T. G. Papadopoulos, "Two-dimensional microwave imaging based on hybrid scatterer representation and differential evolution," *IEEE Transactions on Antennas and Propagation*, vol. 58, no. 10, pp. 3289-3298, Oct. 2010.
- J5. **A. Semnani**, M. Kamyab, and I. T. Rekanos, "Reconstruction of one-dimensional dielectric scatterers using differential evolution and particle swarm optimization," *IEEE Geoscience and Remote Sensing Letters*, vol. 6, no. 4, pp. 671-675, Oct. 2009.
- J4. **A. Semnani** and M. Kamyab, "An enhanced hybrid method for solving inverse scattering problems," *IEEE Transactions on Magnetics*, vol. 45, no. 3, pp. 1534-1537, March 2009.
- J3. **A. Semnani** and M. Kamyab, "Truncated cosine Fourier series expansion method for solving 2-D inverse scattering problems," *Progress In Electromagnetics Research*, vol. 81, pp. 73-97, 2008.
- J2. **A. Semnani** and M. Kamyab, "An Enhanced Method for Inverse Scattering Problems using Fourier Series Expansion in Conjunction with FDTD and PSO," *Progress In Electromagnetics Research*, vol. 76, pp. 45-64, 2007.
- J1. A. Mahmoudi, **A. Semnani**, R. Alizadeh, and R. Adeli, "Negative refraction of a three-dimensional metallic photonic crystal," *European Physical Journal Applied Physics*, vol. 39, pp. 27-32, 2007.

Conference Proceedings

- C47. M. R. Akram and **A. Semnani**, "A planar super-directive antenna realized using Huygens' resonances," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (USNC-URSI)*, Ottawa, Canada, 2025.
- C46. K. Singhal and **A. Semnani**, "An ultra-wideband plasma-matched electrically small monopole antenna," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (USNC-URSI)*, Ottawa, Canada, 2025.
- C45. M. R. Akram and **A. Semnani**, "A compact DR-based microwave anapole (non-radiating) source," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (USNC-URSI)*, Ottawa, Canada, 2025.

- C44. M. R. Akram and **A. Semnani**, “A compact antenna-limiter architecture for high-power microwave mitigation,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (USNC-URSI)*, Ottawa, Canada, 2025.
- C43. S. N. Ramesh, K. Singhal, and **A. Semnani**, “An EVA-based high-power and absorptive frequency-selective plasma limiter,” *IEEE International Microwave Symposium (IMS)*, San Francisco, CA, 2025.
- C42. M. R. Akram and **A. Semnani**, “An EIT-based plasma-integrated metasurface for high-power microwave protection,” *IEEE International Microwave Symposium (IMS)*, San Francisco, CA, 2025.
- C41. K. S. Kabir, K. Singhal, and **A. Semnani**, “A microwave plasma jet array based on SIW-enabled evanescent-mode cavity resonator Technology,” *IEEE International Microwave Symposium (IMS)*, San Francisco, CA, 2025.
- C40. M. R. Akram and **A. Semnani**, “A power-efficient plasma jet line enabled by dielectric anapole resonator technology,” *IEEE International Microwave Symposium (IMS)*, San Francisco, CA, 2025.
- C39. K. K. Varikuntla, M. A. Babar Abbasi, O. Yurduseven, and **A. Semnani**, “Electromagnetic analysis and frequency response of plasma medium for high power microwaves,” *Proceedings of the IEEE Microwaves, Antennas, and Propagation Conference (MAPCON)*, Hyderabad, India, 2024.
- C38. K. K. Varikuntla, M. A. Babar Abbasi, and **A. Semnani**, “Plasma based self-reconfigurable energy selective surface for high-power protection,” *Proceedings of the IEEE Microwaves, Antennas, and Propagation Conference (MAPCON)*, Hyderabad, India, 2024.
- C37. M. R. Akram and **A. Semnani**, “A highly-efficient 2.45 GHz plasma jet based on a dielectric microwave anapole structure,” *IEEE International Microwave Symposium (IMS)*, Washington, DC, 2024.
- C36. K. K. Varikuntla, M. T. Ahmed, and **A. Semnani**, “A plasma-based absorptive and high-power waveguide limiter,” *IEEE International Microwave Symposium (IMS)*, Washington, DC, 2024.
- C35. M. Parsaei, M. R. Akram, and **A. Semnani**, “A 3-D split ring resonator for power-efficient microwave plasma jets,” *IEEE International Microwave Symposium (IMS)*, Washington, DC, 2024.
- C34. **A. Semnani**, K. Singhal, and S. T. Moon, “A plasma-based technique for wideband matching of electrically small antennas,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (USNC-URSI)*, Portland, OR, 2023.
- C33. S. N. Ramesh and **A. Semnani**, “A compact and high-power frequency-selective plasma limiter with an ultra-high isolation,” *IEEE International Microwave Symposium (IMS)*, San Diego, CA, 2023.
- C32. K. S. Kabir and **A. Semnani**, “A 2.45 GHz power-efficient microplasma jet utilizing an SIW evanescent-mode cavity resonator,” *IEEE International Microwave Symposium (IMS)*, San Diego, CA, 2023.
- C31. C. Baylis, A. Egbert, C. Calabrese, J. Roessler, A. Goad, R. J. Marks II, S. Seguin, A. Fisher, Z. Vander Missen, M. Abu Khater, D. Peroulis, and **A. Semnani**, “Real-time impedance tuning for spectrum sharing,” *IEEE International Symposium on Electromagnetic Compatibility EMC*, Spokane, WA, 2022.
- C30. C. Baylis, D. Sicker, S. Blun, E. Fernandez, A. Clegg, S. Hutton, Z. Han, D. Jackson, R. Henderson, R. Narayanan, **A. Semnani**, and T. Tuinstra, “SMART Hub: Solving the spectrum crisis through parallel research in policy, technology, security, and economics for future adaptive and reconfigurable wireless systems,” *IEEE Texas Symposium WMCS*, Waco, TX, 2021.

- C29. Z. Vander Missen, S. O. Macheret, **A. Semnani**, and D. Peroulis, "Plasma switch-based technology for high-speed and high-power impedance tuning," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Clearwater, FL, 2021.
Recipient of the Best Student Paper Award.
- C28. A. Fisher, Z. Vander Missen, **A. Semnani**, and D. Peroulis, "A low-loss 1-4 GHz optically-controlled silicon plasma switch," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Clearwater, FL, 2021.
- C27. J. Alcala-Medel, A. Egbert, C. Calabrese, A. Dockendorf, C. Baylis, G. Shaffer, **A. Semnani**, D. Peroulis, E. Viveiros, K. Gallagher, and A. Martone, "Fast frequency-agile real-time optimization of high-power tuning network for cognitive radar applications," *IEEE International Microwave Symposium (IMS)*, Boston, MA, 2019.
- C26. Z. Vander Missen, **A. Semnani**, and D. Peroulis, "Toward a high-power high-isolation wide-band plasma limiter," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Cocoa, FL, 2019.
- C25. Z. Vander Missen, **A. Semnani**, and D. Peroulis, "Microwave-driven CPW microplasma generator for low-power discharge," *IEEE International Microwave Workshop Series on Advanced Materials and Processes (IMWS-AMP)*, Ann Arbor, MI, 2018.
- C24. **A. Semnani**, M. D. Sinanis and D. Peroulis, "High-power and widely-tunable evanescent-mode cavity-backed slot antenna," *IEEE International Symposium on Antennas and Propagation (AP-S)*, Boston, MA, 2018.
- C23. Z. Vander Missen, **A. Semnani**, and D. Peroulis, "High-power wideband low-cost limiters using cold plasma," *IEEE International Microwave Symposium (IMS)*, Philadelphia, PA, 2018.
- C22. S. Rezayat, C. Kappellmann, Z. Hays, L. Hays, C. Baylis, E. Viveiros, **A. Semnani**, and D. Peroulis, "Real-time frequency-agile circuit reconfiguration for S-band radar using a high-power tunable resonant cavity matching network," *IEEE International Microwave Symposium (IMS)*, Philadelphia, PA, 2018.
- C21. Z. Vander Missen, **A. Semnani**, E. Viveiros, and D. Peroulis, "Interaction of high-power microwaves with low-temperature plasma in a gas-discharge-tube-loaded SIW structure," *IEEE Radio and Wireless Symposium (RWS)*, Anaheim, CA, 2018.
- C20. Z. Hays, C. Kappellmann, L. Lamers, C. Baylis, M. Abu Khater, **A. Semnani**, D. Peroulis, E. Viveiros, and J. Penn, "Fast impedance matching using interval halving of resonator position numbers for a high-power evanescent-mode cavity tuner," *IEEE Radio and Wireless Symposium (RWS)*, Anaheim, CA, 2018.
- C19. Y. C. Wu, M. A. Khater, **A. Semnani**, and D. Peroulis, "An S-band 3-W load-reconfigurable power amplifier with 50 ~ 76% efficiency for VSWR up to 4:1," *IEEE International Microwave Symposium (IMS)*, Honolulu, HI, 2017.
- C18. **A. Semnani**, S. Macheret, and D. Peroulis, "A 2-30 W S-band plasma-based switch," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Cocoa, FL, 2017.
- C17. Z. Hays, C. Baylis, R. J. Marks, M. A. Khater, **A. Semnani**, and D. Peroulis, "Fast amplifier PAE optimization using resonant frequency interval halving with an evanescent-mode cavity tuner," *IEEE Texas Symposium on Wireless and Microwave Circuits and Systems*, Waco, TX, 2017.
- C16. **A. Semnani**, H. J. Yang, M. Sinanis, S.-J. Park, J. G. Eden, S. O. Macheret, and D. Peroulis, "Power limiting characteristics of a plasma-loaded evanescent-mode cavity resonator," *46th European Microwave Conference (EuMC)*, London, United Kingdom, 2016.
- C15. **A. Semnani**, M. Sinanis, G. S. Shaffer, and D. Peroulis, "Field emission mitigation in X-band silicon-etched cavity resonators," *IEEE International Microwave Symposium (IMS)*, San Francisco, CA, 2016.
- C14. **A. Semnani**, H. J. Yang, M. Sinanis, S.-J. Park, J. G. Eden, S. O. Macheret, and D. Peroulis, "Low temperature plasma for tunable resonant attenuation," *IEEE International Microwave Symposium (IMS)*, San Francisco, CA, 2016.
- C13. **A. Semnani**, Z. Vander Missen, S. Macheret, and D. Peroulis, "Gas discharge tube-based variable RF attenuator," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Clearwater, FL, 2016.

- C12. **A. Semnani**, S. Macheret, and D. Peroulis, “A tunable VHF gas discharge tube resonator,” *IEEE Radio and Wireless Symposium (RWS)*, Austin, TX, 2016.
- C11. **A. Semnani** and D. Peroulis, “Electromagnetic sensitivity analysis of RF gas micro/nano-breakdown,” *IEEE International Symposium on Antennas and Propagation (AP-S)*, Memphis, TN, 2014.
- C10. **A. Semnani** and D. Peroulis, “Nano-plasma tunable evanescent-mode cavity resonators,” *IEEE International Microwave Symposium (IMS)*, Tampa, FL, 2014.
- C9. **A. Semnani** and D. Peroulis, “Electromagnetic simulation of gas discharge effects in RF microgaps,” *IEEE International Symposium on Antennas and Propagation (AP-S)*, Orlando, FL, 2013.
- C8. **A. Semnani** and D. Peroulis, “The influence of gas discharge in Nano-gap RF conductivity,” *IEEE International Microwave Symposium (IMS)*, Seattle, WA, 2013.
- C7. K. Chen, **A. Semnani**, and D. Peroulis, “High-power microwave gas discharge in high-Q evanescent-mode cavity resonator and its instantaneous/long-term effects,” *IEEE International Microwave Symposium (IMS)*, Seattle, WA, 2013.
- C6. **A. Semnani**, A. Venkattraman, A. Alexeenko, and D. Peroulis, “Numerical evaluation of RF gas ionization effects in micro- and nano-scale devices,” *International Conference on Electromagnetics in Advanced Applications (ICEAA)*, Cape Town, South Africa, 2012.
- C5. **A. Semnani**, I. T. Rekanos, and M. Kamyab, “One-dimensional profile reconstruction using cosine Fourier and cubic B-spline expansions,” *40th European Microwave Conference (EuMC)*, Paris, France, 2010.
- C4. **A. Semnani** and M. Kamyab, “Comparison of Differential evolution and particle swarm optimization in one-dimensional reconstruction problems,” *20th Asia-Pacific Microwave Conference (APMC)*, Hong Kong, China, 2008.
- C3. **A. Semnani** and M. Kamyab, “An enhanced hybrid method for solving inverse scattering problems,” *13th Biennial IEEE Conference on Electromagnetic Field Computations (CEFC)*, Athens, Greece, 2008.
- C2. **A. Semnani** and M. Kamyab, “Cosine Fourier series expansion method for 2-D inverse scattering problems,” *37th European Microwave Conference (EuMC)*, Munich, Germany, 2007.
- C1. **A. Semnani** and M. Kamyab, “A computationally efficient method in inverse scattering using Fourier series expansion in conjunction with FDTD and PSO,” *Workshop on Computational Electromagnetics in Time-Domain (CEM-TD)*, Perugia, Italy, 2007.

Conference Presentations

- A66. **A. Semnani**, M. R. Akram, K. Singhal, and T. Azam, “Energy-efficient resonant microwave plasma jet architectures,” *78th Annual Gaseous Electronics Conference (GEC)*, Seoul, South Korea, 2025.
- A65. **A. Semnani** and K. Singhal, “Negative-index capacitively coupled plasmas for compact antennas,” *78th Annual Gaseous Electronics Conference (GEC)*, Seoul, South Korea, 2025.
- A64. **A. Semnani**, S. N. Ramesh, M. R. Akram, and K. Singhal, “Reconfigurable plasma protection against high-power microwaves,” *78th Annual Gaseous Electronics Conference (GEC)*, Seoul, South Korea, 2025.
- A63. N. Narwekar, M. R. Akram, **A. Semnani**, and O. Amili, “High-speed schlieren and particle image velocimetry of a highly-efficient atmospheric plasma jet,” *77th Annual Meeting of the Division of Fluid Dynamics (APS-DFD)*, Salt Lake City, UT, 2024.
- A62. K. Singhal, K. S. Kabir, and **A. Semnani**, “An atmospheric plasma jet array based on the evanescent-mode cavity resonator technology,” *77th Annual Gaseous Electronics Conference (GEC)*, San Diego, CA, 2024.
- A61. K. S. Kabir, K. Singhal, M. R. Akram, and **A. Semnani**, “Highly efficient resonant microwave plasma jets,” *77th Annual Gaseous Electronics Conference (GEC)*, San Diego, CA, 2024.

- A60. S. Mahajan, H. Wang, A. M. Loveless, **A. Semnani**, A. Venkatraman, L. I Breen, and A. L. Garner, "Extending microscale gas breakdown theory to AC fields," *IEEE International Power Modulator and High Voltage Conference (IPMHVC)*, Indianapolis, IN, 2024.
- A59. L. I Breen, S. Mahajan, **A. Semnani**, A. M. Loveless, and A. L. Garner, "Gas breakdown at intermediate pressure and gaps," *IEEE International Power Modulator and High Voltage Conference (IPMHVC)*, Indianapolis, IN, 2024.
- A58. S. Mahajan, H. Wang, A. M. Loveless, **A. Semnani**, A. Venkatraman, and A. L. Garner, "Frequency dependence on microwave, microscale gas breakdown," *25th Annual International Vacuum Electronics Conference (IVEC)*, Monterey, CA, 2024.
- A57. P. Nourani, K. S. Kabir, **A. Semnani**, and O. Amili, "High-speed schlieren imaging of a highly-efficient atmospheric plasma jet," *76th Annual Meeting of the Division of Fluid Dynamics (APS-DFD)*, Washington, DC, 2023.
- A56. M. R. Akram and **A. Semnani**, "A dielectric resonator-based microwave plasma jet," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A55. K. Singhal and **A. Semnani**, "An efficient atmospheric pressure resonant microwave plasma line," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A54. K. S. Kabir and **A. Semnani**, "Evaluation of reactive species in a frequency-tunable resonant microwave plasma jet," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A53. K. K. Varikuntla and **A. Semnani**, "A plasma-based frequency-selective limiting reflectarray," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A52. M. T. Ahmed, K. K. Varikuntla, and **A. Semnani**, "Design and analysis of a plasma-based reconfigurable and frequency-selective absorber," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A51. S. N. Ramesh and **A. Semnani**, "An EVA cavity-based frequency-selective plasma limiter," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A50. **A. Semnani**, K. Singhal, and S. T. Moon, "Impedance matching in small antennas through capacitively-coupled plasma technique," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A49. K. K. Varikuntla and **A. Semnani**, "A conformal plasma frequency selective surface with tunable and switching performance," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A48. S. T. Moon and **A. Semnani**, "Tuning of radio-frequency (RF) plasmas by a perpendicular magnetic field," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A47. A. L. Garner, A. M. Loveless, H. Wang, S. Mahajan, A. Venkatraman, and **A. Semnani**, "Gas breakdown for nano- and microscale gaps: linking electron emission and avalanche theories," *76th Annual Gaseous Electronics Conference (GEC)*, Ann Arbor, MI, 2023.
- A46. **A. Semnani**, K. Singhal, and S. T. Moon, "A plasma matching approach to realize wideband and efficient small antennas," *IEEE International Conference on Plasma Science (ICOPS)*, Santa Fe, NM, 2023.
- A45. S. N. Ramesh, K. K. Varikuntla, and **A. Semnani**, "An absorptive plasma topology for frequency selective microwave protection," *IEEE International Conference on Plasma Science (ICOPS)*, Santa Fe, NM, 2023.
- A44. K. S. Kabir and **A. Semnani**, "An efficient microwave microplasma jet realized with printed circuit board technology," *IEEE International Conference on Plasma Science (ICOPS)*, Santa Fe, NM, 2023.

- A43. A. M. Loveless, A. Venkattraman, H. Wang, **A. Semnani**, and A. L. Garner, "Comparing continuum and particle-in-cell simulations at microscale," *IEEE International Conference on Plasma Science (ICOPS)*, Santa Fe, NM, 2023.
- A42. S. Mahajan, A. M. Loveless, **A. Semnani**, A. Venkattraman, and A. L. Garner, "Theoretical analysis of microwave breakdown for microscale gaps," *IEEE International Conference on Plasma Science (ICOPS)*, Santa Fe, NM, 2023.
- A41. A. M. Loveless, A. Venkattraman, S. Mahajan, **A. Semnani**, and A. L. Garner, "Comparison of particle-in-cell and continuum simulations for RF microscale gas breakdown," *IEEE International Power Modulator and High Voltage Conference (IPMHVC)*, Knoxville, TN, 2022.
- A40. S. Mahajan, A. M. Loveless, **A. Semnani**, A. Venkattraman, and A. L. Garner, "Microscale gas breakdown for microwave fields: theory and simulation," *IEEE International Power Modulator and High Voltage Conference (IPMHVC)*, Knoxville, TN, 2022.
- A39. **A. Semnani** and K. S. Kabir, "A highly efficient atmospheric pressure resonant microwave plasma jet," *IEEE International Conference on Plasma Science (ICOPS)*, Seattle, WA, 2022.
- A38. S. N. Ramesh and **A. Semnani**, "Analysis of self-sustained capacitively coupled microwave plasmas using a circuit modeling technique," *IEEE International Conference on Plasma Science (ICOPS)*, Seattle, WA, 2022.
- A37. A. M. Loveless, A. Venkattraman, S. Mahajan, **A. Semnani**, and A. L. Garner, "Comparison of particle-in-cell and continuum simulations for microscale gas breakdown," *IEEE International Conference on Plasma Science (ICOPS)*, Seattle, WA, 2022.
- A36. S. Mahajan, A. M. Loveless, **A. Semnani**, A. Venkattraman, and A. L. Garner, "Theoretical analysis of microwave breakdown for microscale gaps," *IEEE International Conference on Plasma Science (ICOPS)*, Seattle, WA, 2022.
- A35. J. C. Welch III, H. Wang, A. Venkattraman, S. Mahajan, A. M. Loveless, **A. Semnani**, and A. L. Garner, "Calculation of ionization coefficient for microscale gas breakdown in AC fields," *IEEE International Conference on Plasma Science (ICOPS)*, Seattle, WA, 2022.
- A34. S. Mahajan, A. M. Loveless, **A. Semnani**, and A. L. Garner, "Asymptotic analysis of AC microscale gas breakdown," *74th Annual Gaseous Electronics Conference (GEC)*, Virtual, 2021.
- A33. V. Podolsky, **A. Semnani**, and S. O. Macheret, "Experimental study of a low noise tunable plasma antenna sustained by CW and pulsed RF power," *72th Annual Gaseous Electronics Conference (GEC)*, College Station, TX, 2019.
- A32. **A. Semnani**, Z. Vander Missen, and D. Peroulis, "Toward a wideband and high-isolation power limiter," *IEEE International Conference on Plasma Science (ICOPS)*, Orlando, FL, 2019.
- A31. A. Loveless, Z. Vander Missen, **A. Semnani**, and A. Garner, "RF gas breakdown theory and experiment as a function of gas, gap size, frequency, and pressure," *IEEE International Conference on Plasma Science (ICOPS)*, Orlando, FL, 2019.
- A30. **A. Semnani**, M. D. Sinanis, and D. Peroulis, "Evanescent-mode cavity-backed tunable slot antenna," *USNC-URSI National Radio Science Meeting (NRSN)*, Boulder, CO, 2019.
- A29. **A. Semnani**, B. Baskaran, and D. Peroulis, "Wireless microwave powering of agricultural sensors," *USNC-URSI National Radio Science Meeting (NRSN)*, Boulder, CO, 2019.

- A28. J. A. Alcala-Medel, C. Calabrese, C. Baylis, A. Martone, K. Gallagher, E. Viveiros, **A. Semnani**, and D. Peroulis, "Fast reconfiguration of second-generation tunable evanescent-mode cavity matching network for frequency agility in S-band cognitive radar applications," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2019.
- A27. A. Dockendorf, E. Langley, A. Egbert, C. Baylis, **A. Semnani**, D. Peroulis, A. Martone, E. Viveiros, and R. J. Marks II, "Frequency-agile reconfiguration for a high-power resonant cavity tuner using previous search results," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2019.
- A26. C. Baylis, A. Martone, K. Gallagher, E. Viveiros, **A. Semnani**, D. Peroulis, and R. J. Marks II, "Software defined, spectrally sensitive radar transmission," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2019.
- A25. **A. Semnani**, S. Macheret, and D. Peroulis, "Plasma-based electrically small antennas," *71th Annual Gaseous Electronics Conference (GEC)*, Portland, OR, 2018.
- A24. S. Macheret, **A. Semnani**, D. Peroulis, S. S. Tholeti, A. Alexeenko, A. Khomenko, and V. Podolsky, "Spatial and temporal manipulation of plasmas for RF electronics," *9th International Symposium on Plasma Nanoscience and Nanotechnology (iPlasmaNano-IX)*, New Buffalo, MI, 2018.
- A23. **A. Semnani**, Z. Vander Missen, and D. Peroulis, "Microplasma generation in low-power microwave coplanar waveguide (CPW) structures," *IEEE International Conference on Plasma Science (ICOPS)*, Denver, CO, 2018.
- A22. **A. Semnani**, D. Peroulis, and S. Macheret, "Analysis of plasma parameters and conditions required for reconfigurable antennas," *IEEE International Conference on Plasma Science (ICOPS)*, Denver, CO, 2018.
- A21. **A. Semnani**, Z. Vander Missen, and D. Peroulis, "A wideband and high-power plasma-based microwave power limiter," *IEEE International Conference on Plasma Science (ICOPS)*, Denver, CO, 2018.
- A20. A. L. Garner, A. M. Loveless, Z. Vander Missen, and **A. Semnani**, "AC gas breakdown: from simple scaling laws to experiments," *IEEE International Conference on Plasma Science (ICOPS)*, Denver, CO, 2018.
- A19. **A. Semnani**, S. Macheret, and D. Peroulis, "Plasma varactor for reconfigurable RF/microwave systems," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2018.
- A18. **A. Semnani**, M. Abu Khater, D. Peroulis, C. Baylis, L. Hays, C. Kappelmann, and Z. Hays, "An evanescent-mode cavity-based high-power impedance tuner for adaptive radar applications," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2018.
- A17. **A. Semnani**, S. Macheret, and D. Peroulis, "High-power microwave tunable resistor based on low-temperature plasma technology," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2018.
- A16. Z. Vander Missen, **A. Semnani**, and D. Peroulis, "Plasma cell loaded transmission line technologies for broadband applications," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2018.
- A15. C. Kappelmann, L. Hays, Z. Hays, S. Rezayat, C. Baylis, R. J. Marks, E. Viveiros, M. Abu Khater, **A. Semnani**, and D. Peroulis, "Frequency-agile power amplifier matching network reconfiguration using a hybrid real-time search," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2018.
- A14. L. Hays, S. Rezayat, Z. Hays, A. Egbert, C. Kappelmann, C. Baylis, R. J. Marks, E. Viveiros, D. Peroulis, M. Abu Khater, and **A. Semnani**, "Direct tuning of cavity position numbers for circuit optimization using an evanescent-mode cavity tuner designed for reconfigurable radar transmission," *USNC-URSI National Radio Science Meeting (NRSM)*, Boulder, CO, 2018.

- A13. **A. Semnani**, S. Macheret, and D. Peroulis, "Tuning of AC sheath thickness by varying plasma excitation frequency," *70th Annual Gaseous Electronics Conference (GEC)*, Pittsburgh, PA, 2017.
- A12. **A. Semnani**, S. Macheret, and D. Peroulis, "High-power microwave switching utilizing low-temperature gas discharge tube," *IEEE International Conference on Plasma Science (ICOPS)*, Atlantic City, NJ, 2017.
- A11. **A. Semnani**, S. Macheret, and D. Peroulis, "Plasma-based tunable high frequency power limiter," *69th Annual Gaseous Electronics Conference (GEC)*, Bochum, Germany, 2016.
- A10. S. Macheret, **A. Semnani**, and D. Peroulis, "Abnormal glow discharge as a variable capacitor for tunable RF systems," *69th Annual Gaseous Electronics Conference (GEC)*, Bochum, Germany, 2016.
- A9. **A. Semnani**, S. Macheret, and D. Peroulis, "Tunable RF electronics based on low temperature plasma," *IEEE International Conference on Plasma Science (ICOPS)*, Banff, Alberta, Canada, 2016.
- A8. **A. Semnani**, S. Macheret, and D. Peroulis, "Plasma-based reconfigurable RF electronics," *Annual Meeting of the Electrostatics Society of America (ESA)*, West Lafayette, IN, 2016.
- A7. **A. Semnani**, S. Macheret, and D. Peroulis, "Plasma tunable LC resonator for high-power electromagnetic applications," *68th Annual Gaseous Electronics Conference (GEC)*, Honolulu, HI, 2015.
- A6. **A. Semnani**, S. Tholeti, A. Alexeenko, S. Macheret, and D. Peroulis, "Electron energy distribution functions and plasma lifetime in atmospheric pressure microdischarges," *8th International Workshop on Microplasmas (IWM)*, Newark, NJ, 2015.
- A5. **A. Semnani** and D. Peroulis, "Interaction of High-Frequency Electromagnetic Waves with Pre-Breakdown Atmospheric Pressure Micro-Discharge Region," *67th Annual Gaseous Electronics Conference (GEC)*, Raleigh, NC, 2014.
- A4. **A. Semnani** and D. Peroulis, "High frequency tuning mechanism using nano-plasma," *Annual Technical Meeting of Society of Engineering Science (SES)*, West Lafayette, IN, 2014.
- A3. **A. Semnani** and D. Peroulis, "Evaluation of RF micro-discharge regimes in the performance of evanescent-mode cavity resonators," *66th Annual Gaseous Electronics Conference (GEC)*, Princeton, NJ, 2013.
- A2. **A. Semnani**, I. T. Rekanos, M. Kamyab, and C. S. Antonopoulos, "Solving 2-D inverse scattering problems using truncated cosine Fourier and cubic B-spline expansions," *Progress In Electromagnetics Research Symposium (PIERS)*, Marrakesh, Morocco, 2011.
- A1. **A. Semnani** and M. Kamyab, "A hybrid method for solving 2-D inverse scattering problems," *European Electromagnetics Conference (EUROEM)*, Lausanne, Switzerland, 2008.