

# Xiaoguang “Leo” Liu

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## Education

- 2004–2010 **Ph.D.**, *Purdue University*, West Lafayette, IN, USA.  
Dissertation topic: High-Q RF-MEMS Tunable Resonators and Filters for Reconfigurable Radio Frequency Front-Ends  
Co-Advisors: Linda P. B. Katehi and Dimitrios Peroulis
- 2000–2004 **B.Eng.**, *Zhejiang University*, Hangzhou, China.  
College of Information Science and Electronics Engineering

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## Experiences

- 2017–Present **Associate Professor**, *University of California*, Davis, CA.  
2012–2017 **Assistant Professor**, *University of California*, Davis, CA.  
2010–2011 **Postdoctoral Researcher**, *Purdue University*, West Lafayette, IN.  
2005–2010 **Graduate Research Assistant**, *Purdue University*, West Lafayette, IN.  
2004–2005 **Graduate Teaching Assistant**, *Purdue University*, West Lafayette, IN.

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## Research Interests

- Micro/Nano-ElectroMechanical (M/NEMS) Systems and RF-MEMS
- High frequency (RF to THz) integrated circuits and antennas
- Applications of high-frequency electronics in communication and sensing
- Small unmanned aerial vehicles (UAV)

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## Teaching

- EEC 130A: Introductory Electromagnetics I
- EEC 134AB: Design of RF Systems
- EEC 229: RF-MEMS and Adaptive Wireless Systems
- EEC 289N: Design of RF and Microwave Filters

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## Honors and Awards

- 2013 **UC Davis IEEE Professor of the year**, *University of California Davis*.  
Awarded by the UC Davis IEEE Chapter to 1 professor each year
- 2013 **Hellman Foundation Fellow**, *University of California Davis*.  
Awarded to ~10 UC Davis assistant professors each year

2009 **IEEE Antenna-Propagation Society Graduate Fellowship** .

2004 **Graduation with Honors**, *Chu Kochen Honors Class, Zhejiang University*.

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## Publications

### Journal Publications

- [J31] Xiaohu Wu and Xiaoguang Liu, “Magnet-free non-reciprocal bandpass filter using temporally modulated coupled-resonators,” *IET Electronics Letters*, 2019
- [J30] Alejandro Alvarez-Melcon, Xiaohu Wu, Jiawei Zang, Xiaoguang Liu, and Juan Sebastian Gomez-Diaz, “Coupling Matrix Representation of Nonreciprocal Filters Based on Time Modulated Resonators,” Under review, *IEEE Transactions on Microwave Theory and Techniques*, 2019
- [J29] Xiaohu Wu, Xiaoguang Liu, Mark D. Hickie, Dimitrios Peroulis, Juan Sebastian Gomez-Diaz, and Alejandro Alvarez Melcon, “Isolating Bandpass Filters Using Time-Modulated Resonators,” Under review, *IEEE Transactions on Microwave Theory and Techniques*, 2019
- [J28] Hao Wang, Jingjun Chen, Xiaoguang Liu, “High-Efficiency Millimeter-wave CMOS Oscillator Design using Port Voltage/Current Optimization and T-embedding Networks,” Under review, *IEEE Transactions on Microwave Theory and Techniques*, 2019
- [J27] James T. Do, Haitao Zheng, Sumat Purewal, Eric Bryerton, Jeffrey Hesler, and Xiaoguang Liu, “75–110 GHz 3D Holographic Imaging for Identifying Buried Unexploded Ordnance,” Under review, *IEEE Transactions on Geoscience and Remote Sensing*, 2019
- [J26] Wanlu Shi, Yingsong Li, Luyu Zhao, Xiaoguang Liu, “Controllable Sparse Antenna Array for Adaptive Beamforming”, Accepted, *IEEE Access*, 2019
- [J25] Qingyang Wu, Carlos Feres, Daniel Kuzmenko, Zhi Ding, Zhou Yu, Xin Liu, Xiaoguang Liu, “Deep Learning Based RF Fingerprinting for Device Identification and Wireless Security,” Accepted, *IET Electronics Letters*, 2018
- [J24] Bo Yu, Xuan Ding, Hai Yu, Yu Ye, Xiaoguang Liu, and Qun Jane Gu, “Ring-Resonator-Based Sub-THz Dielectric Sensor,” *IEEE Microwave and Wireless Components Letters*, vol. 28, no. 11, pp. 1531–1539, Nov, 2018
- [J23] Hao Wang, Jingjun Chen, Hooman Rashtian, and Xiaoguang Liu, “High-Efficiency Millimeter-wave Single-ended and Differential Fundamental Oscillators in CMOS,” *IEEE Journal of Solid-State Circuits*, vol. 53, no. 8, pp. 2151–2163, Aug, 2018.
- [J22] Kai Yu, Yingsong Li, Xiaoguang Liu, “Mutual Coupling Reduction of Microstrip Patch Antenna Array Using Modified Split Ring Resonator Metamaterial Structures,” *Applied Computational Electromagnetics Society Journal*, vol. 33, no. 7, pp. 758–763, Jul, 2018.

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- [J21] Md. Naimul Hasan, Shahrokh Saeedi, Qun Jane Gu, Hjalti H. Sigmarsson, and Xiaoguang Liu, “Design Methodology of Reconfigurable N-path Filter with Center Frequency and Bandwidth Tuning,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 66, no. 6, pp. 2775–2790, Jun, 2018.
- [J20] Bo Yu, Yu Ye, Xuan Ding, Yuhao Liu, Zhiwei Xu, Xiaoguang Liu, and Qun Jane Gu, “Ortho-Mode Sub-THz Interconnect Channel for Planar Chip-to-chip Communications,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 66, no. 4, pp. 1864–1873, Apr, 2018.

- [J19] Yuhao Liu, Jiansong Liu, Bo Yu, and Xiaoguang Liu, "A Compact Single-Cantilever Multicontact RF-MEMS Switch With Enhanced Reliability," *IEEE Microwave and Wireless Components Letters*, vol. 28, no. 3, pp. 191–193, Mar, 2018.
- [J18] Yuhao Liu, Yusha Bey, and Xiaoguang Liu, "High-Power High-Isolation RF-MEMS Switches with Enhanced Hot-switching Reliability Using A Shunt Protection Technique," *IEEE Transactions on Microwave Theory and Techniques*, vol. 65, no. 9, pp. 3188–3199, Apr, 2017.
- [J17] Yan Wang, Ben Tobias, Yu-Ting Chang, Jo-Han Yu, Meijiao Li, Fengqi Hu, Ming Chen, Manish Mamidanna, T. Phan, Anh-Vu Pham, Jane Q. Gu, Xiaoguang Liu, Yilun Zhu, Calvin W. Domier, L. Shi, E. Valeo, G. J. Kramer, D. Kuwahara, Y. Nagayama, A. Mase, and Neville C. Luhmann Jr., "Millimeter-wave Imaging of Magnetic Fusion Plasmas, Technology Innovations Advancing Physics Understanding," *Nuclear Fusion*, vol. 57, pp. 29703, Mar, 2017.
- [J16] M. Naimul Hasan, Qun Jane Gu, and Xiaoguang Liu, "Tunable Blocker-Tolerant On-chip Radio Frequency Front-end Filter with Dual Adaptive Transmission Zeros for Software Defined Radio Applications," *IEEE Transactions on Microwave Theory and Techniques*, vol. 64, no. 12, pp. 4419–4433, Dec, 2016.
- [J15] Yuhao Liu, Yusha Bey, and Xiaoguang Liu, "Extension of the Hot-Switching Reliability of RF-MEMS Switches Using A Series Contact Protection Technique," *IEEE Transactions on Microwave Theory and Techniques*, vol. 64, no. 10, pp. 3151–3162, Oct, 2016.
- [J14] Akash Anand and Xiaoguang Liu, "Reconfigurable Planar Capacitive Coupling in Substrate-Integrated Coaxial-Cavities Filters," *IEEE Transactions on Microwave Theory and Techniques*, vol. 64, no. 8, pp. 2548–2560, Aug, 2016.
- [J13] Bo Yu, Yuhao Liu, Yu Ye, Xiaoguang Liu, and Qun Jane Gu, "Low-loss and Broadband G-Band Dielectric Interconnect for Chip-to-Chip Communication," *IEEE Microwave and Wireless Components Letters*, vol. 26, no. 7, pp. 478–480, Jun, 2016.
- [J12] Bo Yu, Yuhao Liu, Yu Ye, Junyan Ren, Xiaoguang Liu, and Jane Q. Gu, "High-Efficiency Micromachined Sub-THz Channels for Low-Cost Interconnect for Planar Integrated Circuits," *IEEE Transactions on Microwave Theory and Techniques*, vol. 64, no. 1, pp. 96–105, Jan, 2016.
- [J11] Young Seek Cho, Himanshu Joshi, Xiaoguang Liu, Hjalti H. Sigmarsson, William J. Chappell, and Dimitrios Peroulis, "Development of 6–12 GHz evanescent-mode two-pole low-loss tunable bandpass filter," *Microwave and Optical Technology Letters*, vol. 57, no. 10, pp. 2418–2422, Oct, 2015.
- [J10] Joshua Small, Adam Fruehling, Anurag Garg, Xiaoguang Liu, Dimitrios Peroulis, "Real-time DC-dynamic biasing method for switching time improvement in severely underdamped fringing-field electrostatic MEMS actuators," *Journal of Visualized Experiments*, Vol. 90, e51251, Aug, 2014.
- [J9] Akash Anand, Joshua Small, Dimitrios Peroulis, Xiaoguang Liu, "Theory and Design of Octave Tunable Filters with Lumped Tuning Elements," *IEEE Transactions on Microwave Theory and Techniques*, vol. 62, no. 12, pp. 4353–4364, Dec, 2013.
- [J8] Joshua Small, Adam Fruehling, Anurag Garg, Xiaoguang Liu, and Dimitrios Peroulis, "DC-dynamic biasing for  $>50\times$  switching time improvement in severely under-damped fringing-field electrostatic MEMS actuators," *Journal of Micromechanics and Microengineering*, vol. 22, 125029, 2012.
- [J7] Kenle Chen, Xiaoguang Liu, and Dimitrios Peroulis, "Widely-Tunable High-Efficiency Power Amplifier with Ultra-Narrow Instantaneous Bandwidth," *IEEE Transactions on Microwave Theory and Techniques*, vol. 60, No. 12, pp. 3787–3797, Dec, 2012.

- [J6] Joshua Small, Wasim Irshad, Adam Fruehling, Anurag Garg, Xiaoguang Liu and Dimitrios Peroulis, “Electrostatic fringing-field actuation for pull-in free RF-MEMS analogue tunable resonators,” *Journal of Micromechanics and Microengineering*, vol. 22, No. 9, Sep, 2012.
- [J5] Xiaoguang Liu, Linda P. B. Katehi, William J. Chappell, and Dimitrios Peroulis, “Power Handling of High-Q MEMS Tunable Evanescent-mode Resonators and Filters,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 60, no. 2, pp. 270–283, Feb, 2012.
- [J4] Xiaoguang Liu, Joshua Small, David Berdy, Linda Katehi, William J. Chappell, and Dimitrios Peroulis, “Impact of Mechanical Vibration on the Performance of RF MEMS Evanescent-mode Tunable Resonators,” *IEEE Microwave and Wireless Components Letters*, vol. 21, No. 8, pp. 406–408, Aug, 2011.
- [J3] Kenle Chen, Xiaoguang Liu, Andrew Kovacs, and Dimitrios Peroulis, “Anti-Biased Electrostatic RF MEMS Varactors and Filters,” *IEEE Transactions on Microwave Theory and Techniques*, vol. 58, no. 12, pp. 3971–3981, Dec, 2010.
- [J2] Xiaoguang Liu, Linda P. B. Katehi, and Dimitrios Peroulis, “Novel Dual-Band Microwave Filter using Dual-Capacitively-Loaded Cavity Resonators,” *IEEE Microwave and Wireless Components Letters*, vol. 20, no. 11, pp. 610–612, Nov, 2010.
- [J1] Xiaoguang Liu, Linda P. B. Katehi, William J. Chappell, and Dimitrios Peroulis, “High-Q Tunable Microwave Cavity Resonators and Filters using SOI-based RF MEMS Tuners,” *IEEE/ASME Journal of Microelectromechanical Systems*, vol. 19, no. 4, pp. 774–784, Aug, 2010.

### Conference Publications

- [C66] Xiaohu Wu, Mahmoud Nafe, and Xiaoguang Liu, “Non-Reciprocal 2nd-Order Bandpass Filter by Using Time-Modulated Microstrip Quarter-Wavelength Resonators,” *International Conference on Microwave and Millimeter Wave Technology (ICMMT)*, May, 2019
- [C65] Mahmoud A. Nafe, Xiaohu Wu, Xiaoguang Liu, “A Wideband Magnetic-Free Circulator Using Spatio-Temporal Modulation of 2-pole Bandpass Filters,” Accepted, *IEEE Radio & Wireless Symposium (RWS)*, Jan, 2019.
- [C64] Hao Wang, Jingjun Chen, James T.S. Do, Xiaoguang Liu, “A 212-GHz Differential VCO with 5.3% dc-to-RF Efficiency in 65-nm CMOS Technology,” Accepted, *IEEE Radio & Wireless Symposium (RWS)*, Jan, 2019.
- [C63] Mahmoud Nafe, M. Naimul Hasan, Hind Reggad, Daniel Kuzmenko, Jingjun Chen, Xiaoguang Liu, “Magnetic-free Circulator Based On Spatio-Temporal Modulation Implemented via Switched Capacitors for Full Duplex Communication,” *USNC-URSI Radio Science Meeting (Joint with AP-S Symposium)*, Jul, 2018.
- [C62] **(Invited)** Yuhao Liu, Jiansong Liu, Bo Yu, M. Naimul Hasan, Xiaoguang Liu, "RF MEMS switch for Reconfigurable RF-Front End with Improved Hot-Switching Capabilities," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Jul, 2018

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- [C61] Songjie Bi, Xiaomeng Gao, Victor M. Lubecke, Olga Boric-Lubecke, Dennis Matthews, Xiaoguang Liu, “A Multi-Arc Method for Improving Doppler Radar Motion Measurement Accuracy,” *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2018.

- [C60] Bo Yu, Yu Ye, Xuan Ding, Xiaoguang Liu, Jane Q. Gu, "Sub-THz Interconnect for Planar Chip-to-Chip Communications," *IEEE Radio & Wireless Symposium (RWS)*, Jan, 2018.
- [C59] Jeronimo Segovia-Fernandez, James Do, Xiaonan Jiang, Yuhao Liu, Julius M. Tsai, Hooman Rashtian, Xiaoguang Liu, David A. Horsley, "Monolithic AlN MEMS-CMOS Resonant Transformer for Wake-up Receivers," *IEEE International Ultrasonics Symposium*, Sep, 2017.
- [C58] Yingsong Li, Songjie Bi, Xiaoguang Liu, "A Modified Bow-Tie Antenna for Contact-Based Heartbeats Detection Applications," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Jul, 2017.
- [C57] Kai Yu, Xiaoguang Liu, Yingsong Li, "Mutual Coupling Reduction of Microstrip Patch Antenna Array Using Modified Split Ring Resonator Metamaterial Structures," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Jul, 2017.
- [C56] Kai Yu, Yingsong Li, Xiaoguang Liu, "A High Gain Patch Antenna Using Near Zero-Index Metamaterial Coating," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Jul, 2017.
- [C55] Scott Block, Xiaonan Jiang, Can Cui, Jeronimo Segovia Fernandez, Rajeevan Amirtharajah, David Horsley, Hooman Rashtian, Xiaoguang Liu, "A 170nW CMOS Wake-Up Receiver with -60-dBm Sensitivity Using AlN High-Q Piezoelectric Resonators," *IEEE International Symposium on Circuits and Systems (ISCAS)*, Jun, 2017.
- [C54] Md. Naimul Hasan, Xiaoguang Liu, "Tunable RF Front-end Filter with Wideband Blocker Suppression for Multi-Standard Applications," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2017.
- [C53] Hao Wang, Daniel Kuzmenko, Bo Yu, Yu Ye, Jane Gu, Hooman Rashtian, Xiaoguang Liu, "A Compact 213-GHz CMOS Fundamental Oscillator with 0.56-mW Output Power and 3.9% Efficiency using a Capacitive Transformer," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2017.
- [C52] Bo Yu, Yu Ye, Xuan Ding, Xiaoguang Liu, Jane Q. Gu, "Dielectric Waveguide Based Multi-Mode sub-THz Interconnect Channel for High Data-Rate High Bandwidth-Density Planar Chip-to-Chip Communication," **(Best Student Paper, Third Place)** *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2017.
- [C51] Bo Yu, Yu Ye, Xuan Ding, Xiaoguang Liu, Jane Q. Gu, "High Energy-Efficiency High Bandwidth-Density Sub-THz Interconnect for the Last-Centimeter Chip-to-Chip Communications," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2017.
- [C50] Md Naimul Hasan, Mahmoud Nafe, Xiaoguang Liu, "Design of All Passive Blocker-Tolerant Reconfigurable RF Front-end Filter," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Apr, 2017.
- [C49] Hao Wang, Akash Anand, Xiaoguang Liu, "A Miniature 800-1100-MHz Tunable Filter with High-Q Ceramic Coaxial Resonators and Commercial RF-MEMS Tunable Digital Capacitors," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Apr, 2017.
- [C48] Fengqi Hu, Meijiao Li, Calvin W. Domier, Xiaoguang Liu, Neville C. Luhmann, Jr., "Microwave Imaging Radar Reflectometer System Utilizing Digital Beam Forming," *APS Division of Plasma Physics Meeting*, Oct, 2016.

- [C47] Bo Yu, Yu Ye, Xiaoguang Liu, and Qun Jane Gu, "Microstrip line based sub-THz interconnect for high energy-efficiency chip-to-chip communications," *IEEE International Symposium on Radio-Frequency Integration Technology (RFIT)*, Aug, 2016.
- [C46] Bo Yu, Yu Ye, Xiaoguang Liu, and Qun Jane Gu, "Sub-THz interconnect channel for planar chip-to-chip communication," *IEEE International Symposium on Electromagnetic Compatibility (EMC)*, Jul, 2016.
- [C45] Md. Naimul Hasan, Qun Jane Gu, and Xiaoguang Liu, "Tunable Blocker-Tolerant RF Front-end Filter with Dual Adaptive Notches for Reconfigurable Receivers," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2016.
- [C44] Akash Anand and Xiaoguang Liu, "Metallic Air Cavities Integrated with Surface Mount Tuning Components for Tunable Evanescent-Mode Resonators," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2016.
- [C43] James Chen, Akash Anand, Marvin D. Bengel, Hjalti Sigmarsson, and Xiaoguang Liu, "An Evanescent-mode Tunable Dual-band Filter with Independently-Controlled Center Frequencies," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2016.
- [C42] Md. Naimul Hasan, Qun Jane Gu, and Xiaoguang Liu, "Reconfigurable Blocker-Tolerant RF Front-End Filter with Tunable Notch for Active Cancellation of Transmitter Leakage in FDD Receivers," (**Student Paper Competition Finalist**), *IEEE International Symposium on Circuits and Systems (ISCAS)*, May, 2016.
- [C41] James T. S. Do and Xiaoguang Liu, "A High-Q W Band Tunable Bandpass Filter," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2016.
- [C40] Songjie Bi, Juan Zeng, Marzhan Bekbalanova and Xiaoguang Liu, "Contact-based Radar Measurement of Cardiac Motion—A Position and Polarization Study," *IEEE Topical Conference on Biomedical Wireless Technologies, Networks & Sensing Systems*, Jan, 2016.
- [C39] Hooman Rashtian, Jane Q. Gu, Xiaoguang Liu, "A 200-GHz Triple-Push Oscillator in 65-nm CMOS with Design Techniques for Enhancing DC-to-RF Efficiency," *IEEE Topical Meetings on Silicon Monolithic Integrated Circuits in RF Systems (SiRF)*, Jan, 2016.
- [C38] Md. Naimul Hasan, Sudhir Aggarwal, Qun Jane Gu, and Xiaoguang Liu, "Tunable N-Path RF Front-end Filter with an Adaptive Integrated Notch for FDD/Co-Existence," *IEEE International Midwest Symposium on Circuits and Systems (MWSCAS)*, Aug, 2015.
- [C37] Meijiao Li, Calvin Domier, Xiaoguang Liu, and Neville Luhmann, "Wide Band MM-Wave, Double-sided Printed Bow-Tie Antenna for Phased Array Applications," (**Student Paper Competition Honorable Mention**) *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Jul, 2015
- [C36] (**Invited**) Yuhao Liu, Hao Wang, Yusha Bey, and Xiaoguang Liu, "A Novel RF-MEMS Shunt Capacitive Switch Design for Dielectric Charging Mitigation," *IEEE International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications*, Jul, 2015.
- [C35] Akash Anand, and Xiaoguang Liu, "Capacitively Coupled Coaxial-Cavity Bandstop Filters with Tunable Center Frequency and Bandwidth," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2015.

- [C34] Danqing Fu, Yusha A. Bey, Calvin Domier, Neville C. Luhmann Jr., and Xiaoguang Liu, "A Q-Band RF-MEMS Tapered True Time Delay Line for Fusion Plasma Diagnostics Systems," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2015.
- [C33] Qianteng Wu, and Xiaoguang Liu, "A 3.4–3.6-GHz High Efficiency Gallium Nitride Power Amplifier Using Bandpass Output Matching Network," *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2015.
- [C32] James T.S. Do, and Xiaoguang Liu, "A 75-110GHz Micro-Machined High-Q Tunable Filter," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Apr, 2015.
- [C31] **(Invited)** Xiaoguang Liu, "Tunable RF and Microwave Filters," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Apr, 2015.
- [C30] Songjie Bi, Dennis Matthews, and Xiaoguang Liu, "An experimental study of 2-D cardiac motion pattern based on contact radar measurement," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Apr, 2015.
- [C29] Chan Ho Kim, Kai Chang, and Xiaoguang Liu, "Varactor Tuned Ring Resonator Filter With Wide Tunable Bandwidth," *IEEE Radio & Wireless Symposium (RWS)*, Jan, 2015.
- [C28] Qi Jiang, Danqing Fu, Fengqi Hu, Meijiao Li, Calvin W. Domier, Xiaoguang Liu, Neville C. Luhmann, "Mixer and beamforming advances in millimeter-wave imaging," *International Conference on Infrared, Millimeter, and Terahertz waves (IRMMW-THz)*, Sep, 2014.
- [C27] Md. Naimul Hasan, Sudhir Aggarwal Qun Jane Gu, and Xiaoguang Liu, "Reconfigurable N-path RF front-end filter with improved blocker rejection," *IEEE International Midwest Symposium on Circuits and Systems (MWSCAS)*, Aug, 2014.
- [C26] Akash Anand and Xiaoguang Liu, "Substrate-Integrated Coaxial-Cavity Filter With Tunable Center Frequency and Reconfigurable Bandwidth," **(Best student paper)** *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Jun, 2014.
- [C25] Yuhao Liu, Yusha Bey, Xiaoguang Liu, "Single-Actuator Shunt-Series RF-MEMS Switch," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2014.
- [C24] Bo Yu, Yuhao Liu, Xing Hu, Xiaoxin Ren, Xiaoguang Liu, Qun Jane Gu, "Micromachined Sub-THz Interconnect Channels for Planar Silicon Processes," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2014.
- [C23] Bo Yu, Yuhao Liu, Xing Hu, Xiaoxin Ren, Xiaoguang Liu, Qun Jane Gu, "Micromachined Silicon Channels for THz Interconnect," **(Best conference paper)** *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Jun, 2014.
- [C22] Akash Anand, Yuhao Liu, and Xiaoguang Liu, "Substrate Integrated Octave-Tunable Bandstop Filter with Surface Mount Varactors," *IEEE MTT-S International Microwave Symposium (IMS)*, Apr, 2014.
- [C21] Yuhao Liu, Akash Anand, Xiaoguang Liu, "Design of Low Phase-Noise Voltage-Controlled Oscillator Using Tunable Evanescent-Mode Cavity," *IEEE Radio & Wireless Symposium (RWS)*, Jan, 2014.
- [C20] Akash Anand, Joshua Small, Muhammad Shoab Arif, Michael Sinani, Dimitrios Peroulis, and Xiaoguang Liu, "A Novel High-Qu Octave-Tunable Resonator with Lumped Tuning Elements," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2013

- [C19] Eric Naglich, Xiaoguang Liu, Dimitrios Peroulis, and William Chappell, "MEMS-Tunable Highly-Loaded Cavity Bandstop Filters for X Band and Beyond," *Government Microcircuit Applications and Critical Technologies (GOMACTech) Conference*, Mar, 2013
- [C18] Akash Anand, Joshua Small, Hjalti Sigmarsson, Xiaoguang Liu, "Tunable RF Filters Based on Radially Loaded Evanescent-mode Cavity Resonators," *USNC-URSI National Radio Science Meeting*, Jan, 2013
- [C17] Joshua S. Benjestorf, and Xiaoguang Liu, "Non-Mating Connector (NMC) for USB 3.0 - A Quality Waterproof Connection," *International Conference on Consumer Electronics*, Jan, 2013
- [C16] Xiaoguang Liu, Eric Naglich, and Dimitrios Peroulis, "Non-linear Effects in MEMS Tunable Bandstop Filters," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2012.
- [C15] **(Invited)** Xiaoguang Liu and Dimitrios Peroulis, "Tunable 3-D MEMS Components for Reconfigurable RF Front-Ends," *IEEE International Symposium on Antennas and Propagation*, Jul, 2011.
- [C14] Xiaoguang Liu, Adam Fruehling, Linda Katehi, William J. Chappell and Dimitrios Peroulis, "Capacitive Monitoring of Electrostatic MEMS Tunable Evanescent-mode Cavity Resonators," *European Microwave Symposium*, Oct, 2011.
- [C13] Muhammad S. Arif, Xiaoguang Liu, Wasim Irshad, William J. Chappell, and Dimitrios Peroulis, "A High-Q Magnetostatically-tunable All-silicon Evanescent Cavity Resonator," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2011.
- [C12] Kenle Chen, Xiaoguang Liu, William J. Chappell, and Dimitrios Peroulis, "Integrated Design of Power Amplifier and Narrowband Filter using High-Q Evanescent-Mode Cavity Resonator," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2011.
- [C11] Xiaoguang Liu, Kenle Chen, Linda P. B. Katehi, William J. Chappell and Dimitrios Peroulis, "System-level Characterization of Bias Noise Effects on Electrostatic RF MEMS Tunable Filters," *International Conference on Micro Electro Mechanical Systems (MEMS)*, Jan, 2011.
- [C10] Wesley N. Allen, Xiaoguang Liu, and Dimitrios Peroulis, "Hermetically-Sealed Evanescent-mode Resonators Utilizing Packaging as Cavities," *IEEE Radio & Wireless Symposium (RWS)*, Jan, 2010
- [C9] Wesley N. Allen, Joshua Small, Xiaoguang Liu, and Dimitrios Peroulis, "Bandwidth-optimal Single Shunt-capacitor Matching Networks for Parallel RF Loads of  $Q \gg 1$ ," *Asia-Pacific Microwave Conference (APMC)*, Dec, 2009
- [C8] Joshua Small, Xiaoguang Liu, and Dimitrios Peroulis, "Electrostatically Tunable Analog Single Crystal Silicon Fringing Field MEMS Varactors," *Asia-Pacific Microwave Conference (APMC)*, Dec, 2009
- [C7] Xiaoguang Liu, Linda P. B. Katehi, and Dimitrios Peroulis, "Non-toxic Liquid Metal Microstrip Resonators," *Asia-Pacific Microwave Conference (APMC)*, Dec, 2009
- [C6] Xiaoguang Liu, Linda P. B. Katehi, William J. Chappell, and Dimitrios Peroulis, "Power Handling Capability of High-Q Evanescent-mode RF MEMS Resonators with Flexible Diaphragm," *Asia-Pacific Microwave Conference (APMC)*, Dec, 2009
- [C5] Anurag Garg, Joshua Small, Ajit Mahapatro, Xiaoguang Liu, and Dimitrios Peroulis, "Impact of Sacrificial Layer Type on Thin Film Metal Residual Stress," *IEEE Sensors Conference*, Oct, 2009



- [C4] Xiaoguang Liu, Linda P. B. Katehi, William J. Chappell, and Dimitrios Peroulis, "A 3.4–6.2 GHz Continuously Tunable Electrostatic MEMS Resonator with Quality Factor of 460–530," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2009
- [C3] Xin Wang, Hao-Han Hsu, Xiaoguang Liu, Wesley N. Allen, Linda P. B. Katehi, and Dimitrios Peroulis, "Frequency- and Time- Domain Adaptive RF Front-ends and Antennas," *IEEE International Conference on Microwaves, Communications, Antennas and Electronic Systems*, Aug, 2008
- [C2] Anurag Garg, Joshua Small, Xiaoguang Liu, and Dimitrios Peroulis, "Post-release Displacement Uncertainty of Micro-Cantilevers due to Anchor Over/Under Etching," *ASME International Mechanical Engineering Congress and Exposition*, Oct, 2008
- [C1] Xiaoguang Liu, Linda P. B. Katehi, and Dimitrios Peroulis, "MEMS Liquid Metal Through-Wafer Microstrip to Microstrip Transition," *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2008

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## Invited Talks, Seminars, and Workshops

- [S16] Alejandro Alvarez-Melcon, Jiawei Zang, Diego Correas-Serrano, James T. Do, Xiaoguang Liu, and Juan Sebastian Gomez-Diaz, "Nonreciprocal Light Manipulation Using Time-modulated Metasurfaces," *Photonics & Electromagnetics Research Symposium (PIERS)*, Jun, 2019
  - [S15] Hao Wang, Jingjun Chen, and Xiaoguang Liu, "Optimal Design of Integrated Millimeter-wave Oscillators for Power and Efficiency," *International Conference on Microwave and Millimeter Wave Technology (ICMMT)*, May, 2019
  - [S14] Xiaohu Wu, Mahmoud Nafe, and Xiaoguang Liu, "Wideband Magnetic-Free Non-Reciprocal Based on High-Order Spatio-Temporal Modulation," *IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO)*, May, 2019
  - [S13] Yuhao Liu, Jiansong Liu, Bo Yu, M. Naimul Hasan, Xiaoguang Liu, "RF MEMS switch for Reconfigurable RF-Front End with Improved Hot-Switching Capabilities," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Jul, 2018
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- [S12] Hao Wang, Jingjun Chen, and Xiaoguang Liu, "Optimal Design of Integrated Millimeter-wave Oscillators for Power and Efficiency," *IEEE International Wireless Symposium (IWS)*, May, 2018
  - [S11] Xiaoguang Liu, "Pushing the Limit of Integrated Millimeter-wave Signal Generation with Applications in High-Speed Interconnects," *Chinese Academic of Sciences*, Beijing, Feb, 2018
  - [S10] Hao Wang, Jingjun Chen, and Xiaoguang Liu, "Optimal Design of Integrated Millimeter-wave Oscillators for Power and Efficiency," *IEEE Radio and Wireless Week (RWW)*, Jan, 2018
  - [S9] Yuhao Liu and Xiaoguang Liu, "High-Power Handling RF-MEMS Switches," *Workshop Passive Integrated Circuits, IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2017
  - [S8] Yuhao Liu, Hao Wang, Yusha Bey, and Xiaoguang Liu, "A Novel RF-MEMS Shunt Capacitive Switch Design for Dielectric Charging Mitigation," *IEEE International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications*, Jul, 2015.
  - [S7] Xiaoguang Liu, "Tunable RF and Microwave Filters," *IEEE Wireless and Microwave Technology Conference (WAMICON)*, Apr, 2015.

- [S6] Xiaoguang Liu, “Tunable RF/Microwave MEMS Filters,” *2012 Microwave Update (MUD)*, Oct, 2012.
- [S5] Xiaoguang Liu, “FMCW Radar as a Microwave Education Tool,” *2012 Microwave Update (MUD)*, Oct, 2012.
- [S4] Xiaoguang Liu, “3-D RF-MEMS Devices for Reconfigurable Radio Front-ends,” *ECE Graduate Seminar, Texas Tech University*, Nov, 2011.
- [S3] Xiaoguang Liu, “RF-MEMS: Lessons and Prospects,” *ECE Graduate Seminar, University of California, Davis*, Sep, 2011.
- [S2] Xiaoguang Liu and Dimitrios Peroulis, “Power Handling and Dynamic Monitoring of MEMS Evanescent-mode (EVA) Tunable Resonators/Filters,” Workshop WMJ: Recent Advances in Reconfigurable Filters, *IEEE MTT-S International Microwave Symposium (IMS)*, May, 2010.
- [S1] Xiaoguang Liu and Dimitrios Peroulis, “Evanescent Cavity-Based Tunable RF MEMS Filters,” Workshop WFD: Emerging Applications of RF-MEMS, *IEEE MTT-S International Microwave Symposium (IMS)*, Jun, 2009.

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## Patents

- [P9] Mohammad-Hadi Sohrabi, Xiaoguang Liu, and Omeed Momeni, “Field Effect Bipolar Transistor,” Patent Application No.: US 62/765,076, 2018
- [P8] Xiaoguang Liu, Xudong He, Yuehui Ouyang, “Tunable Filter,” US Provisional Patent Application No.: 62/645,489, 2018
- [P7] Chang Liu, Xiaoguang Liu, “A Quarter-rate Serial Link Receiver with Low Aperture Delays,” US Provisional Patent Application No.: 62/655,064, 2018
- [P6] Dennis Matthews, Xiaoguang Liu, Songjie Bi, “Portable Heart Motion Monitor,” US Patent Application No.: 2015/035,9463, 2015
- [P5] Joshua Hihath, Xiaoguang Liu, Maria L. Marco, “On-chip Platform for Single-Molecule Electrical Conductance Measurements,” US Patent Application No.: US 2015/646,956, 2015
- [P4] Qun Gu, Xiaoguang Liu, Neville C. Luhmann, JR., Bo Yu, “Sub-terahertz/terahertz Interconnect,” US Patent No.: US 9,978,676, May, 2018
- [P3] Dimitrios Peroulis, Akash Anand, Joshua Azariah Small, Xiaoguang Liu, Muhammad Shoaib Arif, Mihal Sinani, “Tunable cavity resonator having a post and variable capacitive coupling,” US Patent No.: US 9,325,052, Apr, 2016
- [P2] Dimitrios Peroulis, Adam Fruehling, Joshua Azariah Small, Xiaoguang Liu, Wasim Irshad, and Muhammad Shoaib Arif, “Tunable Cavity Resonator Including A Plurality of MEMS Beams,” US Patent No.: US 9,166,271, Oct, 2015
- [P1] Himanshu Joshi, Hjalti Hreinn Sigmarsson, Dimitrios Peroulis, William J Chappell, and Xiaoguang Liu, “Tunable Evanescent-Mode Cavity Filter,” US Patent No.: US 9,024,709, May, 2015

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## Service

- 2018–Present **Associate editor.**
- *IEEE Access*, 2018–Present

2009–Present **Technical reviewer.**

**Journals**

- *Applied Sciences (MDPI)*
- *AEÜ – International Journal of Electronics and Communications*
- *IEEE Access*
- *IEEE Communications Magazine*
- *IEEE Journal of Electromagnetics, RF, and Microwaves in Medicine and Biology*
- *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*
- *IEEE/ASME Journal of Microelectromechanical Systems*
- *IEEE Journal of Solid-State Circuits*
- *IEEE Microwave and Wireless Components Letters*
- *IEEE Microwave Magazine*
- *IEEE Transactions on Circuits and Systems II: Express Briefs*
- *IEEE Transactions on Components, Packaging and Manufacturing Technology*
- *IEEE Transactions on Instrumentation and Measurement*
- *IEEE Transactions on Microwave Theory and Techniques*
- *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*
- *IET Electronics Letters*
- *IET Microwaves, Antennas & Propagation*
- *IMAPS Journal of Microelectronics and Electronic Packaging*
- *International Journal of Circuit Theory and Applications*
- *Microelectronics Journal*
- *Scientific Reports*
- *Sensors (MDPI)*
- *Sensors & Actuators: A. Physical*

**Conferences**

- *IEEE International Wireless Symposium (IWS)*, 2019
- *IEEE International Microwave Biomedical Conference (IMBioC)*, 2018–2019
- *IEEE MTT-S International Microwave Symposium (IMS)*, 2014–Present
- *IEEE Wireless and Microwave Technology Conference (WAMICON)*, 2014–Present
- *Asia-Pacific Microwave Conference (APMC)*, 2010–2012

2012–Present **Steering committee member.**

- *IEEE Wireless and Microwave Technology Conference (WAMICON)*, 2014, 2015–2017 (Technical Program Co-Chair), 2018–2019 (Invited Papers Co-Chair)
- *IEEE MTT-S International Microwave Symposium (IMS)*, 2013, 2016, 2018

2012, 2017 **Panel reviewer**, National Science Foundation (NSF).

2006–2007 **President**, Purdue University Chinese Students and Scholars Association (PUCSSA).

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## Mentoring

### Current Graduate Students and Researchers

2012–	<b>Akash Anand</b>	<i>Ph.D.</i>
2016–	<b>Jingjun Chen</b>	<i>Ph.D.</i>
2016–	<b>Te-Chen Lin</b>	<i>M.S.</i>
2016–	<b>Joseph Cooney</b>	<i>M.S.</i>
2016–	<b>James T. S. Do</b>	<i>Ph.D.</i>
2017–	<b>Xiaomeng Gao</b>	<i>Postdoc</i>
2016–	<b>Kiran Iyer</b>	<i>M.S.</i>
2017–	<b>Xiaonan Jiang</b>	<i>Ph.D.</i>
2015–	<b>Daniel Kuzmenko</b>	<i>Ph.D.</i>

2016–	<b>Mahmoud Ali Nafe</b>	<i>Ph.D.</i>
2016–	<b>Hind Reggad</b>	<i>Ph.D.</i>
2014–	<b>Hao Wang</b>	<i>Ph.D.</i>
2017–	<b>Saleh Hassanzadeh Yamchi</b>	<i>Ph.D.</i>
2017–	<b>Amir Ziabasharhagh</b>	<i>Ph.D.</i>
2016–	<b>Li Zhang</b>	<i>Ph.D.</i>

#### **Past Graduate Students and Researchers**

2017–2018	<b>Chang Liu</b>	<i>Postdoc</i>
2013–2018	<b>Bo Yu</b>	<i>Ph.D., co-advised with Prof. Jane Q. Gu</i>
2012–2018	<b>Songjie Bi</b>	<i>Ph.D.</i>
2018	<b>Asem Elshimi</b>	<i>M.S.</i>
2012–2017	<b>Md. Naimul Hasan</b>	<i>Ph.D., co-advised with Prof. Jane Q. Gu</i>
2011–2017	<b>Fengqi Hu</b>	<i>Ph.D., co-advised with Prof. Neville C. Luhmann, Jr.</i>
2011–2017	<b>Meijiao Li</b>	<i>Ph.D., co-advised with Prof. Neville C. Luhmann, Jr.</i>
2012–2017	<b>Yuhao Liu</b>	<i>Ph.D.</i>
2013–2016	<b>Hooman Rashtian</b>	<i>Postdoc</i>
2015–2015	<b>Juan Zeng</b>	<i>Postdoc</i>
2013–2015	<b>Minjie Zhu</b>	<i>M.S.</i>
2013–2015	<b>Samuel Cheung</b>	<i>M.S.</i>
2013–2015	<b>Qianteng Wu</b>	<i>M.S.</i>
2012–2014	<b>Danqing Fu</b>	<i>Ph.D., co-advised with Prof. Neville C. Luhmann, Jr.</i>
2013–2014	<b>Yaping Liang</b>	<i>Postdoc</i>
2013–2014	<b>Chan-Ho Kim</b>	<i>Postdoc</i>
2012–2014	<b>Yusha Bey</b>	<i>Postdoc</i>

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#### **Funded Research Projects**

2019–2019	<b>STTR Phase I: Ultra Low Outgassing, Focusing, and Hard Seal Capable Materials for HPM Radomes</b> , <i>Air Force</i> , Lead PI, Total: \$150 000; UCD: \$48 000.
2017–2019	<b>STTR Phase II: Radar-based Contact-mode Heart Health Monitoring</b> , <i>National Science Foundation (NSF)</i> , Lead PI, Total: \$750 000; UCD: \$350 000.
2017–2019	<b>SPAR Phase I &amp; II: Low Power Plug-and-Play RF Front-End Signal Processing for High Gain Spread Spectrum Communications and Jamming Rejection</b> , <i>Defense Advanced Research Projects Agency (DARPA)</i> , Lead PI, Total: \$2 161 000; UCD: \$780 000.
2017–2019	<b>Wearable Cardiac Arrhythmia Monitor based on Low-Power Radar Principle</b> , <i>Philippines-California Advanced Research Institutes</i> , Lead PI, Total: \$181 000; UCD: \$181 000.
2017–2018	<b>REnewALL—21st Century Solutions for 20th Century Wind Projects</b> , <i>California Energy Commission</i> , Co-PI, Total: \$935 000; UCD: \$935 000.
2016–2017	<b>Ultra-low-power Sensors using Aluminum Nitride Micro-Electromechanical (MEMS) Resonators</b> , <i>Catalyst Foundation</i> , Lead PI, Total: \$20 000; UCD: \$20 000.

- 2016–2017 **Monitoring of Atrial Fibrillation Using Ultrawideband Micro-Impulse Radar (MIR) - Extension**, *Tahoe Institute of Rural Health Research (TIRHR)*, Lead PI, Total: \$172 000; UCD: \$172 000.
- 2016–2017 **NZERO Phase I: Ultralow Power Microsystems via an Integrated Piezoelectric MEMS-CMOS Platform**, *Defense Advanced Research Projects Agency (DARPA)*, Co-PI, Total: \$650 000; UCD: \$400 000.
- 2016–2016 **STTR Phase I: Ka-Band, kW Power, GaN Amplifier with Sequential Combining**, *Missile Defense Agency*, Co-PI, Total: \$30 000; UCD: \$30 000.
- 2015–2016 **Monitoring of Atrial Fibrillation Using Ultrawideband Micro-Impulse Radar (MIR) - Extension**, *Tahoe Institute of Rural Health Research (TIRHR)*, Lead PI, Total: \$20 000; UCD: \$20 000.
- 2015–2016 **MRI: Acquisition of a Plasma Enhanced Chemical Vapor Deposition (PECVD) Tool with Inductively Coupled Plasma (ICP)**, *National Science Foundation (NSF)*, Co-PI, Total: \$490 000; UCD: \$490 000.
- 2015–2015 **Spacecraft-Inspection Cubesat**, *National Aeronautics and Space Administration*, Co-PI, Total: \$77 000; UCD: \$77 000.
- 2014–2015 **STTR Phase I: Radar-based Contact-mode Heart Health Monitoring**, *National Science Foundation (NSF)*, Lead PI, Total: \$80 000; UCD: \$80 000.
- 2014–2017 **EARS: Reconfigurable Bandpass Receivers for Software-Defined Radio Applications**, *National Science Foundation (NSF)*, Lead PI, Total: \$500 000; UCD: \$500 000.
- 2014–2014 **Agilent Modular VSA/G Contest Runner-Up Award**, *Agilent Technologies*, Lead PI, Total: \$14 000; UCD: \$14 000.
- 2013–2014 **Monitoring of Atrial Fibrillation Using Ultrawideband Micro-Impulse Radar (MIR) - Extension**, *Tahoe Institute of Rural Health Research (TIRHR)*, Lead PI, Total: \$20 000; UCD: \$63 000.
- 2012–2013 **Interference Tolerant Wireless Systems**, *Hellman Foundation*, Lead PI, Total: \$29 000; UCD: \$29 000.
- 2012–2014 **Development of a MEMS Integrated Inductor**, *Pine Tree Technologies*, Lead PI, Total: \$120 000; UCD: \$120 000.
- 2012–2013 **Investigation of Novel Microwave Ablation Techniques for Cancer Treatment**, *American Cancer Society Institutional Research Grant*, Lead PI, Total: \$36 000; UCD: \$36 000.
- 2012–2013 **Highly Tunable High-Q Varactors Based on Thick-film Piezoelectric Actuators**, *UC Davis Academic Senate*, Lead PI, Total: \$25 000; UCD: \$25 000.
- 2012–2012 **A Microwave Filter Broadly Tunable With a Surface Acoustic Wave**, *Defense Advanced Research Projects Agency (DARPA)*, Lead PI, Total: \$48 000; UCD: \$48 000.