Changzhi Li

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Education

- PhD Electrical & Computer Engineering, University of Florida, 2009
- MS Electrical & Computer Engineering, University of Florida, 2007
- BS Information & Electronic Engineering, Zhejiang University, China, 2004

Employment

- **Professor and Whitacre Endowed Chair in Electrical and Computer Engineering**, Department of Electrical and Computer Engineering, Texas Tech University, Sept 2020 Present.
- Associate Professor, Department of Electrical and Computer Engineering, Texas Tech University, Sept 2014 Aug 2020.
- Assistant Professor, Department of Electrical and Computer Engineering, Texas Tech University, Aug 2009
 – Aug 2014.

Other Appointments

- **Consultant** for the University of Florida: analog IC design for DARPA MELD project, June 2016 June 2017.
- Consultant for GP Strategies/Texas Instruments, Dallas TX: analog IC design lecturer, May 2013 August 2013.
- **Consultant** for DIS semiconductor, Austin TX: RFIC design, May 2012 August 2012.
- Intern for Coherent Logix inc., Austin, TX: RFIC design, Jun 2009 Aug 2009.
- Intern for Alereon inc., Austin, TX: RFIC design and testing, May 2008 Aug 2008, May 2007 Aug 2007.

Honors and Awards

- Fellow, National Academy of Inventors (NAI), elected 2022.
- IEEE Microwave Theory and Techniques Society (MTT-S) Distinguished Microwave Lecturer, Tatsuo Itoh class of 2022-2024.
- IEEE Microwave Theory and Techniques Society (MTT-S) Outstanding Young Engineer Award, 2018.
- IEEE Sensors Council Early Career Technical Achievement Award, 2016.
- Texas Tech University Teaching Academy Member, elected 2016.
- Chancellor's Council Distinguished Research Award, Texas Tech University, 2015.
- George T. and Gladys Abell-Hanger Faculty Award, TTU Whitacre College of Engineering, 2015.
- IEEE-HKN Outstanding Young Professional Award, 2014.
- ASEE Frederick Emmons Terman Award, 2014.
- Whitacre Research Award, Texas Tech University, 2014.
- NSF Faculty CAREER Award, 2013.
- Texas Tech Alumni Association New Faculty Award, 2012.
- Finalist, Vodafone Wireless Innovation Project, 2011.
- IEEE Microwave Theory and Techniques Society (MTT-S) Graduate Fellowship, 2008.
- Best Student Paper Award in 2nd place, IEEE Radio and Wireless Symposium, 2007.
- Graduate Alumni Fellowship, University of Florida, 2005~2009.
- First Class Scholarship, 2000~2004, Zhejiang University.

Honors and Awards of Advisees

- Society of Automotive Engineers Doctoral Engineering Scholarship, 2023 (Aaron Carman)
- TTU Horn Professor's Graduate Achievement Award, 2023 (Davi Rodrigues), 2017 (Zhengyu Peng), 2013 (Changzhan Gu)
- Cadence's Diversity in Technology Scholarship, 2022 (Davi Rodrigues)
- IEEE MTT-S Tom Brazil Graduate Fellowship, 2022 (Davi Rodrigues)

- IEEE IMS High-Sensitivity Motion Sensing Radar Competition 2nd place, 2021 (Prateek Nallabolu, Daniel Rodriguez, Davi Rodrigues)
- Best Student Paper Award finalist, IEEE Radio Wireless Week, 2021 (Daniel Rodriguez, Davi Rodrigues)
- Best Student Paper Award, IEEE MTT-S International Microwave Biomedical Conference (IMBioC), 2020 (Davi Rodrigues)
- Best Paper Award in Antenna Category, Asia-Pacific Microwave Conference (APMC), 2020 (Davi Rodrigues)
- IEEE MTT-S Graduate Fellowship, 2020 (Daniel Rodriguez), 2016 (Zhengyu Peng)
- Best Student Paper Award in 2nd place, IEEE Radio Wireless Week, San Antonio, 2020 (William McDonnell)
- IEEE IMS Adaptive Relay Transceiver Competition 1st place, 2019 (Davi Rodrigues, Daniel Rodriguez, Jing Wang)
- IEEE IMS High-Sensitivity Motion Sensing Radar Competition 2nd place, 2019 (Davi Rodrigues, Daniel Rodriguez, Jing Wang)
- Best Student Paper Award Honorable Mention, IEEE Radio Wireless Week, Orlando, 2019 (Rachael Chae, received as a high school student)
- IEEE IMS High Sensitivity Radar Competition 3rd place, 2015 (Zhengyu Peng)
- IEEE MTT-S Pre-Graduate Scholarship, 2015 (Chenhui Liu)
- IEEE MTT-S Pre-Graduate Scholarship, 2014 (Yao Tang)
- Best Student Paper Award in 1st place, IEEE Topical Conference on Bio-medical Wireless Technologies, Networks, and Sensing Systems (BioWireleSS), 2014 (Yiran Li)
- Best Student Paper Award in 2nd place, IEEE Topical Conference on Bio-medical Wireless Technologies, Networks, and Sensing Systems (BioWireleSS), 2014 (Sharmi Banerjee)
- IEEE MTT-S Pre-Graduate Scholarship, 2013 (Anudeep Malepati)
- IEEE MTT-S Graduate Fellowship in Medical Applications, 2013 (Changzhan Gu)
- Chinese Government Award for Outstanding Self-financed Students Abroad, 2012 (Changzhan Gu)
- Best Student Paper Award in 1st place, IEEE Topical Conference on Bio-medical Wireless Technologies, Networks, and Sensing Systems (BioWireleSS), 2013 (Changzhan Gu)
- Best Conference Paper Award, 13th Annual IEEE Wireless and Microwave Technology Conference, 2012 (Yihong Yang)
- Student Paper Competition Finalist, IEEE International Symposium on Circuits and Systems (ISCAS), 2012 (Li Lu)
- Best Student Paper Award in 2nd place, IEEE Topical Conference on BioWireleSS, 2012 (Changzhan Gu)
- Best Conference Paper Award in 3rd place, 12th Annual IEEE Wireless and Microwave Technology Conference, 2011 (Changzhan Gu)
- Best Student Paper Award in 4th place, IEEE Topical Conference on BioWireleSS, 2011 (Changzhan Gu)
- Best Paper in Poster Session Award, 11th Annual IEEE Wireless and Microwave Technology Conference, 2010 (Li Lu)

Research Activities

RF/analog and microwave/millimeter-wave circuits and systems for healthcare, security, autonomous vehicles, and human-machine interface.

Teaching Activities

Texas Tech University (U=undergraduate level, G = graduate level):

| Term/Year | Course Number/Name | Level | # of Students | Course Rating/5 |
|-------------|--|-------|------------------|--------------------|
| Summer 2023 | ECE 3302 Fundamentals of Electrical Engineering (study abroad) | U | 19 | 4.8 |
| Summer 2023 | ECE 2372 Modern Digital System Design (study abroad) | U | 15 | 5 |
| Spring 2023 | ECE 4349/5349 Modern Radar Circuits and Systems | U/G | 10/18 | 4.9/4.8 |
| Fall 2022 | ECE 2372 Modern Digital System Design | U | 47 | 4.9 |
| Fall 2022 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 12/37 | 4.9/4.9 |
| Summer 2022 | ECE 3302 Fundamentals of Electrical Engineering (study abroad) | U | 10 | 5 |
| Summer 2022 | ECE 2372 Modern Digital System Design (study abroad) | U | 5 | 5 |
| Spring 2022 | ECE 4342/5342 Microwave Solid-State Circuits | U/G | 17/29 | 4.1/4.7 |
| Fall 2021 | ECE 4310/5310 Introduction to VLSI Design | U/G | 29/18 | 5/4.9 |
| Spring 2021 | HONS 2101 Inquiry and Investigation | U | 12 | 4 |
| Spring 2021 | ECE 4349/5349 Modern Radar Circuits and Systems | U/G | 15/7 | 5/5 |

| | ECE 2372 Modern Digital System Design | U | 49 | 4.7 |
|-------------|--|-----|-------|----------|
| | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 7/15 | 4.7/4.7 |
| Spring 2020 | ECE 4342/5342 Microwave Solid-State Circuits | U/G | 7/6 | 5/5 |
| | ECE 2372 Modern Digital System Design (study abroad) | U | 17 | 4.9 |
| | ECE4349 Modern Radar Circuits and Systems (study abroad) | U | 16 | 4.4 |
| | ECE4349/5332 Modern Radar Circuits and Systems | U/G | 13/15 | 4.89/4.5 |
| | ECE 2372 Modern Digital System Design | U | 48 | 4.8 |
| - | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 21/13 | 4.9/4.7 |
| Spring 2018 | ECE 4342/5342 Microwave Solid-State Circuits | U/G | 15/19 | 4.4/4.8 |
| | ECE 2372 Modern Digital System Design | U | 49 | 4.9 |
| Fall 2017 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 6/20 | 4.6/4.9 |
| Spring 2017 | ECE4332/5332 Modern Radar Circuits and Systems | U/G | 11/10 | 4.8/5 |
| Fall 2016 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 16/30 | 4.88 |
| Fall 2016 | ECE2372 Modern Digital System Design | U | 48 | 4.61 |
| Spring 2016 | ECE4342/5342 Microwave Solid State Circuits | U/G | 7/30 | 4.93 |
| Fall 2015 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 9/36 | 4.33 |
| Fall 2015 | ECE2372 Modern Digital System Design | U | 49 | 4.74 |
| Summer 2015 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 2/14 | 4.60 |
| Spring 2015 | ECE4332/5332 Modern Radar Circuits and Systems | U/G | 9/34 | 4.90 |
| Fall 2014 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 7/39 | 4.91 |
| Fall 2014 | ECE2372 Modern Digital System Design | U | 45 | 4.67 |
| Spring 2014 | ECE4342/5342 Microwave Solid State Circuits | U/G | 42 | 4.88 |
| Fall 2013 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 32 | 4.91 |
| Spring 2013 | ECE4342/5342 Microwave Solid State Circuits | U/G | 46 | 4.68 |
| Fall 2012 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 41 | 4.77 |
| Fall 2012 | ECE2372 Modern Digital System Design | U | 43 | 4.59 |
| Spring 2012 | ECE4342/5342 Microwave Solid State Circuits | U/G | 41 | 4.75 |
| Fall 2011 | ECE2372 Modern Digital System Design | U | 59 | 4.23 |
| Fall 2011 | ECE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 47 | 4.71 |
| Spring 2011 | ECE4342/5342 Microwave Solid State Circuits | U/G | 43 | 4.88 |
| Fall 2010 | EE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 27 | 4.95 |
| Spring 2010 | EE4321/5321 Design and Analysis of Analog Integrated Circuits | U/G | 48 | 4.86 |
| | EE4342/5342 Microwave Solid State Circuits | U/G | 12 | 4.89 |

Texas Instruments, Dallas, TX (as GP Strategies consultant):

| Term/Year | Course Number/Name | # of Employees | Course Rating/5 |
|-------------|---|-------------------|--------------------|
| Summer 2013 | Design & Analysis of Analog ICs in LBC7 | 7 | 4.5 |

Professional Activities

Associate Editor

- Associate Editor, IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology, 2017– present.
- Associate Editor, IEEE Transactions on Microwave Theory and Techniques, 2019–2022.
- Associate Editor, IEEE Transactions on Circuits and Systems I, 2016–2019
- Associate Editor, *IEEE Transactions on Circuits and Systems II*, 2014–2015
- Area Editor, International Journal of Electronics and Communications, 2011–2013

Guest Editor

- IEEE Transactions on Microwave Theory and Techniques, for mini-special issue on "2022 IEEE Radio Wireless Week", 2022
- *IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology*, for special issue on "2022 International Microwave Symposium (IMS)", 2022
- IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology, for special issue on "Wireless Non-contact Sensing of Life Activities for Biomedical Applications", 2021
- Remote Sensing (ISSN 2072-4292), for special issue on "Radar Remote Sensing on Life Activities", 2019
- IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology, for "2018 IEEE MTT-S

International Microwave Biomedical Conference special issue", 2018

- *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, for special issue on "Wireless Sensing Circuits and Systems for Healthcare and Biomedical Applications", 2017–2018
- *IEEE Transactions on Transactions on Microwave Theory and Techniques*, for special issue on "Emerging RF Measurement Techniques and Applications", 2016
- Sensors (ISSN 1424-8220), for special issue on "Non-contact Sensing", 2016

Chair of Technical Committee (TC)

- Chair, IEEE MTT-S TC-10 Biological Effect and Medical Applications of RF and Microwave, 1/2018~12/2019;
- Vice-Chair, IEEE MTT-S TC-10 Biological Effect and Medical Applications of RF and Microwave, 1/2016~12/2017;

Chair of Conference

- General Chair, IEEE Radio Wireless Week (RWW), San Antonio, 2024
- General Co-Chair, IEEE Radio Wireless Week (RWW), Las Vegas, 2023

Chair of Technical Program Committee/Sub-committee (TPC)

- TPC Chair, IEEE Radio Wireless Week (RWW), 2022
- TPC Co-Chair, IEEE International Microwave Biomedical Conference (IMBioC), 2018 and 2019
- International Microwave Symposium (IMS) TPRC-34 Chair, 2016 and 2017

• TPC Co-Chair, IEEE Wireless and Microwave Technology Conference (WAMICON), 2012 and 2013;

Organizer of Workshop and Special Sessions

- Workshop, 'Radio Frequency and Millimeter-wave Radar Sensing Technologies for Medical and Biomedical Applications,' International Microwave Symposium (IMS), 2023;
- Workshop, 'Non-contact Vital Sign Detection and human motion Tracking using WiFi and Radar Techniques', International Microwave Symposium (IMS), 2021;
- Special session, 'Applied EM for Biomedical and IoT Radar Technologies' ACES, 2019 International Applied Computational Electromagnetics Society Symposium (ACES), Miami, FL, USA, April 14-19, 2019;
- Workshop, 'RF and optical techniques for non-contact and wearable health monitoring', International Microwave Symposium (IMS), 2017;
- Special session, 'Circuits for Enhancing Access to Radio Spectrum (EARS) and Phased-Array Radar', 58th IEEE Midwest Symposium on Circuits and Systems (MWSCAS), 2015;
- Workshop, 'Modern Radar Systems for High Resolution Ranging, Indoor Localization, and Vital Signs Detection' International Microwave Symposium (IMS), 2015;
- Special session, 'Reconfigurable RF-CAS for RADAR, Cognitive Radio and EARS I & II', 57th IEEE Midwest Symposium on Circuits and Systems (MWSCAS), 2014;
- Workshop, 'Recent Advances in Radar Indoor Sensors, Wireless Implantable Devices and Biosensors', International Microwave Symposium (IMS), 2014;
- Workshop, 'Diversity in Biomedical Radar Applications', IEEE Radio Wireless Week (RWW), 2014;

Chair of Design Competition and Demo Track

- Chair, IEEE Radio Wireless Week Demo Track, 2014~2017;
- Co-Chair, International Microwave Symposium (IMS) Student Design Competition 'Wearable/Frugal Microwave Energy Harvesting Design Competition', 2019;
- Co-Chair, International Microwave Symposium (IMS) Student Design Competition 'High Sensitivity Radar', 2014, 2015, and 2017;

TPC Member

 International Microwave Symposium (IMS, 2011~present); IEEE Topical Conference on Biomedical Wireless Technologies, Networks & Sensing Systems (part of RWW, 2011~2016); IEEE Topical Conference on Wireless Sensors and Sensor Networks (part of RWW, 2011~present); SPIE Radar Sensor Technology Conference (2010~present); IEEE Wireless and Microwave Technology Conference (WAMICON, 2010~present); Asia-Pacific Microwave Conference (APMC, 2011~present); IEEE MTT-S International Microwave Workshop Series on RF and Wireless Technologies for Biomedical and Healthcare Applications (IMWS-Bio, 2013); MOBIHEALTH (2015); European Microwave Week (2020); IEEE International Microwave Biomedical Conference (IMBioC, 2018~present)

Reviewer:

 IEEE Transactions on Microwave Theory and Techniques, IEEE Transactions on Instrumentation and Measurement, IEEE Transactions on Geoscience and Remote Sensing, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Circuits and Systems I, IEEE Transactions on Antennas and Propagation, IEEE Transactions on Haptics, IEEE Sensors Journal, IET Radar Sonar & Navigation, IEEE Microwave and Wireless Component Letters, IEEE Antenna and Wireless Propagation Letters, IEEE Photonics Technology Letters, IEEE Communications Magazine, IET Electronics Letters, IET Healthcare Technology Letters, Medical Physics, Applied Physics Letters, IEEE Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), IEEE International Symposium on Circuits and Systems (ISCAS), Wiley Book Series in: Biomedical Engineering and Multi-Disciplinary Integrated Systems, Mechanical Engineering, Journal of Electromagnetic Waves and Applications (PIER & JEMWA), Sensors (ISSN 1424-8220), Radio Science, Nature Electronics

Others

- Vice Chair, IEEE MTT-S Education Committee, 2022~present
- Publication Chair, IEEE SENSORS Conference, 2023
- Publication Chair, IEEE SENSORS Conference, 2022
- Publication Chair, IEEE Wireless Power Transfer Conference (WPTC), 2021
- Finance Chair, IEEE Radio Wireless Week (RWW), 2021
- Chair, Frederick Emmons Terman Award (ASEE) committee, 2015
- Secretary, IEEE South Plains Section, 2012~2019
- Co-Chair, Graduate Fellowship in Medical Applications award committee, IEEE MTT-S, 2013~present
- NSF and NIH review panelist
- Member, IEEE MTT-S Education Committee, 2012~present
- Member, MTT TC-28 Biological Effect and Medical Applications of RF and Microwave, 2011~present

Service at Texas Tech University

- Chair, Electrical and Computer Engineering Biomedical Faculty Search Committee (2021-2022)
- Electrical and Computer Engineering Department Chair Search Committee (2020-2021)
- Chair, Electrical and Computer Engineering Faculty Search Committee in Engineering Medicine (2019)
- Mechanical Engineering Faculty Search Committee in Control Area (2018~2019)
- Whitacre College of Engineering Tenure and Promotion Committee (2016~2018)
- Mentor, IEEE Student Chapter (2015~present)
- Whitacre College of Engineering Grant Writer Search Committee (2015~2016)
- Whitacre College of Engineering Faculty Research Awards Committee (2015~2017)
- Whitacre College of Engineering IT Director Search Committee (2014)
- Faculty mentor, The Clark Scholars Program (2013, 2015, 2017, 2018)
- Faculty mentor, Program in Semiconductor Product Engineering (PSPE) (2011~present)
- Advisor, the TTU Solar Racing Team (2009~2012)
- Computer Engineering Faculty Search Committee (2010~2011, 2014~2015)
- Computer Engineering Curriculum Committee (2010)
- Electromagnetics & Power Curriculum Subcommittee (2010)

Student Supervision

Current

- **PhD**: Aaron Carman, Christopher Williams, Leya Zeng, Michael Brown, Rita Jakelyn Abad-Lima, Syed Doha Uddin, Victor Gabriel Rizzi Varela
- M.S.: Derek Thompson, JT Crainer, Rhyse Joseph, Vishal Yadav
- Undergraduate: Silas Rodriguez, Emmanuel Camacho, Hannah Vancamp, Luke Medina, Erik Vaughn, Marcos Portillo

Completed

- PhD: Li Lu (Qualcomm), Changzhan Gu (Shanghaijiaotong University), Yihong Yang (Intel), Guochao Wang (Apple), Zhengyu Peng (Aptiv), Yiran Li (United Imaging), Ashish Mishra (Veoneer Corp), Anna Wang (family business), Daniel Rodriguez (Intel), Dongyang Tang (Qualcomm), Prateek Reddy Nallabolu (Oculii), Davi Rodrigues (Assistant Professor at the University of Texas at El Paso)
- M.S.: Abhishek Angadi (Broadcom→Qualcomm), Stephen Rodriguez (Texas Instruments), Satyabh Mishra (Qualcomm→Qorvo), Sharmi Banerjee (Virginia Tech), Devashish Deshpande (Qualcomm), Longfei Wang (WSU), Krishna Kannaya Kailash (Intel), Juan Rodriguez (Intel), Bozorgmehr Vosooghi (University of Houston), Chenhui Liu (Qualcomm), Supreet Juneja (Intel), Douglas Nichols (Sandia National Lab), Minh Nguyen (Viettel), Anthony Flores Nigaglioni (Harris), Haris Zulhilmi (Ludlum Measurements)
- **Undergraduate:** Aaron Carman (continue with PhD), Amy Weatherby (Raytheon), Ryan Lee (Edwards Airforce Base), Pablo Chavez (L3 Technologies), Hallie Franco (L3Harris), Christopher Williams (continue with M.S.), Oreoluwa Ogundana (Texas Instruments)

- Visiting Graduate Students: Chueh-Yu Kuo (National Cheng Kung University, summer 2011), Heng Zhao (Najing University of Science and Technology, 2015-2016), Jiaming Yan (Najing University of Science and Technology, 2016-2017), Tianqi Jiao (Harbin Engineering University, 2017), Shengyuan Luo (Harbin Engineering University, 2017), Chuanwei Ding (Najing University of Science and Technology, 2018-2019), Li Zhang (Nanjing University of Science and Technology, 2018-2019)
- Visiting Undergraduate Students: Anthony Flores Nigaglioni (Universidad de Puerto Rico, summer 2014), Davi Rodrigues (undergraduate student from Instituto Militar de Engenharia, Brazil, 2016), Sylvie Ngo (Ecole Nationale Supérieure d'Ingénieurs de Limoges, France, summer 2017), José Rojas (Universidad Técnica Federico Santa María, Chile, summer 2017), Malika Bernari (Ecole Nationale Supérieure d'Ingénieurs de Limoges, France, summer 2018), Ziyan Tang (Shanghai Jiao Tong University, China, summer 2018), William McDonnell (Maynooth University, Ireland, summer 2019), Max Vasconcelos (Universidade Federal de Santa Maria, Brazil, summer 2022), Nisa Wongpan (King Mongkut's University of Technology North Bangkok, Thailand, summer 2022), Sew Pei Geoh (University of Technology Petronas, Malaysia, summer 2022)
- Visiting High School Students: Ali Kocaturk (Dallas TX, 2012), Aditya Bhumbla (Clark Scholar 2013, California High School in San Ramon, CA→UC Berkeley), Robert Henning (Clark Scholar 2015, Mission Hills High School, San Marcos, CA→MIT), Lucy Song (Clark Scholar 2018, Mountain View High School, Mesa, AZ→Arizona State University), Rachel Chae (Clark Scholar 2018, Woodbridge High School, Irvine, CA→MIT), Thilina Navod Balasooriya (Clark Scholar 2021, Hamilton High School, Chandler, AZ→Columbia University), Hannah Gao (Clark Scholar 2022, Harriton High School of Lower Merion, Rosemont, PA→MIT), Rachel Ma (Clark Scholar 2023)

Thesis Committee Member

- TTU: Rabindra Bhatta (PhD), Austin Hewitt (PhD), Laura Polanco (PhD), Saugato Rahman Dhruba (PhD), Omid Bazgir (PhD), Jerry Tsay (PhD), Tri Doan (PhD), Sashi Majety (PhD), Mohammad Fairouz (PhD), Atiqul Islam (PhD), Sahil Oak (PhD), Subash Vegesna (PhD), Cemile Bardak (PhD), Forrest Bao (PhD), Dhanya Nair (PhD), Sashikanth Majety (PhD), Ashish Mishra (M.S.), Bailey Ulferts (M.S.), Sri Rathan Rangisetti (M.S.), Bo Hu (M.S.), Venkateswara Rao Vemuri (M.S.), Xiaodong Cai (M.S.), Ravi Ichapurapu (M.S.), Divya Reddy (M.S.), Jason Durbin (M.S.), Amy Fleischmann (M.S.), Nozar Naing (M.S.), Mozar Naing (M.S.), Purvi Patni (M.S.), Tolu Owodunni (M.S.), Davis Hoover (M.S.), Vishvabandhu Chaudhary (M.S.), Manisha Potay (M.S.), Yang Yang (M.S.), Hao Xu (M.S.), Sam Grenadier (M.S.), Xin Chen (M.S.), Ze Zhang (M.S.), Joshua Winslow (M.S.), Kyler Kunzler (M.S.)
- **External**: Zivin Park (PhD, University of Florida), Mari Zakrzewski (PhD, Tampere University of Technology, Finland), Minh Nguyen (Johannes Kepler University, Austria)

Publications

Google Scholar Profile: <u>http://scholar.google.com/citations?user=Hx6pVv4AAAAJ</u> (Citations: 11409, h-index: 52, i10-index: 203)

ORCiD: https://orcid.org/0000-0003-2188-4506

Book Authored

[1] C. Li, J. Lin, "Microwave Motion Sensing and Analysis," John Wiley & Sons, ISBN: 978-0470642146, 2013. *Books Edited*

- [1] Z. Peng, C. Li, F. Uysal, "Modern Radar for Automotive Applications," IET, ISBN: 978-1-83953-435-5, 2022.
- [2] C. Li, M. Tofighi, D. Schreurs, T.-S. Horng, "Principles and Applications of RF/Microwave in Healthcare and Biosensing," Elsevier, ISBN: 9780128029039, 2016.

Book Chapters

- [1] L. Zhang, C. Fu, C. Li, H. Hong, "RF and camera-based vital signs monitoring applications," *Contactless Vital Signs Monitoring*, ISBN 9780128222812, Academic Press, pp. 303-326, 2022.
- [2] R. Gómez-García, D. Psychogiou, Z. Peng, J. Muñoz-Ferreras, C. Li, D. Peroulis, "Adaptive RF multiinterference suppression for wideband radar/communication receivers," *Radar and Communications Spectrum Sharing*, ISBN: 9781785613579, SciTech Publishing, Chapter 10, 2018.
- [3] C. Li, C. Gu, "Physiological Radar Sensor Chip Development," *Medical and Biological Microwave Sensors and Systems*, ISBN: 9781107056602, Cambridge University Press, Chapter 6, 2017.
- [4] C. Li, D.M.M.-P. Schreurs, "Fundamentals of microwave engineering", *Principles and Applications of RF/Microwave in Healthcare and Biosensing*, ISBN: 9780128029039, Elsevier, Chapter 1, 2016.
- [5] J.-M. Muñoz-Ferreras, R. Gómez-García, C. Li, "Human-aware Localization using Linear-frequencymodulated Continuous-wave Radars," *Principles and Applications of RF/Microwave in Healthcare and*

Biosensing, ISBN: 9780128029039, Elsevier, Chapter 5, 2016.

- [6] L. Lu, C. Gu, C. Li, J. Lin, "Doppler Radar Noncontact Vital Sign Monitoring," *Neural Computation, Neural Devices, and Neural Prosthesis*, ISBN: 9781461481508, Springer New York, Chapter 3, pp. 41-62, 2014.
- [7] B.H. Chu, T.J. Anderson, H.T. Wang, D.P. Norton, S.J.Pearton, C. Li, J Lin, Y.L. Wang, J. Kim, L.C. Tien, J.W. Johnson, A. Dabiran, F. Ren, "Recent Advances in Wide Bandgap Semiconductor Based Gas Sensors", *Semiconductor Gas Sensors*, ISBN: 9780857098665, Woodhead Publishing Limited, UK, Chapter 5, 2012.

Articles in Refereed Journals

- [1] M. Brown, C. Li, "Incorporation of Digital Modulation into Vital Sign Detection and Gesture Recognition Using Multimode Radar Systems," *Sensors*, vol. 23, no. 18, 7675, doi: https://doi.org/10.3390/s23187675.
- [2] H. Gao and C. Li, "Automated Violin Bowing Gesture Recognition Using FMCW-Radar and Machine Learning," *IEEE Sensors Journal*, vol. 23, no. 9, pp. 9262-9270, 1 May1, 2023, doi: 10.1109/JSEN.2023.3263513.
- [3] M. C. Brown and C. Li, "A K-Band Ultra-Wideband Binary Phase Shifter for Phase Modulating Applications in Radar," *IEEE Microwave and Wireless Technology Letters*, vol. 33, no. 4, pp. 467-470, April 2023, doi: 10.1109/LMWT.2022.3230039.
- [4] J.-C. Chiao, C. Li, J. Lin, R. Caverly, J. Hwang, H. Rosen, A. Rosen, "Applications of Microwaves in Medicine," *IEEE Journal of Microwaves*, vol. 3, no. 1, pp. 134-169, Jan. 2023, doi: 10.1109/JMW.2022.3223301.
- [5] V. G. Rizzi Varela, D. V. Q. Rodrigues, L. Zeng and C. Li, "Multitarget Physical Activities Monitoring and Classification Using a V-Band FMCW Radar," *IEEE Transactions on Instrumentation and Measurement*, vol. 72, pp. 1-10, 2023, doi: 10.1109/TIM.2022.3227998.
- [6] F. Tong, J. Liu, C. Li, C. Gu and J. Mao, "A Low-IF Doppler Radar With Asynchronous Bandpass Sampling for Accurate Measurement of Displacement Motions," *IEEE Transactions on Microwave Theory and Techniques*, vol. 71, no. 1, pp. 456-465, Jan. 2023, doi: 10.1109/TMTT.2022.3221167.
- [7] D. Tang, V. G. R. Varela, D. V. Q. Rodrigues, D. Rodriguez and C. Li, "A Wi-Fi Frequency Band Passive Biomedical Doppler Radar Sensor," *IEEE Transactions on Microwave Theory and Techniques*, vol. 71, no. 1, pp. 93-101, Jan. 2023, doi: 10.1109/TMTT.2022.3193408.
- [8] P. Nallabolu, D. Rodriguez and C. Li, "Emulation and Malicious Attacks to Doppler and FMCW Radars for Human Sensing Applications," *IEEE Transactions on Microwave Theory and Techniques*, vol. 71, no. 2, pp. 805-817, Feb. 2023, doi: 10.1109/TMTT.2022.3208026.
- [9] C. Ding, L. Zhang, H. Chen, H. Hong, X. Zhu and C. Li, "Human Motion Recognition With Spatial-Temporal-ConvLSTM Network Using Dynamic Range-Doppler Frames Based on Portable FMCW Radar," *IEEE Transactions on Microwave Theory and Techniques*, vol. 70, no. 11, pp. 5029-5038, Nov. 2022, doi: 10.1109/TMTT.2022.3200097.
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Patents

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International Patent Application Publication WO2008/151141, published on Dec. 11, 2008.

[2] US Patent Awarded (8,721,554) on May 13, 2014: Random Body Movement Cancellation For Non-Contact Vital Sign Detection.

International Patent Application Publication WO2009/009722, published on Jan. 15, 2009.

[3] US Patent Awarded (8,814,805) on August 26, 2014: Complex Signal Demodulation and Angular Demodulation for Non-contact Vital Sign Detection.

International Patent Application WO2009/076298, PCT/US2008/085899, filed on Dec. 8, 2008.

[4] US Patent Awarded (9,200,945) on December 1, 2015: Wavelength Division Sensing RF Vibrometer for Accurate Measurement of Complex Vibrations.

International Patent Application Publication WO2009/009690, published on Jan. 15, 2009.

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During Treatment Using A Radar Motion Sensor.

- [6] US Patent Awarded (9,477,812) on Oct 25, 2016: *Random Body Movement Cancellation For Non-Contact Vital Sign Detection* (continuation from Patent 8,721,554).
- [7] US Patent Awarded (9,924,906) on March 27, 2018: *Random Body Movement Cancellation For Non-Contact Vital Sign Detection* (continuation from Patent 8,721,554).
- [8] US Patent Awarded (10,436,625) on Oct 8, 2019: Interferometric Doppler Radar and Method for Wave and Water Level Measurement.
- [9] US Patent Awarded (10,436,888) on Oct 8, 2019: Hybrid FMCW-Interferometry Radar for Positioning and Monitoring and Methods of Using the Same.
- [10] US Patent Awarded (10,958,295) on Mar 23, 2021: Complex Domain Beamforming System and Methods Relating Thereto.
- [11] U.S. Patent Awarded (11,460,723) on Oct 4, 2022: Semiconductor Optical Phased Arrays (OPAs) and Methods Related Thereto.
- [12] U.S. Patent Awarded (11,735,828) on Aug 22, 2023: 24-GHz Low-cost Continuous Beam Steering Phased Array for Indoor Smart Radar and Methods Relating Thereto.
- [13] US Patent Application US 2018/0004298 A1: System and Method for Non-contact Interaction with Mobile Devices, Publication Date: January 4, 2018.
- [14] US Patent Application US20200236545A1: Method and system for non-contact motion-based user authentication, Publication Date: 2020-7-23.
- [15] US Patent Application: Wide Bandgap Optical Phased Arrays (OPA's) and Methods Related Thereto, Filing date: 2023-4-7.

Sample of Invited Talks

Keynote speeches

- [1] "Past, Present, and Future of Biomedical Radar Sensors," Keynote Speech for the IEEE MTT-S International Microwave Biomedical Conference, Leuven, Belgium, September 11–13, 2023.
- [2] "Portable Radar Systems for Life Activity Sensing and Human Tracking," Keynote Speech for MIKON (a traditional conference of the Polish microwave community organized since 1969), Gdańsk, Poland, September 14, 2022.
- [3] "Portable Radar Systems for Life Activity Sensing, Anomaly Detection, and Human Tracking," Keynote Speech for IEEE International Workshop on Electromagnetics (iWEM), November 29, 2021.
- [4] "Portable Microwave Radar Systems for Life Activity Sensing and Human Localization," Keynote Speech for 14th International Conference on Advanced Technologies, Systems and Services in Telecommunications, Niš, Serbia, October 23, 2019.
- [5] "Portable Radar Systems for Life Activity Sensing, Anomaly Detection, and Human Tracking", Keynote Speech for IEEE International Workshop on Electromagnetics and Student Innovation Competition, Qingdao, China, September 18, 2019.

Invited presentations

- [6] "Modern Smart Radar for Health and Activity Sensing," 2021 CIE/USA-DFW Technical Seminar, September 18, 2021.
- [7] "Exploring and Mitigating Attacks to Modern Radar Sensors," University of South Carolina Graduate Seminar, September 24, 2021.
- [8] "Portable Radar Systems for Life Activity Sensing, Anomaly Detection, and Human Tracking," Joint ICMMT & IEEE MTT-S International Wireless Symposium (IWS), September 20, 2020.
- [9] "Portable Radar Systems for Life Activity Sensing, Anomaly Detection, and Human Tracking", IEEE MTT-S Webinar, October 15, 2019.
- [10] "Portable Radar Systems for Life Activity Sensing, Anomaly Detection, and Human Tracking", IMEC seminar, Leuven, Belgium, October 3, 2019.
- [11] "Smart Radar Sensors for Life Activity Sensing and Localization", University of Alcalá, Spain, September 25, 2019.
- [12] "Portable Radar Systems for Life Activity Sensing, Anomaly Detection, and Flood Water Monitoring", IEEE MTT-S Tainan Chapter, Kaohsiung, Taiwan, May 23, 2019.
- [13] "Smart Radar Sensors for Non-Contact Sensing and Localization", Peking University, July 23, 2018.

- [14] "Portable Continuous-Wave Radar for Non-Contact Sensing and Localization", 2018 IEEE International Solid-State Circuits Conference (ISSCC), San Francisco, February 15, 2018.
- [15] "Portable Radar Research at Texas Tech University", United Technologies Research Center (UTRC), East Hartford, CT, April 27, 2017.
- [16] "Portable Radar Research at Texas Tech University", SPIE Radar Sensor Technology XXI, Anaheim, CA, April 12, 2017.
- [17] "Smart Radar Sensors for Tumor Tracking and Human Localization", Taiwan Electromagnetic Industry-Academia Consortium (TEMIAC), Kaohsiung, Taiwan, September 24, 2015.
- [18] "Structural Health Monitoring of Wind Turbines using Low-Cost Portable Radar", National Chung Cheng University, Chiayi, Taiwan, September 23, 2015.
- [19] "Smart Radar Sensors for Biomedical and Civil Applications", Nanjing University of Science and Technology, Nanjing, China, June 16, 2015.
- [20] "Smart Radar Sensors for Biomedical and Civil Applications", University of Central Florida, Orlando, February 16, 2015.
- [21] "Smart Radar Sensor for Pervasive Motion-Adaptive Health Applications", Texas Instruments, Dallas, July 23, 2014.
- [22] "Smart Radar Motion Sensors for Biomedical and Civil Applications", University of Texas Austin, October 4, 2013.
- [23] "Microwave Education and Research Through NI and AWR Integrated Solutions", NI Week 2013, Austin, TX, August 5, 2013.
- [24] "CMOS Integrations of Non-contact Vital Signs Monitor: Challenges and Solutions", Texas Analog Center of Excellence, Dallas, TX, July 19, 2010.
- [25] "CMOS Integrations of Doppler Radar Sensor for Non-contact Vital Sign Detection", Marvell Technology Group Ltd., Santa Clara, CA, February 2009.

MTT-S Distinguished Microwave Lecturer Talks in 2022

| Chapter Name | Country | Format | Date | |
|--|--|---------------|-----------|--|
| Zhejiang University | China | Virtual | 1/5/2022 | |
| Shanghai Section Chapter | China | Virtual | 1/5/2022 | |
| MTT-s IEEE Hyderabad section (added in January 2022) | India | Virtual | | |
| IEEE MTT-S Student Branch Chapter, SBC20461B | TT-S Student Branch Chapter, SBC20461B India | | 2/13/2022 | |
| IEEE MTT-S SBC | India | Virtual | | |
| IEEE Latvia Section COM/MTT/AP Joint Societies Chapter | Latvia | Virtual | 0/47/0000 | |
| MTT17 Microwave Theory and Techniques | Croatia | Virtual | 2/17/2022 | |
| CH10231 - Victorian Section Jt. Chapter, AP03/MTT17 | Australia | Virtual | 3/2/2022 | |
| Tainan Section Chapter, Taiwan | Taiwan | Virtual | 2/10/2022 | |
| Taipei Section Chapter, Taiwan | Taiwan | Virtual | 3/18/2022 | |
| IEEE DBIT Student Chapter MTT-S Chapter | India | Virtual | | |
| IEEE MTT-S Student Branch Chapter, Indian Institute of Technology Kanpur | India | Virtual | | |
| SBC70701B (MTT SBC NIT WARANGAL) | India | Virtual | 3/23/2022 | |
| University of Engineering and Management Jaipur | India | Virtual | | |
| IEEE MTT-S SBC, JADAVPUR UNIVERSITY | India | Virtual | | |
| Villanova University IEEE Student Branch | USA | In-person | 4/21/2022 | |
| Temple University | USA | In-person | 4/20/2022 | |
| Drexel University | USA | In-person | 4/20/2022 | |
| MTT-S SBC CHAPTER MTT17 | India | India Virtual | | |
| IEEE MTT-S Sri Lanka | Sri Lanka | Virtual | 4/27/2022 | |
| IEEE International Microwave Biomedical Conference (IMBioC 2022) | China | Virtual | 5/18/2022 | |
| Poland Section Jt. Chapter AP03/AES10/MTT17 | Poland | Virtual | 5/25/2022 | |

| IEEE MTT Student Branch Chapter at Universidade de Aveiro | | Virtual | |
|---|-----------|-----------|------------|
| IEEEE MTT-S Tunisia Chapter | | Virtual | 6/27/2022 |
| IEEE MTT-S/CAS Singarpore | Singapore | Virtual | 8/4/2022 |
| IEEE MTT-S Poland | Poland | In-person | 9/14/2022 |
| MTT-S Chpater @ University of Virginia | | In-person | 10/7/2022 |
| IEEE MTT/AP/EMC/CAS Joint Chapter, Islamabad | Pakistan | Virtual | 10/21/2022 |
| IEEE MTT-S Student Chapter - University of Oklahoma | USA | In-person | 11/11/2022 |
| Guadalajara Chapter | Mexico | Virtual | 11/18/2022 |

Sample of News Release/Media Report

- [1] Texas Tech Researcher Getting to Heart of Cybersecurity Issue http://today.ttu.edu/posts/2017/10/cardiac-password
- [2] "Smart Radar Sensor for Accurate Tumor Tracking in Motion Adaptive Cancer Radiotherapy" IEEE Life Sciences Newsletter, Feb. 2013: <u>https://lifesciences.ieee.org/lifesciences-newsletter/2013/february-2013/smart-radar-sensor-for-accurate-tumor-tracking-in-motion-adaptive-cancer-radiotherapy/</u>
- [3] "Doppler Baby Monitor" Science Update (AAAS): <u>http://www.scienceupdate.com/2008/12/doppler-baby-monitor/</u>
- "Wireless Crib Monitor Keeps Tabs On Baby's Breathing" Science Daily: <u>http://www.sciencedaily.com/releases/2008/12/081202170826.htm</u> Health Jockey: <u>www.healthjockey.com/2008/12/06/wireless-crib-monitor-detects-irregular-breathing-in-baby/</u> Sensors: http://www.sensorsmag.com/sensors-mag/december-rampd-round-up-1534