### **Dr. Cynthia M. Furse**

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**EDUCATION:** Specialty in Electromagnetics

***Ph.D., Electrical Engineering*** University of Utah, 1994

***Master of Science, Electrical Engineering***, University of Utah, 1988

***Bachelor of Science, Electrical Engineering*,** University of Utah, 1986

Minor: Mathematics (Magna Cum Laude/UofU Salutorian 1986)

**WORK EXPERIENCE:**

**PROFESSOR** 7/06 to present and **ASSOCIATE PROFESSOR** 9/02 to 7/06

*Courses Taught: Electromagnetics*, *Microwave Engineering,* *Computational Electromagnetics, Wireless Communication, Intro.to ECE*

**ASSOCIATE VICE PRESIDENT FOR RESEARCH** 7/09 to 6/19

 University of Utah

**ASSOCIATE CHAIR** for Undergraduate Studies 7/07 to 7/09

 Dept. of Electrical and Computer Engineering, University of Utah

**CHIEF TECHNICAL ADVISOR & C0-FOUNDER** *LiveWireInnovation.com* 3/04 to present LiveWire Innovation, LLC (spin off company from the Center of Exc. for Smart Sensors)

**ASSISTANT PROFESSOR** 9/97 to 8/01 and **ASSOCIATE PROFESSOR** 9/01to 9/02 Dept. of Electrical and Computer Engineering, Utah State University

*Courses Taught: Electromagnetics*, *Microwave Engineering,* *High Frequency (Digital) Engineering, Antennas and Radiation, Computational Electromagnetics, Wireless Communication*

***Founding Director: Richard and Moonyeen Anderson Wireless Communication Research and Education Center***

***Founding Director***: ***Center of Excellence for Smart Sensors***

**RESEARCH ASSISTANT PROFESSOR** 9/95 to 9/97 Dept. of Electrical Engineering, University of Utah

*National Science Foundation Computational Sciences and Engineering Postdoctoral Research Fellow*

**RESEARCH ASSOCIATE** **and** **ENGINEERING INSTRUCTOR** 3/94 to 9 /97 Dept. of Electrical Engineering, University of Utah

*EE553: Numerical Methods in Electromagnetics* (1994, 1995, 1996, 1997) *EE108/109: Electrical Engineering for Non-Majors* (1997)

**CONTRIBUTIONS**

***Bioelectromagnetic Simulation***: In the late 1980s and early 1990s, there were many questions about the safety of electromagnetic fields from power transmission lines, cell phones, and the like. My early work as a graduate and postdoctoral fellow was to develop a finite-difference time-domain (FDTD) method for simulating these electromagnetic fields in the human body with mm-resolution, which was orders of magnitude more detail (2+ million voxels) than previous models (roughly 1000 voxels). I helped develop the first MRI-based anatomical human model, hand-segmenting full-body MRI scans into 31 distinct tissue types. This was the model of choice used by numerous research groups from 1988 until 1994, when the Visible Man model was produced by the National Institutes of Health. Simulating this model required almost two weeks on the computers of the day. I also helped Dr. Susan Hagness (U Wisc-Madison) adapt this method for developing MRI-derived breast models such as the one shown in Fig. 10 in this proposal. I developed a number of novel computational advancements, so it could be run overnight. Sinusoidal FDTD codes were the norm at the time, but required re-running the simulation for every frequency of interest (not practical for bioelectromagnetic simulations). I developed a pulsed FDTD code to enable analysis of a broad frequency set with a single run, bucking the prevailing notion that this would create aliasing in the calculations, proving practically and theoretically why that was not the case. The method I developed for frequency analysis (the 2-equation 2-unknowns 2E2U method) is used in most commercial FDTD codes today. I also developed a frequency-dependent FDTD method to account for the frequency dependence of tissue, and a method to evaluate low frequency (60Hz) fields. I recently developed a stochastic S-FDTD method for evaluating the variation in the fields from variance in the tissues. The bio-FDTD method I helped develop is used extensively in research and design. Its most visible application is in cell phone analysis, where it is used commercially to determine compliance with power deposition guidelines. Our initial work that demonstrated higher power deposition in children than adults spawned more than a decade of debate, and has now been validated by numerous other models. Recently, I have extended the FDTD method to stochastic analysis of how normal variation in human tissues impacts the variability of the fields and power deposition in the body.

***Implantable Antennas:*** From the work in computational bioelectromagnetics, I moved into designing antennas and communication systems (telemetry) for implantable medical devices (pacemakers, etc.). This required managing the loss and de-focusing from the fields propagating through the body, loss from the body trying to short out the antenna, and loss from the biocompatible materials required to build the antennas. The basic microstrip antenna design I developed in 1999 became the basis for implantable antennas used in research applications through the present time. This is effective to create communication systems for devices that have a battery pack on the order of 2” square, but next-generation (and some research applications already) are shrinking to ¼” square. These are too small to support antennas of this type, so I am currently developing tattoo antennas in the fat layer under the skin to allow use of a larger re-radiating antenna.

***Live Wire Fault Location:*** I developed novel methods for locating faults in live, energized electrical systems using a low-interference pseudo-noise signal (similar to your cell phone signal). Many intermittent electrical faults occur during system use, but are not reproducible when the system is shut down for maintenance (“no fault found – NFF”), and these often represent the largest cost in both risk and maintenance dollars. SSTDR enables fault location on aging aircraft wiring while the plane is in flight. It has been used in other critical applications (auto, industrial, mining, oil/gas, etc.) The Spread Spectrum Time Domain Reflectometry (SSTDR) method I pioneered can both detect and locate faults on LIVE electrical cables with accuracy without interfering with existing signals on the line. This method is extremely robust and flexible and has been used on wires up to 5km long (accuracy on the order of 10 feet), a few hundred feet long (accuracy on the order of a foot), and (for shorter wires) with accuracy within a few millimeters. I co-founded LiveWire Innovation in 2000 to commercialize the SSTDR live fault location technology and assisted with an additional student-driven start up for automotive applications (Short Solutions) in 2006. This technology is currently being used to improve safety in aircraft, rotorcraft, high speed trains, mines, off shore oil drilling, automotive, and more, and it is currently being installed throughout the British Rail system through our partner company, Viper (in the UK). Our current research is extending this to fault location for large-scale photovoltaic (solar) farms.

***Engineering Education:*** I have been teaching since 1987. In 2007 I pioneered a teaching method, the Flipped Classroom, that has now become a mainstream pedagogical approach used throughout the country and the world. In the Flipped Classroom, students watch the lecture by video BEFORE class, leaving class time for active discussion, problem solving, and engineering applications. I have led efforts at the University of Utah, and numerous other universities around the country, and mentored many professors who are flipping their classes. I was the lead developer of the NSF-sponsored Teach-Flip training program for faculty who want to flip their classes. We trained over 2200 faculty and K12 teachers around the world on ways to use flipped methods to increase active learning in the classroom. I have also led significant innovative efforts in development of hands-on laboratories and technical communication training across the ECE curriculum. The laboratories we developed to teach system-level design concepts have been used at numerous US and international universities, have been the highest number of downloads on the Agilent Educator’s Corner site, and have even been commercialized in Korea.

**BOOKS**

1. James Nagel, Cynthia Furse, Douglas Christiansen, Carl Durney, Introduction to Bioelectromagnetics, 2nd and 3rd Editions, CRC Press, 2008, 2018 (also translated into Korean)
2. F.T. Ulaby, M. Maharabiz, C. Furse, Circuits (2nd Ed., 2015), NTS Press, 2015; (3rd Ed., 2018) University of Michigan Press, <http://cad.eecs.umich.edu/> As of Sept. 2020, this book is being used in 417 US colleges and universities and 469 non-US schools, for a total of 886. The lists are available at fet.eecs.umich.edu
3. Akhlesh Lakhtakia, Cynthia M. Furse, editors The World of Applied Electromagnetics: In Appreciation of Magdy Fahmy Iskander, Springer, Cham, 2017

Total number of chapter downloads as of 6/2019 is 24.7k. Details:

<http://www.bookmetrix.com/detail_full/book/1337cdfb-9c45-4d9d-bacf-a5a33a3283ae#citations>.

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2. Jeffrey Carlstrom, Cynthia Furse, History of Emigration Canyon, First Edition: Utah State University Press, 2002. Second Edition: Lulu Press, 2019. <https://emigrationcanyonhistory.wordpress.com/>

**BOOK CHAPTERS:**

1. O.P. Gandhi, C.M.Furse, G. Lazzi, "Monopole Antennas", Wiley Encyclopedia of Electrical and Electronics Engineering, John Webster, editor, 2000; Reprinted in Wiley Encyclopedia of RF and Microwave Engineering, 2003, Vol 4, pp. 3238-3244; 2014; 2019
2. Cynthia M. Furse, Om P. Gandhi, Gianluca Lazzi, “Dipole Antennas”, Wiley Encyclopedia of Electrical and Electronics Engineering, John Webster, editor, 2000, 2006 (online); Reprinted in Wiley Encyclopedia of RF and Microwave Engineering, 2003, Vol 2, pp. 1047-1052; 2014; 2019
3. Cynthia M. Furse, Gianluca Lazzi, Om P. Gandhi, “Dipole, Monopole and Loop Antennas,” Modern Antennas, Constantine Balanis, editor, 2006
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5. Cynthia Furse, “Reflectometry for Structural Health Monitoring,” New Developments in Sensing Technology for Structural Health Monitoring, edited by Dr. Subhas Chandra Mukhopadhyay, Springer-Verlag, 2011
6. Steve Smith, Cynthia Furse, ‘Stochastic FDTD,’ in Advances in FDTD Computational Electrodynamics: Photonics and Nanotechnology, Artech-House, 2013. Allen Taflove, Ardavan Oskooi, & Steven G. Johnson, Editors
7. Cynthia M. Furse, "Bioelectromagnetic Dosimetry: Simulating Electromagnetic Fields in the Human Body." *The World of Applied Electromagnetics*. Springer, Cham, 2018. 351-368. Updated for Akhlesh Lakhtakia, Cynthia M. Furse, editors The World of Applied Electromagnetics: In Appreciation of Magdy Fahmy Iskander, Springer, Cham, 2017
8. Cynthia M. Furse, Elene Tiffany Iskander. "Electromagnetics Education: Past, Present, and Future Directions." *The World of Applied Electromagnetics*. Springer, Cham, 2018. 655-675. Akhlesh Lakhtakia, Cynthia M. Furse, editors The World of Applied Electromagnetics: In Appreciation of Magdy Fahmy Iskander, Springer, Cham, 2017. Updated for Akhlesh Lakhtakia, Cynthia M. Furse, editors The World of Applied Electromagnetics: In Appreciation of Magdy Fahmy Iskander, Springer, Cham, 2023
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12. Hugo Espinosa, Uday Khankhoje, Berardi Sensale-Rodriguez, Levent Sevgi, Cynthia M. Furse, “Chapter 12: Learning and Teaching in a Time of Pandemic, Teaching electromagnetics: Innovative approaches and pedagogical strategies, Selvan KT and Karl Warnick, Editors, Waterstone Publishers, 2021 <https://www.waterstones.com/book/teaching-electromagnetics/krishnasamy-t-selvan/karl-warnick/9780367710880>
13. Bioelectromagnetics in Healthcare Advanced sensing and communication applications, edited by Will Whittow -- Chapter: Dosimetry for Bioelectromagnetics, by Cynthia M. Furse, 2022, <https://shop.theiet.org/bioelectromagnetics-in-healthcare>, ISBN-13: 978-1-83953-349-5. The Institute of Engineering and Technology (IET)
14. Amanda Biggs, Cynthia Furse, Chapter 9 -- Engineering Students’ Stress and Mental Health

*An Essential Piece in the Retention Puzzle,* **Advancing engineering education beyond COVID: A guide for educators,**edited by Hugo Espinosa and Ivan Gratchev, 2023, Routledge (Taylor and Francis Group)

**SPECIAL ISSUES EDITED:**

1. Cynthia Furse, Moussa Kafal, Reza Rezzaghi, Yong-June Shin, *IEEE Sensors Journal* [Special Issue on Embedded Sensors for Fault Diagnosis in Electrical Wiring Interconnection Systems, Power Grids, Structural Cables, Pipelines, and Electrical Machines](https://ieeexplore.ieee.org/document/9298494?source=authoralert), 20(2), Jan. 2021 <https://ieeexplore.ieee.org/document/9298494>
2. Youchung Chung, Cynthia Furse, Sensors Special Issue on RF Sensors: Design, Optimization, and Applications, 2021 <https://www.mdpi.com/journal/sensors/special_issues/RFsensors>

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1. Evan Benoit, Joel B. Harley, Cynthia M. Furse, "Capability of Impedance Measurement using Spread Spectrum Time Domain Reflectometry", IEEE Transactions on Instrumentation and Measurement, 72(8), 2023
2. Khadijeh Masumnia-Bisheh, Cynthia Furse, " Variability in Specific Absorption Rate from Variation in Tissue Properties," *Journal of Multiscale and Multiphysics Computational Techniques*, (7)2022, pp. 304-311, Print ISSN: 2379-8793 Online ISSN: 2379-8793 Digital Object Identifier: 10.1109/JMMCT.2022.3216642 <https://ieeexplore.ieee.org/document/9927358>
3. K. T. Selvan, C.M. Furse, Professional Development Ideas for Students and Young Professionals, *IEEE Antennas and Propagation Magazine*, *64*(5), Oct. 2022, *pp.* 122-127. <https://ieeexplore.ieee.org/document/9913246>
4. Asimina Kiourti, Amin M. Abbosh, Maria Athanasiou, Toni Björninen, Aline Eid, Cynthia Furse, Koichi Ito, Gianluca Lazzi, Mohamed Manoufali, Matteo Pastorino, Manos Tentzeris, Katrina Tisdale, Erdem Topsakal, Leena Ukkonen, William G. Whittow, Huanan Zhang, Konstantina S. Nikita, "Enabling Technologies for Emerging Bioelectromagnetics Applications," *IEEE Open Journal of Antennas and Propagation (OJAP),* 3 (2022), pp. 363-390
5. Ayobami S. Edun, Cody LaFlamme, Samuel Kingston, Cynthia M. Furse, Michael A. Scarpulla, Joel B. Harley, "Anomaly detection of SSTDR signals using Variational Autoencoders," *IEEE Sensors Journal*, Jan. 6, 2021
6. Samuel Kingston, Cody LaFlamme, Mashad U. Saleh, Hunter Ellis, Evan Benoit, Ayobami Edun, Michael A. Scarpulla, Cynthia M. Furse, Joel B. Harley, "[Spread Spectrum Time Domain Reflectometry (SSTDR) Digital Twin Simulation of Photovoltaic Systems for Fault Detection and Location](http://www.jpier.org/PIERB/pier.php?paper=21071507)," *Progress in Electromagnetics Research (PIERS-B),* vol. 94, pp. 105-126, Jan. 2021
7. Cody LaFlamme, Evan Benoit, Ayobami Edun, Cynthia M. Furse, Michael A. Scarpulla, Joel B. Harley, "[Quantifying the Environmental Sensitivity of SSTDR Signals for Monitoring PV Strings](https://ieeexplore.ieee.org/document/9628168?source=authoralert)," *IEEE Journal of Photovoltaics*, vol. 12, no. 1, Jan. 2022, **DOI:** [10.1109/JPHOTOV.2021.3127465](https://doi.org/10.1109/JPHOTOV.2021.3127465)
8. Tasmia Tasnim, Jill E. Shea, Jayant Agarwal, Cynthia M. Furse, Huanan Zhang, "Thermally Tunable Hydrogel Crosslinking Mediated by Temperature Sensitive Liposome,” *Biomedical Materials*, 16(6), 065026, 2021 <http://iopscience.iop.org/page/acceptedmanuscripts>
9. Samuel Kingston, Evan Benoit, Ayobami S. Edun, Farhad Elyasi Chamazkoti, Dawn E. Sweeney, Joel B. Harley, Paul K. Kuhn, Cynthia M. Furse, " SSTDR Methodology, Implementations, and Challenges," *Sensors* -- Special Edition on RF Sensors, 2021 [https://www.mdpi.com/1424-8220/21/16/5268](https://www.mdpi.com/1424-8220/21/16/5268/pdf)
10. Ayobami S. Edun, Samuel Kingston, Cody LaFlamme, Evan Benoit, Michael R. Scarpulla, Cynthia M. Furse, Joel B. Harley, "Detection and Localization of Disconnections in a Large-Scale String of Photovoltaics using SSTDR," 11(4), *IEEE Journal of Photovoltaics,* 2021, pp. 1097-1104.
11. Hunter Ellis, Cody LaFlamme, James R. Nagel, Joel Harley, Cynthia M. Furse, "Multiconductor Transmission Lines and Asymmetric Fault in SSTDR Measurements," *IEEE Sensors Journal*, 2021, pp. 1-7, DOI10.1109/JSEN.2021.3075363, Print ISSN: 1530-437X Online ISSN: 1558-1748 Digital Object Identifier: 10.1109/JSEN.2021.3075363

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1. William Berger, Cynthia Furse, "Spread Spectrum Techniques for Measurement of Dielectric Aging on Low Voltage Cables for Nuclear Power Plants," *IEEE Trans. Dielectrics and Electrical Insulation*, 28(3), 2021, pp. 1028-1033, DOI: 10.1109/TDEI.2021.009469
2. Richard J. Allred, Cynthia M. Furse, "Reflection Budgeting Methodology for High-Speed Serial Link Design”, *Progress in Electromagnetics Research* (Pier-B), 91, April 1, 2021
3. Evan Benoit, Jack Mismash, Samuel Kingston, Ayobami Edun, Hunter Ellis, Cody LaFlamme, Michael Scarpulla, Joel B. Harley, Cynthia Furse, “Quantifying the Window of Uncertainty for SSTDR Measurements of a Photovoltaic System,” *IEEE Sensors Journal,* 2021. Print ISSN: 1530-437X Online ISSN: 1558-1748 Digital Object Identifier: 10.1109/JSEN.2021.3059412
4. Samuel R. Kingston, Hunter Ellis, Mashad U. Saleh, Evan J. Benoit, Ayobami Edun, Cynthia M. Furse, Michael A. Scarpulla, Joel B. Harley, "Spread Spectrum Time Domain Reflectometry and Steepest Descent Inversion to Measure Complex Impedance," *Applied Computational Electromagnetics Society (ACES )Journal,* 36(2), 2021
5. Benjamin Sanchez-Terrones, Mark B. Bromberg, Robert S. Macleod, Cynthia Furse, "Electrical impedance myography: a critical review and outlook," Invited Review *Clinical Neurophysiology*, Dec. 2020
6. Frank A. Curry Jr, Andrew M. Chrysler, Tasmia Tasmin, Jill E. Shea, Jayant Agarwarl, Cynthia M. Furse, Huanan Zhang, “Biostable Conductive Nanocomposite for Subdermal Antenna,” *APL Materials*, 8(10), 2020. <https://doi.org/10.1063/5.0019720> DOI: 10.1063/5.0019720
7. Mashad Uddin Saleh, Chris Deline, Evan Benoit, Samuel Kingston, Joel B. Harley, Cynthia M. Furse, Michael Scarpulla, "Detection and Localization of Damaged Photovoltaic Cells and Modules Using Spread Spectrum Time Domain Reflectometry," *IEEE Journal of Photovoltaics*, 11(1), pp. 195-201, Jan. 2021, Print ISSN: 2156-3381, Online ISSN: 2156-3403, DOI: [10.1109/JPHOTOV.2020.3030185](https://ieeexplore.ieee.org/document/9239263?source=authoralert)
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9. Cynthia Furse*, “*How to Be a Great Advocate for Women in Engineering,” (invited WIE column) *IEEE Antennas and Propagation Magazine*, 62(6), Dec. 2020, pp. 98-103
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2. Kaitlin Hall, Huanan Zhang, Cynthia Furse, "Design of an Interstitial Microwave Applicator for 3D Printing in the Body", *IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology Special Issue,* 4(4) Dec. 2020. Pp. 260 – 264. **DOI:** [10.1109/JERM.2020.3003834](https://doi-org.ezproxy.lib.utah.edu/10.1109/JERM.2020.3003834)
3. Samuel Kingston, Naveen Kumar Tumkur Jayakumar, Mashad U. Saleh, Evan Benoit, Ayobami S. Edun, Rujun Sun, Cynthia Furse, Michael Scarpulla, Joel B. Harley, "Measurement of Capacitance in PV Cells using Spread Spectrum Time Domain Reflectometry (SSTDR) and Dictionary Matching,” *IEEE Sensors Journal*, *20*(17), 2020 pp.10102-10109,
4. Cynthia Furse, Moussa Kafal, Reza Rezzaghi, Yong-June Shin, "Fault Diagnosis for Electrical Systems and Power Networks: A Review," Special Issue *IEEE Sensors Journal,* 21(2), pp. 888-906, Jan. 2021. Print ISSN: 1530-437X Online ISSN: 1558-1748 Digital Object Identifier: 10.1109/JSEN.2020.2987321
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6. Mashad Uddin Saleh, Chris Deline, Kent Terwilliger, Joel Harley, Cynthia Furse, Michael Scarpulla, “An Overview of Spread Spectrum Time Domain Reflectometry Responses to Photovoltaic Faults" *IEEE Journal of Photovoltaics, 10(3), pp.* 844-851, May 2020, DOI: 10.1109 /JPHOTOV.2020.2972356
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12. Cynthia Furse, Charles Killian, Gerald Hasty, Robert Nelson, “Ham Radio and the Pony Express: Providing Communication in Remote Areas,” *IEEE Antennas and Propagation Magazine*, 61(6), 2019, DOI 10.1109/MAP.2019.2945584
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**SHORT COURSES:**

Cynthia Furse, "Application of the Finite-Difference Time-Domain Method to Simulation of Electromagnetic Coupling to the Human Body," The *14th Annual Review of Progress in Applied Computational Electromagnetics, ACES Symposium*, Monterey, CA, March 16-20, 1998

**KEYNOTE and INVITED PRESENTATIONS (virtual):**

1. Cynthia Furse, “Your Smart Phone: How it works and how it is changing the world,” ARCS Foundation presentation (in person)
2. Cynthia Furse, “**Using Spread-spectrum time-domain reflectometry (SSTDR) to measure impedance,” Queen Mary University, London, Sept. 27, 2023**
3. “Cynthia Furse, “Stochastic FDTD Method Applied to Bioelectromagnetic Simulations,” IEEE IISc Bangalore, India, MTT/AP-S Chapter, Sept. 20, 2023
4. Cynthia Furse, “History and Future of Implantable Antennas,” IEEE MTT-S NIT Silchar, India, Sept. 22, 2022
5. Cynthia Furse, “History and Future of Implantable Antennas,” IEEE University of Alberta, Sept. 14, 2022
6. Cynthia Furse, “A Busy Professor’s Guide to Sanely Flipping Your Classroom (Workshop),” King Fahd University of Petroleum & Minerals (KFUPM, Saudi Arabia), Sept. 7, 2022
7. Cynthia Furse, “History and Future of Implantable Antennas,” IEEE Iowa-Illinois Section, May 18, 2022
8. Cynthia Furse, “Arcs and Sparks: Building a Company to Find Faults on Aging Electrical Wiring”, Department of Engineering Science and Mechanics (ESM) at Penn State, April 6, 2022
9. Cynthia Furse, “History and Future of Implantable Antennas,” University of Tokyo, March 25, 2022
10. Cynthia M. Furse, “Arcs and Sparks: Building a Company to Find Faults on Aging Electrical Wiring,” PNNL MAaD Science Lab and IEEE Richland Section, Dec. 16, 2021
11. Cynthia M. Furse, “Arcs and Sparks: Building a Company to Find Faults on Aging Electrical Wiring,” Keynote for [III Microwave, Antennas and Sensor Workshop](https://ucsp.edu.pe/agenda/workshop-microondas-antenas-sensores/#programa), Peru, Dec. 2, 2021
12. Cynthia Furse, “History and Future of Implantable Antennas,” L4: Learn from Leaders, Learn from Legends series, IEEE APS SBC Govt Engineering College Barton Hill (Trivandrum, Kerala, India), Nov. 23, 2021
13. Cynthia M. Furse, “Arcs and Sparks: Building a Company to Find Faults on Aging Electrical Wiring,” at Ottawa IEEE AP/MTT chapter, Nov. 11, 2021
14. Cynthia Furse, “Education after Covid: Opportunities and Adventures,” Iowa State University, [Nov. 15, 2021](https://iastate.zoom.us/j/95495072510?pwd=Z29HTmFQOGVLQStOV0VUcVNXaUNFdz09)
15. Cynthia Furse, “Arcs and Sparks: Finding Faults on Aging Electrical Wiring,” IEEE AP-S/MTT-S Chicago Joint Chapter, September 10th, 2021.
16. Cynthia Furse, “History and Future of Implantable Antennas,” 2022 IEEE International Microwave Biomedical Conference (IMBioC2022), May 16-18, 2022, Suzhou, China
17. Cynthia Furse,“History and Future of Implantable Antennas”, 2021 IEEE Asia Pacific Conference on Applied Electromagnetics (APACE 2021), Dec. 21, 2021
18. Cynthia Furse, “History and Future of Implantable Antennas”, Sunway Antenna Technology Webinar, Malaysia, May 26, 2021
19. Cynthia Furse, “Why Study EM?” for the University of Edinburgh IEEE Master Class on Electromagnetics, 2021
20. Cynthia Furse, “Arcs and Sparks: Finding Faults on Aging Electrical Wiring”, [EmergingTrends in Industry 4.0 (ETI 4.0)](http://www.eticonf.com/), May 19, 2021, OP Jindal University, India
21. Cynthia Furse, “Arcs and Sparks: Finding Faults on Aging Electrical Wiring “, Department of Electronics and Communication Engineering, Bennett University,India, online workshop on “Recent Advancement in RF and Microwave Circuits and Devices”, April 8, 2021
22. Cynthia Furse, “Bioelectronics and Bioelectronics and the Bionic Age: How electronics touch our hearts and minds,” invited lecture for IEEE MTTS SBC JADAVPUR UNIVERSITY, May 6, 2021
23. Cynthia Furse, “Women Inventors Who Changed the World,” University of Utah Online talk for Intl. Women’s Week, 3/10/2021
24. Cynthia Furse, “The Power of Failure: Getting it Right by Getting it Wrong,” seminar on Enhancing Skills for Professional Success, SSN College of Engineering, India (online), Feb. 25, 2021, <https://youtu.be/9jtKFziv9H4>
25. Cynthia Furse, “History and Future of Implantable Antennas”, CHARUSAT Endowment Chair Expert Lecture, Electronics and Communication Department, CHAURSAT, Gujarat, India, March 8, 2021
26. Cynthia Furse, “Bioelectronics and the Bionic Age: How electronics touch our hearts and minds,” invited lecture for Department of Electronics and Communication Engineering, SSN College of Engineering, Tamil Nadu, India, invited by Professor Krishnasamy Selvan, Feb. 10, 2021
27. Cynthia Furse, “Arcs and Sparks: Finding Faults on Aging Electrical Wiring,” Mediterranean Microwave Symposium, Dec. 9,2020 (Morocco, moved online, invited presentation)
28. [Cynthia Furse, “Antennas for Next-Generation Medical Implants”, Antenna and Propagation Conference (APC) 2020, London, UK (online), Nov. 10, 2020](https://event.on24.com/wcc/r/2648773/40CF00B9C6E39880061B5DC857A804BD/1530966)
29. Cynthia Furse, “Opportunities in Electromagnetics and Microwave Engineering,” invited talk (online) for Dept. of Electrical and Communications Engineering, RV College of Engineering, Bangalore, India, Sept. 17, 2020 <https://www.youtube.com/watch?v=G1R--_9mJQk>
30. Cynthia Furse, “Implantable Antennas for Medical Applications,”, invited talk (online) for *IOT Technology Research Center of Tohoku Institute of Technology, IEEE AP-S Tokyo Chapter, IEEE Sendai Section, IEEE Sendai Women in Engineering*, Sept. 9, 2020
31. Cynthia Furse, “Finding Faults on Live Wires: Planes to Trains and Everything in Between,” plenary invited talk (online) in *5th International Conference on UK - China Emerging Technologies (UCET)*, Aug. 21, 2020
32. Cynthia Furse, “The Power of Change,” Keynote for Women in Electromagnetics and Radio Science, *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Montreal (moved online), July 5-10, 2020

**CONFERENCE PRESENTATIONS:**

1. A.J Metz, Karen Tao, Donna Ziegenfuss, Arabella Bhutto, Cynthia Furse, “Enhancing STEM Graduate Education: The Design, Development, and Piloting of a Course to Promote Reesarch Innovation, Mentoring, and Career Readiness,” accepted to 2024 Hawaii International Conference on Education, Waikoloa, Hawaii, Jan. 3-6, 2023
2. Cynthia Furse, Karen Tao, A.J. Metz, Donna Ziegenfuss, and Arabella Bhutto,” An Innovative Graduate Education Course – Lean Canvas for Invention,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Portland, OR, July 23-28, 2023
3. Samuel Jerel Hansen, Evan Benoit, Joel B. Harley, and Cynthia Furse, “Evaluation of Methods to Generate Spread Spectrum Time Domain Reflectometry,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Portland, OR, July 23-28, 2023
4. Cynthia Furse, “APS 2033: A Future for Women in Electromagnetics,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Portland, OR, July 23-28, 2023
5. Cody LaFlamme, Cynthia Furse, Joel B. Harley, “Ground Faults in Photovoltaics: SStdr for Characterization, Detection, and Location,” ASME 2022 49th Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE2022), July 25-27, 2022, San Diego, CA
6. Samuel Hansen, Robbie Barker,Evan Benoit, Joey Brignone, Derek Dyreng, Ayobami Edun, Farhad Elyasi Chamazkoti, Nikodem Gazda, Julio Gutierrez, Samuel Kingston, Cody LaFlamme, Ivan Nikishov, Brian Paulsen, Hailee Sumpter, Zachary Wilkerson, Mashad Saleh, Michael A. Scarpulla, Joel B. Harley,Paul K. Kuhn,Cynthia M. Furse, “Fault Detection and Location on Photovoltaic Systems using Spread Spectrum Time Domain Reflectometry,” [*PV Performance Modeling Collaborative (PVPMC) workshop*](1.%09https%3A/pvpmc.sandia.gov/2022-in-person-pvpmc-workshop-august-23-24-in-salt-lake-city/), Salt Lake City, Utah, August 23-24, 2022
7. Samuel Jerel Hansen, Evan Benoit, Joseph Brignone, Joel B. Harley, Cynthia M. Furse, “Measuring Impedance with Spread Spectrum Time Domain Reflectometry,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Denver, July 10-15, 2022
8. Cynthia Furse, “How Allen Taflove’s Left-Handed FDTD Code Helped Revolutionize Bioelectromagnetics,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Denver, July 10-15, 2022
9. **Carter Christensen, Cynthia Furse, “**Field Focusing for Implantable Telemetry Antennas,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Denver, July 10-15, 2022
10. **Cynthia Furse, Evan Benoit, Samuel Hansen, “Towards a Spread Spectrum VNA*,”*** *IEEE Conference on Antenna Measurements and Applications* (*2021* IEEE *CAMA*), online, Nov. 15-17, 2021 Video Link: <https://youtu.be/0a4I5cr-NDk>
11. Joseph Kiflom, Shaun McKellar, Tara Spafford, Huanan Zhang, Tasmia Tasneem, Crysta Oswald, Kaitlin Hall, Cynthia Furse, "Measurements on a Thermally-Crosslinked Biopolymer for Future Implantable Antennas," *International Conference on Electromagnetics in Advanced Applications (ICEAA)* Aug. 9-13, 2021 ICEAA / IEEE APWC / USNC-URSI RSM, August 9-13, 2021, in Honolulu, Hawaii, USA
12. Audrey Rubart, Kaitlin Hall, Cynthia Furse, David Hasan, “Minimally Invasive Deep Brain Stimulation with Intracranial Stents”, *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Singapore (and virtual), Dec. 4-10, 2021
13. **Evan Benoit, Cynthia Furse, “**A Broadband S/SSTDR-VNA for Energized Circuits”, *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Singapore (and virtual), Dec. 4-10, 2021 Video Link: https://youtu.be/7nFj5W7wDo4
14. **Cynthia Furse, James Nagel, Berardi Sensale-Rodriguez, Jamesina Simpson, “**University of Utah Hybrid-Flexible Education,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Singapore (and virtual), Dec. 4-10, 2021
15. Tara Spafford, Kaitlin Hall, Carter Christensen, Cynthia Furse, with Joseph Kiflom, Christopher Trampel, Kelsey Tyler, Valeria Corona, Shaun McKellar**, “**Miniaturization of Implantable Antenna and Discussion of Concentration of Fields,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Singapore (and virtual), Dec. 4-10, 2021
16. **Esther Florence, Krishnasamy T. Selvan, Hugo Espinosa, Cynthia M. Furse, “**Experiences from teaching an online short-term course on bioelectricity during the pandemic,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Singapore (and virtual), Dec. 4-10, 2021
17. **Khadijeh Masumnia-Bisheh, Cynthia Furse, “**Should SAR Guidelines Include Variability?,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Singapore (and virtual), Dec. 4-10, 2021
18. Ayobami Edun, Cody LaFlamme, Michael A. Scarpulla, Cynthia M. Furse, Joel B. Harley "Health Monitoring of Solar Arrays with Spread Spectrum Time Domain Reflectometry and Variational Autoencoders," Review of Progress in Quantitative Nondestructive Evaluation (QNDE), online, July 28-30, 2021
19. Cody LaFlamme, Ayobami Edun, Evan Benoit, Michael Scarpulla, Joel Harley, Cynthia Furse, “Baseline Signal Learning for SSTDR Fault Detection in Photovoltaic Strings,” Review of Progress in Quantitative Nondestructive Evaluation (QNDE), online, July 28-30, 2021
20. Alexander Charters, Paul K. Kuhn, Hunter Ellis, Dawn Sweeny, Marc Fobair, Joel Harley, Cynthia Furse, "Feasibility of using SSTDR to Monitor Battery Cell Degradation," Review of Progress in Quantitative Nondestructive Evaluation (QNDE), online, July 28-30, 2021
21. Farhad Elyasi Chamazkoti, Evan Benoit, Dawn Sweeney, Cynthia Furse, "Machine Learning for Spread Spectrum Time-Domain Reflectometry Impedance Measurement," Review of Progress in Quantitative Nondestructive Evaluation (QNDE), online, July 28-30, 2021
22. **Massood Tabib-Azar, Shaun McKellar, Cynthia Furse, “Free Space Resonant Electromagnetic Sensing Techniques to Detect Airborne Viral and Environmental Particles Using Atomic Layer Graphene,” *NT21: International Conference on the Science and Application of Nanotubes and Low-Dimensional Materials*, virtual, June 6-11, 2021**
23. Zachary K. Wilkerson, Ayobami S. Edun, Michael A. Scarpulla, Cynthia M. Furse, Joel B. Harley, “Scale Transform Signal Processing for Reducing the Effect of Rain on SSTDR Signals,” *ICEAA 2021 International Conference on Electromagnetics in Advanced Applications*, Hybrid Format, Honolulu, HI, May 17-20, 2021
24. Shaun McKellar, Kaitlin Hall, Cynthia Furse, "Implantable Antennas via Biopolymer Thermal Crosslinking," *Utah Bioengineering Conference*, Feb. 5, 2021, <https://www.youtube.com/watch?v=wTnlL9BNtyM>
25. [Hunter Ellis, Cody Laflamme Cynthia Furse, James Nagel, “Describing Asymmetric Faults with Multiconductor Transmission Lines for SSTDR,” *National Radio Science Meeting (NRSM)*, Jan. 4-9, 2021 (online)](https://youtu.be/iXMXbGNox3Q)
26. Joel B. Harley, Ayobami Edun, Cody LaFlamme, Samuel Kingston, Evan Benoit, Michael Scarpulla, Cynthia Furse, "Spread Spectrum Time Domain Reflectometry for Health Monitoring of Solar Arrays," 47th Annual Review of Progress in Quantitative Nondestructive Evaluation, Minneapolis, MN, July 25-26, 2020
27. Evan Benoit, Cynthia Furse, “Inversion Theory and SSTDR Analysis,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Montreal (moved online), July 5-10, 2020
28. Kaitlin Hall, Tasmia Tasnim, Cynthia Furse, Huanan Zhang, Audrey Evans and Susan C. Hagness, “Adaptation of a Microwave Ablation System for Wireless Medical Applications,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Montreal (moved online), July 5-10, 2020
29. Khadijeh Masumnia-Bisheh, Cynthia Furse, “Estimating the Variance of SAR in a 3D Human Head Model Using Stochastic FDTD,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Montreal (moved online), July 5-10, 2020
30. Ayobami Edun, Cody LaFlamme, Mashad U. Saleh, Samuel Kingston, Evan Benoit, Hunter Ellis, Jack Mismash, Michael A. Scarpulla, Cynthia M. Furse, Joel B. Harley, “Spread Spectrum Time Domain Reflectivity to Detect and Locate Disconnects in Large-Scale PV Arrays”, *PV Reliability Workshop, Denver, CO, February 25-29, 2020*
31. Samuel Kingston, Evan Benoit, Naveen KT Jayakumar, Mashad U. Saleh, Josiah LaCombe, Cynthia M. Furse, Michael A. Scarpulla, and Joel B. Harley. "Spread spectrum time-domain reflectometry for detecting and locating capacitive impedances," In *AIP Conference Proceedings*, vol. 2102, no. 1, p. 090009. AIP Publishing, 2019.
32. Khadijeh Masumnia-Bisheh, Cynthia Furse, "Geometrically Stochastic Finite Difference Time Domain Method," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Atlanta, GA July 7-12, 2019
33. Kaitlin Hall, Cynthia Furse, “Design of an Interstitial Microwave Applicator for 3D Printing Antennas in the Body,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Atlanta, GA, July 7-12, 2019
34. Evan Benoit, Naveen Kumar Tumkur Jayakumar, Samuel Kingston, Mashad Uddin Saleh, Michael Scarpulla, Joel Harley, Cynthia Furse, "Applicability of SSTDR Analysis of Complex Loads," *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Atlanta, GA, July 7-12, 2019
35. Mashad Uddin Saleh, Chris Deline, Kent Terwilliger, Joel Harley, Cynthia Furse, Michael Scarpulla, "Spread Spectrum Time Domain Reflectometry for Detecting Accelerated Degradation in Photovoltaic Cells," *IEEE Photovoltaic Specialists' Conference (PVSC),* Chicago, IL, June 16-21, 2019
36. Samuel Kingston, Ayobami Edun, Evan Beniot, Naveen K. T. Jayakumar, Mashad U. Saleh, Cynthia M. Furse, Michael A. Scarpulla, Joel B. Harley, “Simulating the Spread Spectrum Time Domain Reflectometry Responses of Photovoltaic Cells to Detect and Locate Faults,” *PV Reliability Workshop, Denver, CO, February 26-31, 2019*
37. Evan Benoit, Naveen Kumar Tumkur Jayakumar, Samuel Kingston, Mashad U. Saleh, Michael Scarpulla, Joel B. Harley, Cynthia Furse, “Spread Spectrum Time Domain Reflectometry for Complex Impedance Fault Detection,” *PV Reliability Workshop, Denver, CO, February 26-31, 2019*
38. Samuel Kingston, Evan Benoit, Naveen Kumar Tumkur Jayakumar, Josiah LaCombe, Mashad Saleh, Michael A. Scarpulla, Cynthia M. Furse, Joel B. Harley, "Spread Spectrum Time Domain Reflectometry used for Detecting and Locating Electrical Faults in Solar Panels and Connecting Cables with Arbitrary Impedances*," Qualitative Non-Destructive Evaluation (QNDE) Conference,* July 16-19, 2018, Burlington, VT
39. Arabella Bhutto, Cynthia Furse, "Bridging Academic Inventor-TTO Manager Schism: A Tool - the Lean Canvas for Invention", First International [Triple Helix Summit](http://triplehelix.ae/index.html%2C) on “The Role of Government / Academia / Industry in building Innovation-based Cities and Nations” Nov. 10-13, 2018, Dubai, United Arab Emirates <https://link.springer.com/chapter/10.1007/978-3-030-23898-8_5>
40. (Invited Paper) Cynthia Furse, Naveen Kumar Tumkur Jayakumar, Evan Benoit, Mashad Saleh, Josiah LaCombe, Michael Scarpulla, Joel Harley, Samuel Kingston, Brent Waddoups, Chris Levine, “Spread Spectrum Time Domain Reflectometry for Complex Impedances: Application to PV Arrays,” *IEEE AutoTestCon 2018*, Sept 17-20, National Harbor, MD
41. Cynthia Furse, Neil Cotter, Angela Rasmussen, “Bottlenecks and Muddiest Points in a Freshman Circuits Course,” *2018 Annual Amercan Society for Engineering Education Conference and Exposition,* June 24-27,2018, Salt Lake City, Utah
42. Donna Ziegenfuss and Cynthia Furse, “Evidence-Based Practice: Student-Centered and Teacher-Friendly Formative Assessment in Engineering,” *2018 Annual American Society for Engineering Education Conference and Exposition,* June 24-27,2018, Salt Lake City, Utah
43. Donna Ziegenfuss, Cynthia Furse, Alyson Froehlich “Teach-Flipped: A Faculty Development MOOC on How to Teach Flipped,” *2018 Annual American Society for Engineering Education Conference and Exposition,* June 24-27,2018, Salt Lake City, Utah
44. Zachary Deneris, Cynthia Furse, “A Biological Testbed for Implanted Antennas Using Layered Porcine Tissue,” IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, Boston, MA, 2018.
45. Naveen Kumar Tumkur Jayakumar, Mashad Uddin Saleh, Evan Benoit, Josiah Lacombe, Michael Scarpulla, Cynthia Furse, “Fault Detection In PV Strings Using SSTDR,” IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, Boston, MA, 2018.
46. Mashad Uddin Saleh, Naveen Kumar Tumkur Jayakumar, Josiah Lacombe, Evan Benoit, Cynthia Furse, Mike Scarpulla, 'Modeling SSTDR Localization of Faults in PV Strings: Constructing a Frequency-Dependent Model of Signal Propagation', 2018 NREL Photovoltaic Reliability Workshop (PVRW). 3rd place student paper prize.
47. Hossein Mehrpour Bernety, David Schurig, and Cynthia Furse, “Field Focusing with Novel Implantable Lens Designs using 3D Printing,” IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, Boston, MA, 2018.
48. Andrew Chrysler, Kaitlin Hall, Huanan Zhang, Cynthia Furse, “Towards a Tattooed Antenna,“ IEEE Microwave Theory and Techniques Symposium, Honolulu, Hawaii, 2017.
49. Frank Curry Jr., Andrew Chrysler, Cynthia Furse, Huanan Zhang, “Gold Nanocomposite for Subdermal Antenna,” AIChE Annual Meeting, Oct 29-Nov 3, 2017, Minneapolis, MN
50. Kaitlin Hall, Andrew Chrysler, Cynthia Furse, “A Comparison of Solid, Mesh, and Segmented Broad Dipoles in Biological Environments,” 2017 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting in San Diego, CA, July 9-14, 2017
51. Andrew Chrysler, Cynthia Furse, Rainee Simons, Felix Miranda, “A Ka-Band (26 GHz) Circularly Polarized 2x2 Microstrip Patch Sub-Array with Compact Feed,” 2017 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting in San Diego, CA, July 9-14, 2017
52. Cynthia Furse, Donna Ziegenfuss, “Training Teachers to Teach Flipped,” American Academy of Arts and Sciences: *Envisioning the Future of Undergraduate STEM Education: Research and Practice,* April 27-29, 2016 in Washington, DC.
53. Andrew Chrysler, Cynthia Furse, Youchung Chung, “Biocompatible, Implantable UHF RFID Antenna Made from Conductive Ink, 2016 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting in Fajardo, Puerto Rico, June 26 - July 1, 2016.
54. Richard Allred, Barry Katz, Cynthia Furse, “Ripple analysis: Identify and quantify reflective interference through ISI decomposition,” 2016 IEEE 20th Workshop on Signal and Power Integrity (SPI)
55. (invited keynote) C. Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ Utah State University Empowering Teaching Excellence Conference, Aug. 19, 2015
56. (invited keynote Donna Ziegenfuss, Cynthia Furse, ‘Transforming Teaching Practice: A MOOC Experience ,’ InstructureCon 2015, Park City, Utah, June 16-19, 2015
57. ) C. Furse, ‘What My Students Have Taught Me,’ University of Utah Annual Teaching Workshop, Aug. 17, 2015
58. Panelist, Blended Learning: What Works & What Doesn’t, ECE Department Heads Association, March 16, 2015, Charleston, SC
59. Cynthia Furse, (invited keynote), Flipping Teaching & Learning, Symposium on Emerging Technology Trends in Higher Education, Feb. 27, 2015, Salt Lake City <http://stream.lib.utah.edu/index.php?c=details&id=10301>
60. Donna Ziegenfuss, Cynthia Furse, ‘Co-Flipped Teaching: Experiences Sharing the Flipped Classroom,’ 2015 IEEE International Symposium on Antennas and Propagation and USNC-URSI National Radio Science Meeting in Vancouver, BC, July 19-25, 2015
61. Cynthia Furse, (invited keynote) 'A Busy Professors Guide to Sanely Flipping Your Classroom', IEEE AP-S Workshop on EM Education, Dec. 5, 2014, Taiwan
62. Panelist: New Teaching Methods, 2014 Engineering Dean's Institute (EDI) Annual Conference, Scottsdale, AZ, April 7,2014
63. Panelist: New Teaching Methods, NI Week 2014 , August 4, 2014 Austin, TX
64. Miguel Rodriguez, Cynthia Furse, Steve Blair, Jennifer Shumaker-Parry, ’Scaling the Response of Nanocrescent Antennas into the Ultraviolet,’ 2014 IEEE International Symposium on Antennas and Propagation and USNC-URSI National Radio Science Meeting in Memphis, Tennessee, USA, July 6-12, 2014
65. Bach Nguyen, Cynthia Furse, Jamesina Simpson, ‘Analysis of Electromagnetic Field Variability in Magnetized Ionosphere Plasma using the Stochastic FDTD Method," 2014 IEEE International Symposium on Antennas and Propagation and USNC-URSI National Radio Science Meeting in Memphis, Tennessee, USA, July 6-12, 2014
66. (Invited Keynote) Cynthia Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ Rensselaer Polytechnic University, *14th Annual RPI Colloquium on Teaching and Learning, April 9, 2014.*
67. (Invited Keynote) Cynthia Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ University of Hawaii, Manoa, Oct 16, 2013
68. (Invited Keynote) Cynthia Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ University of Utah Faculty Showcase, Sept. 23, 2013
69. (Invited Keynote) Cynthia Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ Salt Lake Community College, Sept. 2013
70. (Invited Keynote) Cynthia Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ University of Wisconsin, Platteville, June 26, 2014
71. Cynthia Furse, Donna Ziegenfuss, Stacy Bamberg, ‘Learning to Teach in the Flipped Classroom,’ 2014 IEEE International Symposium on Antennas and Propagation and USNC-URSI National Radio Science Meeting in Memphis, Tennessee, USA, July 6-12, 2014
72. Donna Ziegenfuss, Cynthia Furse, Stacy Bamberg,’ Using a MOOC as a Faculty Development Tool and/or Learning Community for STEM Faculty Teaching Flipped Classes,’ MOOCs in STEM: Exploring New Educational Technologies, San Jose State University, June 6, 2014 <https://www.slideserve.com/vance/dr-donna-harp-ziegenfuss-dr-cynthia-furse-dr-stacy-bamberg-donna-ziegenfuss-utah>
73. Steve Smith, Cynthia Furse, ‘A Tutorial on Stochastic FDTD,’ 2014 IEEE International Symposium on Antennas and Propagation and USNC-URSI National Radio Science Meeting in Memphis, Tennessee, USA, July 6-12, 2014
74. Cynthia Furse, Andrew Chrysler, ‘A History & Future of Implantable Antennas, 2014 IEEE International Symposium on Antennas and Propagation and USNC-URSI National Radio Science Meeting in Memphis, Tennessee, USA, July 6-12, 2014
75. Karen Krapcho, C.Furse, 'Lessons Learned Developing an Engaging Engineering Summer Camp,' 2014 ASEE Annual Conference
76. Cynthia Furse, ‘A Busy Professor’s Guide to Sanely Flipping Your Classroom,’ 2013 IEEE AP-S International Symposium on Antennas and Propagation and 2012 USNC/CNC/URSI Meeting in Lake Buena Vista, FLA, July 7-12, 2013
77. Cynthia Furse, “Teaching the World-Changers,” TEDx-CSDT Teachers, Dec. 3, 2013 <https://www.youtube.com/watch?v=ks9pEtnmfzE>
78. Miguel Rodriguez, Robert Franklin, Cynthia Furse, ‘'Manufacturing Considerations for Implantable Antennas,’ to 2013 IEEE AP-S International Symposium on Antennas and Propagation and 2012 USNC/CNC/URSI Meeting in Lake Buena Vista, FLA, July 7-12, 2013
79. Elene T. Iskander, Paul Gore, Amy Bergerson, Cynthia Furse, ‘'Gender Disparity in Engineering: Results and Analysis from School Counselors Survey and National Vignette,’ 2013 IEEE AP-S International Symposium on Antennas and Propagation Lake Buena Vista, FLA, July 7-12, 2013
80. Lucas Thomson, Brian Jones, James Stephenson, Cynthia Furse, ‘Non-Contact Connections for Reflectometry and Location of Faults in Cable Shields,’ 2012 Aircraft Airworthiness and Sustainability Conference, April 2-5, 2012, Baltimore, MD
81. Bryan Willis, Cynthia Furse, ‘A Look at the Future of Printed Antennas, 2012 IEEE AP-S International Symposium on Antennas and Propagation and 2012 USNC/CNC/URSI Meeting in Chicago, Illinois, July 8-14, 2012
82. Lucas Thomson, Brian Jones, Cynthia Furse, ‘Locating Small Apertures in Cable Shielding,’ 2012 IEEE AP-S International Symposium on Antennas and Propagation and 2012 USNC/CNC/URSI Meeting in Chicago, Illinois, July 8-14, 2012
83. Elene T. Iskander, Paul Gore, Amy Bergerson, Cynthia Furse, ‘Gender Disparity in Engineering: Results and Analysis from School Counselors Survey and National Vignette,’ 2012 IEEE AP-S International Symposium on Antennas and Propagation and 2012 USNC/CNC/URSI Meeting in Chicago, Illinois, July 8-14, 2012
84. Amy Bergerson, Brian K. Hodgkins, Cynthia Furse, ‘Outreach and Identity Development: New Perspectives on College Student Persistence, Association for the Study of Higher Education, November 2011, Charlotte, North Carolina
85. David Richerson, Amy Bergerson, Cynthia Furse, “University Partnership with High School Teachers to Increase Student Awareness of Engineering,” ASEE Annual Conference, 2011
86. Tursunjan Yasin, Reyhan Baktur, Cynthia Furse, ‘A Comparative Study on Two Types of Transparent Antenna,’ 30th URSI General Assembly, Aug 13-20, 2011, Istanbul, Turkey
87. Sai Ananthanarayanan P.R., Cynthia Furse, ‘Antenna Optimization for Vehicular Environments,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and 2010 USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
88. Tursunjan Yasin, Reyhan. Baktur, Cynthia Furse,’A Study on the Efficiency of Transparent Antennas Designed from Conductive Oxide Films,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
89. Alyssa Magleby Richards, Sai Ananthanarayanan P.R., Cynthia Furse, ‘Vehicular Channel Measurement and Modeling for Multi--Antenna Communication,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
90. Brian Jones, Cynthia Furse, ‘Leaky Fields from Damaged Shields,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
91. Bryan Willis, S. Ananathanarayanan P.R., Cynthia Furse, ‘Small Antenna Design Using 3D Rapid Prototyping,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
92. David J. Lubbers, Kenneth Golden, Joyce Lin, Cynthia Furse, ‘Electrical Measurements of Sea-Ice Cores,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
93. Eric Lundquist, Cynthia Furse, ‘Novel Inverse Methods for Wire Fault Detection and Diagnosis,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
94. Jason Carter, Nate Thronton, Sai Ananthanarayanan P.R., Cynthia Furse, ‘Development of Tri-Band Antennas for Use in Body Centric Networks, 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
95. Steven M. SmithCynthia Furse, ‘A Stochastic FDTD Method for Statistically Varying Biological Tissues,’ 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
96. Elene T. Iskander, Cynthia Furse, ‘Women in Engineering: Statistical Analysis of ACT Data and Proposed Procedure to Reverse Trend, 2011 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Spokane, WA July 4-8, 2011
97. Eric Lundquist, Shang Wu, Brian Jones, Cynthia Furse, C. Lo, ‘Aging Wire Fault Diagnosis Using Faster, Higher-Precision Methods, 2011 Aircraft Airworthiness and Sustainability Conference, April 18-21, 2011, SanDiego, CA
98. Jason Saberin, Cynthia Furse, “Passive Feed Methods for Meshed Antennas,” 2010 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Toronto, ON, Canada, July 11-17, 2010
99. Jason Saberin, Cynthia Furse, Tursunjan Yasin, Reyhan Baktur, “Challenges with Optically Transparent Patch Antennas for Small Satellites,” 2010 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Toronto, ON, Canada, July 11-17, 2010
100. Sai Ananthanarayanan, D. Ferguson, Cynthia Furse, “2.5 GHz Microwave Thermal Ablation for Performing Thermosensitive Polymer-Chemotherapy for Cancer,” 2010 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Toronto, ON, Canada, July 11-17, 2010
101. Sai Ananthanarayanan, Alyssa Magleby, Cynthia Furse, “Measurement and Modeling of Noise and Interference in Aircraft System,” 2010 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Toronto, ON, Canada, July 11-17, 2010
102. Jason Carter, Jason Saberin, Tejal Shah, Sai Ananthanarayanan, Cynthia Furse, “Inexpensive Fabric Antenna for off-Body Wireless Sensor Communication,” 2010 IEEE AP-S International Symposium on Antennas and Propagation and USNC/CNC/URSI Meeting in Toronto, ON, Canada, July 11-17, 2010
103. Tursunjan Yasin, Reyhan Baktur, Jason Saberin, Cynthia Furse, “Inkjet-Printed Transparent Antennas Integrated on Solar Cells,” 24th Annual AIAA/USU Conference on Small Satellites, August 2010
104. Peruvemba R. Sai A, James Nagel, Alyssa Magleby, Cynthia Furse, “Wireless and Surface Wave Communication for Aircraft Sensor Networks,” 2010 Aircraft Airworthiness and Sustainment (AA&S) Conference, May 10-13, 2010, Austin, TX
105. Cynthia Furse, Chet Lo, Kevin Wheeler, “Fast, Modular Wire Simulation Tools to Better Understand Small Wire Faults,” 2010 Aircraft Airworthiness and Sustainment (AA&S) Conference, May 10-13, 2010, Austin, TX
106. James Nagel, Alyssa Magleby, Sai Ananthanarayanan, Cynthia Furse, “Measured Multi-User MIMO Capacity in Aircraft,” AMTA Symposium, Salt Lake City, Utah 2010
107. T. Turpin, M. Mahmoud, R. Baktur, C. Furse, “Integrated After-Market Solar Panel Antennas for Small Satellites,” 23rd Annual AIAA/USU Conference on Small Satellites, August 2009
108. Elene Tiffany Iskander, Paul A. Gore, Cynthia Furse, “Gender differences in expressed interests in engineering-related fields over a 30-year span,” 2009 ASEE Annual Conference and Exposition, June 14-17, 2009 Austin, TX
109. Amy Aldous Bergerson, Cynthia Furse, “Work on Progress: Outreach and Retention in the University of Utah’s Engineering Programs,” Frontiers in Education, San Antonio, TX, Oct 18-21, 2009
110. Alyssa Magleby, Cynthia Furse, Z. Q. Yun, “3D Ray Tracing for Intravehicle MIMO,” IEEE /URSI Antennas and Propagation Symposium, Charleston, SC, June 1-5, 2009
111. Peruvemba R. Sai A, Cynthia Furse, “Enabling Wireless Communication in Aircraft Using Multiple Antenna Systems,” IEEE /URSI Antennas and Propagation Symposium, Charleston, SC, June 1-5, 2009
112. Timothy W. Turpin, Reyhan Baktur, Mike Scarpulla, Gene Siegel, Jason Saberin, and Cynthia Furse, “Surface Mounted Antennas for Commercial Solar Cells,” IEEE /URSI Antennas and Propagation Symposium, Charleston, SC, June 1-5, 2009
113. Peruvemba R. Sai A, Alyssa Magleby, James R. Nagel, Cynthia Furse, “MIMO Wireless Communication for Aircraft Sensors,” 12th Joint FAA/DOD/NASA Conference on Aging Aircraft, Kansas City Convention Center, May 04 - May 07, 2009
114. (invited keynote presentation) Cynthia Furse, “Biomedical telemetry: today’s opportunities and challenges,” 2009 IEEE Workshop on Antenna Technology – Small Antennas and Novel Metamaterials, March 2-6, 2009, Santa Monica, California
115. James Stephenson, Cynthia Furse, “Table Top Micro Fluidic Nuclear Magnetic Resonance Spectrometer,” XXIX General Assembly of URSI, Chicago, Ill, August 11-15, 2008
116. (Invited Presentation) C. Furse, “Utah’s Engineers – A Statewide Initiative for Growth,” ECEDHA meeting, March 2008, San Diego, CA
117. E. Tiffany Iskander, Paul A. Gore, Jr, Cynthia Furse, “Historical trends in the expressed and measured engineering-related interests of college bound youth: Comparison across Genders, “2009 ASEE Annual Conference & Exposition, Austin, TX, June 14-17, 2009
118. (Keynote Presentation) Cynthia Furse, “Aging Aircraft Wiring – Locating Hidden Hazards,” International Conference on Computers and Communication Systems, Daegu University, Korea, Nov. 7, 2008
119. Amy Bergerson, “Work in Progress: Utah’s Engineers – a Statewide Initiative for Growth,” Frontiers in Education Conference, Saratoga Springs, NY, Oct 22-25, 2008
120. C. Furse, et al., “How Many Engineers Does It Take?”, 2008 ASEE Annual Conference & Exposition in Pittsburgh, Pennsylvania, June 22-25, 2008.
121. Chet Lo, Cynthia Furse, “Use of InSitu Sensors for Wire Fault Prognostics,” Joint FAA/DOD/NASA Conference on Aging Aircraft, April 21-24, 2008, Phoenix, Arizona
122. Paul Smith, Paul Kuhn, Michael Diamond, Cynthia Furse,, Srini C. Sekar, Lynn Edmunds, Tom Kukowski, “ASIC Implementation of Live Arc Fault SSTDR Tester,” Joint FAA/DOD/NASA Conference on Aging Aircraft, April 21-24, 2008, Phoenix, Arizona
123. Cynthia Furse, Paul Smith, Paul Kuhn, “Intermittent Fault Location on Live Electrical Wiring Systems,” SAE Conference 2008
124. Alyssa Magleby, Cynthia Furse, “Predicted MIMO Performance in Intra-Vehicle Channels,” *IEEE Antennas and Propagation Symposium (APS),* SanDiego, CA, July 7-11,2008
125. David Landon, Cynthia Furse, “The MIMO Transmission Equation,” *IEEE Antennas and Propagation Symposium (APS),* SanDiego, CA, July 7-11,2008 (Honorable Mention, student paper contest)
126. Peruvemba R. Sai A, C. Furse, “System Level Analysis of Noise and Interference Analysis

for a MIMO System,” *IEEE Antennas and Propagation Symposium (APS),* SanDiego, CA, July 7-11,2008

1. Alex L. Robinson, Cynthia Furse, Paul Kuhn, Michael Diamond, “Update on LiveWire Fault Detection, “SAND Number: 2008-1695A, Sensors Workshop 2008, LLNL, Livermore, CA, April 1-2, 2008
2. Peruvemba R. Sai A, C. Furse, “Iterative Array Level Optimization of MIMO Antennas,” XXIX General Assembly of URSI, Chicago, Ill, August 11-15, 2008
3. Alyssa Magleby, Cynthia Furse, “LAB REPORT WRITING (AND TEACHING!) MADE EASY,” 2008 ASEE Annual Conference & Exposition in Pittsburgh, Pennsylvania, June 22-25, 2008.
4. (Invited paper) Jeff Johnson, Cynthia Furse, “Statistical Analysis of Detuning Effects for Implantable Microstrip Antennas,” North American Radio Science Conference
URSI-CNC/USNC organizers. July 22-26, 2007, Ottawa, Canada
5. (Invited Paper) Cynthia Furse, Reid Harrison, Florian Solzbacher, “Recent Advances in BioMedical Telemetry,” International Conference on Electromagnetics in Advanced Applications (ICEAA ‘07), Torino, Italy, September 17-21, 2007
6. Paul Smith, Cynthia Furse, Paul Kuhn, “Locating Intermittent and Static Faults in Complex Wiring Systems,” (SAE Conference) AE-8 Aerospace Electrical/Electronic Distribution Systems and the AEISS Aerospace Electrical Interconnect Systems Symposium, October 22-26, 2007, Savannah, Georgia.
7. David G. Landon, Cynthia M. Furse, “Recovering handset MIMO capacity with polarization-agile antennas*,” IEEE Antennas and Propagation Symposium (APS),* Honolulu, HI June 9-16, 2007
8. Alyssa Magleby, Cynthia Furse, “Improving Communication Skills Through Project-Based Learning, *IEEE Antennas and Propagation Symposium (APS),* Honolulu, HI June 9-16, 2007
9. Paul Smith, Michael Walz, Cynthia Furse, “Locating Electrical Faults Using a Walk-to-Fault Probe,” Joint FAA/DoD/NASA Conference on Aging Aircraft, Palm Springs, CA, April 16-19, 2007
10. Cynthia Furse, Shang Wu, Michael Diamond, David Mih, Chet Lo, Paul Smith, “Potential Prognostics for Preventative Maintenance of Electrical Wiring,” Joint FAA/DoD/NASA Conference on Aging Aircraft, Palm Springs, CA, April 16-19, 2007
11. David G. Landon, Cynthia M. Furse, “Statistical Comparison of Capacity Predictions for Realistic MIMO Channels*,” IEEE Antennas and Propagation Symposium (APS),* Albuquerque, NM, July 9-14, 2006
12. Paul Kuhn, Cynthia Furse, Paul Smith, “Locating Hidden Hazards on Electrical Wiring,” Aged Electrical Systems Research Application Symposium, October 18-19, 2006, Chicago, Illinois
13. Cynthia Furse, Brian Stenquist, Behrouz Farhang-Boroujeny, April Kedrowitz, Stephanie Richardson, “Integrated System-Level Design in Electrical Engineering,” 2006 ASEE Annual Conference & Exposition in Chicago, Illinois, June 18-22, 2006, Nominated for Best Paper Award
14. Chet Lo, Cynthia Furse, "Modeling and Simulation of Branched Wiring Network," *17th Symposium EMC-Zurich,* Singapore, March 2006
15. Roland Kempter, Cynthia Furse, Neil E. Cotter, Nick M. Safai, Lee Brinton, “On Undergraduate Education in Electrical Engineering across Colleges: Transfer Students and Challenges in Curriculum Adaptation,” Best Paper Award (International Division) 2006 ASEE Annual Conference & Exposition in Chicago, Illinois, June 18-22, 2006,
16. Rohit Verma, Cynthia Furse, “A Multidisciplinary Approach to Teaching Technology Entrepreneurship and Product Innovation to Engineering and Business Administration Students,” 2006 ASEE Annual Conference & Exposition in Chicago, Illinois, June 18-22, 2006
17. Paul Smith, Cynthia Furse, “State of the Art in LiveWire Testing,” Joint FAA/DoD/NASA Conference on Aging Aircraft, Jan 31-Feb 3, 2005, Palm Springs, CA
18. Makoto Ando, Ari Sihvola, Lotfollah Shafai and Cynthia Furse, “Commission B (Fields and Waves) International Survey about EM Education,” URSI General Assembly, New Delhi, India, Oct. 2005.
19. Sembiam Rengarajan, Lotfollah Shafai, Cynthia Furse, David Kelley, “Electromagnetics Education in North America,” URSI General Assembly, New Delhi, India, Oct. 2005.
20. Chet Lo, Kedarnath Nagoti, Arthur Mahoney, You Chung Chung, Cynthia Furse, “Detection and Mapping of Branched Wiring Networks from Reflectometry Responses,” Joint FAA/DoD/NASA Conference on Aging Aircraft, Palm Springs, CA, Jan 31-Feb 4, 2005
21. (INVITED PAPER) James Stephenson, Cynthia Furse,” Table Top Micro Fluidic Nuclear Magnetic Resonance Spectrometer,” 2006 URSI National Radio Science Meeting, Boulder, CO, Jan 4-10, 2006
22. (INVITED PAPER) Cynthia Furse, “Emerging Technologies for Live Wire Fault Location,” NAVWAG Conference, San Diego, CA, Nov. 4, 2003
23. (INVITED PAPER) Cynthia Furse, ‘Microsystems for Medicine’, 17th annual biological basis of Pediatric Practice Symposium, Sept 12-14, 2003, Deer Valley, Utah
24. (INVITED PAPER) Cynthia Furse, Sensors for Critical Fault Location on Live Aging Wiring Networks, *International Workshop on Advanced Sensors, Structural Health Monitoring, and Smart Structures*, November 10-11, 2003 at Keio University, Yokohama, Japan
25. (INVITED PAPER) Cynthia Furse, Paul Smith, Rohit Parakh, “Sensors for Wiring and Structural Cable Fault Location,” Joint US-India Workshop on Advanced Sensing Systems and Smart Structures Technologies, in cooperation with IIT Bombay, on December 20-22, 2004
26. Lance Griffiths, Youchung Chung, Cynthia Furse, “Integrated Dual Band GSM Microstrip Monopole using GA and FDTD”, IEEE APS, Wash, D.C., July 2005
27. Lance Griffiths, You Chung Chung, Cynthia Furse, “Wide and Tri-Band Microstrip LAN Antenna Design and GUI Tool Using a GA and FDTD, “International IEEE/URSI Antennas and Propagation Symposium, June 22-26, 2004, Monterey, CA
28. Pichitpong Soontornpipit, Ramadevi Bylapudi, Cynthia Furse, Youchung Chung, “Comparison of helical microstrip antennas imbedded in lossy dielectric using genetic algorithms,” International IEEE/URSI Antennas and Propagation Symposium, June 22-26, 2004, Monterey, CA
29. Farhang-Boroujeny, Behrouz, Cynthia Furse. "Robust multicarrier spread spectrum technique for data transmission over partially jammed channels." In *IEEE MILCOM 2004. Military Communications Conference, 2004.*, vol. 2, pp. 751-757. IEEE, 2004.
30. Cynthia Furse, Paul Smith, Youchung, Chet Lo, “Fault Location in Aging Aircraft Wiring Networks”, Aging Aircraft Conference, New Orleans, LA, Sept. 12-15,2003
31. S.Nagaraj, Cynthia Furse, “A Novel MAC for Sensor Networks in Aircraft,” ICNP conference 2003, "Second ACM International Workshop on Wireless Sensor Networks and Applications (WSNA '03)" is in San Diego on 19th of Sept. 2003
32. Youchung Chung, Pitchitpong Soontornpipit, Kamal Vasagiri, Rama Devi, Cynthia Furse, “Imbedded Microstrip and Helical Antennas as Sensors and Communicators: Sane Application of Genetic Algorithms,” IEEE Antennas and Propagation International Symposium, June 2003, Columbus, OH
33. Youchung Chung, Chet Lo, John Mahoney, Jeremy Pruitt, Ryan Hanks, Santi Basava, Cynthia Furse, “Non-Destructive Fault Location on Aging Aircraft Wiring Networks, Part 1 – Cost-Optimized Solutions,” IEEE Antennas and Propagation International Symposium, June 2003, Columbus, OH
34. Paul Smith, Alyssa Magelby, Deekshit Dosibhatla, Chet Lo, Cynthia Furse, Jacob Gunther, “Non-Destructive Fault Location on Aging Aircraft Wiring Networks, Part 2 – Live Wires in Flight,” *IEEE Antennas and Propagation International Symposium, June 2003, Columbus, OH*
35. Cynthia Furse, “Smart Sensors for Wiring Health Analysis,” AFRL Wiring Integrity System Characterization and Evaluation Program’s 1st Information Exchange and Workshop, Oct. 23-24, 2002, Dayton, OH
36. Jeff Ward, Charles Swenson, Cynthia Furse,” Finite Difference Time Domain Simulations of an Impedance Probe,” AGU (American Geophysical Union) in San Fransico, Dec 6-10, 2002
37. Cynthia Furse, Ruby Mohan, Arvind Jakayar, Sriram Kharidehal, Brad McCleod, Shawn Going,Lance Griffiths, Pichitpong Soontornpipit, Daniel Flamm, James Bailey, Irwan Hadi Budiman, Mark Hullinger, “A Biocompatible Antenna for Communication with Implantable Medical Devices,” IEEE Antennas and Propagation International Symposium, June 16-21, 2002, San Antonio, TX
38. Cynthia Furse, Deekshit Dosibhatla, Jacob Gunther, Paul Smith, Chet Lo, Sachin Chandra, Alyssa Magelby, “Spread Spectrum Communication Techniques Applied to Impedance Measurement,” IEEE Antennas and Propagation International Symposium, June 16-21, 2002, San Antonio, TX, Invited Paper
39. Cynthia Furse, Youchung Chung, Jeremy Pruitt, Glen Mabey, Derek Bates, Santi Basava, Chris Griffin, Mark Schmidt, Krishna Konda, Nagendra Grandhi, Rory Buchanan, Eric Cannon, Suketu Naik, Sumeeth Nagaraj, Sachin Chandra, Clark Landeen, Paul Smith, Deekshit Dosibhatla, Jake Gunther, Chet Lo, Ravi B. Gopal, Alyssa Magelby, “In Situ Analysis System for Diagnosis of Aging Aircraft Wiring,” IEEE Antennas and Propagation International Symposium, June 16-21, 2002, San Antonio, TX
40. Guy Serbin, Dani Or, Cynthia Furse, “Radar backscatter from layered wet soils with a diurnal temperature wave,” Rocky Mountain Space Grant Consortium Conference, Salt Lake City, Utah April 2001
41. Brent Waddoups, Cynthia Furse, “Analysis of Reflectometry for Detection of Chafed Aircraft Wiring Insulation,” Fifth Joint NASA/FAA/DoD Conference on Aging Aircraft, September 10-13, 2001, Orlando, FLA
42. Sean Field, Pall Arnason, “Smart Wire Technology for Aircraft Applications,” Fifth Joint NASA/FAA/DoD Conference on Aging Aircraft, September 10-13, 2001, Orlando, FLA
43. Chad Pendley, Cynthia Furse, Alan Tripp, Vinod Rayala,” Geophysical Analysis of Cross-Borehole Propagation and Reflection Using Triaxial Sources,” *IEEE Antennas and Propagation Symposium*, July 13-18, 2001, Boston, MA
44. Nitin Madan, Cynthia Furse, “Imbedded Antennas for Measurement of the Electrical Properties of Materials,” *IEEE Antennas and Propagation Symposium*, July 13-18, 2001, Boston, MA
45. Cynthia Furse, Ruby Mohan, Arvind Jakayar, Sriram Kharidehal, Brad McCleod, Shawn Going, “A Biocompatible Antenna for Communication with Implantable Medical Devices,” *IEEE Antennas and Propagation Symposium*, July 13-18, 2001, Boston, MA
46. Jeff Ward, Cynthia Furse, Charles Swenson, “FDTD analysis of microstrip antennas immersed in anisotropic space plasma,” *IEEE Antennas and Propagation Symposium*, July 13-18, 2001, Boston, MA
47. Brent Waddoups, Cynthia Furse, “Detection of Chafed Insulation in Aging Aircraft Wiring,” *IEEE Antennas and Propagation Symposium*, July 13-18, 2001, Boston, MA
48. Kenneth Blemel, Cynthia Furse, Sean Field, " Applications of Microsystems and Signal Processing for Wiring Integrity Monitoring," 2001 IEEE Aerospace Symposium held at Big Sky, Montana, March 2001
49. Cynthia Furse, Joseph Olakangil, Charles Swenson, "FDTD Analysis of a Short Dipole Immersed in Ionospheric Plasma," *IEEE Antennas and Propagation Symposium*, July 16-21, 2000, Salt Lake City, Utah
50. X. Li, K. Leininger, S.C. Hagness, and C. Furse, “FDTD Modeling of Electromagnetic Interactions with the Human Breast,” *World Congress on Medical Physics and Biomedical Engineering*, Chicago, Ill, July 23-28, 2000
51. Cynthia Furse, "Analysis of Current and Field Distributions for Electrotherapy Devices," *World Congress on Medical Physics and Biomedical Engineering*, Chicago, Ill, July 23-28, 2000
52. Charles Swenson, C. Furse, C. Fish, P. Nikitin, "Impedance Probes for Space Plasma Diagnostics," *URSI National Conference*, Boulder, CO, Jan. 5, 2000
53. C. Furse, M. Long, "Optimization of Imbedded Microstrip Antenna for Communication with Implantable Medical Devices," 8th AIAA/NASA/USAF/ISSMO Symposium on Multidisciplinary Design -- Adding Value, Sept. 6-8, 2000 Long Beach, CA
54. David Johnson, Cynthia Furse, Alan C.Tripp, "FDTD Modeling of the Borehole EM Response of a Conductive Ore Deposit in a Lossy Dielectric," Society of Exploration Geophysics International Conference, Sept. 12-15, 1998, New Orleans, LA (Also listed under international mininglinks.com data base.)
55. Jana Price, Cynthia Furse, "Making a World of Difference: A New Slide Show for Recruiting Women in Engineering", ASEE Rocky Mountain Regional Conference, Provo, Utah, April 1999
56. Candace Deffendol, Cynthia Furse, "Microstrip Antennas for Dielectric Property Measurement," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
57. Chad Fish, Cynthia Furse, "Development of New Electronics for Antenna Impedance Measurements in the Ionosphere," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
58. Cynthia Furse, David M.Johnson, Elena Cherkaeva, Alan Tripp, "Optimization Cross-borehole Prospecting Technique for Delineation of Buried Conductive Ore Deposits in a Resistive Host," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
59. C. Furse, H.K. Lai, C. Estes, A. Mahadik, A. Duncan, "An Implantable Antenna for Communication with Implantable Medical Devices," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
60. C. Furse and J. Price, "Making a World of Difference -- Recruitment of Undergraduate Students at USU," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
61. C. Furse, "Hands-on Electromagnetics -- Microstrip Circuit and Antenna Design Laboratories at USU," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
62. N. Kamdar and C. Furse, "An Inexpensive Distance Measuring System for Location of Robotic Vehicles," 1999 IEEE Antennas and Propagation/ URSI International Symposium, Orlando, FL, July 1999
63. C.M. Furse, "Faster than Fourier -- Ultra-Efficient Time-to-Frequency Domain Conversions for FDTD Applied to Bioelectromagnetic Dosimetry," The 14th Annual Review of Progress in Applied Computational Electromagnetics, ACES Symposium, Monterey, CA, March 16-20, 1998; IEEE AP-S International Symposium, June 21-25,1998, Atlanta, GA
64. O.P.Gandhi, D.Wu, Q.-S. yu, G. Lazzi, A. Tinniswood, S.S. Pattnaik, C.M. Furse, "Numerical and Experimental Methods for Determination of SAR and Radiation Patterns of Hand-held Wireless Telephones," presented at RF Dosimetry: 25 years of Progress, University of Utah, Oct. 20-21, 1997
65. A.D. Tinniswood, C.M. Furse, O.P. Gandhi, "Computations of SAR Distributions for Two Anatomically-Based Models of the Human Head Using CAD Files of Commercial Telephones and the Parallelized FDTD Code," *IEEE AP-S International Symposium and URSI Radio Science Meeting,* Montreal, Canada, July 13-18, 1997
66. J.M. Ziriax, C.M. Furse, J.A. D'Andrea, D.J. Hatcher, P.A. Mason, and O.P. Gandhi, "Comparison of FD-TD and experimentally determined local and whole-body SAR in a rhesus monkey model," The Second World Congress for Electricity and Magnetism in Biology and Medicine, June 8-13, 1997, Bologna, Italy; *Electricity and Magnetism in Biology and Medicine* (1999): 287.
67. G.Lazzi, C.M. Furse, O.P.Gandhi, "Use of the PML for Bioelectromagnetic Simulations," *IEEE AP-S International Symposium and URSI Radio Science Meeting,* Montreal, Canada, July 13-18, 1997
68. C.M. Furse, A.D. Tinniswood, O.P. Gandhi, "Conditions for Resonant Absorption in the Human Head for Plane Wave Exposure," The Second World Congress for Electricity and Magnetism in Biology and Medicine, June 8-13, 1997, Bologna, Italy
69. A.D. Tinniswood, M.Pernice, C.M. Furse, "Large-Scale Parallel Simulation of Bioelectromagnetic Interactions," Siam Conference, March 14-17, 1997, Minneapolis
70. G.Lazzi, O.P. Gandhi, C.M. Furse, "State of the Science Regarding RF Dosimetry, Measurements, and Certification," IEEE-EMC ROMA, Nov. 1996
71. G.Lazzi, C.M. Furse, O.P. Gandhi, "FDTD Computation of Electromagnetic Absorption in the Human Head for Mobile Telephones," in *Proc. Of the Eighteenth Annual Technical Meeting of the Bioelectromagnetics Society - BEMS,* pp. 118-119, 1996
72. C.M. Furse, O.P. Gandhi, "Calculation of Electric Fields and Currents Induced in a mm-Resolution Human Model with a Novel Time-to-Frequency Domain Conversion," International Bioelectromagnetic Society Conference, Victoria, Canada, June 1996; IEEE Antennas and Propagation Society Conference, Baltimore, MD, July 21-25,1996
73. C.M.Furse, G.Lazzi, O.P. Gandhi," FDTD Computation of Power Deposition in the Head for Cellular Telephones," *Proc. Of the 1996 IEEE Antennas and Propagation Society Conference*, pp. 1794-1797, Baltimore, MD, July 21-25,1996
74. Vishram Pandit, Robert McDermott, Gianluca Lazzi, Cynthia Furse and Om Gandhi "Electrical Energy Absorption in the Human Head from a Cellular telephone: Case Study",IEEE VISUALIZATION '96, San Francisco Oct 27 - Nov 1, 1996
75. C.M. Furse, O.P. Gandhi, "Subdivision of Large Models in Finite-Difference Time-Domain Simulations for Microwave Dosimetry," *Sixteenth Annual Meeting of the Bioelectromagnetics Society,* Copenhagen, Denmark, June 13-17, 1994
76. O.P. Gandhi, J.Y. Chen, C.M. Furse, Y.Cui, "A Simple Convolution Procedure for Calculating Coupling in the Human Body for EM Fields of Prescribed Time and Space Variations, 15th Annual Meeting of the Bioelectromagnetics Society, Los Angeles, CA, 1993
77. C.M. Furse, O.P. Gandhi, V. Sarvepalli, R.J. McDermott, "Video Displays of Currents Induced in the Human Body for Exposure to Ultrawideband EM Pulses," *Fifteenth Annual Meeting of the Bioelectromagnetics Society,* Los Angeles, CA, June 13-17, 1993
78. C.M. Furse, J.Y. Chen, O.P. Gandhi, "A Frequency-Dependent Finite-Difference Time-Domain Method for Induced Current Calculations for a Heterogeneous Model of the Human Body," First World Congress for Electricity and Magnetism in Biology and Medicine, Lake Buena Vista, Florida, 1992
79. C.M. Furse, S.P. Mathur, O.P. Gandhi, "Improvements to the Finite-Difference Time-Domain Method for Calculating Radar Cross Section of a Perfectly Conducting Target," *URSI* National Radio Science Meeting, Boulder, CO, Jan. 1989
80. C.M.Furse, M.F.Iskander, "Three-dimensional Electromagnetic Power Deposition in Tumors using Interstitial Antenna Arrays," *Tenth Annual Meeting of the IEEE Bioelectromagnetics Society, Stamford, CT, June 19-24, 1988*
81. M.F. Iskander, T.V. Duong, H.C. Chen, C.M.Furse, "A New Sectioning Procedure for Calculating Scattering and Absorption by Elongated Dielectric Targets," *IEEE/Ap-S International Symposium*, June 15-19, Blacksburg, VA, 1987
82. M.F. Iskander, C.M. Furse, "Utilization of Sectioning Procedure to Calculate Light Scattering by Very Long and Irregularly Shaped Aerosol Chains and Clusters," *CRDEC conference on Obscuration and Aerosol Research*, US Army, June 23-27, 1986 Aberdeen, MD, *Proc. CRDEC 1986 Scientific Conference,* R.H. Kohl, Ed.

**PATENTS**

1. U.S. Patent No. 9,476,932B2, 9244117B2, 9970977B2, Cynthia Furse, Faisal Khan, "Systems and methods for implementing S/SSTDR measurements." Oct. 25, 2016.
2. US Patent [8,269,497](https://www.google.com/patents/US8395468?dq=8395468&hl=en&sa=X&ved=0ahUKEwi-j7mg55rKAhUM7GMKHVNqAdkQ6AEIHDAA), J. Stephenson, B. Gale, C. Furse, ‘Enhanced Fill Factor NMR Coils and Associated Methods,’ Sept. 18, 2012
3. US Patent [8,279,122](https://www.google.com/patents/US8279122?dq=8,279,122&hl=en&sa=X&ved=0ahUKEwiAxJm155rKAhUI1WMKHZ9kBgMQ6AEIHDAA) B2, D. Landon, C. Furse, ‘Mobile Communications Systems and Methods Relating to Polarization-Agile Antennas,’ Oct. 2, 2012
4. US Patent [8,395,468](https://www.google.com/patents/US8395468?dq=12/159,927&hl=en&sa=X&ved=0ahUKEwiOxsHB55rKAhUS0WMKHcXvCpwQ6AEIHTAA), J.Stephenson, B. Gale, C. Furse, ‘High Field Strength Magnetic Generation System and Associated Methods,’ 2012
5. US Patent [7,634,012](https://patents.google.com/patent/US7634012B2/en), B. Farhang-Boroujeny, C. Furse, “Multicarrier spread spectrum using non-linear modification of sub-carrier bands,” Dec. 15,2009
6. US Patent [7,622,931](https://patents.google.com/patent/US7622931B2/en). S. Wu, C. Furse, C. Lo ,”Non-Contact Reflectometry System and Method,” Nov. 24, 2009
7. US Patent [7,548,071](https://patents.google.com/patent/US7548071B2/en). “Reflectometry Test System Using a Sliding Pseudo-Noise Reference,” Reid Harrison, Cynthia Furse, Chirag Sharma
8. US Patent [7,495,450](https://patents.google.com/patent/US7495450B2/en), “Device and method for detecting anomalies in a wire and related sensing method,” C. Furse, J. Mahoney, Y. C. Chung, N. N. Amarnath, Feb. 24, 2009
9. US Patent [6,868,357](https://www.google.com/patents/US6868357?dq=6,868,357&hl=en&sa=X&ved=0ahUKEwip1__l55rKAhVV52MKHTERBKAQ6AEIHDAA), "Frequency Domain reflectometry system for testing wires and cables utilizing in situ connectors, passive connectivity, cable fray detection, and live wire testing" Cynthia Furse, March 15, 2005
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11. US Patent [7,069,163](https://www.google.com/patents/US7069163?dq=7,069,163&hl=en&sa=X&ved=0ahUKEwjg9NGF6JrKAhUBSGMKHUSCDWQQ6AEIHDAA), “Digital spread spectrum methods and apparatus for testing aircraft wiring,” J. Gunther, D. Dosibhatla, C. Furse, June 27, 2006
12. US Patent [7,215,126](https://patents.google.com/patent/US7215126B2/en),  “Apparatus and method for testing a signal path from an injection point,” C. Furse, C. Lo, May 8, 2007
13. US Patent [7,271,596](https://patents.google.com/patent/US7271596B2/en). Method and System for testing a signal path having an operational signal. C Lo, C Furse, Sept. 18, 2007
14. US Patent [7,165,200](https://patents.google.com/patent/US7165200B2/en). N. Jani, C. Furse, “System and method for characterizing a signal path using a sub-chip sampler,” Jan 16, 2007
15. U.S. Patent [7,250,772](https://www.google.com/patents/US7250772?dq=7,250,772&hl=en&sa=X&ved=0ahUKEwiVqfGj6JrKAhVEy2MKHS4WABIQ6AEIHDAA), Cynthia Furse, Paul Smith, “Method and Apparatus for Characterizing a Signal Path Carrying an Operational Signal” 2007
16. U.S Patent [7,282,922](https://patents.google.com/patent/US7282922B2/en). Algorithm for Detection of Opens and Shorts of Branched Wiring Network with TDR Data, Inventors: Cynthia Furse, Chet Lo

**HONORS, AWARDS, TECHNICAL SOCIETIES:**

**2024 John G. Francis Undergraduate Mentoring Award** [**https://us.utah.edu/awards.php**](https://us.utah.edu/awards.php)

**2023** Office of Undergraduate Research OUR Mentor Award <https://our.utah.edu/awards>

**University Professorship 2023-2025** <https://us.utah.edu/faculty-resources/university-professorship.php>

**Union of Radio Scientists International (URSI)** Full member of commissions B and K

**2021 Excellence in Mentoring Award,** Electrical & Computer Engineering, UofU

**2021-2023 IEEE Antennas and Propagation Society Distinguished Lecturer**

**2020 IEEE Chen To Tai Distinguished Educator Award: “**For motivating, challenging, educating and inspiring the next generation of EM engineers through innovative teaching, hands on experiences, current research and lively participation.”

This award recognizes an individual who has given outstanding service to education in the field of antennas and propagation, and who exemplifies the special human qualities of Chen-To Tai, whose exemplary career in teaching and research represents the highest qualities of service.

**2019** [**University of Utah Distinguished Teaching Award**](https://attheu.utah.edu/facultystaff/exceptional-faculty/)

**2018 “Last Lecture” Getting an A in Life: The Interplay of Success and Failure** (Selected by the Assoc. Students of the UofU, this prestigious lecture invitation isn’t really a LAST lecture, but is supposed to impart wisdom as if it were.)

**2014-present, Member, Entrepreneurial Faculty Scholars, University of Utah**

**2017 Utah Governor’s Medal for Science and Technology**

**2017** **Pioneers of Progress Award for Scientific Achievement**

**2015 Fellow, National Academy of Inventors**

**2014 Distinguished Teaching Award,** Electrical & Computer Engineering, UofU

**2014 Utah Engineering Council (UEC) Engineering Educator of the Year**

**2013 ASUU Student Choice Award** forcontributions to the teaching profession

**2009 University of Utah Reynolds Lecturer**

**2009 Harriett B. Rigas award** (IEEE Education Society)

**2009 Women Tech Council Education Excellence**

**2003, Best of Show, Innovation Showcase**, Utah Engineering Experiment Station

**2008 College of Engineering Outstanding Teaching Award,** University of Utah

**2008 Finalist, Stoel Rives Utah Innovation Awards**, Computer and Electronics Division, LiveWire Test Labs, Inc.,

**2008 Distinguished Young Alumnus,** University of Utah Electrical and Computer Engineering Department

**2008 Fellow, Institute of Electrical and Electronic Engineers** (IEEE)

**2001 Utah State University Outstanding Faculty Employee**

**2000 Teaching Excellence of the Year**, College of Engineering, Utah State University 1998-1999 **Outstanding Teacher of the Year 1998-99** Department of Electrical and Computer Engineering, Utah State University

**Outstanding Teacher of the Year 1999-00** Department of Electrical and Computer Engineering, Utah State University

**Outstanding Advisor of the Year** 2000-01 Department of Electrical and Computer Engineering, Utah State University

**Outstanding Advisor of the Year** 2001-02 Department of Electrical and Computer Engineering, Utah State University

**Outstanding Researcher of the Year** 2000-01 Department of Electrical and Computer Engineering, Utah State University

**IEEE nominee for the Utah Engineers Council Utah Engineering Educator of the Year** 2001-2

**USU Nominee, Carnegie Professor of the Year** 2002

**Chair, Education Committee, IEEE Antennas and Propagation Society** (2003-2007 , member 2000-2003,2007-2019)

Member, Diversity, Equity and Inclusion Committee, **IEEE Antennas and Propagation Society, (2020-present)**

Member, Young Professionals Committee, **IEEE Antennas and Propagation Society, (2019-present)**

Member, IEEE Antennas and Propagation Society Administrative Committee (ADCom) 2006-2009

Chari, IEEE Antennas and Propagation Society Awards Committee (2021-present)

**Founding Editor-in-Chief, International Journal of Antennas and Propagation**, 2006-2015

**Associate Editor, IEEE Transactions on Antennas and Propagation**, 2000-2007; 2010-present

**Associate Editor, Applied Computational Electromagnetics Society Journal**, 2003-2008

**Associate Editor, IEEE Antennas and Wireless Propagation Letters** (online), 2003-2006

**Member of the Founding Editorial Board, Journal of Smart Structures and Systems**, 2004-pres

**Member, IEEE Standards Committee**, 1998-2000

**Member of Eta Kappa Nu, Tau Beta Pi, and Phi Kappa Phi honor societies**

**Member American Society for Engineering Education**

**Senior Member Society of Exploratory Geophysicists**

**Senior Member and Faculty Advisor (1997-2007), Society of Women Engineers** (USU and UofU)

**EXTERNAL SERVICE:**

2023: Reviewer for IET Microwaves, Antennas & Propagation, IEEE Antennas and Propagation Symposium

**TEACHING:**

I teach/have taught Introduction to Electromagnetics, Wireless Communication, Antennas, Microwave Engineering, Business & Engineering, and Introduction to Electrical & Computer Engineering. These courses, including notes, video lectures, etc. are open publicly on my website [www.ece.utah.edu/~cfurse](http://www.ece.utah.edu/~cfurse) . I have been a pioneer in the teaching ‘flipped’ movement since 2007 and have also mentored numerous faculty both locally and internationally to help them teach this way. We have now converted that material to “hybrid-flexible” (hyflex), where students can attend in person or by zoom, as their situation warrants. See [www.teach-flip.utah.edu](http://www.teach-flip.utah.edu) and [www.teach-hyflex.utah.edu](http://www.teach-hyflex.utah.edu)

I have served as the major advisor for 224 undergraduate students doing their capstone design or other research projects in EM, and 6 high school students, including one exceptional young woman who won the Intel International Science Fair with an EM project. Most of these students were working directly with her research group on their capstone projects, and many have participated in publications and major demos for the sponsors. She has also supported, mentored, and graduated 64 master’s students and 23 PhDs as chair of their thesis/dissertation committee.