Deanna M. **Sessions**

Electrical Engineer · Electromagnetics PhD Student

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Education

Pennsylvania State University — *State College, Pennsylvania*

Ph.D in Electrical Engineering - *In Progress* — *Aug. 2018 - Present*

Specialization in Applied Electromagnetics

Research Advisor: Dr. Gregory Huff

Pennsylvania State University — *State College, Pennsylvania*

Master of Science in Electrical Engineering - December 2019 — *Aug. 2018 - Dec. 2019*

Thesis Topic: *Leveraging Data-Science to Characterize Additively Manufactured Electromagnetic Components*

Thesis Advisor: Dr. Gregory Huff

Texas A&M University — *College Station, Texas*

Graduate Student in Electrical Engineeering - *Transfer* — *Jan. 2017 - Aug. 2018*

Began Ph.D at Texas A&M prior to transferring to Penn State

Texas A&M University — *College Station, Texas*

Bachelor of Science in Electrical Engineering - December 2016 — *Aug. 2012 - Dec. 2016*

Specialization: Electromagnetics & Microwaves, Sub-specializations: Optics, Digital Communication, Nanofabrication

Minors: Physics, Mathematics

Skills

Design & Fabrication	Antenna design and fabrication, additive manufacturing, printed circuit boards
Software	Ansys HFSS, Keysight ADS, CST Microwave Studio, SENTRi, CUBIT, KiCAD, EagleCAD, SolidWorks, COMSOL
Equipment	Anechoic Chambers, Vector Network Analyzers, Spectrum Analyzers, Signal Generators
Programming	Machine Learning (TensorFlow, Keras), Python, Julia, MATLAB, LaTeX
Testing Standards	Electromagnetic Interference: RTCA/DO-160G, MIL-STD-461, MIL-STD-464

Research

Huff Research Group - Penn State University — *State College, PA*

Electrical Engineering Graduate Research Assistant — *Aug. 2018 - Present*

Graduate Research Assistant in Electromagnetics & Microwaves under the advisement of Dr. Gregory Huff

- Electromagnetics PhD student specializing in origami-inspired reconfigurable structures, additive manufacturing, and machine learning
- Design, fabricate, and test novel electromagnetic structures including frequency selective surfaces, antennas, and antenna arrays

Air Force Research Laboratory / UES Inc. — *Dayton, OH*

Electrical Engineering Graduate Student Researcher — *Jun. 2017 - Aug. 2019*

Origami and Machine Learning / Topology Optimization Team in the Soft Matter & Materials group of the Materials and Manufacturing Directorate under the direction of Dr. Philip Buskohl

- *May 2019 - Aug. 2019 - High Performance Computing Internship Program* - Direct-write additive manufacturing defect detection and classification in EM elements using machine learning algorithms and neural nets to link defects to RF performance
- *Jun. 2018 - Aug. 2018 - Minority Leadership Program* - Electromagnetics specialist in Origami-inspired antennas and frequency selective surfaces
- *Jun. 2017 - Aug. 2017 - High Performance Computing Internship Program* - Simulate Origami FSS models in HFSS, SENTRi, and COMSOL

Huff Research Group - Texas A&M University — *College Station, TX*

Electrical Engineering Student Researcher (Undergraduate and Graduate) — *May 2013 - Aug. 2018*

Student researcher in Electromagnetics & Microwaves under the advisement of Dr. Gregory Huff

- *2013-2018* - Specialize in the design and testing of reconfigurable electromagnetic structures
- *2015-2018* - Collaborative effort with the Air Force Research Lab designing and testing reconfigurable frequency selective surfaces and antenna arrays utilizing origami folds for surface configuration
- *2015-2018* - Additive manufacturing of reconfigurable electromagnetic components
- *2017-2018* - Phased array consultant for 5G communication systems
- *2013-2015* - 3-D random volumetric antenna array design and fabrication
- *2013-2014* - Unmanned aerial vehicle (UAV) design and fabrication using antenna components as structural elements
- *2013-2016* - Antenna mount design and fabrication using additive manufacturing
- *2013* - Quad-ridged horn antenna design

AggiE-Challenge - Texas A&M University *College Station, TX*

Research Team Leader *Aug. 2013 - Dec. 2016*

Interdisciplinary undergraduate research team under the advisement of Dr. Gregory Huff and Dr. Jean-Francois Chamberland

- *Aug. 2015 - Dec. 2016* - Water monitoring system collecting real time water quality and consumption data
- *Aug. 2014 - May 2015* - River data collection buoy collecting environmental data and map riverbed
- *Aug. 2013 - May 2014* - Biologically inspired autonomous underwater vehicle for low power deep-sea pipeline monitoring

Work Experience

Texas A&M University *College Station, TX*

Electrical Engineering Senior Capstone Teaching Assistant *Jan. 2017 - May 2017*

- Assisted and mentored senior Electrical and Computer engineering teams with senior capstone projects
- Assisted in design, fabrication, and validation of each group project, graded technical reports, and provided feedback on presentations

Texas A&M University AVSI *College Station, TX*

Electrical Engineering Consultant *Nov. 2016 - May 2017*

- Assisted in testing WAIC signal effects on radio altimeters for the TAMU aerospace department using Huff Research Group lab equipment

Ion Beam Applications (IBA) *Oklahoma City, OK*

Electrical Engineering Senior Intern *May 2016 - Aug. 2016*

- Worked with a proton therapy cancer treatment system including the calibration and maintenance of cyclotron machinery

L3 Mission Integration *Greenville, TX*

Electrical Engineering Senior Co-op *May 2015 - Jan. 2016*

- Tested for electromagnetic effects on military aircraft and the communications equipment
- Worked in an anechoic chamber for equipment testing with environmental testing standards
- Led multiple aircraft tests for interference monitoring

Memberships

IEEE *USA*

Member *Aug. 2013 - Present*

Applied Computational Electromagnetics Society (ACES) *USA*

Member *Apr. 2019 - Present*

D3EM (Data-Enabled Design and Discovery of Energy Materials) - Texas A&M University *College Station, TX*

Member *Aug. 2017 - Aug. 2018*

- Interdisciplinary academic group combining Material Science and Mechanical Engineering to design new materials, funded by AFOSR

Honors & Awards

2019	**Recipient** - High Performance Computing grant through the Air Force Research Laboratory	*Dayton, OH*
2018	**Recipient** - Milton P. Bloom Memorial Graduate Fellowship	*State College, PA*
2018	**Recipient** - Minority Leadership Program through the Air Force Research Laboratory	*College Station, TX*
2017	**Recipient** - Minority Leadership Program through the Air Force Research Laboratory	*College Station, TX*
2017	**Recipient** - High Performance Computing grant through the Air Force Research Laboratory	*Dayton, OH*
2016	**Finalist** - Texas A&M Electrical and Computer Engineering Senior Capstone Competition	*College Station, TX*

Conferences

2019 Antenna Applications Symposium - Monticello, IL - *A Multi-Domain Data Science Analysis for the Classification of Additive Manufactured Frequency Selective Surface Elements* (presentation)

2019 Applied Computational Electromagnetics Society (ACES) - Miami, FL - *Coupled Structural-Electromagnetic Analysis of Origami-Inspired Adaptive Structures* (presentation)

2018 Antenna Applications Symposium - Monticello, IL - *Coupled Structural-Electromagnetic Analysis of Embedded Electromagnetic Devices on Origami-Inspired Adaptive Structures* (presentation) and *Direct-Write Print Resolution's Effect on RF Performance* (presentation)

2018 AP-S/URSI - Boston, MA - *Computer Vision Image Analysis for Defect Detection and Material Characterization of Additively Manufactured Electromagnetic Components* (poster), *Folding, Tessellation, and Deployment of an Origami Inspired Active-Material-Enabled Self Folding Reflector Antenna* (author), and *An Origami Inspired Circularly-Polarized Folding Patch Antenna Array* (author)

2018 GOMACTech - Miami, FL - *Beamforming and Reconfiguration of Structurally Embedded Vascular Antenna Array (SEVA2) in both Multilayer and Complex Curved Composite* (poster)

2018 URSI National Radio Science Meeting - Boulder, CO - *Origami-Inspired Frequency Selective Surface* (presentation)

2017 AP-S/URSI - San Diego, CA - *Physical Reconfiguration of an Origami-Inspired Deployable Microstrip Patch Antenna Array* (poster)

2015 TAMU TEES Conference - Austin, TX - Presentation and demonstration of river data collection project to Texas Legislature

Publications

Journal Articles

Accepted - F. Espinal, G. Huff, S. Pallampati, D. Sessions, K. Fuchi, G. Bazzan, S. Seiler, P. Buskohl, A. Cook, A. Gillman, "A Circularly-Polarised Origami-Inspired Folding Patch Antenna Sub-Array," *IET Microwaves, Antennas & Propagation*, 2020.

D. Sessions, A. Cook, K. Fuchi, A. Gillman, G. Huff and P. Buskohl, "Origami-Inspired Frequency Selective Surface with Fixed Frequency Response under Folding," *Sensors*, Iss. 21, Vol. 19, Nov. 2019.

D. Sessions, K. Fuchi, S. Pallampati, D. Grayson, S. Seiler, G. Bazzan, G. Reich, P. Buskohl and G. Huff, "Investigation of Fold-Dependent Behavior in an Origami-Inspired FSS Under Normal Incidence," *Progress In Electromagnetics Research M*, Vol. 63, 131-139, Jan. 2018.

Conference Proceedings

Submitted - D. Sessions, A. Gillman, K. Fuchi, A. Cook, G. Huff and P. Buskohl, "A Data-Science Approach for Defect Detection in Additive Manufactured Electromagnetic Components," *2020 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Montreal, QC, 2020.

D. Sessions, A. Gillman, K. Fuchi, A. Cook, G. Huff and P. Buskohl, "A Multi-Domain Data Science Analysis for the Classification of Additive Manufactured Frequency Selective Surface Elements," *2019 Antenna Applications Symposium*, Monticello, IL, 2019.

D. Sessions, A. Gillman, A. Cook, K. Fuchi, G. Huff and P. Buskohl, "Leveraging Data Science to Characterize Additively Manufactured Electromagnetic Components," *2019 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Atlanta, GA, 2019.

K. Fuchi, D. Sessions, A. Gillman, P. Buskohl, A. Pankonien and G. Huff, "From Paper Cranes to New Tech Gains: Frequency Tuning through Origami Folding," *177th Meeting of the Acoustical Society of America*, Louisville, KY, 2019.

D. Sessions, G. Huff, J. Ruff, K. Fuchi, A. Cook, A. Gillman, A. Pankonien and P. Buskohl, "Coupled Structural-Electromagnetic Analysis of Origami-Inspired Adaptive Structures," *2019 ACES*, Miami, FL, 2019.

D. Sessions and G. Huff, "Advancements in Deployable Structures for Shielding and Absorption," *2019 CAPCON*, 2019.

D. Sessions, J. Ruff, K. Fuchi, A. Cook, A. Gillman, A. Pankonien, P. Buskohl and G. Huff, "Coupled Structural-Electromagnetic Analysis of Embedded Electromagnetic Devices on Origami-Inspired Adaptive Structures," *2018 Antenna Applications Symposium*, Monticello, IL, 2018.

A. Cook, D. Sessions, A. Gillman, K. Fuchi, A. Pankonien, G. Huff and P. Buskohl, "Image Analysis and Measurement of Printed Spiral FSS," *2018 Antenna Applications Symposium*, Monticello, IL, 2018.

D. Sessions, S. Jape, E. Peraza-Hernandez, J. Ruff, B. Borges, F. Espinal, G. Huff, D. Lagoudas and D. Hartl, "Folding, Tessellation, and Deployment of an Origami Inspired Active-Material-Enabled Self Folding Reflector Antenna," *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018.

D. Sessions, A. Cook, K. Fuchi, J. Ruff, P. Buskohl and G. Huff, "Computer Vision Image Analysis for Defect Detection and Material Characterization of Additively Manufactured Electromagnetic Components," *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018.

S. Seiler, G. Bazzan, K. Fuchi, E. Alanyak, A. Gillman, G. Alexander, A. Cook, P. Buskohl, S. Pallampati, F. Espinal, D. Sessions and G. Huff, "An Origami Inspired Circularly-Polarized Folding Patch Antenna Array," *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018.

D. Sessions, G. Huff, P. Buskohl and K. Fuchi, "Origami-Inspired Frequency Selective Surface," *2018 USNC-URSI National Radio Science Meeting*, Boulder, CO, 2018.

S. Seiler, G. Bazzan, K. Fuchi, E. Alanyak, A. Gillman, G. Reich, P. Buskohl, S. Pallampati, D. Sessions, D. Grayson and G. Huff, "Physical reconfiguration of an origami-inspired deployable microstrip patch antenna array," *2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, San Diego, CA, 2017, pp. 2359-2360.