Austin R.J. Downey

Curriculum Vitae

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Professional Academic Experience

2018 - present **Assistant Professor**, Department of Mechanical Engineering, University of South Carolina, Columbia, South Carolina.

June - August 2020 **Visiting Faculty**, Naval Surface Warfare Center, United States Navy, Carderock, Potomac Maryland.

May - July 2019 **Summer Faculty Fellow**, Air Force Research Laboratory, United States Air Force, Eglin Air Force Base, Valparaiso, Florida.

2014 - 2018 **Graduate Research Assistant**, major advisors: Chao Hu and Simon Laflamme Departments of Mechanical Engineering and Civil, Construction & Environmental Engineering, Iowa State University, Ames, Iowa.

2013 - 2014 **Undergraduate Research Assistant**, major advisor: Simon Laflamme Department of Civil, Construction & Environmental Engineering, Iowa State University, Ames, Iowa.

Education

2014 - 2018 **Ph.D.**, from the departments of Mechanical and Aerospace Engineering with Dual Majors in Wind Energy Science, Engineering, & Policy and Engineering Mechanics, Iowa State University, Ames, Iowa.

2009 - 2014 **B.S.**, Civil Engineering, Iowa State University, Ames, Iowa.

2006 - 2007 **T.C.**, Industrial Mechanics, Iowa Central Community College, Fort Dodge, Iowa.

Curriculum Vitae Statistics

Publications Citations 677, h-index 18, i10-index 18, total publications 71.

Funding Over $6,500,000 in total funding with over $1,250,000 as PI.

Students 7 current Ph.D and 6 current M.S; 1 graduated M.S.

Non-Academic Experience

2015 - Present **President**, Infrastructure and Environmental Systems Support (IESS) LLC, Ankeny, Iowa.

2014 Field Engineer, Kotzebue Electric Association, Kotzebue, Alaska.

2009 - 2014 **Owner**, Texas Imports DBA, Ames, Iowa.

2008 - 2009 **Industrial Mechanic**, Mitchell Transmission, Huxley, Iowa.

2006 - 2009 **Industrial Mechanic**, Hidden Acres, Dayton, Iowa.

Security Clearance

2020 - Present **T3-Secret**, Sponsored by Technology Management Training Group Inc. for my Visiting Faculty position at Naval Surface Warfare Center Carderock division in 2020.

Visiting Scholarship

May - July 2020 **Naval Surface Warfare Center (NSWC) Carderock**, Investigated multi-timescale model updating for ship structures subjected to fatigue (long timescale) and impact (short timescale).

May - July 2019 **Air Force Research Laboratory (AFRL) Munitions Directorate**, Developed algorithms and methodologies for microsecond model updating for structures operating in ballistic environments.

June 2018 **Air Force Research Laboratory (AFRL) Munitions Directorate**, Investigated the implementation of real-time modeling techniques for the state-estimation of structures experience high-rate dynamics.

June - Aug. 2017 **University of Perugia**, Collaborated on the development and modeling of a clay brick doped with nanoparticles to form a new class of embedded sensors for structural health monitoring, fully funded by the Italian Ministry of Education, University and Research (MIUR).

July - Dec. 2016 **University of Perugia**, Collaborated on the development of data-driven algorithms for damage detection in wind turbine blades, and model-based approaches for damage detection in conductive concrete, fully funded by the NSF through IGERT.

May 2015 **University of Perugia**, Developed testing procedures and protocols for a new class of nanocomposite cement-based sensors for structural health monitoring.

Licensure

2014 **Engineer Intern**, #19091, State of Iowa.

Grants and Contracts

[13] **University of South Carolina**, "ASPIRE II: A Rapid Response System for the Assessment and Prediction of Contaminant Dispersion in Wet-Weather Emergencies", July 2021 - December 2022, $100,000 PI: Jasim Imran; Co-PIs Austin Downey, Nikolaos Vitzilaios, Mohammed Baalousha, Erfan Goharian.

[12] **Air Force Office of Scientific Research**, "2021 YIP: Real-time Model Updating for Structures in Shock Environments", May 2021 - May 2024, $450,000 PI: Austin Downey.

[11] **NASA EPSCoR South Carolina**, "Mini-REAP 2020: Towards Real-time Online Validation of Additively Manufactured Metallic Components", October 2020 - April 2021, $9,979 PI: Lang Yuan; Co-PI Austin Downey.

[10] **National Science Foundation**, "Collaborative Research:SHF:Medium:Machine Learning on the Edge for Real-Time Microsecond State Estimation of High-Rate Dynamic Events", August 2020 - July 2024, $690,248, PI: Jason Bakos; Co-PI: Austin Downey.

[9] **Office of Naval Research**, "Digital Twin Technology for Navy P&E Systems", February 2020 - February 2021, $4,585,426, PI: Roger Dougal; Co-PIs: Herbert Ginn, Enrico Santi, Jamil Khan, and Austin Downey.

[8] **Iowa Department of Transportation**, "Robust wireless skin sensor networks for long-term fatigue crack monitoring of bridges", May 2020 - May 2023, $80,000, PI: Austin Downey; Co-PI: Paul Ziehl.

[7] **Air Force Office of Scientific Research**, "DURIP: Real-Time Edge Computing in Structures Experiencing Shock", February 2020 - February 2021, $201,882, PI: Austin Downey; Co-PIs: Paul Ziehl, Sourav Banerjee, Lingyu Yu, and Jason Bakos.

[6] **National Science Foundation**, "RTML: Small: Collaborative: A Programming Model and Platform Architecture for Real-time Machine Learning for Sub-second Systems", May 2019 - May 2022, $275,785, PI and Project Lead: Austin Downey; Co-PI: Jason Bakos.

[5] **University of South Carolina**, "SCoer Development of Open Educational Resources for a No-cost Mechanical Vibrations Class (Emch 330) at the University of South Carolina", August 2019 - December 2019, $500, PI: Austin Downey.

[4] **University of Dayton Research Institute**, "Subcontract on Prime Contract No FA8651-16-D-0311, Task Order 0004. Real Time High-rate Decision Making for Functional Prognosis of Complex Mechanical Systems", April 2019 - March 2021, $39,999, PI: Austin Downey.

[3] **South Carolina Research Authority**, "Smart Additive Manufacturing Enabled by In-situ Sensing and Hybrid Computational Models", July 2019 - June 2020, $99,836, PI: Lang Yuan; Co-PI: Austin Downey.

[2] **University of South Carolina**, "ASPIRE-I: Real-Time Surrogate Model Updating for Structures Experiencing High-Rate Dynamics", August 2019 - July 2021, $15,000, PI: Austin Downey; Co-PI: Yi Wang.

[1] **National Science Foundation**, "CRII: Algorithms and Methodologies for Real-Time Decision-Making of Mission-Critical Structures Experiencing High-Rate Dynamics", March 2019 - February 2021, $191,000, PI: Austin Downey.

Awards and Honors

[12] **2021 AFOSR-YIP**, Air Force Office of Scientific Research 2021.

[11] **Outstanding Reviewer of 2019**, Smart Materials and Structures, IOP Publishing 2020.

[10] **SCoer Faculty Award**, University of South Carolina, University Libraries 2019.

[9] **Comet Hall of Fame**, Charles City Community School District 2019.

[8] **Research Excellence Award**, Department of Mechanical Engineering, Iowa State University 2018.

[7] **Best Paper Award**, 4th International Electronic Conference on Sensors and Applications (ECSA-4) 2017.

[6] **Graduate Research** Award Department of Mechanical Engineering, Iowa State University 2017.

[5] **Featured Article**, "Biphasic DC Measurement Approach for Enhanced Measurement Stability and Multi-channel Sampling of Self-sensing Multi-functional Structural Materials Doped with Carbon-based Additives", Smart Materials and Structures 2016.

[4] **2016 Journal Highlights**, "Reconstruction of In-plane Strain Maps Using Hybrid Dense Sensor Network Composed of Sensing Skin", Measurement Science and Technology 2016.

[3] **2015 Journal Highlights**, "Network of Flexible Capacitive Strain Gauges for the Reconstruction of Surface Strain", Measurement Science and Technology 2015.

[2] **National Science Foundation - IGERT Fellowship**, Iowa State University, Wind Energy Science, Engineering and Policy 2014.

[1] **Pak-Liu Fung Undergraduate Research Scholarship**, Department of Civil Construction and Environmental Engineering, Iowa State University awarded twice, August 2013 and January 2014.

Teaching Experience

[10] **EMCH-561 Machine Learning for Mechanical Engineers**, Summer 2021, XXX students.

[9] **EMCH-330 Mechanical Vibrations**, Spring 2021, 24 students.

[8] **EMCH-460 Special Problems**, Spring 2021, 4 students.

[7] **EMCH-368 Mechatronics**, Fall 2020, 152 students.

[6] **EMCH-561 Machine Learning for Mechanical Engineers**, Spring 2020, 34 students.

[5] **EMCH-460 Special Problems** Fall 2019, 2 students.

[4] **EMCH-330 Mechanical Vibrations** Fall 2019, 130 students.

[3] **EMCH-460 Special Problems** Fall 2019, 2 students.

[2] **EMCH-460 Special Problems** Spring 2019, 2 students.

[1] **EMCH-330 Mechanical Vibrations** Fall 2018, 78 students.

Patents

[2] **Austin Downey**, Simon Laflamme, and Randall Geiger. "Systems and Methods for Leading Edge Sensors in Wind Turbines." *Patent 10724504,* July 24th, 2020,

[1] **Austin Downey**, Simon Laflamme, and Douglas Taylor. "Apparatus, Method, and System for High Capacity Band Brake Type Variable Friction Damping of Movement of Structures." *Patent 9896836,* February 20th, 2018,

Journal Articles

† Graduate student of Austin Downey
‡ Undergraduate student of Austin Downey

[30] Yanzhou Fu†, **Austin Downey**, Lang Yuan, Avery Pratt, and Yunusa Balogun. "In situ monitoring for fused filament fabrication process: A review." *Additive Manufacturing,* vol. 38, February 2021, p. 101749, doi:10.1016/j.addma.2020.101749. Journal Impact Factor 7.002.

[29] Yu Hui Lui, Meng Li, **Austin Downey**, Sheng Shen, Venkat Pavan Nemani, Hui Ye, Collette VanElzen, Gaurav Jain, Shan Hu, Simon Laflamme, and Chao Hu. "Physics-based prognostics of implantable-grade lithium-ion battery for remaining useful life prediction." *Journal of Power Sources,* vol. 485, February 2021, p. 229327, doi:10.1016/j.jpowsour.2020.229327. Journal Impact Factor 8.247.

[28] Vahid Barzegar, Simon Laflamme, **Austin Downey**, Meng Li, and Chao Hu. "Numerical Evaluation of a Novel Passive Variable Friction Damper for Vibration Mitigation." *Engineering Structures,* no. 220, October 2020, p. 110920, doi:10.1016/j.engstruct.2020.110920. Journal Impact Factor 3.55.

[27] **Austin Downey**, Jonathan Hong, Jacob Dodson, Michael Carroll‡, James Scheppegrell†. "Millisecond Model Updating for Structures Experiencing Unmodeled High-Rate Dynamic Events." *Mechanical Systems and Signal Processing,* no. 138, April 2020, p. 106551, doi:10.1016/j.ymssp.2019.106551. Journal Impact Factor 5.01.

[26] Jin Yan, **Austin Downey**, An Chen, Simon Laflamme, Sammy Hassan. "Capacitance-based Sensor with Layered Carbon-fiber Reinforced Polymer and Titania-filled Epoxy." *Composite Structures,* vol. 227, November 2019, p. 111247, doi:10.1016/j.compstruct.2019.111247. Journal Impact Factor 4.83.

[25] Jonathan Hong, Jacob Dodson, Simon Laflamme, and **Austin Downey**. "Transverse Vibration of Clamped-pinned-free Beam with Mass at Free End." *Applied Sciences,* vol. 9, no. 15, July 2019, p. 2996, doi:10.3390/app9152996. Journal Impact Factor 2.22.

[24] **Austin Downey**, Anna Laura Pisello, Elena Fortunati, Claudia Fabiani, Francesca Luzi, Luigi Torre, Filippo Ubertini, and Simon Laflamme. "Durability and Weatherability of a Styrene-ethylene-butylene-styrene (SEBS) Block Copolymer-based Sensing Skin for Civil Infrastructure Applications." *Sensors and Actuators A: Physical,* vol. 293, July 2019, p. 269-280, doi:10.1016/j.sna.2019.04.022. Journal Impact Factor 2.74.

[23] Jin Yan, **Austin Downey**, Alessandro Cancelli, Simon Laflamme, An Chen, and Filippo Ubertini. "Concrete Crack Detection and Monitoring Using a Capacitive Dense Sensor Array." *Sensors,* vol. 19, no. 8, April 2019, p. 1843, doi:10.3390/s19081843. Journal Impact Factor 3.03.

[22] **Austin Downey**, Connor Theisen, Heather Murphy, Nicholas Anastasi, and Simon Laflamme. "Cam-based Passive Variable Friction Device for Structural Control." *Engineering Structures,* vol. 188, March 2019, p. 430-439, doi:10.1016/j.engstruct.2019.03.032. Journal Impact Factor 3.08.

[21] **Austin Downey**, Jin Yan, Eric Zellner, Karl Kraus, Iris Rivero, and Simon Laflamme. "Use of Flexible Sensor to Characterize Biomechanics of Canine Skin." *BMC Veterinary Research,* vol. 15, no. 1, February 2019, p. 40, doi:10.1186/s12917-018-1755-y. Journal Impact Factor 3.12.

[20] **Austin Downey**, Yu-Hui Lu, Chao Hu, Simon Laflamme, and Shan Hu. "Physics-Based Prognostics of Lithium-Ion Battery Using Non-linear Least Squares with Dynamic Bounds." *Reliability Engineering & System Safety,* vol. 182, February 2019, p. 1-12, doi:10.1016/j.ress.2018.09.018. Journal Impact Factor 4.04.

[19] **Austin Downey**, MohammadKazem Sadoughi, Simon Laflamme, and Chao Hu. "Incipient Damage Detection for Large Area Structures Monitored with a Network of Soft Elastomeric Capacitors Using Relative Entropy." *IEEE Sensors Journal,* vol. 18, no. 21, November 2018, p. 8827-8834, doi:10.1109/jsen.2018.2868135. Journal Impact Factor 3.08.

[18] **Austin Downey**, MohammadKazem Sadoughi, Simon Laflamme, and Chao Hu. "Fusion of Sensor Geometry Into Additive Strain Fields Measured with Sensing Skin." *Smart Materials and Structures,* vol. 7, no. 27, June 2018, p. 075033, doi:10.1088/1361-665x/aac4cd. Journal Impact Factor 3.54.

[17] MohammadKazem Sadoughi, **Austin Downey**, Jin Yan, Chao Hu, and Simon Laflamme. "Reconstruction of Unidirectional Strain Maps via Iterative Signal Fusion for Mesoscale Structures Monitored by a Sensing Skin." *Mechanical Systems and Signal Processing,* vol. 112, November 2018, p. 401-416, doi:10.1016/j.ymssp.2018.04.023. Journal Impact Factor 3.54.

[16] Andrea Meoni, Antonella D'Alessandro, **Austin Downey**, Enrique García-Mací, Marco Rallini, Annibale Luigi Materazzi, Luigi Torre, Simon Laflamme, Rafael Castro-Triguero, and Filippo Ubertini . "An Experimental Study on Static and Dynamic Strain Sensitivity of Embeddable Smart Concrete Sensors Doped with Carbon Nanotubes for SHM of Large Structures." *Sensors,* vol. 18, no. 3, March 2018, p. 831, doi:10.3390/s18030831. Journal Impact Factor 3.03.

[15] **Austin Downey**, Antonella D'Alessandro, Filippo Ubertini, and Simon Laflamme. "Automated Crack Detection in Conductive Smart-concrete Structures Using a Resistor Mesh Model." *Measurement Science and Technology,* vol. 29, no. 3, February 2018, p. 035107, doi:10.1088/1361-6501/aa9fb8. Journal Impact Factor 1.86.

[14] **Austin Downey**, Antonella D'Alessandro, Simon Laflamme, and Filippo Ubertini. "Smart Bricks for Strain Sensing and Crack Detection in Masonry Structures." *Smart Materials and Structures,* vol. 27, no. 1, November 2017, p. 015009, doi:10.1088/1361-665X/aa98c2. Journal Impact Factor 3.54.

[13] **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "Experimental Wind Tunnel Study of a Smart Sensing Skin for Condition Evaluation of a Wind Turbine Blade." *Smart Materials and Structures,* vol. 26, no. 12, October 2017, p. 125005, doi:10.1088/1361-665X/aa9349. Journal Impact Factor 3.54.

[12] **Austin Downey**, Antonella D'Alessandro, Micah Baquera, Enrique García-Mací, Daniel Rolfes, Filippo Ubertini, Simon Laflamme, and Rafael Castro-Triguero. "Damage Detection, Localization and Quantification in Conductive Smart Concrete Structures Using a Resistor Mesh Model." *Engineering Structures,* vol. 148, October 2017, p. 924-935, doi:10.1016/j.engstruct.2017.07.022. Journal Impact Factor 3.08.

[11] **Austin Downey**, Filippo Ubertini, and Simon Laflamme. "Algorithm for Damage Detection in Wind Turbine Blades Using a Hybrid Dense Sensor Network with Feature Level Data Fusion." *Journal of Wind Engineering and Industrial Aerodynamics,* vol. 168, September 2017, p. 288-296, doi:10.1016/j.jweia.2017.06.016. Journal Impact Factor 3.01.

[10] Antonella D'Alessandro, Filippo Ubertini, Enrique García-Mací, Rafael Castro-Triguero, **Austin Downey**, Simon Laflamme, Andrea Meoni, and Annibale Luigi Materazzi. "Static and Dynamic Strain Monitoring of Reinforced Concrete Components through Embedded Carbon Nanotube Cement-Based Sensors." *Shock and Vibration,* vol. 2017, August 2017, p. 1-11, doi:10.1155/2017/3648403. Journal Impact Factor 1.63.

[9] Enrique García-Mací, **Austin Downey**, Antonella D'Alessandro, Rafael Castro-Triguero, Simon Laflamme, and Filippo Ubertini. "Enhanced Lumped Circuit Model for Smart Nanocomposite Cement-based Sensors Under Dynamic Compressive Loading Conditions." *Sensors and Actuators A: Physical*, vol. 260, June 2017, p. 45-57, doi:10.1016/j.sna.2017.04.004. Journal Impact Factor 2.74.

[8] **Austin Downey**, Antonella D'Alessandro, Filippo Ubertini, Simon Laflamme, and Randall Geiger. "Biphasic DC Measurement Approach for Enhanced Measurement Stability and Multi-channel Sampling of Self-sensing Multi-functional Structural Materials Doped with Carbon-based Additives." *Smart Materials and Structures*, vol. 26, no. 6, May 2017, p. 065008, doi:10.1088/1361-665X/aa6b66. Journal Impact Factor 3.54.

[7] **Austin Downey**, Chao Hu, and Simon Laflamme. "Optimal Sensor Placement within a Hybrid Dense Sensor Network Using an Adaptive Genetic Algorithm with Learning Gene Pool." *Structural Health Monitoring*, vol. 17, no. 3, April 2017, p. 450-460, doi:10.1177/1475921717702537. Journal Impact Factor 4.94.

[6] **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "Reconstruction of In-plane Strain Maps Using Hybrid Dense Sensor Network Composed of Sensing Skin." *Measurement Science and Technology*, vol. 27, no. 12, November 2016, p. 124016, doi:10.1088/0957-0233/27/12/124016. Journal Impact Factor 1.86.

[5] **Austin Downey**, Liang Cao, Simon Laflamme, Douglas Taylor, and James Ricles. "High Capacity Variable Friction Damper Based on Band Brake Technology." *Engineering Structures*, vol. 113, April 2016, p. 287-298, doi:10.1016/j.engstruct.2016.01.035. Journal Impact Factor 3.08.

[4] Hussam Saleem, **Austin Downey**, Simon Laflamme, Matthias Kollosche, and Filippo Ubertini. "Investigation of Dynamic Properties of a Novel Capacitive-based Sensing Skin for Nondestructive Testing." *Materials Evaluation*, vol. 73, no. 10, October 2015, p. 1384-1319, Journal Impact Factor 0.48.

[3] Liang Cao, **Austin Downey**, Simon Laflamme, Douglas Taylor, and James Ricles. "Variable Friction Device for Structural Control Based on Duo-servo Vehicle Brake: Modeling and Experimental Validation." *Journal of Sound and Vibration*, vol. 348, no. 21, July 2015, p. 41-56, doi:10.1016/j.jsv.2015.03.011. Journal Impact Factor 3.12.

[2] Jingzhe Wu, Chunhui Song, Hussam Saleem, **Austin Downey**, and Simon Laflamme. "Network of Flexible Capacitive Strain Gauges for the Reconstruction of Surface Strain." *Measurement Science and Technology*, vol. 26, no. 5, April 2015, p. 055103, doi:10.1088/0957-0233/26/5/055103. Journal Impact Factor 1.86.

[1] Simon Laflamme, Filippo Ubertini, Hussam Saleem, Antonella D'Alessandro, **Austin Downey**, Halil Ceylan, and Annibale Luigi Materazzi. "Dynamic Characterization of a Soft Elastomeric Capacitor for Structural Health Monitoring." *Journal of Structural Engineering*, vol. 141, no. 8, August 2014, p. 04014186, doi:10.1061/(ASCE)ST.1943-541X.0001151. Journal Impact Factor 2.53.

Peer-Reviewed Conference Proceedings

[8] James Scheppegrell†, Adriane G. Moura, Jacob Dodson, and **Austin Downey**. "Optimization of Rapid State Estimation in Structures Subjected to High-rate Boundary Change." *Proceedings of the ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2020)*, September 2020, doi:10.1115/SMASIS2020-2306.

[7] Seong Hyeon Hong, Claire Drnek†, **Austin Downey**, Yi Wang, Jacob Dodson, and Jonathan Hong. "Real-time Model Updating Algorithm for Structures Experiencing High-rate Dynamic Events." *Proceedings of the ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2020)*, September 2020, doi:10.1115/SMASIS2020-2439.

[6] Jin Yan, **Austin Downey**, Alessandro Cancelli, Simon Laflamme, and Simon Laflamme. "Detection and Monitoring of Cracks in Reinforced Concrete Using an Elastic Sensing Skin." *Structures Congress 2019; Bridges, Tunnels, and Other Transportation Structures,* April 2019, doi:10.1061/9780784482230.009.

[5] MohammadKazem Sadoughi, **Austin Downey**, Garrett Bunge, Aditya Ranawat, Chao Hu, and Simon Laflamme. "A Deep Learning-based Approach for Fault Diagnosis of Roller Element Bearings." *Proceedings of the Annual Conference of the PHM Society,* vol. 10, no. 1, September 2018,

[4] **Austin Downey**, MohammadKazem Sadoughi, Liang Cao, Simon Laflamme, and Chao Hu. "Passive Variable Friction Damper for Increased Structural Resilience to Multi-Hazard Excitations." *Proceedings of the ASME 2018 International Design Engineering Technical Conferences,* August 2018, doi:10.1115/detc2018-85207.

[3] Srikanthan Ramesh, Iris V. Rivero, Jin Yan, **Austin Downey**, Simon Laflamme, and Eric Zellner. "Solventless Fabrication of Biodegradable Sensors for Measuring Soft Tissue Deformation." *2018 IISE annual Conference,* February 2018,

[2] Mostafa Yossef, An Chen, and **Austin Downey**. "Development of a Photovoltaic Integrated Insulated Concrete Sandwich Panel." *The 13th International Symposium on Fiber-Reinforced Polymer Reinforcement for Concrete Structures,* vol. 327, November 2018, p. 29.1-29.18,

[1] Filippo Ubertini, Antonella D'Alessandro, Annibale Luigi Materazzi, Simon Laflamme, and **Austin Downey**. "Novel Nanocomposite Clay Brick for Strain Sensing in Structural Masonry." *2017 IEEE International Conference on Environment and Electrical Engineering and 2017 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe),* June 2017, doi:10.1109/EEEIC.2017.7977598.

Conference Proceedings

[27] James Scheppegrell, **Austin Downey**, Adriane G. Moura, and Jacob Dodson. "Delayed comparison error minimization for frequency domain state estimation in structures subjected to high-rate boundary change." *Smart Structures + Nondestructive Evaluation; Health Monitoring of Structural and Biological Systems XV,* vol. 11593, no. 115932Q, Mar 2021, doi:10.1117/12.2583331.

[26] Han Liu, Simon Lafamme, Jian Li, Caroline Bennett, William Collins, **Austin Downey**, and Hongki Joe. "Experimental Validation of Textured Sensing Skin for Fatigue Crack Monitoring." *Smart Structures + Nondestructive Evaluation; Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2021,* vol. 11591, no. 115911R, Mar 2021, doi:10.1117/12.2582592.

[25] Yanzhou Fu, **Austin Downey**, Lang Yuan, Yunusa Balogun, and Avery Pratt. "In situ structural validation of components manufactured using fused filament fabrication." *SPIE Smart Structures + Nondestructive Evaluation; Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, Civil Infrastructure, and Transportation XV,* vol. 11592, no. 115921E, Mar 2021, doi:10.1117/12.2581600.

[24] Alexander B. Vereen, **Austin Downey**, Subramani Sockalingam, Paul Ziehl, Simon Laflamme, Jian Li, and Hongki Joe. "Monitoring impact damage in composites with large area sensing skins." *Smart Structures + Nondestructive Evaluation; Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2021,* vol. 11591, no. 115911Q, Mar 2021, doi:10.1117/12.2582572.

[23] Ishrat Singh, Philip Conrad, Puja Chowdhury, Jason D. Bakos, **Austin Downey**. "Real-time Forecasting of Vibrations with Nonstationarities." *39th International Modal Analysis Conference (IMAC XXXIX),* Feb 2021,

[22] Mitchell Stiles, Safwan Al Subaihawi, James Ricles, Liang Cao, and **Austin Downey**. "Undergraduate Research Experience (REU), NHERI 2019: Fabrication of a Semi-Active Friction Damper." *44th Annual Natural Hazards Workshop,* Aug 2019, doi:10.17603/DS2-PT11-YN09.

[21] **Austin Downey**, Jonathan Hong, Bryan Joyce, Jacob Dodson, Chao Hu, Simon Laflamme. "Methodology for Real-Time State Estimation At Unobserved Locations For Structures Experiencing High-rate Dynamics." *Structural Health Monitoring 2019,* Nov 2019, p. 3375-3381, doi:10.12783/shm2019/32498.

[20] **Austin Downey**, Anna Laura Pisello, Elena Fortunati, Claudia Fabiani, Luigi Torre, Filippo Ubertini, and Simon Laflamme. "Durability Assessment of Soft Elastomeric Capacitor Skin for SHM of Wind Turbine Blades." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10599, March 2018, p. 10599-11, doi:10.1117/12.2296518.

[19] **Austin Downey**, Antonella D'Alessandro, Filippo Ubertini, and Simon Laflamme. "Crack Detection in RC Structural Components Using a Collaborative Data Fusion Approach Based on Smart Concrete and Large-area Sensors." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10598, March 2018, p. 10598-13, doi:10.1117/12.2296695.

[18] Andrea Meoni, Antonella D'Alessandro, **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "Strain Monitoring in Masonry Structures Using Smart Bricks." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10598, March 2018), p. 10598-10, doi:10.1117/12.2297526.

[17] Jin Yan, Xiaosong Du, **Austin Downey**, Alessandro Cancelli, Simon Laflamme, Leifur Leifsson, An Chen, and Filippo Ubertini. "Surrogate Model for Condition Assessment of Structures Using a Dense Sensor Network." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10598, March 2018, p. 10598-9, doi:10.1117/12.2296711.

[16] MohammadKazem Sadoughi, **Austin Downey**, Chao Hu, and Simon Laflamme. "An Iterative Signal Fusion Method for Reconstruction of In-plane Strain Maps from Strain Measurements by Hybrid Dense Sensor Networks." *2018 American Institute of Aeronautics and Astronautics Information Systems-AIAA Infotech@ Aerospace,* January 2018, p. 0467, doi:10.2514/6.2018-0467.

[15] Filippo Ubertini, Antonella D'Alessandro, **Austin Downey**, Enrique García-Mací, Simon Laflamme, and Rafael Castro-Triguero. "Recent Advances on SHM of Reinforced Concrete and Masonry Structures Enabled by Self-Sensing Structural Materials." *4th International Electronic Conference on Sensors and Applications,* vol. 2, no. 3, November 2017, p. 119, doi:10.3390/ecsa-4-04889.

[14] **Austin Downey**, Jin Yan, Simon Laflamme, and An Chen. "Dynamic Reconstruction of In-plane Strain Maps Using a Two-dimensional Sensing Skin." *Structural Health Monitoring 2017,* August 2017, doi:10.12783/shm2017/14019.

[13] Antonella D'Alessandro, Filippo Ubertini, Andrea Meoni, **Austin Downey**, and Simon Laflamme. "Nanocomposite Clay Bricks for Smart Masonry Structures." *25th Annual International Conference on Composites and Nano Engineering ICCE-25,* July 2017,

[12] **Austin Downey**, Simon Laflamme, Filippo Ubertini, and Partha Sarkar. "Experimental Damage Detection of Wind Turbine Blade Using Thin Film Sensor Array." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10169, April 2017, p. 101691G-1, doi:10.1117/12.2261531.

[11] **Austin Downey**, Enrique García-Mací, Antonella D'Alessandro, Simon Laflamme, Rafael Castro-Triguero, and Filippo Ubertini. "Continuous and Embedded Solutions for SHM of Concrete Structures Using Changing Electrical Potential in Self-sensing Cement-based Composites." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10168, April 2017, p. 1016815, doi:10.1117/12.2261427.

[10] **Austin Downey**, Filippo Ubertini, and Simon Laflamme. "Damage Detection and Localization Algorithm Using a Dense Sensor Network of Thin Film Sensors." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 10168, April 2017, p. 1016813, doi:10.1117/12.2261408.

[9] **Austin Downey**, Simon Laflamme, Filippo Ubertini, Heather Sauder, and Partha Sarkar. "Experimental Study of Thin Film Sensor Networks for Wind Turbine Blade Damage Detection." *43rd Review of Progress in Quantitative Nondestructive Evaluation,* vol. 1806, no. 1, February 2017, p. 070002, doi:10.1063/1.4974617.

[8] **Austin Downey**, Simon Laflamme, Filippo Ubertini, Heather Sauder, and Partha Sarkar. "Damage Detection of Wind Turbine Blade using Hybrid Dense Sensor Networks." *XIV Conference of the Italian Association for Wind Engineering,* September, 2016, p. 97-98,

[7] **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "Distributed Thin Film Sensor Array for Damage Detection and Localization." *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring,* vol. 9803, April 2016, p. 98030R, doi:10.1117/12.2219301.

[6] Simon Laflamme, Jeramie Vens, Daji Qiao, **Austin Downey**, and Jian Li. "Dense Network of Large Area Electronics for Fatigue Crack Detection and Localization." *Structural Health Monitoring 2015,* August 2015, doi:10.12783/SHM2015/37.

[5] **Austin Downey**, Liang Cao, Simon Laflamme, Douglas Taylor, and James Ricles. "Experimental Validation of a Large Capacity Semi-Active Friction Device." *International Workshop on Advanced Smart Materials and Smart Structures Technology,* August 2015,

[4] Simon Laflamme, **Austin Downey**, Christopher Sheafe, Daji Qiao, and Jian Li. "Scalable Thin Film Sensor for Damage Detection and Localization." *11th International Workshop on Advanced Smart Materials and Smart Structures Technology,* August 2015,

[3] Hussam Saleem, **Austin Downey**, and Simon Laflamme. "Algorithm for Decomposition of Additive Strain From Dense Network of Thin Film Sensors." *SPIE Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems,* vol. 9435, March 2015, p. 94351N, doi:10.1117/12.2084369.

[2] Liang Cao, **Austin Downey**, Simon Laflamme, Douglas Taylor, and James Ricles. "A Novel Variable Friction Device for Natural Hazard Mitigation." *Tenth U.S. National Conference on Earthquake Engineering,* July 2014,

[1] Liang Cao, **Austin Downey**, Simon Laflamme, Douglas Taylor, and James Ricles. "Characterization of a Variable Friction Damper on Drum Brake Technology." *6th edition of the World Conference of the International Association for Structural Control and Monitoring (IACSM),* July 2014,

Extended Abstracts

[3] Michael Carroll[‡], **Austin Downey**, Jacob Dodson, Jonathan Hong, and James Scheppegrell[†]. "Subsecond Model Updating for High-Rate Structural Health Monitoring." *38th International Modal Analysis Conference (IMAC XXXIIX),* Feb 11, 2020,

[2] Jin Yan, Simon Laflamme, An Chen, **Austin Downey**, Xiasong Du, Leifur Leifsson, and Chao Hu. "Surface sensing-based technique for nondestructive evaluation." *46th Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE),* June 2019,

[1] **Austin Downey**, Cyrus Vakili Rad, Alexander Vereen[‡], Fariha Mir, Subramani Sockalingam, Sourav Banerjee. "Sensing Skin for in-service Monitoring of Woven Composite Laminates Subjected to Impact Damage." *46th Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE),* June 2019, p. 6839,

Conference Abstracts (No publication)

[11] Corinne Smith[‡], Joud Satme[‡], Richard Matthews[‡], Shaheer Anjum[†], Daniel Gibson[‡], Jasim Imran, Nikolaos Vitzilaios, **Austin Downey**. "UAV-deployable Sensor Packages for the Measurement of Hydraulic Parameters." *8th International Conference on Water and Flood Management,* March 31, 2021,

[10] Sabrina Carrol, Joud Satme[‡], Shadhan Alkharusi, Nikolaos Vitzilaios, **Austin Downey**, and Dimitris Rizos. "Drone Based Vibration Monitoring and Assessment of Structures." *2021 Transportation Research Board (TRB) Annual Meeting – A Virtual Event ,* January 05, 2021,

[9] **Austin Downey**, Jason Smith[‡], Alysson Mondoro, Benjamin Grisso. "Multi-Model Data Assimilation for Structures." *ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2020),* September 15, 2020,

[8] Jin Yan, **Austin Downey**, Simon Laflamme, An Chen. "Model-assisted Validation of Sensor Networks." *46th Annual Review of Progress in Quantitative Nondestructive Evaluation Conference (QNDE),* July 16, 2019,

[7] **Austin Downey**, Antonella D'Alessandro, Filippo Ubertini, and Simon Laflamme. "Model-Assisted Crack Detection and Localization in Multifunctional Concrete Doped with MWCNTs." *Engineering Mechanics Institute 2018,* June 1, 2018,

[6] **Austin Downey**, MohammadKazem Sadoughi, Jin Yan, Chao Hu, and An Chen. "Progress Towards a Sensing Skin Enabling Self-sensing for Structural Components." *Engineering Mechanics Institute 2018,* May 31, 2018,

[5] **Austin Downey**, Simon Laflamme, Filippo Ubertini, and Partha Sarkar. "Experimental Wind-tunnel Study of a Sensing Skin for Damage Detection on a Wind Turbine Blade." *North American Wind Energy Academy (NAWEA),* September 27, 2017,

[4] **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "A Data-driven Approach for Damage Detection in Wind Turbine Blades using a Dense Array of Soft Elastomeric Capacitors." *Engineering Mechanics Institute 2017,* June 6, 2017,

[3] **Austin Downey**, and Simon Laflamme. "Dense Array of Soft Elastomeric Capacitors for Feature Extraction on Wind Turbine Blades." *Engineering Mechanics Institute 2016,* May 24, 2016,

[2] **Austin Downey**, and Simon Laflamme. "Damage Detection of Wind Turbine Blades Using a Root Based Network of Thin Film Sensors." *42nd Annual Review of Progress in Quantitative Nondestructive Evaluation,* July 28, 2015,

[1] **Austin Downey**, Hussam Saleem, and Simon Laflamme. "Highly Elastic Sensing Skin for Mesosurface Strain Monitoring." *Engineering Mechanics Institute 2015,* June 18, 2015,

Conference Presentations

[20] **Austin Downey**, Jason Smith[‡], Alysson Mondoro, Benjamin Grisso. "Multi-Model Data Assimilation for Structures." *ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2020),* September 15, 2020,

[19] Seong Hyeon Hong, Claire Drnek[†], **Austin Downey**, Yi Wang, Jacob Dodson, and Jonathan Hong. "Real-time Model Updating Algorithm for Structures Experiencing High-rate Dynamic Events." *Proceedings of the ASME 2020 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2020),* September 2020,

[18] **Austin Downey**, Jonathan Hong, Bryan Joyce, Jacob Dodson, Chao Hu, Simon Laflamme. "Methodology for Real-Time State Estimation At Unobserved Locations For Structures Experiencing High-rate Dynamics." *The 12th International Workshop on Structural Health Monitoring (IWSHM),* Sept 10, 2019,

[17] **Austin Downey**, Cyrus Vakili Rad, Alexander Vereen[‡], Fariha Mir, Subramani Sockalingam, and Sourav Banerjee. "Sensing Skin for In-service Monitoring of Woven Composite Laminates Subjected to Impact Damage." *Quantitative Nondestructive Evaluation Conference (QNDE) 2019,* July 16, 2019,

[16] Jin Yan, **Austin Downey**, Alessandro Cancelli, Simon Laflamme, and Simon Laflamme. "Detection and Monitoring of Cracks in Reinforced Concrete Using an Elastic Sensing Skin." *2019 ASCE-SEI Structures Congress,* April 26, 2019,

[15] **Austin Downey**, MohammadKazem Sadoughi, Liang Cao, Simon Laflamme, and Chao Hu. "Passive Variable Friction Damper for Increased Structural Resilience to Multi-Hazard Excitations." *44th Design Automation Conference (ASME 2018 International Design Engineering Technical Conferences),* August 29, 2018,

[14] **Austin Downey**, Antonella D'Alessandro, Filippo Ubertini, and Simon Laflamme. "Model-Assisted Crack Detection and Localization in Multifunctional Concrete Doped with MWCNTs." *Engineering Mechanics Institute 2018,* June 1, 2018,

[13] **Austin Downey**, MohammadKazem Sadoughi, Jin Yan, Chao Hu, and An Chen. "Progress Towards a Sensing Skin Enabling Self-sensing for Structural Components." *Engineering Mechanics Institute 2018,* May 31, 2018,

[12] **Austin Downey**, Antonella D'Alessandro, Filippo Ubertini, and Simon Laflamme. "Crack Detection in RC Structural Components Using a Collaborative Data Fusion Approach Based on Smart Concrete and Large-area Sensors." *SPIE smart structures and nondestructive evaluation,* March 8, 2018,

[11] **Austin Downey**, Anna Laura Pisello, Elena Fortunati, Claudia Fabiani, Luigi Torre, Simon Laflamme, and Filippo Ubertini. "Durability Assessment of Soft Elastomeric Capacitor Skin for SHM of Wind Turbine Blades." *SPIE smart structures and nondestructive evaluation,* March 8, 2018,

[10] Jin Yan, Xiaosong Du, **Austin Downey**, Alessandro Cancelli, Simon Laflamme, Leifur Leifsson, An Chen, and Filippo Ubertini. "Surrogate Model for Condition Assessment of Structures Using a Dense Sensor Network." *SPIE smart structures and nondestructive evaluation,* March 8, 2018,

[9] **Austin Downey**, Simon Laflamme, Filippo Ubertini, and Partha Sarkar. "Experimental Wind-tunnel Study of a Sensing Skin for Damage Detection on a Wind Turbine Blade." *North American Wind Energy Academy (NAWEA),* September 27, 2017,

[8] **Austin Downey**, Jin Yan, Simon Laflamme, and An Chen. "Dynamic Reconstruction of In-plane Strain Maps Using a Two-dimensional Sensing Skin." *11th International Workshop on Structural Health Monitoring,* September 11, 2017,

[7] **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "A Data-driven Approach for Damage Detection in Wind Turbine Blades using a Dense Array of Soft Elastomeric Capacitors." *Engineering Mechanics Institute 2017,* June 6, 2017,

[6] **Austin Downey**, Simon Laflamme, Filippo Ubertini, Heather Sauder, and Partha Sarkar. "Damage Detection of Wi8nd Turbine Blade using Hybrid Dense Sensor Networks." *XIV Conference of the Italian Association for Wind Engineering,* September 27, 2016,

[5] **Austin Downey**, and Simon Laflamme. "Dense Array of Soft Elastomeric Capacitors for Feature Extraction on Wind Turbine Blades." *Engineering Mechanics Institute 2016,* May 24, 2016,

[4] Simon Laflamme, Jeramie Vens, Daji Qiao, **Austin Downey**, and Jian Li. "Dense Network of Large Area Electronics for Fatigue Crack Detection and Localization." *10th International Workshop on Structural Health Monitoring,* September 2, 2015,

[3] **Austin Downey**, and Simon Laflamme. "Damage Detection of Wind Turbine Blades Using a Root Based Network of Thin Film Sensors." *42nd Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE),* July 28, 2015,

[2] **Austin Downey**, Hussam Saleem, and Simon Laflamme. "Highly Elastic Sensing Skin for Mesosurface Strain Monitoring." *Engineering Mechanics Institute 2015,* June 18, 2015,

[1] Liang Cao, **Austin Downey**, Simon Laflamme, Douglas Taylor, and James Ricles. "A Novel Variable Friction Device for Natural Hazard Mitigation." *Tenth U.S. National Conference on Earthquake Engineering,* July 24, 2014,

Invited Presentations

[13] "Real-time Model Updating for Structures Experiencing High-rate Dynamic Events." *University of Strathclyde,* December 11th, 2020,

[12] "Multi model Data Assimilation for Naval Ship Structures." *Research brief for Summer Faculty Research Program (NSWC-Carderock division),* August 3rd, 2020,

[11] "Progress Towards Real-Time Decision-Making for Structures Experiencing High-Rate Dynamics." *AFRL Munitions Directorate Summer Faculty Fellowship Program - Seminar,* July 23, 2019,

[10] "Solutions for Mesoscale Monitoring." *University of Virgina Seminar Series,* May 2, 2019,

[9] "Solutions for Mesoscale Monitoring." *NHERI Lehigh Seminar Series,* March 28, 2019,

[8] "Self-sensing Structural Materials for the Condition Monitoring of Structures." *Intelligent Infrastructure Engineering seminars - Iowa State University,* March 3, 2018,

[7] "Solutions for Mesoscale Monitoring." *System Reliability and Safety Laboratory at Iowa State University,* February 8, 2018,

[6] "Monitoring of Historical Structures in Central Italy." *Guest lecture for CE 101 at Iowa State University,* November 29, 2017,

[5] "Advancements in the Field of Smart-Materials for Structural Health Monitoring." *Guest lecture for CE 549 at Iowa State University,* November 6, 2017,

[4] "A Data-driven Approach for Damage Detection in Large Structures using a Dense Array of Soft Elastomeric Capacitors." *Iowa State University Structure Seminar Series,* March 15, 2017,

[3] "Algorithm for Damage Detection in Wind Turbine Blades using a Hybrid Dense Sensor Network with Feature Level Data Fusion." *Wind Energy Science, Engineering and Policy (WESEP), Real-Time Research Collaborative,* February 13, 2017,

[2] "Smart Materials for Structural Health Monitoring." *University of Perugia Working Group on Smart Structures and Building Physics,* October 20, 2016,

[1] "Large Area Sensors for the Monitoring of Wind Turbine Blades." *Wind Energy Science, Engineering and Policy (WESEP), Real-Time Research Collaborative,* May 12, 2015,

Posters

[6] Michael Carroll and **Austin Downey**. "Microsecond Structural Health Monitoring." *Air Force Research Lab Scholars Program,* July 24, 2019,

[5] Mitchell Stiles, Liang Chao, James Ricles, and **Austin Downey**. "Fabrication of a Semi-Active Friction Damping Device." *Research Experiences for Undergraduates in Multi Hazard Engineering,* July 20, 2019,

[4] Claire Drnek and **Austin Downey**. "Gait Analysis and Person Identification Using Human-Structure Interaction." *Discover USC,* April 17, 2019,

[3] **Austin Downey**, Simon Laflamme, and Filippo Ubertini. "Data Fusion of Dense Sensor Networks for Damage Detection in Wind Turbine Blades." *North American Wind Energy Academy (NAWEA),* September 27, 2017,

[2] **Austin Downey**, and Simon Laflamme. "Smart Sensory Membrane for Wind Turbine Blades." *Iowa State University Wind Energy Industry Symposium,* September 27, 2015,

[1] Liang Cao, **Austin Downey** Simon Laflamme, Douglas Taylor, and James Ricles. "A Novel Variable Friction Device for Natural Hazard Mitigation." *Iowa State University Graduate Student Poster Competition,* November 25, 2014,

Mentorship and Advisement at the University of South Carolina

Current Ph.D. students

[7] Zhymir Thompson; Ph.D Computer Science and Mechanical Engineering (Dual Majors), "Generative adversarial network for data synthesis", 2021 - present.

[6] Joud Satme; Ph.D Mechanical Engineering, “Real-time computing at the edge”, 2021 - present.

[5] Emmanuel Ogunniyi; Ph.D. Mechanical Engineering, “Methodologies for Real-Time Decision-Making for structures”, 2021- present.

[4] Puja Chowdhury; Ph.D. Mechanical Engineering, “(Dual advised with Jason Bakos) A Programming Model and Platform Architecture for Real-time Machine Learning for Sub-second Systems”, 2020 - present.

[3] Alex Vereen; Ph.D. Mechanical Engineering, “Real-Time Decision Making for Structure Under Impact”, 2020 - present.

[2] Philip Conrad; Ph.D. Computer Engineering (Dual advised with Jason Bakos), ”A Programming Model and Platform Architecture for Real-time Machine Learning for Sub-second Systems”, 2020 - present.

[1] Yanzhou Fu; Ph.D. Mechanical Engineering In Situ Qualification of Additively Manufactured Components”, 2019 - present.

Current M.S. students

[6] Jarrett Peskar; M.S. Mechanical Engineering, “Development of a battery simulator on embedded hardware”, 2021 - present.

[5] Jason Smith; M.S. “Real-Time Estimation of Structural System State using Long Short-Term Memory Neural Networks”, 2021 - present.

[4] Claud J. Boyd; M.S. Mechanical Engineering Thermal modeling for integrated power electric ship applications 2021 - present

[3] John Cooley; M.S. Mechanical Engineering Digital twins for navy electric ship applications 2021 - present

[2] Shaheer Anjum; M.S. Mechanical Engineering Real-time computational fluid dynamics for the automated landing of UAVs 2021 - present

[1] James Scheppegrell; M.S. Mechanical Engineering Real Time High-rate Decision Making for Functional Prognosis of Complex Mechanical Systems 2019 - present

Current Undergraduate students

[9] Saif Wilkes-Davis; Mechanical Engineering, “Development of motionless rain gauge”, awarded a 2021 McNAIR Junior Fellowship for undergraduate research, $2,000, 2020 - present.

[8] Ethan “Lake” Williams; Mechanical Engineering, “Modeling of NMR spectroscopy”, Awarded a Science Undergraduate Research Fellowship (SURF), $2,000, 2020 - present.

[7] Daniel “Nile” Coble; Mechanical Engineering, “UAV-deployable acoustic measurement sensor package”, 2021 - present.

[6] Jacob Womick; Mechanical Engineering, Awarded a Magellan Scholarship for, “Distributed energy solutions for actively cooled batteries”, $3,000. Co-advised with Dr. Jamil Khan, 2020 - present.

[5] Daniel Gibson; Mechanical Engineering, “Development of UAV controls within the ceiling effect domain”, awarded a 2021 McNAIR Junior Fellowship for undergraduate research, $2,000, 2020 - present.

[4] Braden Priddly; Mechanical Engineering, “Long short-term memory for time series predictions”, 2020 - present.

[3] Corinne Smith; Mechanical Engineering, “UAV Deployed sensors for hydrologic parameter sensing”, 2020 - present.

[9] Jacob Martin; Electrical Engineering, “Compact nuclear magnetic resonance (NMR)”, 2020 - present.

[2] Sebastian Ionita; Electrical Engineering, "Design of a custom polymer 3D printer for in-situ component qualification", awarded a 2020 McNAIR Junior Fellowship for undergraduate research. 2019 - present.

[1] Hung-Tien Huang; Computer Science, "Energy Harvesting from Civil Structures", awarded a 2020 McNAIR Junior Fellowship for undergraduate research, 2019 - present.

M.S. students Advised

[1] Claire Drnek; M.S. Mechanical Engineering, "Local Eigenvalue Modification Procedure for Real-time Model Updating of Structures Experiencing High-rate Dynamic Events", 2019 - 2020, (Employed by IBM following graduation).

Undergraduate students advised

[20] Jarrett Peskar; Mechanical Engineering, "Development of a battery simulator on embedded hardware", 2020 - 2021.

[19] William Bowers; Mechanical Engineering, "Large Area Sensing Skins for Crack Detection", 2020 - 2021.

[18] Breanna Spruell; Mechanical Engineering, "Electrical Impedance Tomography for Smart Structures", awarded an NSF-REU $8,000, 2020 - 2021.

[17] Sydney Houck; Mechanical Engineering, "UAV Deployed sensors for environmental parameter sensing ", 2020 - 2021.

[16] Richard Matthews; Mechanical Engineering, "UAV Deployed sensors for hydrologic parameter sensing", 2020 - 2021.

[15] Nicholas Peraino; Mechanical Engineering Awarded a Magellan Scholarship for, "Identification of objects with passively sensing artificial seaweed", $2,750 2019 - 2021.

[14] Ishrat Singh; Computer Science Awarded: Science Undergraduate Research Fellowship (SURF) for, "Real-time machine learning of vibration signals", $3,000, Magellan Scholarship, $2,500, and; NSF-REU $8,000, 2019 - 2021.

[13] Jason Smith; Mechanical Engineering Awarded a Magellan Scholarship and NSF-REU for, "Real-Time Estimation of Structural System State using Long Short-Term Memory Neural Networks", $2,750 2019 - 2021.

[12] Sirazus "Hasib" Salekin; Electrical Engineering, "Electrical Impedance Tomography for Smart Structures", awarded an NSF-REU $8,000, 2019 - 2021.

[11] Joud Satme; Electrical Engineering Awarded a Magellan Scholarship for, "Drone development for structural health monitoring", $2,750 2019 - 2021.

[10] Zhymir Thompson; Ph.D Computer Science, "Generative adversarial network for data synthesis", 2020 - 2021.

[9] John Cooley; Mechanical Engineering, "Digital twins for navy electric ship applications", 2020 - 2020.

[8] Michael Gallagher; Mechanical Engineering Awarded a Science Undergraduate Research Fellowship (SURF) for, "Miniaturization of Data Acquisition Systems for Structural Health Monitoring", $1,560 2019 - 2020.

[7] Michael Carroll; Mechanical Engineering, "Real-Time State Estimation of Structural Systems for the United State Air Force", 2019 - 2020.

[6] Mitchell Stiles; Mechanical Engineering, "Development of CAD models for advanced friction dampers", 2019 - 2020.

[5] David H. Thompson; Mechanical Engineering, "National Instruments Data Acquisition + Python Programming Language: A cheaper alternative to LabVIEW", 2019.

[4] Matthew Cover; Mechanical Engineering, "Design and manufacturing of a dielectric tester", 2018 - 2019.

[3] Alex Vereen; Mechanical Engineering, "Testing of Additively Manufactured Friction Material", 2018 - 2020.

[2] Claire Drnek; Mechanical Engineering Awarded a Magellan Scholarship for, "Gait Analysis and Person Identification Using Human-Structure Interaction", $2,500 2018 - 2019.

[1] Bianca Riello; Biomedical Engineering Awarded a Science Undergraduate Research Fellowship (SURF) for, "Methodologies for integrated control and data acquisition of a structural test bed", $1,250 2018 - 2019.

Mentorship Experiences at Iowa State University

Graduate students

[3] Jin Yan Ph.D. Civil Engineering, "Surrogate Model Updating for Mesoscale Structures Using a Dense Sensor Network", 2017 - 2018.

[2] Yuesheng Li M.S. Civil Engineering, "Smart resistive membrane sensors for structural health monitoring", 2014 - 2016.

[1] Irvin Pinto M.S. Civil Engineering, "Acceleration of Percolation for Cementitious Sensors using Conductive Paint Filler", 2014 - 2016.

Undergraduate students

[21] Ayuush Mehta Civil Eng., Stress estimations with embedded systems 2018 - 2018.

[20] Connor Theisen Industrial Eng., Structural control and damping 2014 - 2018.

[19] Heather Murphy Mechanical Eng., Structural control and damping 2014 - 2018.

[18] Nicholas Anastasi Mechinical Eng., Structural control and damping 2014 - 2018.

[17] Sammy Hassan Civil Eng., Corrosion detection and measurement 2017 - 2018.

[16] Khuzema Wala Civil Eng., Sensor manufacturing and testing 2017 - 2017.

[15] Shuang "Jack" Li Civil Eng., Sensor interface development 2017 - 2017.

[14] Cidney Hartz Civil Eng., NSF-REU project on dense sensor networks 2017 - 2017.

[13] Xun Zhou Civil Eng., Dynamic testing of large area sensors 2016 - 2017.

[12] Justin Whorley Electrical Eng., Cable investigation for sensor networks 2017 - 2017.

[11] Akira Demoss Electrical Eng., Material testing and embedded systems 2015 - 2017.

[10] Jordan Schlak Aerospace Eng., Sensor testing in windtunnel 2015 - 2016.

[9] Quiqi Cai Civil Eng., Fatigue crack detection using capacitive sensors 2016 - 2016.

[8] Anzhe Wang Civil Eng., Dynamic testing of large area sensors 2016 - 2016.

[7] Avery Zaleski Civil Eng., NSF-REU noise study of sensor networks 2016 - 2016.

[6] Dan Arbogast Civil Eng., Project on dense sensor networks 2015 - 2015.

[5] Brooke Mitchell Civil Eng., Project on dense sensor networks 2015 - 2015.

[4] Garrett Bird Civil Eng., NSF-REU project on dense sensor networks 2015 - 2015.

[3] Paola Armada-Rodriguez Civil Eng., NSF-REU sensor fabrication 2015 - 2015.

[2] Danial Soto Civil Eng., Dispersion of carbon black in concrete 2015 - 2015.

[1] Enrique Delgado Civil Eng., Dispersion of carbon black in concrete 2015 - 2015.

SERVICES

Professional Organizations

[4] Society for Experiment Mechanics (SEM), Member, 2020 - present.
- Data Science Technical Historian and Member, 2020 - present.

[3] Society of Photo-Optical Instrumentation Engineers (SPIE), Member, 2019 - present.

[2] American Society of Mechanical Engineers (ASME) Member 2019 - present.
- Adaptive Structures & Material Systems (ASMS) Branch, Member, 2019 - present.

[1] American Society of Civil Engineers (ASCE), Member, 2017 - present.

Seminars Organized at the University of South Carolina

[2] Marcus Perry from Strathclyde university November 19th 2020

[1] James Ricles from Lehigh University February 12th 2020

Conference Sessions Chaired

[4] SEM IMAC XXIX 058 Panel Discussion for High-Rate Structural Health Monitoring and Prognostics

[3] SEM IMAC XXIX 030 High-Rate Structural Health Monitoring and Prognostics

[2] SEM IMAC XXIX 006 Data-based Modeling and Analysis

[1] SPIE Smart Structures + Nondestructive Evaluation 2019 SESSION 13B: Skin-based Distributed Sensing for SHM Applications

Best Paper Awards Organized

[2] SEM-IMAC Data Science Technical Division best paper 2021 Organized best paper award panel for the SEM-IMAC Data Science Technical Division best paper competition

[1] ASME-ASMS Materials and Systems best paper 2019 Organized best paper award panel for the ASME-ASMS branches' Materials and Systems best paper competition

Special Issues

[1] Special Issue "Flexible Sensors for Structural Health Monitoring" in MDPI Sensors Helped to organize special issue

Open Source Textbooks

[1] Open Vibrations An open source textbook indented to cover the basics of mechanical vibrations Role: lead author github.com/austindowney/Open_Vibrations

Academic Reviewer

Journal name	Publisher	Journal Impact Factor	Reviews
Engineering structures	Elsevier	3.084	10
Sensors	MDPI	3.031	5
Smart Materials and Structures	IOP	3.543	5
Mechanical Systems and Signal Processing	Elsevier	5.01	5
Journal of Intelligent Material Systems and Structures	Springer	3.535	5
Applied Sciences	MDPI	2.217	4
Structural Health Monitoring	Sage	4.939	4
Journal of Vibration and Control	Sage	2.86	3
Measurement Science and Technology	IOP	1.861	2
Earthquake Engineering and Structural Dynamics	Wiley	3.419	2
Advances In Structural Engineering	Sage	1.320	2
Automation in Construction	Elsevier	4.313	2
Journal of Nondestructive Eval., Diag. and Prog. of Engineering Systems	ASME	N/A	2
Transactions on Industrial Electronics	IEEE	7.503	1
Measurement	Elsevier	2.791	1
Mathematical Problems In Engineering	Hindawi	1.179	1
Journal of Earthquake Engineering	Taylor & Francis	2.754	1
Additive Manufacturing	Elsevier	7.137	1
Journal of Sound and Vibration	Elsevier	3.126	1
Journal of Civil Structural Health Monitoring	Springer	1.817	1
Elsevier Book Review	Elsevier	N/A	1
		Total	53

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