

# Brian Mazzeo

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## EDUCATION

**University of Cambridge**

Cambridge, England, UK

**Ph.D. in Engineering** (2008)

Dissertation: *Electromagnetic Measurement of Biological Species in Solution*

**Massachusetts Institute of Technology**

Cambridge, MA, USA

**B.S. in Electrical Engineering** (2005)

Undergraduate thesis: *Models for Energy States in Thin Film Transistors*

GPA 5.0/5.0.

**Nova High School**

Davie, FL, USA

Valedictorian (1999)

Weighted GPA 5.5/4.0; unweighted GPA 4.0/4.0.

## PROFESSIONAL EXPERIENCE

**Brigham Young University**

Provo, UT, USA

*Professor, Department of Electrical and Computer Engineering*

*September 2019-present*

*Associate Professor, Department of Electrical and Computer Engineering*

*September 2014-2019*

*Assistant Professor, Department of Electrical and Computer Engineering*

*September 2008-2014*

**Sidney Sussex College**

Cambridge, England, UK

*Supervisor, Tripos IB Paper 7, Mathematical Methods*

*October 2006 – June 2008*

**MIT Microsystems Technology Laboratory**

Cambridge, MA, USA

*Undergraduate Researcher & Graduate Research Assistant, Akinwande Research Group*

*February 2004 – August 2005*

**Milliken Research Corporation**

Spartanburg, SC, USA

*Research Associate, Electrotexiles*

*Two internships: June – August 2004, May – August 2003*

**MIT Media Laboratory**

Cambridge, MA, USA

*Undergraduate Researcher, Tangible Media Group*

*February – May 2003*

**Massachusetts Institute of Technology**

Cambridge, MA, USA

*Laboratory Assistant, Structure and Interpretation of Computer Programs*

*February – May 2000*

**Motorola, Inc.**

Plantation, FL, USA

*Intern, Global Technology Development Group (2002, 1999)*

*Intern, Land Mobile Products Sector, Radio Network Solutions Group (1998)*

*Three Internships: June – August 2002, June – August 1999, June – August 1998*

## PEER-REVIEWED JOURNAL ARTICLES

47. J. E. Vogel, J. G. Sederholm, E. M. Shumway, G. J. Abello, S. E. Trask, D. R. Wheeler, **B. A. Mazzeo**. Li-Ion Battery Electrode Contact Resistance Estimation by Mechanical Peel Test. *Under Revision* (2022).
46. B. Liu, K. Prugue, M. Nikpour, K. Ward, **B. A. Mazzeo**, and D. Wheeler. Heterogeneity in MacMullin Number of Li-ion Battery Electrodes Studied by Means of an Aperture Probe. *Journal of The Electrochemical Society* **169**, 010517 (2022).
45. M. N. Nikpour, **B. A. Mazzeo**, and D. R. Wheeler. A Model for Investigating Sources of Li-Ion Battery Electrode Heterogeneity – Part 2: Active Material Size, Shape, Orientation, and Stiffness. *Journal of The Electrochemical Society* **168**, 120518 (2021).
44. J. E. Vogel, E. E. Hunter, D. R. Wheeler, and **B. A. Mazzeo**. Micro-Flexible-Surface Probe for Determining Spatially Heterogeneous Electronic Conductivity of Lithium-Ion Battery Electrode Films. *Journal of The Electrochemical Society* **168**, 100504 (2021).
43. M. D. Thomas, T. M. Moriarty, D. D. Cook, and **B. A. Mazzeo**. Electrical capacitance measurements to assess European Corn Borer infestation in maize. *Computers and Electronics in Agriculture* **187**, 106305 (2021).
42. M. Nikpour, N. Barrett, Z. Hillman, A. I. Thompson, **B. A. Mazzeo**, and D. R. Wheeler. A Model for Investigating Sources of Li-Ion Battery Electrode Heterogeneity - Part 1: Electrode Drying and Calendering Processes. *Journal of The Electrochemical Society* **168**, 060547 (2021).
41. S. Pashoutani, J. Zhu, C. Sim, K. Wan, **B. A. Mazzeo**, and W. S. Guthrie. Multi-sensor data collection and fusion using deep autoencoders in condition evaluation of concrete bridge decks. *Journal of Infrastructure Preservation and Resilience* **2**, 18 (2021).
40. R. Stevens, W. S. Guthrie, J. Baxter, and **B. A. Mazzeo**. Field testing of polyester polymer concrete overlays on bridge decks in Utah. *Journal of Materials in Civil Engineering* **33** (7), 04021155 (2021).
39. F. Pouraghajan, A. Thompson, E. Hunter, **B. Mazzeo**, J. Christensen, R. Subbaraman, M. Wray, D. Wheeler. The Effects of Cycling on Ionic and Electronic Conductivities of Li-ion Battery Electrodes. *Journal of Power Sources* **492**, 229636 (2021).
38. J. Baxter, L. Hendricks, W. S. Guthrie, and **B. A. Mazzeo**. Instrumentation for Multi-Channel Vertical Electrical Impedance Scanning of Concrete Bridge Decks. *Engineering Research Express* **2**, 035010 (2020).
37. L. Hendricks, J. Baxter, Y. Chou, M. Thomas, E. Boekweg, W. S. Guthrie, and **B. A. Mazzeo**. High-Speed Acoustic Impact-Echo Sounding of Concrete Bridge Decks. *Journal of Nondestructive Evaluation* **39**, 58 (2020).
36. J. L. Larsen, J. McElderry, W. S. Guthrie, and **B. A. Mazzeo**. Automated sounding for concrete bridge deck inspection through a multi-channel, continuously moving platform. *NDT&E International* **109**, 102177 (2020).
35. J. Barton, J. Baxter, W. S. Guthrie, and **B. A. Mazzeo**. Vertical electrical impedance scanner for non-destructive concrete bridge deck assessment without a direct rebar connection. *Materials Evaluation* **77** (10), 1258-1266 (2019).
34. J. Yao, J. Cassler, D. Wheeler, and **B. A. Mazzeo**. Characterization of Mechanical Properties of Thin-film Li-ion Battery Electrodes from Laser Excitation and Measurements of Zero Group Velocity Resonances. *Journal of Applied Physics* **126**, 085112 (2019).
33. W. S. Guthrie, J. Larsen, J. Baxter, and **B. A. Mazzeo**. Automated air-coupled impact-echo testing of a concrete bridge deck from a continuously moving platform. *Journal of Nondestructive Evaluation* **38**, 32 (2019).
32. J. Barton, J. Baxter, W. S. Guthrie, and **B. A. Mazzeo**. Large-area electrode design for vertical electrical impedance scanning of concrete bridge decks. *Review of Scientific Instruments* **90**, 025101 (2019).
31. J. E. Vogel, M. M. Forouzan, E. E. Hardy, S. T. Crawford, D. Wheeler, and **B. A. Mazzeo**. Electrode Microstructure Controls Localized Electronic Impedance in Li-Ion Batteries. *Electrochimica Acta* **297**, 820-825 (2019).

30. F. Pouraghajan, H. Knight, M. Wray, **B. Mazzeo**, R. Subbaraman, J. Christensen, and D. Wheeler. Quantifying tortuosity of porous Li-ion battery electrodes: comparing polarization-interrupt and blocking-electrolyte methods. *Journal of The Electrochemical Society* **165**(11), A2644-A2654 (2018).
29. M. Forouzan, **B. Mazzeo**, and D. Wheeler. Modeling the effects of electrode microstructural heterogeneities on Li-ion battery performance and lifetime. *Journal of The Electrochemical Society* **165**(10), A2127-A2144 (2018).
28. K. Dallon, J. Yao, D. Wheeler, **B. Mazzeo**. "Characterization of mechanical properties of battery electrode films from acoustic resonance measurements," *Journal of Applied Physics* **123**, 135102 (2018).
27. W. S. Guthrie, J. Baxter, and **B. A. Mazzeo**. "Vertical impedance testing of a concrete bridge deck using a rolling probe." *NDT&E* **95**, 65-71 (2018).
26. L.-F. Tsai, H. Gong, K. Dallon, **B. A. Mazzeo**, and G. Nordin, "Light Emission from Electrodes under Dielectrophoresis (DEP) Conditions," *Journal of Micro/Nanolightography, MEMS, and MOEMS* **15**(2), 025001 (2016).
25. M.M. Forouzan, C.-W. Chao, D. Bustamante, **B. A. Mazzeo**, and D.R. Wheeler, "Simulation of the fabrication process of a lithium-ion battery cathode for determining microstructure and mechanical properties," *Journal of Power Sources* **312**, 172-183 (2016).
24. **Mazzeo, B. A.** and Rice, M. D. Bit Error Rate Comparison Statistics and Hypothesis Tests for Inverse Sampling (Negative Binomial) Experiments. *IEEE Transactions on Communications* **64**(5), 2192-2203. (2016).
23. Lanterman, B. J., Riet, A. A., Gates, N. S., Flygare, J. D., Cutler, A. D., Vogel, J. E., Wheeler, D. R., **Mazzeo, B. A.** Micro-four-line probe to measure electronic conductivity and contact resistance of thin-film battery electrodes. *Journal of Electrochemical Society* **162**, A2145-A2151 (2015).
22. Flygare, J. D., Riet, A. A., **Mazzeo, B. A.**, Wheeler, D. R. Mathematical model of four-line probe to determine conductive properties of thin-film battery electrodes. *Journal of Electrochemical Society* **162** A2136-A2144 (2015).
21. Aggarwal, P., Asthana, V., Lawson, J. S., Tolley, H. D., Wheeler, D. R., **Mazzeo, B. A.**, Lee, M. L. Correlation of chromatographic performance with morphological features of organic polymer monoliths. *Journal of Chromatography A* **1334**, 20-29 (2014).
20. **Mazzeo, B. A.**, Patil, A. N., Hurd, R. C., Klis, J. M., Truscott, T. T., Guthrie, W. S. Air-coupled impact-echo delamination detection in concrete using spheres of ice for excitation. *Journal of Nondestructive Evaluation* **33**(3), 317-326 (2014).
19. Blankenagel, B. S., Khadka, S., Hawkins, A. R., Warnick, K. F., and **Mazzeo, B. A.** Radio-frequency microfluidic interferometer in printed circuit board process. *Microwave and Optical Technology Letters* **55**(7), 1616-1618 (2013).
18. Ness, S. J., Anderson, R. R., Hu, W., Richards, D. C., Oxborrow, J., Gustafson, T., Tsai, B., **Mazzeo, B. A.**, Woolley, A., and Nordin, G. P. Weak Adsorption-Induced Surface Stress upon Streptavidin Binding to Biotin Tethered to Silicon. *IEEE Sensors Journal* **13**(3), 959-968 (2013).
17. **Mazzeo, B. A.** and Busath, D. D. From molecular dynamics to fluorescence anisotropy of fluorophores bound to oriented structures. *Journal of Computational Physics* **232**, 482-497 (2013).
16. Mellor, B. L., Wood, S. J., and **Mazzeo, B. A.** Quantitation of pH-induced aggregation in binary protein mixtures by dielectric spectroscopy. *The Protein Journal* **31**, 703-709 (2012).
15. Bartholomew, P. D., Guthrie, W. S., and **Mazzeo, B. A.** Vertical impedance measurements on concrete bridge decks for assessing susceptibility of reinforcing steel to corrosion. *Review of Scientific Instruments* **83**, 085104 (2012).
14. Rice, M. D., and **Mazzeo, B. A.** On the Superiority of the Negative Binomial Test over the Binomial Test for Estimating the Bit Error Rate. *IEEE Transactions on Communications* **60**, 2971-2981 (2012).
13. **Mazzeo, B. A.**, Patil, A. N., and Guthrie, W. S. Acoustic impact-echo investigation of concrete delaminations using liquid droplet excitation. *NDT&E International* **51**, 41-44 (2012).

12. Mazzeo, A. D., Kalb, W. B., Chan, L., Killian, M. G., Block, J. F., **Mazzeo, B. A.**, and Whitesides, G. M. Paper-based, Capacitive Touch Pads. *Advanced Materials* **24**, 2850-2856 (2012).
11. Mellor, B. L., Cruz Cortés, E., Khadka, S., and **Mazzeo, B. A.** Increased bandwidth for dielectric spectroscopy of proteins through electrode surface preparation. *Review of Scientific Instruments* **83**, 015110 (2012).
10. Mellor, B. L., Khadka, S., Busath, D. D., and **Mazzeo, B. A.** Influence of pK<sub>a</sub> shifts on the calculated dipole moments of proteins. *The Protein Journal* **30**, 490-498 (2011).
9. Anderson, R., Hu, W., Noh, J., Dahlquist, W., Ness, S., Gustafson, T., Richards, D., Kim, S., **Mazzeo, B. A.**, Woolley, A., and Nordin, G. Transient deflection response in microcantilever array integrated with polydimethylsiloxane (PDMS) microfluidics. *Lab on a Chip* **11**, 2088 (2011).
8. Mellor, B. L., Kellis, N. A., and **Mazzeo, B. A.** Note: Electrode polarization of Galinstan electrodes for liquid impedance spectroscopy. *Review of Scientific Instruments* **82**, 046110 (2011).  
-also linked in *Virtual Journal of Biological Physics Research*, 1 May 2011.
7. Mellor, B. L., Cruz Cortés, E., Busath, D. D., and **Mazzeo, B. A.** Method for Estimating the Internal Permittivity of Proteins Using Dielectric Spectroscopy. *Journal of Physical Chemistry B* **115**, 2205 (2011).
6. **Mazzeo, B. A.**, Chandra, S., Mellor, B., and Arellano, J. Temperature-stable parallel-plate dielectric cell for broadband liquid impedance measurements. *Review of Scientific Instruments* **81**, 125103 (2010).
5. **Mazzeo, B. A.** Analytic solutions for capacitance of cylinders near a dielectric interface. *IEEE Transactions on Dielectrics and Electrical Insulation* **17**, 1877 (2010).
4. Shang, T., Teng, E., Woolley, A. T., **Mazzeo, B. A.**, Schultz, S. M., and Hawkins, A. R. Contactless Conductivity Detection of Small Ions in Surface Micro-Machined CE Chip. *Electrophoresis* **31**, 2596 (2010).
3. **Mazzeo, B. A.** Parasitic capacitance influence of potential-sensing electrodes on four-electrode liquid impedance measurements. *Journal of Applied Physics* **105**, 094106 (2009).
2. **Mazzeo, B. A.** and Flewitt, A. J. Two- and Four-Electrode Dielectric Spectrometer for Conductive Liquids: Theory, Limitations, and Experiment. *Journal of Applied Physics* **102**, 104106 (2007).
1. **Mazzeo, B. A.** and Flewitt, A. J. Observation of Protein-Protein Interaction by Dielectric Relaxation Spectroscopy of Protein Solutions for Biosensor Application. *Applied Physics Letters* **90**, 123901 (2007).

#### CONFERENCES – Full Paper Peer-Review with Substantial Revision

6. E. T. Boekweg, W. S. Guthrie, and **B. A. Mazzeo.** Nondestructive Evaluation of a New Concrete Bridge Deck Subject to Excessive Rainfall during Construction: Implications for Durability in a Cold Region. ASCE Regional Conference on Permafrost 2021 and the 19th International Conference on Cold Regions Engineering: pp. 163-171. **Best Student Paper Award**
5. W. S. Guthrie, **B. A. Mazzeo.** Vertical Impedance Testing for Assessing Protection from Chloride-Based Deicing Salts Provided by an Asphalt Overlay System on a Concrete Bridge Deck. 16<sup>th</sup> International Conference on Cold Regions Engineering. 19-22 July 2015.
4. Nordin, G. P., Anderson, R. R., Hu, W., Ness, S. J., Richards, D. C., Oxborrow, J., Gustafson, T., Tsai, B., **Mazzeo, B.**, Woolley, A. Microantilever Array Sensors with Integrated PDMS Microfluidics. IEEE Sensors Conference. 28-31 October 2011.
3. Giraud-Carrier, M. C., Moon, K., Teng, E., Hawkins, A., Warnick, K., **Mazzeo, B. A.** Broadband RF Impedance Spectroscopy in Micromachined Microfluidic Channels (Poster). 33<sup>rd</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 30 August – 3 September 2011.

2. Mellor, B. L., Kellis, N. A., **Mazzeo, B. A.** Dielectric Spectroscopy of Molecular Interactions Based on the Avidin-Biotin Complex. 33<sup>rd</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 30 August – 3 September 2011.
1. **Mazzeo, B. A.**, Rice, M. D. On Monte Carlo Simulation of the Bit Error Rate. IEEE International Conference on Communications. Kyoto, Japan. 5-9 June 2011.

## BOOK

1. **Mazzeo, B.** *Design Decisions: Integrated Product Design Handbook*. 13 August 2020. ISBN: 979-8675117789

## CONFERENCE PROCEEDINGS – Full Paper Reviewed

8. **B. A. Mazzeo** and W. S. Guthrie. Algorithms for highway-speed acoustic impact-echo evaluation of concrete bridge decks. 44th Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings **1949**, 030010 (2018).
7. J. S. Baxter, W. S. Guthrie, T. Waters, J. D. Barton, and **B. A. Mazzeo**. Vertical electrical impedance evaluation of asphalt overlays on concrete bridge decks. 44th Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings **1949**, 030011 (2018).
6. E. Hardy, D. Clement, J. Vogel, D. Wheeler, and **B. Mazzeo**. Flexible probe for measuring local conductivity variations in Li-ion electrode films. 44th Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings **1949**, 040002 (2018).
5. L. Hendricks, W. S. Guthrie, and **B. A. Mazzeo**. Implementing statistical analysis in multi-channel acoustic impact-echo testing of concrete bridge decks: Determining thresholds for delamination detection. 44th Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings **1949**, 040005 (2018).
4. K. L. Dallon, J. Yao, D. R. Wheeler, and **B. A. Mazzeo**. Determination of mechanical properties of battery films from acoustic resonances. 44th Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings **1949**, 040009 (2018).
3. **B. A. Mazzeo**, J. Baxter, J. Barton, and W. S. Guthrie. Vertical Impedance Measurements of Concrete Bridge Deck Cover Condition without a Direct Electrical Connection to the Reinforcing Steel. 43rd Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings 1806, 080004 (2017).
2. **B. A. Mazzeo**, J. Larsen, J. McElderry, and W. S. Guthrie. Rapid Multichannel Impact-Echo Scanning of Concrete Bridge Decks from a Continuously Moving Platform. 43rd Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings 1806, 080003 (2017).
1. **B. A. Mazzeo**, A. N. Patil, J. M. Klis, R. C. Hurd, T. T. Truscott, and W. S. Guthrie. Numerical Simulations and Experimental Measurements of Steel and Ice Impacts for Acoustic Interrogation of Delaminations in Bridge Decks. 40th Annual Review of Progress in Quantitative Nondestructive Evaluation, AIP Conference Proceedings 1581, 895 (2014).

## PATENTS

14. **Mazzeo, B. A.**, Vogel, J., Wheeler, D., Hardy, E., Clement, D. Flexible electric probe. U.S. Patent #11,340,261; 24 May 2022.
13. Merrell, A. J., Bowden, A. E., Fullwood, D. T., **Mazzeo, B. A.** Polymeric foam deformation gauge. U.S. Patent #10,260,968; 16 April 2019.
12. **Mazzeo, B. A.**, Guthrie, W. S., Baxter, J., and Barton, J. D. Flexible elements for probes and guard rings. U.S. Patent #10,082,492; 25 September 2018.

11. **Mazzeo, B. A.**, Guthrie, W. S., Kemmerer, W., Baxter, J., Roedel, C. Data acquisition system with rotating probe members and ground reference electrode. U.S. Patent #9,909,974; 6 March 2018.
10. Bartholomew, P. D., Guthrie, W. S., and **Mazzeo, B. A.** Apparatus for analysis of concrete including a reinforcing bar. U.S. Patent #9,816,978; 14 November 2017.
9. Guthrie, W. S., **Mazzeo, B.**, Larsen, J., and McElderry, J. Multichannel impact response for material characterization. U.S. Patent #9,581,530; 28 February 2017.
8. **Mazzeo, B. A.**, Guthrie, W. S., and Patil, A. N. Method and system for structural integrity assessment. U.S. Patent #9,470,661; 18 October 2016.
7. Chandra, S., and **Mazzeo, B. A.** Cell for broadband dielectric spectroscopy. U.S. Patent #8,593,164; 26 November 2013.
6. Deangelis, A. R., Wilson, D. B., and **Mazzeo, B. A.** Capacitive sensor. U.S. Patent #7,578,195; 25 August 2009.
5. Deangelis, A. R., Wilson, D. B., and **Mazzeo, B. A.** Flexible capacitive sensor. U.S. Patent #7,395,717; 8 July 2008.
4. Deangelis, A. R., Wilson, D. B., and **Mazzeo, B. A.** Printed capacitive sensor. U.S. Patent #7,368,921; 6 May 2008
3. Deangelis, A. R., Wilson, D. B., and **Mazzeo, B. A.** Printed capacitive sensor. U.S. Patent #7,301,351; 27 November 2007.
2. Deangelis, A. R., Wilson, D. B., and **Mazzeo, B. A.** Printed capacitive sensor. U.S. Patent #7,276,917; 2 October 2007.
1. Deangelis, A. R., Wilson, D. B., and **Mazzeo, B. A.** Printed capacitive sensor. U.S. Patent #7,208,960; 24 April 2007.

## PRESENTATIONS

79. M. Nikpour, D. Wheeler, and **B. Mazzeo**. "Predictive Modeling of Transport and Elastic Moduli of Porous Extreme Fast Charging Li-Ion Electrodes," 240th Meeting of the Electrochemical Society, 2021.
78. J. G. Sederholm, E. M. Shumway, J. A. Miles, J. E. Vogel, **B. A. Mazzeo**, and D. Wheeler. "Measuring and Reducing Contact Resistance at the Current Collector," 240th Meeting of the Electrochemical Society, 2021.
77. M. Nikpour, B. Liu, D. Wheeler, and **B. A. Mazzeo**. "Li-Ion Electrode Microstructure Evolution during Drying and Calendering," 240th Meeting of the Electrochemical Society, 2021.
76. N. Clemens, D. Wheeler, and **B. Mazzeo**. "Alignment of Conductive Additive in Li-Ion Battery Electrodes through Use of Electric Fields," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
75. E. E. Hunter, J. E. Vogel, D. Wheeler, and **B. A. Mazzeo**. "The Impact of Calendering on the Electronic Conductivity Heterogeneity of Lithium-Ion Electrode Films," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
74. K. Nielsen, B. Liu, **B. Mazzeo**, and D. Wheeler. "Heterogeneity of Ionic Conductivity in Lithium-Ion Battery Electrodes," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
73. F. Pouraghajan, F. Sun, **B. Mazzeo**, and D. Wheeler. "The Interplay of Electrode Heterogeneity, SEI Growth, and Li Plating in Li-Ion Batteries," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
72. A. I. Thompson, F. Pouraghajan, **B. A. Mazzeo**, and D. Wheeler. "The Effects of Cycling on Ionic and Electronic Conductivities of 18650 Li-Ion Cells," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
71. B. Liu, K. Nielsen, **B. Mazzeo**, and D. Wheeler. "Instrument for Measuring Local Ionic Conductivity of Porous Electrodes," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
70. M. Nikpour, N. Barrett, C. A. Harrison, and D. Wheeler, **B. A. Mazzeo**. "Microscale Simulations of Drying and Calendering Processes to Manufacture Porous Electrodes," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.

69. J. G. Sederholm, J. E. Vogel, **B. Mazzeo**, and D. Wheeler. "Factors Affecting Contact Resistance between Electrode and Current Collector," 236th Meeting of the Electrochemical Society, Atlanta, GA, 2019.
68. **B. A. Mazzeo**, J. Baxter, L. Hendricks, W. S. Guthrie. "Project 202: Vertical Electrical Impedance Scanner for Concrete Bridge Deck Assessment without Direct Rebar Attachment" (Poster), Transportation Research Board Annual Meeting, Washington, DC, 2019. *Invited*
67. **B. A. Mazzeo** and D. R. Wheeler. "Addressing heterogeneity in electrode fabrication processes" (Poster), Department of Energy 2018 Annual Merit Review Meeting, Washington, DC, 2018. *Invited*
66. M. M. Forouzan, D. R. Wheeler, and **B. A. Mazzeo**, "Effects of Local Tortuosity and Porosity Heterogeneities on Charge and Discharge Performance of Li-Ion Batteries," 233rd Meeting of the Electrochemical Society, Seattle, WA, 2018.
65. M. Nikpour, J. Cordon, D. R. Wheeler, and **B. Mazzeo**, "Slurry Model for Understanding Fabrication of Li-Ion Battery Electrodes," 233rd Meeting of the Electrochemical Society, Seattle, WA, 2018.
64. J. E. Vogel, E. E. Hardy, S. Crawford, **B. A. Mazzeo**, and D. R. Wheeler. "Local Variation in Microstructure Causes Heterogeneity in the Conductivity of Commercial Lithium-Ion Cathode Films," 233rd Meeting of the Electrochemical Society, Seattle, WA, 2018.
63. F. Pouraghajan, A. I. Thompson, J. E. Vogel, **B. A. Mazzeo**, and D. R. Wheeler, "The Effect of Different Mixing Processes on the Ionic and Electronic Conductivities of Li-Ion Battery Electrodes," 233rd Meeting of the Electrochemical Society, Seattle, WA, 2018.
62. **B. A. Mazzeo** and D. R. Wheeler, "Measurement and Origins of Conductivity Variations in Commercial Li-Ion Electrode Films," International Battery Seminar & Exhibit, Fort Lauderdale, FL, 2018. *Invited*
61. K. L. Dallon, J. Yao, D. R. Wheeler, and **B. A. Mazzeo**, "Determination of Mechanical Properties of Battery Films from Acoustic Resonances," Review of Progress in Quantitative Nondestructive Evaluation, Provo, UT, 2017.
60. J. S. Baxter, W. S. Guthrie, J. D. Barton, and **B. A. Mazzeo**, "Vertical Electrical Impedance Evaluation of Asphalt Overlays on Concrete Bridge Decks," Review of Progress in Quantitative Nondestructive Evaluation, Provo, UT, 2017.
59. **B. A. Mazzeo** and W. S. Guthrie, "Algorithms for Highway-Speed Acoustic Impact-Echo Evaluation of Concrete Bridge Decks," Review of Progress in Quantitative Nondestructive Evaluation, Provo, UT, 2017.
58. L. Hendricks, W. S. Guthrie, and **B. Mazzeo**, "Implementing Statistical Analysis in Multi-Channel Acoustic Impact-Echo Testing of Concrete Bridge Decks," Review of Progress in Quantitative Nondestructive Evaluation, Provo, UT, 2017.
57. E. Hardy, D. Clement, J. Vogel, D. Wheeler, and **B. Mazzeo**, "Flexible probe for measuring local conductivity in Li-Ion electrode films," Review of Progress in Quantitative Nondestructive Evaluation, Provo, UT, 2017.
56. F. Pouraghajan, H. Knight, **B. A. Mazzeo**, and D. R. Wheeler, "Quantifying Tortuosity of Porous Li-Ion Battery Electrodes: Comparing Polarization-Interrupt and AC Impedance (Blocking-Electrolyte) Methods," 231st Meeting of the Electrochemical Society, New Orleans, LA, 2017.
55. K. L. Dallon, M. Wray, D. R. Wheeler, and **B. A. Mazzeo**, "Determination of Mechanical Properties of Battery Films from Acoustic Measurements," 231st Meeting of the Electrochemical Society, New Orleans, LA, 2017.
54. H. Knight, F. Pouraghajan, D. R. Wheeler, and **B. A. Mazzeo**, "The Effects of Aging on the Tortuosity of Li-Ion Battery Electrodes," 231st Meeting of the Electrochemical Society, New Orleans, LA, 2017.
53. E. E. Hardy, J. E. Vogel, D. V. Clement, D. R. Wheeler, and **B. A. Mazzeo**, "Flexible Probe for Measuring Local Conductivity Variations in Li-Ion Electrode Films," 231st Meeting of the Electrochemical Society, New Orleans, LA, 2017.
52. J. E. Vogel, D. V. Clement, E. Hardy, **B. A. Mazzeo**, and D. R. Wheeler, "Local Variation in Microstructure Causes Heterogeneity in the Conductivity of Commercial Lithium-Ion Cathode Films," 231st Meeting of the Electrochemical Society, New Orleans, LA, 2017.

51. **B. A. Mazzeo** and W. S. Guthrie, "Highway-Speed Acoustic Evaluation of Deteriorated Concrete Bridge Decks," ACI Spring Convention, Detroit, MI, 27 March 2017. *Invited*
50. T. Waters, W. S. Guthrie, and **B. A. Mazzeo**, "Acoustic Impact-Echo and Vertical Electrical Impedance Scanning of Concrete Bridge Bridge Decks from Continuously Moving Platforms," Subcommittee on Non-Destructive Evaluation of Structures, Transportation Research Board, Washington, DC, January 2017.
49. M. M. Forouzan, A. Gillespie, N. Lewis, **B. A. Mazzeo**, and D. R. Wheeler, "A predictive model of lithium-ion electrode fabrication, including mixing, coating, drying, and calendering," PRiME 2016, Honolulu, HI, 2016.
48. J. E. Vogel, W. Lange, D. V. Clement, **B. A. Mazzeo**, and D. R. Wheeler, "Correlation of local conductivity to microstructure for Li-ion battery electrodes by use of a contact probe and SEM/FIB," PRiME 2016, Honolulu, HI, 2016.
47. **B. A. Mazzeo**, J. Baxter, J. Barton, and W. S. Guthrie, "Vertical Impedance Measurements of Concrete Bridge Deck Cover Condition without a Direct Electrical Connection to the Reinforcing Steel," Review of Progress in Quantitative Nondestructive Evaluation, Atlanta, GA. 20 July 2016.
46. **B. A. Mazzeo**, J. Larsen, J. McElderry, and W. S. Guthrie, "Rapid Multichannel Impact-Echo Scanning of Concrete Bridge Decks from a Continuously Moving Platform," Review of Progress in Quantitative Nondestructive Evaluation, Atlanta, GA. 20 July 2016.
45. F. Pouraghajan, R.L. Fitzhugh, M. Wray, **B. A. Mazzeo** and D.R. Wheeler, "Measurement of ionic conductivity of intact battery electrodes using a four-line probe," 2015 Annual Meeting of AIChE, Salt Lake City, UT.
44. M. Forouzan, C.-W. Chao, D. Bustamante, W. Lange, **B. A. Mazzeo**, D. R. Wheeler, "Predicting transport, mechanical, and microstructural properties of porous Li-ion battery electrodes by a particle-based simulation," 2015 Annual Meeting of AIChE, Salt Lake City, UT.
43. A. Riet, J. Sedgewick, J. Vogel, D. Clement, A. Cutler, **B. A. Mazzeo**, D.R. Wheeler, "Non-destructive high-resolution conductivity mapping of thin-film battery electrodes," 228th Meeting of the Electrochemical Society, Phoenix, AZ, 2015.
42. M.M. Forouzan, C.-W. Chao, D. Bustamante, W. Lange, **B. A. Mazzeo**, and D.R. Wheeler, "Predictive particle-based simulation of the fabrication of Li-ion battery electrodes," 227th Meeting of the Electrochemical Society, Chicago, IL, 27 May 2015.
41. Chao, C.-W., Bustamante, D., Lange, W., Forouzan, M. M., **Mazzeo, B. A.**, Wheeler, D. R. Dynamic particle packing model for simulating electrode microstructure. Material Research Society Fall Meeting. Boston, MA. 1 December 2014.
40. Cutler, A., Clement, D., Gates, N., Flygare, J., Vogel, J., Sedgwick, J., **Mazzeo, B. A.**, Wheeler, D. R. Micro-four-line probe for determining spatial conductivity distributions in thin-film battery electrodes. Material Research Society Fall Meeting. Boston, MA. 1 December 2014.
39. **Mazzeo, B. A.**, Measurement of electrical properties of solutions to estimate protein dipole moments and protein-protein interactions. Pfizer. St. Louis, MO. 19 September 2014. *Invited*.
38. Lanterman, B., Flygare, J., Cutler, A., Gates, N., **Mazzeo, B. A.**, Wheeler, D. R.. Probing local conductivity variations in particle-based electrodes. Gordon Research Conference on Batteries. Ventura, CA. 9-14 March 2014.
37. Aggarwal, P., Tolley, H. D., Lawson, J. S., Wheeler, D. R., **Mazzeo, B.**, Lee, M. L. Characterization and Optimization of Organic Monolith Morphology for Improved Chromatographic Performance. PITTCON 2014. Chicago, Illinois. 3 March 2014.
36. **Mazzeo, B. A.**, Smith, J., Wood, S., Mellor, B., Best, R., Reddy, A., Zhang, S. Engineering the electrical properties of proteins: Perspectives from molecular dynamics and dielectric spectroscopy. XVI Annual Linz Winter Workshop. Linz, Austria. 1 February 2014. *Invited*.
35. **Mazzeo, B. A.**, Lanterman, B., Flygare, J., Cutler, A., and Wheeler, D. R. Conductivity measurements of thin-film battery films. Society of Hispanic Professional Engineers Engineering Research Symposium. Indianapolis, IN. 1 November 2013.



34. Lanterman, B., Flygare, J., Cutler, A., **Mazzeo, B. A.**, Wheeler, D. R. Development of a micro four-line probe for the measurement of thin-film battery electrode conductivity. 224<sup>th</sup> Electrochemical Society Meeting, San Francisco, CA. 28 October 2013.
33. **Mazzeo, B. A.**, Patil, A. N., Klis, J. M., Hurd, R. C., Truscott, T. T., and Guthrie, W. S. Numerical Simulations and Experimental Measurements of Steel and Ice Impacts for Acoustic Interrogation of Delaminations in Bridge Decks. 40<sup>th</sup> Annual Review of Progress in Quantitative Nondestructive Evaluation. Baltimore, MD. 24 July 2013.
32. **Mazzeo, B. A.** and Guthrie, W. S. Impact-Echo Testing for Delamination Detection. Utah Department of Transportation, Salt Lake City, UT. 11 April 2013.
31. Guthrie, W. S. and **Mazzeo, B. A.** Electrochemical Impedance Spectroscopy. Utah Department of Transportation, Salt Lake City, UT. 11 April 2013.
30. **Mazzeo, B. A.** Interdisciplinary Collaboration. BYU IEEE Student Branch, Provo, UT. 2 April 2013. *Invited*
29. **Mazzeo, B. A.** Electrical measurements of proteins in solution. BYU Biomedical Engineering Club, Provo, UT. 6 March 2013. *Invited*.
28. **Mazzeo, B. A.** Listening for Concrete Defects. BYU Acoustics Research Group, Provo, UT, 21 February 2013. *Invited*.
27. Mazzeo, A. D., Kalb, W. B., Chan, L., Killian, M. G., Bloch, J.-F., **Mazzeo, B. A.**, and Whitesides, G. M. Paper-based, Capacitive Touch Pads. ASME IMECE, Houston, TX, 13 November 2012.
26. **Mazzeo, B. A.**, Warnick, K. F. and Hawkins, A. R.. Low-cost planar interferometric microchannels for dielectric measurements in the GHz range (Poster). Broadband Dielectric Spectroscopy (BDS) and its Application, Leipzig, Germany. 5 September 2012.
25. **Mazzeo, B. A.**, Mellor, B. L. and Busath, D. D. From numerical simulation to measurement of protein dielectric relaxation in solution. Broadband Dielectric Spectroscopy (BDS) and its Application, Leipzig, Germany. 4 September 2012.
24. **Mazzeo, B. A.**, Warnick, K. F., Hawkins, A. R. and Hill, G. Low-cost RF Impedance Measurements in Micromachined Microfluidic Channels (Poster). Agilent University Research Fair, Santa Rosa, CA. 14 June 2012.
23. Khadka, S., Blankenagel, B., Giraud-Carrier, M., Hawkins, A., Warnick, K. F., and **Mazzeo, B. A.** Low-cost broadband RF impedance spectroscopy in micromachined microfluidic channels. Annual Meeting of the Four Corners Sections of the American Physical Society, Tucson, AZ. 22 October 2011.
22. **Mazzeo, B. A.**, Cruz Cortés, E., and Mellor, B. L. Electrode-electrolyte impedance due to polarization: influence of surface roughness. Annual Meeting of the Four Corners Sections of the American Physical Society, Tucson, AZ. 22 October 2011.
21. Mellor, B. L., Kellis, N. A., Brewster, S., Busath, D. D., and **Mazzeo, B. A.** Protein-ligand biosensing: dielectric spectroscopy and numerical simulation of molecular interactions. Annual Meeting of the Four Corners Sections of the American Physical Society, Tucson, AZ. 21 October 2011.
20. Bartholomew, P., Blankenagel, B., Guthrie, W. S., and **Mazzeo, B. A.** Impedance spectroscopy of concrete cover on bridge decks with reinforcing steel. Annual Meeting of the Four Corners Sections of the American Physical Society, Tucson, AZ. 21 October 2011.
19. Mellor, B. L., Kellis, N. A., Brewer, S. J., Busath, D. D., and **Mazzeo, B. A.** Detection of Molecular Interactions Using Impedance-Based Biosensors (Poster). 7<sup>th</sup> Annual Utah Biomedical Engineering Conference, Salt Lake City, UT. 13 September 2011.
18. **Mazzeo, B. A.**, Cardon, B. L. Busath, D. D. From molecular dynamics to multi-dimensional probabilities and fluorescence anisotropy. Gordon Research Conference: Liquids, Chemistry & Physics of, Holderness, NH. 24-29 July 2011.

17. Bartholomew, P., Sumsion, E., Guthrie, W. S., **Mazzeo, B. A.** Measurement of steel corrosion in concrete by impedance spectroscopy. Four Corners Section Meeting of the American Physical Society, Ogden, UT. 16 October 2010. **Outstanding Undergraduate Student Paper Award Winner**
16. Mellor, B., Cruz Cortés, E., Busath, D., **Mazzeo, B. A.** Estimation of the internal dielectric constant of proteins using measured and simulated charge moments. Four Corners Section Meeting of the American Physical Society, Ogden, UT. 15 October 2010.
15. Getz, P., **Mazzeo, B. A.** Measurement of liquid permittivity by solenoid self-resonance. Four Corners Section Meeting of the American Physical Society, Ogden, UT. 15 October 2010.
14. Kellis, N., **Mazzeo, B. A.** On the use of liquid-metal electrodes for liquid impedance spectroscopy measurements. Four Corners Section Meeting of the American Physical Society, Ogden, UT. 15 October 2010.
13. **Mazzeo, B. A.** and Getz, P. Overcoming electrode polarization by magnetic induction spectroscopy. 6th International Conference on Broadband Dielectric Spectroscopy and its Applications, Madrid, Spain. 10 September 2010.
12. **Mazzeo, B. A.** Liquid electrical measurements for protein analysis. BYU Physics & Astronomy Department Colloquium, Provo, UT. 18 November 2009. *Invited*
11. Kellis, N., Mazzeo, A. D., **Mazzeo, B. A.** Liquid "Wires" for Microfluidics. Four Corners Section Meeting of the American Physical Society, Golden, CO. 24 October 2009.
10. Poudyal, B., **Mazzeo, B. A.**, Warnick, K. F. RF Liquid Measurement of Capillary Tubes. Four Corners Section Meeting of the American Physical Society, Golden, CO. 24 October 2009.
9. Mellor, B. and **Mazzeo, B. A.** A Method to Calculate Protein Dipole Moments. Four Corners Section Meeting of the American Physical Society, Golden, CO. 24 October 2009.
8. Chandra, S., Arellano, J., and **Mazzeo, B. A.** Broadband Liquid Dielectric Spectrometer. Four Corners Section Meeting of the American Physical Society, Golden, CO. 23 October 2009.
7. **Mazzeo, B. A.** and Flewitt, A. J. Time-resolved dielectric spectroscopy of protein aggregation performed on model system of hen lysozyme and beta-lactoglobulin. March Meeting of the American Physical Society, Pittsburgh, PA. 20 March 2009.
6. **Mazzeo, B. A.** Time-Resolved Dielectric Spectroscopy of Protein Solutions. CAPE Advanced Technology Lecture. Cambridge, UK. 18 April 2008.
5. **Mazzeo, B. A.** and Flewitt, A. J. Electrical aspects of protein-protein interactions: Dielectric spectroscopy reveals interaction between beta-lactoglobulin and lysozyme (Poster). Sanger-Cambridge PhD Symposium. Hinxton, UK. 15 April 2008.
4. **Mazzeo, B. A.** Electrical Measurements of Proteins in Solution. Brigham Young University, Provo, UT, USA. 10 April 2008.
3. **Mazzeo, B. A.** and Flewitt, A. J. Dielectric Relaxation Spectroscopy of Protein Solutions. Centre for Advanced Photonics and Electronics Biosensor Colloquium. Cambridge, UK. 20 June 2007.
2. **Mazzeo, B. A.** and Flewitt, A. J. Differential Dielectric Spectroscopy of Protein Solutions: Observation of Protein Interactions. March Meeting of the American Physical Society, Denver, CO. 6 March 2007.
1. Steinfeld, J. I., Gardner, M., Keith, J.L., Dai, J., Downes, E., Kagawa, A., Martin, C., **Mazzeo, B.**, Rodrigo, M., Tillekertne, G., Cheng, K., Dichtel, W. Nichols, L. Reducing MIT's Energy Intensity and Environmental Impact (Poster). Annual Meeting of the Alliance for Global Sustainability, Cambridge, MA. 19-22 January 2000.

## FUNDING

### Extramural:

Title: STTR Phase I: Domestic Halloysite-Derived Silicon as a Low-Cost High-Performance Anode Material for Li-Ion Batteries, 06/2021-06/2022

Sponsor: Department of Energy (through Applied Minerals, Inc.)

Role: Co-PI with Dean Wheeler

Amount: \$80,000

Title: Long-Term Performance of Low Permeable Concrete for Structures, 09/15/2020-09/30/2021

Sponsor: Utah Department of Transportation (through UVU)

Role: Co-PI with W. Spencer Guthrie

Amount: \$15,000

Title: Validation of Service Life Prediction for a 28-Year-Old Parking Garage Constructed of Low Permeability Concrete, 05/26/2020 – 08/30/2021

Sponsor: ACI Foundation (through UVU)

Role: Co-PI with W. Spencer Guthrie

Amount: \$23,000

Title: Capacitive and Mechanical Assessment of Maize Stalk Integrity, 03/05/2020 – 03/04/2021

Sponsor: Pioneer hi-Bred International, Inc. (Corteva Agriscience)

Role: Co-PI with Douglas Cook

Amount: \$50,000

Title: Spectral Correlation Based Defect Recognition System to Enable In-Process, Real-Time Non-Destructive Examination for Friction Stir Welding, 05/2020 – 05/2021

Sponsor: Utah NASA Space Grant Consortium

Role: Co-PI with Yuri Hovanski

Amount: \$25,000

Title: Enabling Electrified Flight through Utah-Sourced Material for Improving Lithium-Ion Batteries, 05/2020 – 05/2021

Sponsor: Utah NASA Space Grant Consortium

Role: Co-PI with Dean Wheeler

Amount: \$24,000

Title: Development and Implementation of a Moving NDE Platform for Bridge Deck Inspection, 07/2017 – 12/2019

Sponsor: University of Nebraska – Lincoln from Nebraska Department of Roads from FHWA

Role: PI with W. Spencer Guthrie

Amount: \$65,597

Title: ASNT Fellowship Award, 07/2017 – 06/2019

Sponsor: American Society for Nondestructive Testing, Inc.

Role: PI supervising student Jeffrey Barton

Amount: \$20,000

Title: NCHRP IDEA Project NCHRP-202: Vertical Impedance Scanner for Concrete Bridge Deck Assessment without Direct Rebar Attachment, 04/2017 – 08/2019

Sponsor: Department of Transportation

Role: PI with W. Spencer Guthrie

Amount: \$149,853

Title: Application of Acoustic Impact-Echo Testing for Guiding Condition Assessment of Multi-Span Concrete Bridge Decks, 6/2017 - 12/2017

Sponsor: Utah Department of Transportation

Role: Co-PI with W. Spencer Guthrie  
Amount: \$24,996

Title: Addressing Heterogeneity in Electrode Fabrication Processes 02/2017 – 12/2019  
Sponsor: Department of Energy, Lawrence Berkeley National Laboratory, BMR Program  
Role: Co-PI with Dean Wheeler  
Amount: \$1,050,000

Title: High-Speed Subsurface Defect Mapping of Concrete Bridge Decks 12/2016 – 10/2017  
Sponsor: Utah Technology Acceleration Grant  
Role: PI with W. Spencer Guthrie  
Amount: \$91,730

Title: Evaluation of Twisted Steel Micro Reinforcement to Mitigate Cracking in Concrete Bridge Decks 06/2016-05/2019  
Sponsor: Utah Department of Transportation  
Role: Co-PI with W. Spencer Guthrie  
Amount: \$21,002

Title: Determine whether a deck with a microsilica or latex concrete overlay in place can be overlaid 1/2016 – 02/2016  
Sponsor: University of Illinois at Urbana-Champaign from Illinois Department of Transportation from US DOT  
Role: PI with W. Spencer Guthrie  
Amount: \$2,643

Title: Technology Development Towards Multi-Wavelength Lidar Calibration Instrumentation for Dugway Proving Ground 1/2016 – 1/2017  
Sponsor: U. S. Army Dugway Proving Ground through Utah State University  
Role: PI  
Amount: \$30,000

Title: Technology Development of Lidar calibration instrumentation for Dugway Proving Ground 8/2015 – 12/2015  
Sponsor: U. S. Army Dugway Proving Ground through Utah State University  
Role: PI  
Amount: \$7,500

Title: Development of a Concrete Bridge Deck Management Guide, 1/2015 – 6/2018  
Sponsor: Utah Department of Transportation  
Role: Co-PI with W. Spencer Guthrie  
Amount: \$176,800

Title: Vertical Impedance Testing and Air-Coupled Impact-Echo Testing of Concrete Bridge Decks, 6/2014 – 8/2015  
Sponsor: Utah Department of Transportation  
Role: Co-PI with W. Spencer Guthrie  
Amount: \$19,993

Title: Predicting Microstructure and Performance for Optimal Cell Fabrication, 4/2013 – 4/2017  
Sponsor: Department of Energy, Lawrence Berkeley National Laboratory, BATT (changed to BMR) Program  
Role: Co-PI with Dean Wheeler  
Amount: \$750,499

Title: Characterizing Microwave Transmission Properties of Low-loss Materials at High Temperature, 12/2012 – 8/2014  
Sponsor: Raytheon  
Role: PI with Karl Warnick  
Amount: \$100,000

Title: Student Intern Support, 9/2012-9/2015  
Sponsor: US Army  
Role: PI with Aaron Hawkins  
Amount: \$60,000

Title: Broadband planar waveguide sensor for materials measurement to 40 GHz, 5/2012 – 8/2012  
Sponsor: Agilent Technologies Foundation  
Role: PI  
Amount: \$4,500

Title: RF Broadband Impedance Spectroscopy for Integrateable Universal Biosensing, 1/2011 – 12/2011  
Sponsor: Agilent Technologies Foundation  
Role: PI  
Amount: \$30,000

Title: Concrete Bridge Deck Evaluation for the Long-Term Bridge Performance Program, 6/2010 - 4/2011  
Sponsor: Utah State University  
Role: Faculty Consultant  
Amount: \$13,146

**Extramural Total: \$2,835,259**

Intramural:

Interdisciplinary Research Origination Award: Smart Seeds: A Platform for Widely Dispersed Soil Sensing, 04/2021-08/2023  
Role: PI  
Amount: \$40,000

Title: Evaluation of Halloysite-Derived Nano-Silicon as Anode Material for Lithium-Ion Batteries, 2020  
Role: Co-PI  
Amount: \$9,300

Title: Mentored Research Grant: IMMERSE 2018  
Role: PI  
Amount: \$25,000

Title: MEG: Mentoring students in acoustic signal processing of high-speed impacts to identify defects in concrete bridge decks, 2013  
Role: PI  
Amount: \$20,000

Title: Dynamic Nanogap Impedance Biosensor Development, 2012  
Role: Co-PI with Greg Nordin  
Amount: \$10,000

Title: Development of micro-line probe for rapid electrical measurement of battery electrodes, 2012  
Role: Co-PI with Dean Wheeler  
Amount: \$25,000

Title: MEG: Condition Assessment of Concrete Bridge Decks: Sampling and Testing of Decommissioned Bridges on Interstate 15 in Utah, 1/2011 – 1/2012  
Role: Co-Applicant with W. Spencer Guthrie  
Amount: \$20,000

Title: MEG: Search for a Viral Channel Blocker, 1/2011 – 1/2012  
Role: Co-Applicant with David D. Busath  
Amount: \$20,000

Title: Research Initiation Fund Proposal: Measurement of Influenza M2 Protein Tetramerization by Dielectric Spectroscopy for NIH Application, 8/2010 – 8/2011  
Role: PI  
Amount: \$10,000

Title: Graduate Mentoring Award: Modeling and Measurement of Proteins using Dielectric Spectroscopy, 9/2010 – 8/2011  
Role: PI  
Amount: \$4,000

Title: Impedance Spectroscopy of Microfluidic Electrophoretic Separations, 2/2010 - 12/2010  
Role: PI  
Amount: \$17,000

Title: MEG: Advanced Biological and Biomedical Applications in Electrical Engineering, 1/2009-1/2010  
Role: Co-PI with Neal Bangerter  
Amount: \$20,000

Title: Electrical Measurements of Biological Species in Solution, 1/2009 – 12/2009  
Role: PI  
Amount: \$20,000

**Intramural Total: \$240,300**

Non-Department Student Support:

Title: ORCA Mentoring Grant: Characterizing Li-ion Battery Electrodes, 1/2014-12/2014  
Student: Andrew Cutler  
Amount: \$1,800

Title: ORCA Mentoring Grant: Quantitation of Protein Aggregation by Dielectric Spectroscopy, 1/2013-12/2013  
Student: Stephen Wood  
Amount: \$1,800

Title: ORCA Mentoring Grant: Low-cost RF Impedance Spectroscopy in microfluidic channels – Fabrication, 1/2012-12/2012  
Student: Shiul Khadka  
Amount: \$1,800

Title: BYU/MIT Lincoln Laboratory Fellowship, 9/2011-8/2012  
Student: Brett Mellor  
Amount: \$15,000

Title: BYU Graduate Research Fellowship: Detection of Antiviral Drugs for Treatment of the Influenza A Virus using Electrical Liquid Measurements, 9/2011-8/2012  
Student: Brett Mellor  
Amount: \$15,000

Title: ORCA Mentoring Grant: Measurement of Steel Corrosion in Bridge Decks by Impedance Spectroscopy, 1/2011-12/2011  
Student: Paul Bartholomew  
Amount: \$1,800

Title: ORCA Mentoring Grant: Dielectric Spectroscopy of Protein Titrations, 1/2009-12/2009  
Student: Satyan Chandra  
Amount: \$1,800

**Student Total: \$37,200**

## **COURSES TAUGHT**

ECEn 240	Circuits
ECEn 301	Elements of Electrical Engineering
ECEn 370	Probability Theory
ME/ECEn 475/476	Capstone Product Development
ECEn 487	Introduction to Digital Signal Processing
ECEn 490	Senior Project
ECEn 662R, 667	Electromagnetic Properties of Materials
ECEn 670	Stochastic Processes
ECEn 672	Detection and Estimation Theory

## **PROFESSIONAL MEMBERSHIPS**

American Physical Society  
American Society for Nondestructive Testing  
IEEE  
Society of Hispanic Professional Engineers

## **PROFESSIONAL RECOGNITION**

2017 ASNT Fellowship Award  
2017 SHPE Young Investigator Award

## **PROFESSIONAL SERVICE**

Local Organizing Committee, 2017 Review of Progress in Nondestructive Evaluation Conference  
Faculty Development Institute Organizing Committee, 2016 SHPE National Conference  
Conference Organizing Committee, 2015 ASCE Cold Regions Conference  
Session Co-Chair, Advances in Chemical Biosensors, EMBC 2011

Reviewer:

Biosensors & Bioelectronics  
European Biophysical Journal  
Geophysical Prospecting  
IEEE Electron Device Letters  
IEEE Transactions on Instrumentation and Measurement  
Journal of Acoustical Society of America  
Journal of Electrostatics  
Journal of Energy Storage  
Journal of Nondestructive Evaluation  
Journal of Molecular Liquids  
Proteins: Structure, Function, and Bioinformatics  
Review of Scientific Instruments  
Solid State Sciences  
International Conference of the IEEE Engineering in Medicine and Biology Society, 2011, 2012, 2013

## **UNIVERSITY SERVICE**

Co-Director	BYU Capstone program, 2017-2021
Graduate Coordinator	ECEn Department, 2016-2017
Member	ECEn Department Executive Committee, 2016-2017

Faculty Advisor	BYU Chapter, Society of Hispanic Professional Engineers, 2012-present
Faculty Coach	Marshall and Rhodes Scholarships, BYU National Scholarships, Fellowships, and Programs
Faculty Mentor	Intensive Mentoring and Micro-Electronics Research for Students in Engineering (IMMERSE), 2008-present
Member	ECEn Department Graduate Committee, 2008-2017
Member	ECEn External Relations Committee, 2018-present

## UNIVERSITY HONORS AND SCHOLARSHIPS

2005 Marshall Scholarship  
 Semi-Finalist, 2003 MIT Autonomous Robot Design Competition  
 Boeing Scholarship  
 MIT Class of 1950 Scholarship  
 Robert C. Byrd Scholarship  
 Elks National Foundation Most Valuable Student Scholarship  
 National Merit Scholarship  
 Florida Engineering Society Scholarship  
 RMHC/HACER Scholarship  
 RadioShack/Tandy Scholar

## GRADUATE STUDENT ADVISEMENT

### Chair of Committee

Name	Level	Status
Brett Lee Mellor	PhD	Defended on June 27, 2012
Anjali Narendra Patil	MS	Defended on December 5, 2013
Joshua Dee Smith	MS	Defended on June 10, 2014
Derek Van Clement	MS	Defended on June 2, 2017
Kathryn Lanae Dallon	MS	Defended on October 9, 2017
Jeffrey David Barton	MS	Defended on June 14, 2018
Jacob Lynn Larsen	MS	Defended on July 9, 2018
Jing (Ethan) Yao	MS	Defended on January 9, 2019
Alexander Jay Smart	MS	Defended on July 26, 2019
Jared Scott Baxter	PhD	Defended on November 18, 2019
Yao Chou	PhD	Defended on November 22, 2019
Lorin James Hendricks	PhD	Defended on March 16, 2020
Mavrik Thomas	MS	Defended on April 7, 2021
Enoch Boekweg	MS	Defended on July 6, 2021
John Eric Vogel	PhD	Defended on March 31, 2022

### Member of Committee

Name	Level	Status
Stephen Joseph Preston	MS	Defended on April 16, 2010
Brian Adam Gunn	MS	Defended on May 27, 2010
Tao Shang	PhD	Defended on June 29, 2010
Yabing Luo	PhD	Defended on January 7, 2011
Caleb Chamberlain	MS	Defended on March 2, 2011
Weisheng Hu	PhD	Defended on March 3, 2011
Michael Johnson	PhD	Defended on April 18, 2011
Aaron Swan	MS	Defended on June 7, 2011
Justin Penner	MS	Defended on November 18, 2011
Manoj Adhikari	MS	Defended on June 29, 2012
Stanley J. Ness	PhD	Defended on October 24, 2012
John Frederick Hulbert	PhD	Defended on May 10, 2013



Peter A. Jepsen	MS	Defended on June 28, 2013
Joseph B. Oxborrow	MS	Defended on November 18, 2013
Michael A. Mendoza	MS	Defended on December 3, 2013
David Michael William Landry	MS	Defended on December 4, 2013
James Badal	MS	Defended on February 21, 2014
Hillary McKenna Argyle	MS	Defended on March 4, 2014
Peter C. Niedfeldt	PhD	Defended on June 26, 2014
Daniel Joseph Park	PhD	Defended on September 12, 2014
Craig Lee Stringham	PhD	Defended on December 5, 2014
Andrew Dennis McMurdie	MS	Defended on April 16, 2015
Kamran Qaderi	MS	Defended on April 21, 2015
Nathan Mark Madsen	MS	Defended on September 4, 2015
David Brian Lindell	MS	Defended on February 16, 2016
Long-Fang Tsai	PhD	Defended on February 19, 2016
Matthieu C. Giraud Carrier	PhD	Defended on February 23, 2016
Jon-Paul Anderson	PhD	Defended on June 13, 2016
Haonan Wang	PhD	Defended on June 21, 2016
Tenli Waters	MS	Defended on June 23, 2016
Jordan Curtis Hill	MS	Defended on March 9, 2017
Thomas Allen Wall	PhD	Defended on September 8, 2017
Aaron Jake Merrell	PhD	Defended on February 21, 2018
Matthew Alan Stott	PhD	Defended on March 22, 2018
Mohammad Mehdi Forouzan	PhD	Defended on April 9, 2018
Garrett Scott McDonald	MS	Defended on June 1, 2018
John Michael Stout	PhD	Defended on September 21, 2018
Hua Gong	PhD	Defended on September 26, 2018
Jerel Bendt Nielsen	PhD	Defended on June 5, 2019
Fezzeh Pouraghajansarhamami	PhD	Defended on May 29, 2020
Johnathan Bryce Hunt	MS	Defended on July 15, 2020
Tenli Waters	PhD	Defended on November 17, 2020
Emilee Elizabeth Hunter	MS	Defended on December 8, 2020
Baichuan Liu	PhD	Defended on May 31, 2022
Daniel Benjamin Free	PhD	In progress
Amir Sina Hamedi	PhD	In progress
Johnathan Bryce Hunt	PhD	In progress
Fei Sun	PhD	In progress
Ian Syndergaard	PhD	In progress