

# Jonathan C. Erickson

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## CURRENT POSITION

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<b>University of Auckland</b> , Auckland, New Zealand Senior Research Fellow, Medical and Health Science	2024 – 2027
<b>Washington and Lee University</b> , Lexington, VA, USA Professor, Physics and Engineering Department	2021 –
Associate Professor	2015 – 2021
Assistant Professor	2009 – 2015

## ACADEMIC TRAINING

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<b><u>Alimetry</u></b> , Auckland, New Zealand Visiting Research Scholar: Biomedical Engineering	2021 – 2022
<b>Auckland Bioengineering Institute</b> , Auckland, New Zealand Visiting Research Fellow, Gastrointestinal Electrical Mapping Technologies and Devices	2016 – 2017
<b>Vanderbilt University</b> , Nashville, TN Postdoctoral Research Fellow, Departments of Physics and Surgery	2007 – 2009
<b>California Institute of Technology</b> , Pasadena, CA Ph.D. Bioengineering	2001 – 2008
<b>Harvey Mudd College</b> , Claremont, CA B.S. Physics, <i>cum laude</i>	1997 – 2001

## TEACHING

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**Electrical Circuits with Lab (ENGN/PHYS 207)**, Fall 2009-2014, 2017-2020, 2022, 2023. Required core course for majors. Topics covered include DC and AC circuit analysis, op-amps, passive and active filters, and microcontrollers interfacing to analog and digital components. Emphasis on hands-on designing, building, testing practical circuits systems (electromyography for prosthetics; tracking solar panels; LED light organ syncing music to laser light show). Community Based Learning (CBL) partnership with local elementary after school program Fall 2019 and 2022: [“Electric Mondays!”](#)

**Electronics (ENGN/PHYS 208)**, Winter 2011, 2012, 2015, 2019, 2021, 2024. Project-based elective course for majors with emphasis on design, construction, and testing of electronics systems for real world applications. Projects integrate microcontrollers, wireless devices, digital sensors (accelerometers, distance sensors, etc.). Past projects have included the [SmartRock](#) capsule for geological measurements, hi-fi transistor audio amplifiers, wireless communication “spy circuits”, and biomedical equipment targeted for the visually impaired.

**Bioengineering, and Bioinspired Design (ENGN/BIOL 267)**, Fall 2010, 2011, 2013, Winter 2015, 2016, 2018, 2020, 2023. Elective course I developed which studies animal systems from an integrated physics-engineering-biology perspective. Model systems covered include: cephalopod optical camouflage, mantis shrimp optics; neural interfacing for building insect biobots, kinematics of ocean swimmers (jellyfish, manta rays); bioinspired robotics. Emphasis is placed both on how key principles from biological systems can be integrated into the next generation of human-engineered designs.

**Mathematical Methods for Physics and Engineering (ENGN/PHYS 225)**, Winter 2016, 2018, 2021. Required core course for majors. Topics covered include: vector calculus, eigenvalue problems, complex analysis, Fourier transforms, ODEs and PDEs.

**Applied Signal Processing (ENGN 395)**, Spring 2020. New project-based course I developed which studies a variety of signal processing methods applied to real world problems. Topics/projects covered include: Step-counter from accelerometer measurements (event detection; energy transforms, statistical thresholding); hunting gravity waves in the LIGO database (digital filtering; time-frequency analysis Fourier transforms; continuous wavelet transforms); compression of earthquake ground acceleration data (discrete wavelet transform compression and denoising); hunting gastrointestinal waves from multichannel electrical recordings (blind source separation, spatial intensity mapping).

**Capstone Design (ENGN 378)**, Fall 2023. First-half of a year-long engineering design sequence. Senior majors work in teams to identify and define design problems and generate initial prototype solutions.

**Capstone Design II (ENGN 379)**, Winter 2018-2021, 2024. Second-half of a year-long sequence. Senior majors work together in teams to design and implement engineering solutions to real-world problems. Project topics span and wide range, including: Autonomously navigating “RoboBoat”; SmartGate electronics module for home pets; City of Lexington, VA traffic study and traffic flow optimization; Lime Kiln park redesign.

**Physics of Music (PHYS/MUS 102)**, Spring 2011, 2012, 2014, 2015, 2016, 2018. Course for non-majors and the musically-inclined. Topics include wave mechanics and modal analysis; design and operational principles of winds, strings, voice, etc.; perception of sound in the human auditory system. Primary mode of inquiry is hands-on investigation to connect scientific quantities to aesthetic qualities of music.

**Mechanical Vibrations (ENGN 330)**, Winter 2010, 2011, 2014, 2016, 2024. Elective course for majors. Topics covered include single and multi-degree of freedom and

continuous systems, damped-driven oscillations, stability, force isolation, normal modes, vibration measurement instrumentation, and earthquake engineering.

**Introductory Physics Lab II (PHYS 114)**, Winter 2010. Required core course for majors. Instrumentation and analysis of experiments with electricity and magnetism, simple harmonic motion, geometrical optics, and modern physics.

**Honors Thesis (ENGN/PHYS 493)**, 2011-12, 2013-14, 2014-15, 2019-20.

Laura Bruce '20. *Is Detection of Colon Motility Waves Possible?: An Investigation of Two Spatial Filtering Techniques with Electrocolonography (EcolG)*

Cort Hammond '15. *Low-cost techniques for assessing the quality of drinking water from biosand filters.*

Alvin Thomas '14. *Plasticity in Dissociated Neuronal Networks under Chronic Stimulation.*

Raisa Velasco-Castedo '12. *Algorithms for and Assesment of Small Intestine Spike Activity During Onset of Ischemia*

### **Directed Independent Study (ENGN/PHYS 421/422/423)**

*GI system and devices: non-invasive sensing of motility patterns (2017 – 2024)*

*Smartrock: Wireless electronics module for measuring pressure and kinematics of rock plucking in rivers* (Stevan Kriss '20 and Laws Smith '20; in collaboration with Dr. David Harbor, W&L Geology Department)

*Mapping slow waves and spikes in ischemic small intestine* (Joy Putney '16, Jamie Hayes '17, and Alfred Rwagaju '18)

*Wireless neural-electric stimulus and path-tracking for cockroach biobots* (John Kirby '16 and Ann Catherine Bokinsky, '16)

### **SERVICE and PROFESSIONAL ACTIVITIES**

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- W&L [Faculty Representative to the Board of Trustees](#), elected member, 2023– 2025
- W&L [Presidents Advisory Committee](#), elected member, 2021 – 2024.
- W&L [Engineering Community Development student club](#) faculty adviser (ECD), 2010. Helped organize, lead, and implement local and international projects in Virginia, USA; Belmopan, Belize; Monterrey, Mexico; Santiago de Atitlán, Guatemala, and Pampoyo, Bolivia.

- Academic Calendar, Scheduling, and Registration Committee (ACSR), appointed member 2017-2023.
- General Education Development Committee (GEDC), elected member, 2019 – 2021
- Community Based Learning Teacher-Scholar Cohort Fellow (CBL), 2018 –
- University Assurance of Learning Committee (AOL), appointed member 2019-2022
- Institute Animal Care and Use Committee (IACUC), appointed member, 2011 – 2015.
- Peer reviewer: Annals of Biomedical Engineering; Journal of the Royal Society Interface; Scientific Reports; PLoS ONE; Frontiers in Bioengineering; Journal of Neuroscience Methods, Biomedical Signal Processing and Control; American Journal of Physiology: Gastroenterology & Hepatology; IEEE-Engineering in Medicine and Biology; Journal of Insect Research; Soft Robotics.

## **RESEARCH INTERESTS and EXPERIENCE**

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Interdisciplinary problems at the boundary of engineering, physics, and biology. My lab develops new tools—electronics hardware instrumentation and automated signal processing methods—to noninvasively detect gastrointestinal electrical activity patterns focused on the colon. Our aim is to enable more effective treatment pathways for GI motility disorders. In the past, my lab has also worked on neural-electric interfaces for hybrid insect biobots. I have had the privilege of mentoring >25 outstanding undergraduate summer research scholars, many of whom have pursued graduate programs.

## **ACTIVE COLLABORATORS**

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Gastrointestinal Motility & Devices: Drs. Greg O’Grady ([Alimetry](#)) and Sean Seo (University of Auckland, New Zealand); Dr. Tim Angeli-Gordon (Auckland Bioengineering Institute, New Zealand); Dr. Alain Benitez (Children’s Hospital of Philadelphia); Dr. Jan Tack (UZ Leuven); Dr. Nikolas Perentos (University of Cyprus). *Developing hardware and automated signal processing tools to non-invasively monitor motility in the gastrointestinal system*

Prof. David Harbor, W&L Geology Department. *Smartrock: Wireless electronics module for measuring pressure and kinematics of rock plucking in rivers*

## **SELECTED REFEREED JOURNAL PUBLICATIONS** (\* = ungraduated student co-author)

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Seo SHB, Wells CI, Dickson T, Rowbotham D, Gharibans AA, Calder S, Bissett I, O'Grady G, and **Erickson J**. (2024) Validation of body surface colonic mapping (BSCM) against high resolution colonic manometry for evaluation of colonic motility. *Sci Rep* 14, 4842 [<https://doi.org/10.1038/s41598-024-54429-7>]

**Erickson J**, Hassid E\*, and Stepanyan E\*. (2023) Comparison of dry and wet electrodes for detecting gastrointestinal activity patterns from body surface electrical recordings. *Ann. Biomed. Eng.* 51:1310-1321. [[doi:10.1007/s10439-023-03137-w](https://doi.org/10.1007/s10439-023-03137-w)]

Dorwick JM, Jungbauer L, Offutt SJ, Tremain P, **Erickson J**, and Angeli-Gordon TR. (2023) Translation of an existing implantable cardiac monitoring device for measurement of gastric electrical slow-wave activity. *Neurogastroenterology and Motility*, e14273 (online ahead of press) [<https://onlinelibrary.wiley.com/doi/full/10.1111/nmo.14723>].

Calder S, Cheng LK, Andrews CN, Paskaranandavadivel N, Waite S, Alighaheh S, **Erickson J**, Gharibans AA, O'Grady G, and Du P. (2022) Validation of non-invasive body-surface gastric mapping for detecting gastric slow wave spatiotemporal features by simultaneous serosal mapping in a porcine model. *Am J Physiol-Gastrointestinal and Liver Physiology*. G295-G305. [doi: [10.1152/ajpgi.00049.2022](https://doi.org/10.1152/ajpgi.00049.2022)]

Schamberg G, Varghese C, Calder S, Waite S, **Erickson J**, O'Grady G, Gharibans AA (2022). Revised spectral metrics for body surface measurements of gastric electrophysiology, *Neurogastroenterology and Motility*, 2022; 00:e14491. [<https://doi.org/10.1111/nmo.14491>].

Lin AY, Varghese C, Du P, Wells CI, Paskaranandavadivel N, Gharibans AA, **Erickson J**, Bissett IP, O'Grady G. (2021) Intraoperative serosal extracellular mapping of the human distal colon: a feasibility study. *Biomed Eng OnLine*. Dec; 20(105):1-4. [[doi: 10.1186/s12938-021-00944-x](https://doi.org/10.1186/s12938-021-00944-x)]

**Erickson J**, Bruce L\*, Taylor A\*, Higgins C\*, Richman J\*, Wells C, and O'Grady G. (2019) Electrocolonography: Non-invasive detection of colonic cyclic motor activity from multielectrode body surface recordings, *IEEE Trans. Biomed. Engn.*; 67(6): 1628 -1637. [[doi: 10.1109/TBME.2019.2941851](https://doi.org/10.1109/TBME.2019.2941851)]

O'Grady G, Angeli TR, Paskaranandavadivel N, **Erickson J**, Wells C, Gharibans AA, Cheng LK, and Du P. (2018) Methods for high-resolution electrical mapping in the gastrointestinal tract, *IEEE Rev. Biomed. Engn.*; 12: 287-302 [[doi: 10.1109/RBME.2018.2867555](https://doi.org/10.1109/RBME.2018.2867555)]

**Erickson J**, Hayes J\*, Bustamanate M\*, Joshi R\*, Rwagaju A\*, Paskaranandavadivel N, and Angeli TR. (2018) Intsy: a low-cost, open-source, wirelessly multi-channel bioamplifier system, *Physiol. Meas.*; 39: 035008. [[doi: 10.1088/1361-6579/aaad51](https://doi.org/10.1088/1361-6579/aaad51)]

Mayne T, Paskaranandavadivel N, **Erickson J**, O'Grady G, and Cheng LK. (2018) Improved visualization of gastrointestinal slow wave propagation using a novel wavefront-

orientation interpolation technique, *IEEE Trans. Biomed Eng.*; 65(2):319-326. [[doi: 10.1109/TBME.2017.2764945](https://doi.org/10.1109/TBME.2017.2764945)]

O'Grady G, Paskaranandavadivel N, Du P, Angeli T, **Erickson J**, Cheng LK. (2017) Correct techniques for extracellular recordings of electrical activity in gastrointestinal muscle, *Nature Reviews – Gastroenterology and Hepatology*; 14(6): 372. [[doi: 10.1038/nrgastro.2017.15](https://doi.org/10.1038/nrgastro.2017.15)]

Wang T, Du P, Angeli TR, Paskaranandavadivel N, **Erickson J**, Abell T, Cheng LK, and O'Grady G. (2017) Relationships between gastric slow wave frequency, velocity, and extracellular amplitude studied by a joint experimental-theoretical approach, *Neurogastroenterology and Motility*; 30(1):e13152. [[doi: 10.1111/nmo.13152](https://doi.org/10.1111/nmo.13152)]

**Erickson J**, Putney J\*, Hilbert D\*, O'Grady G, Cheng LK, and Angeli TR. (2016) Iterative Covariance-based Removal of Time-Synchronous Artifacts: Application to Gastrointestinal Electrical Recordings, *IEEE Trans. Biomed. Eng.* 63(11): 2262-2272. [[doi: 10.1109/TBME.2016.2521764](https://doi.org/10.1109/TBME.2016.2521764)]

Bradshaw L, Cheng LK, Chung E, Obioha CB, **Erickson J**, Gorman BL, Somarajan S, and Richards WO. (2016) Diabetic gastroparesis alters the biomagnetic signature of the gastric slow wave. *Neurogastroenterology and Motility*; 28(6): 837-848. [[doi: 10.1111/nmo.12780](https://doi.org/10.1111/nmo.12780)]

**Erickson J**, Bustamante M\*, Herrera M\*, Shingiro A\*, and Bowen T\*. (2015) Effective Stimulus Parameters for Directed Locomotion in Madagascar Hissing Cockroach Biotot. *PLoS ONE* 10(8): e0134348 [[doi: 10.1371/journal.pone.0134348](https://doi.org/10.1371/journal.pone.0134348)]

**Erickson J**, Velasco-Castedo R\*, Obioha CB, Angeli TA, Cheng LK, and O'Grady G. (2013) Automated Algorithm for GI Spike Burst Detection and Demonstration of Efficacy in Ischemic Small Intestine, *Ann. Biomed. Eng.*; 41(10): 2215-2228. [[doi: 10.1007/s10439-013-0812-8](https://doi.org/10.1007/s10439-013-0812-8)]

**Erickson J**, Paskaranandavadivel N, and Bull S. (2013) Quantitative Analysis of Electrical Activity in the Gastrointestinal Tract, in Cheng LK, ed., *New Advances in Gastromotility Research*, Springer Science. [[doi: 10.1007/978-94-007-6561-0\\_5](https://doi.org/10.1007/978-94-007-6561-0_5)]

Obioha C, **Erickson J**, Suseela S, Hajri T, Chung E, Richards W, Bradshaw LA. (2013) Effect of Body Mass Index on the sensitivity of Magnetogastrogram and Electrogastrogram. *J. Gastroenterology and Hepatology Research*; 2(4): 512-518. [[doi: 10.6051/j.issn.2224-3992.2013.02.244](https://doi.org/10.6051/j.issn.2224-3992.2013.02.244)]

Angeli TR, O'Grady G, Paskaranandavadivel N, **Erickson J**, Du P, Pullan AJ, Bissett I, and Cheng LK. (2013) Experimental and Automated Techniques for High-Resolution Electrical

Mapping of Small Intestine Slow Wave Activity. *J. Neurogastroenterology and Motility*, 19(2):179-191. [[doi: 10.5056/jnm.2013.19.2.179](https://doi.org/10.5056/jnm.2013.19.2.179)]

Yassi R, O'Grady G, Paskaranandavadivel N, Du P, Angeli TR, Cheng LK, and **Erickson J** (2012) The Gastric Electrical Mapping Suite (GEMS): Software for analyzing and visualizing high-resolution (multi-electrode) recordings in spatiotemporal detail. *BMC Gastroenterology* 12(60). [[doi: 10.1186/1471-230X-12-60](https://doi.org/10.1186/1471-230X-12-60)]

**Erickson J**, O'Grady G, Du P, Egbuji, JE, Pullan AJ, and Cheng LK. (2011) Automated Gastric low wave cycle partitioning and visualization for high-resolution activation time maps. *Ann. Biomed. Eng.* 39(1): 469-483 [[doi: 10.1007/s10439-010-0170-8](https://doi.org/10.1007/s10439-010-0170-8)]

**Erickson J**, O'Grady G, Du P, Obioha C, Qiao W, Richards WO, Bradshaw LA, Pullan AJ, and Cheng LK. (2010) Falling-Edge, Variable Threshold (FEVT) Method for the Automated Detection of Gastric Slow Wave Events in High-Resolution Serosal Electrode Recordings. *Ann. Biomed. Eng.* 38(4): 1511-1529 [[doi: 10.1007/s10439-009-9870-3](https://doi.org/10.1007/s10439-009-9870-3)]

**Erickson J**, Obioha C, Bradshaw LA., Goodale A, and Richards WO. (2009) Detection of Small Bowel Slow-Wave Frequencies From Noninvasive Biomagnetic Measurements. *IEEE Trans. Biomed. Eng.* 56(9): 2181-9. [[doi: 10.1109/TBME.2009.2024087](https://doi.org/10.1109/TBME.2009.2024087)]

**Erickson J**, Tooker A, Tai Y-C, and Pine J. (2008) The Neurochip: a parylene-based microdevice for non-invasive probing of cultured neural network connectivity at the single neuron level. *J. Neurosci. Meth.* 175(1): 1-16. [[doi:10.1016/j.jneumeth.2008.07.023](https://doi.org/10.1016/j.jneumeth.2008.07.023)]

#### **SELECTED CONFERENCE PROCEEDINGS** (\* = Student Co-author)

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**Erickson J**, Reed .\*, Wharton J\*, Thapa U\*, Robey J\*, Shrestha R\*. (2020) Open-source 128-channel Bioamplifier Module for Ambulatory Monitoring of Gastrointestinal Electrical Activity, *Conf. Proc. IEEE-EMBS 2020*, 4429-2243.

Neely L\*, Gaiennie J\*, Noble N\*, and **Erickson J**. (2016) Stingray-inspired robot with simply actuated intermediate motion. *Proc SPIE 9797, Bioinspiration, Biomimetics and Bioreplication*, 2016. [[doi: 10.1117/12.2219494](https://doi.org/10.1117/12.2219494)]

Putney J\*, O'Grady G, Angeli TA, Paskaranandavadivel N, Cheng LK, **Erickson J**, Du P. (2015) Determining the efficient inter-electrode distance for high-resolution mapping using mathematical model of human gastric dysrhythmias. *Conf. Proc. IEEE-EMBS 2015* [[doi: 10.1109/EMBC.2015.7318642](https://doi.org/10.1109/EMBC.2015.7318642)]

Paskaranandavadivel N, Du P, **Erickson J**, O’Grady G, Cheng LK. (2015) Extending the automated gastrointestinal analysis pipeline: Removal of invalid slow wave marks in gastric serosal recordings *Conf. Proc. IEEE-EMBS* 2015. [doi: 10.1109/EMBC.2015.7318763]

**Erickson J**, Engel E\*, Strickland K\*, Wasden WA\*, and Overholtzer J. (2014) Microbiological and Economic Assessment of Ceramic Pot Filters Used Long-Term in Households in San Pedro La Laguna, Guatemala. *World Environmental and Water Resources Congress 2014*: 1617-1626 [doi: 10.1061/9780784413548.160]

**Erickson J**. (2012) New course in bioengineering and bioinspired design. *Biomed Sci Instrum.*, 48:96-103 [PMID: 22846270]

Giampalmo S\*, Absher B\*, Bourne WT\*, Steves L\*, Vodenski V\*, O’Donnell P\*, and **Erickson J**. (2011) Generation of Complex Motor Patterns in American Grasshopper Via Current-Controlled Thoracic Electrical Interfacing. *Conf. Proc. IEEE-EMBS* 2011, 1275 - 1278. [doi: [10.1109/IEMBS.2011.6090300](https://doi.org/10.1109/IEMBS.2011.6090300)]

Angeli TR, O’Grady G, **Erickson J**, Du P, Paskaranandavadivel N, Bissett IP, Cheng LK, and Pullan AJ. (2011) Mapping Small Intestine Bioelectric Activity Using High-Resolution Printed Circuit-Board Electrodes. *Conf. Proc. IEEE-EMBS* 2011, 4951 – 4954. [doi:10.1109/IEMBS.2011.6091227]

**Erickson J**, Tooker A, Tai Y-C, and Pine J. (2008) First Network Studies with the Caged-Neuron Multielectrode Array. *Conf Proc 6<sup>th</sup> International Meeting on Substrate-Integrated Multi Electrode Arrays*. Reutlingen, Germany, July 2008, 287-289.

**Erickson J**, Obioha C, Goodale A, Bradshaw LA, and Richards WO. (2008) Noninvasive Detection of Small Bowel Electrical Activity from SQUID Magnetometer Measurements using SOBI. *Proc. IEEE-EMBS* 2008, Vancouver, B.C., pp 1871-1874. [doi:10.1109/IEMBS.2008.4649550]

## **SELECTED CONFERENCE ABSTRACTS**

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Seo S, O’Grady G, Wells C, Rowbotham D, Calder S, Bissett I, Paskaranandavadivel N, and **Erickson J**. Validation of body surface colonic mapping against high resolution colonic manometry: a novel non-invasive tool for detection of colonic motility. Accepted abstract, invited for podium presentation at the *American Society of Colon and Rectal Surgeons (ASCRS) Annual Scientific Meeting*, Seattle, June 2023.



Dorwick JM, Tremain PJ, Nikoas, LJ, Offutt SJ, **Erickson J**, and Angeli TR. Translation of an off-the shelf, implanatable cardiac monitoring device for the measurement of gastric electrical slow wave activity, validated with high-resolution electrical mapping. *Digestive Diseases Week*, Chicago, IL, USA, May 2023, SU1957.

Colavita M\*, Witherell H\*, **Erickson J**, and Schreiber W. (2019) Measurement of Discrete Behaviors in Ants Using Spatially Averaged Intensity Gradients. *Society for Integrate and Comparative Biology Annual Meeting*, Tampa, FL, Jan 2019.

Calder S, **Erickson J**, O’Grady G, Cheng LK, Du P. (2018) Wave front tracking and velocity profiling of EGG signatures. *Digestive Diseases Week – international Gastrointestinal Electrophysiology Society Meeting*, Washington, DC, June 2, 2018.

Putney J\*, Hayes J\*, **Erickson J**, and Angeli T. (2016) The Quantification of Slow Wave Behavior after Induction of Intestinal Ischemia in a Porcine Model. *Conf. Proc. IEEE-EMBS 2016*, Orlando, FL.

Yassi R, O’Grady G, Cheng LK, and **Erickson J**. (2011) The Gastric Electrical Mapping Suite (GEMS): Software for analyzing and visualizing gastrointestinal multi-electrode recordings. *Digestive Diseases Week* (1030948), Chicago, IL, May 7 – 10 (Invited oral presentation, top 10% of abstracts)

**Erickson J**, O’Grady G, Du P, Pullan AJ, and Cheng LK. (2010) “Automated Event Detection and Activation Mapping for High Resolution Gastric Slow Wave Recordings.” *Digestive Diseases Week*, New Orleans, May 2010.

Goodale A, **Erickson J**, Obioha C., Irimia A, Williams B., Bradshaw LA, and Richards WO. (2008) Partial Mesenteric Ischemia Alters Biomagnetic Slow Wave. *Conference Proceedings: Digestive Diseases Week*, San Diego, 2008 (W1289).

#### **UNDERGRADUATE SUMMER RESEARCH MENTORSHIP** (selected projects)

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Summer 2023: *GI stethoscope for monitoring colonic bowel sounds; Colonic motor patterns relation to heart rate variability: proxy for brain-gut interaction* (Lui Blomberg ’25, Jasmine Gipson ’24, Mason Marchetti ’24, London Paige ’25; Noah Shelton ’25)

Summer 2021: *Can dry body-surface electrodes be used to non-invasively measure colonic motility?: a meal-response study* (Emily Hassid ’22, Elen Stepanyan ’22)

Summer 2020: *On the outside looking in: automated method for tracking propagating wavefronts in the distal colon.* (Emily Hassid ’22, Lauren Shelby ’23, Elen Stepanyan ’22, and Jeremy Wharton ’23)

Summer 2019: *Mapping cyclic contractions of the colon with high spatial density.* (Beth Reed, '22, Jack Robey '20, Riwan Shrestha '22, Utkrist Thapa '21, and Jeremy Wharton '23)

Summer 2018: *Electrocolonography: body surface recordings detect underlying contractions of the colon in meal response study* (Laura Bruce'20, Andrew Taylor '20, Jack Richman '20, Connor Higgins '20, and Nicole Chin '22)

Summer 2017: *Quantifying and characterizing spike burst activity in ischemic small intestine.* (Alfred Rwagaju '18)

Summer 2016: *In vivo assessment and quantification of new electronics module for measuring gastrointestinal slow waves.* (Jamie Hayes '17)

Summer 2015: *Non-invasive, Low-Cost, Wireless Electronics for Detecting Gastrointestinal Slow Waves* (Jamie Hayes '17, Alfred Rwagaju '18, and Rajwol Joshi '18)