

# Ross C. Lagoy, PhD

**Contact information:**

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**Current address:**

Quincy, MA 02169

**Expertise:**

Assay automation, microfluidics, software development, neuroscience, microscopy, optogenetics, data vis/analysis

## EDUCATION

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<b>PhD</b>	Worcester Polytechnic Institute (WPI), Biomedical Engineering (BME) Advisor: Dirk R. Albrecht, PhD Title: <i>Automated whole-organism functional screening technologies and neurological disease models in C. elegans</i>	5/2018
<b>M.E.</b>	Worcester Polytechnic Institute, BME, 4.0 GPA	5/2015
<b>B.S.</b>	Worcester Polytechnic Institute, BME, High distinction Massachusetts Academy of Mathematics and Science at WPI	5/2013 5/2010

## RESEARCH EXPERIENCE

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<b>Dissertation Research</b>		2013-18
WPI Department of Biomedical Engineering Advisor: Dirk R. Albrecht, PhD		
<ul style="list-style-type: none"><li>- Developed an approach for modeling and characterizing human neurological disorders using the organism <i>C. elegans</i>. (see publication #2)</li><li>- Invented, designed, and built a robotic technology that enables new automated high-throughput assays for microfluidic devices. (see patent #1; publication #3)</li><li>- Invented and developed an automated high-content screening method and analysis platform for identifying modulators of cellular activity <i>in vivo</i>. (see patent #2; in prep. for publication #1)</li></ul>		
<b>Research Assistant</b>		2012-13
WPI Department of Chemistry and Biochemistry Advisor: Christopher R. Lambert, PhD		
<ul style="list-style-type: none"><li>- Developed and characterized a photosensitive self-assembled monolayer for retinal prosthesis (see publication #7).</li></ul>		
<b>Research Assistant</b>		2011-12
WPI Department of Biomedical Engineering Advisor: Glenn R. Gaudette, PhD		
<ul style="list-style-type: none"><li>- Evaluated stem cell delivery methods and techniques for human tissue regeneration.</li></ul>		

## HONORS & AWARDS

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Sigma Xi Outstanding Doctoral Dissertation Award	2019
National Academy of Inventors, honorary member	2018
Alfred R. & Janet H. Potvin Award, outstanding graduate student in BME	2015
Teaching Assistant of the Year Award ( <b>1 out of 142</b> )	2014
NSF Graduate Research Fellowship Program, honorable mention ( <b>2,000 out of &gt;12,000</b> )	2014
WPI Alumni Association Outstanding Leadership Award	2013
WPI Crimson & Gray Award, significant contributions in improving quality of life at WPI	2013
Certificate of Appreciation, USA Special Olympics Unified Partner	2011
Massachusetts State Science and Engineering Fair, 2 <sup>nd</sup> and 3 <sup>rd</sup> Place Sponsored Awards at MIT	2008-10

## PATENTS

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1. Modular Robotic Systems for Delivering Fluid to Microfluidic Devices	USPTO App. # 62/613,951	2019
2. Hydrogel Encapsulation of Living Organisms for Long-Term Microscopy	USPTO App. # 62/557,434	2018

## TEACHING EXPERIENCE

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- Teaching Assistant, Marine Biological Laboratory, Woods Hole, MA** 2015-18  
*Neural Systems & Behavior Course* (4 summers)
- Mentored postdocs, MD, and PhD students during a two-week intensive course in calcium imaging and optogenetics, microfluidics, and genetic techniques for the *C. elegans* module with collaborators from Yale University (Colón-Ramos) and UMass Med. School (Alkema).
- Invited Guest Lecture, WPI Department of Computer Science** 2018  
*Biovisulization – CS4802/573/582, BCB4802/502*
- *BioVis In Support of Neuro Research*, slides available on [rosslagoy.com/portfolio](http://rosslagoy.com/portfolio)
- Teaching Assistant, WPI Department of Biomedical Engineering** 2013-17  
*Biomedical Signals, Instruments and Measurements – BME 2210* (4 terms)
- Assisted in the development of a new biological sensor lab course (~100 students), held weekly discussions and office hours, and graded labs, homework, and exams.
  - Supervised 3-4 undergraduate peer-learning assistants in grading of assignments per term.
  - The instructor was awarded the Romeo L. Moruzzi Young Faculty Award for innovation in undergraduate education during my appointment as the TA.
- Cellular Engineering Lab – BME 3813* (2 terms)
- Prepared weekly lab materials for ~36 students and assisted lab practice of cell culture techniques, microscopy, and analysis. Designed, implemented, and taught a new micro-contact cell culture patterning lab module. Graded lab reports.
  - Supervised 2-3 undergraduate peer-learning assistants in laboratory preparation per term.
- Introduction to Biomechanics and Biotransport – BME 2511* (1 term)
- Held weekly discussions and office hours, administered online quizzes, and graded exams.

## MENTORSHIP & LEADERSHIP EXPERIENCE

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- Research Scientist, National Oceanic and Atmospheric Administration (NOAA)** 2018
- Assisted chief scientists and crew onboard the *RV Hugh R. Sharp* in marine sampling and sorting, data collection, and HabCam operation (WHOI) for the Northeast Fisheries Science Center (NEFSC) annual scallop survey leg (10 days, 12 hour shifts).
- Judge & Mentor, Science, Technology, Engineering and Math Fair(s)** 2014-18
- Volunteered as a judge and project advisor (Mass Academy high school juniors) for middle and high school regional science and engineering fairs, as well as Assistive Technology (AT) projects at Mass Academy. I was an invited AT judge at Mass Academy, and Roth Award Task Force judge at the Massachusetts State Science and Engineering Fair (MSSEF) at MIT.
- Co-founder, WPI Undergraduate Research Journal (WURJ)** 2015-17
- Scholarly research journal featuring undergraduate work from independent and group research or WPI course projects. WURJ is organized by graduate students that peer-review and accept undergraduate submissions based on rigorous criteria. Raised >\$10K through WPI student government associations, grant (NSF IGERT EHR), and industry sponsorships.
- Graduate Student REU Mentor, National Science Foundation** 2014-15
- Mentored undergraduate bioengineering students from LSU and MIT in the Albrecht Lab. Abstracts were presented at annual Biomedical Engineering Society (BMES) meetings.
- Graduate Student Advisor, BME Major Qualifying Project (MQP)** 2013-14
- Mentored a team of four senior BME students in the Albrecht Lab. Their project was a finalist at WPIs MQP Project Presentation Day and national BMES Undergraduate Design Competition.
- Student representative, WPI Recruiting Fair(s) (BMES, NCUR, and Tau Beta Pi) 2015-17
- Student representative, WPI BME Department Open House 2015-16
- Research demonstration, WPI Engineering Outreach Day 2014-16
- Exhibit volunteer, WPI-NASA TouchTomorrow (K-12 STEM) 2016
- Resident Advisor, WPI (Rising Star award, Program of The Year award) 2012-14
- Unified Partner, USA Special Olympics 2008-16

## PUBLICATIONS

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1. **Lagoy, R.C.**, Albrecht, D.R. (2019). "Automated high-content and long-term functional compound screening of cellular activity in *C. elegans*." In preparation for submission.
2. **Lagoy, R.C.**†, Kim, H.†, Mello, C.C., Albrecht, D.R. "A *C. elegans* model for the rare human channelopathy, Timothy syndrome type 1." microPublication Biology (2018). doi.org/10.17912/MICROPUB.BIOLOGY.000081.
3. **Lagoy, R.C.**, Albrecht, D.R. (2018). "Automated fluid delivery from multiwell plates to microfluidic devices for high-throughput experiments and microscopy." Scientific Reports. 8, 6217. doi:10.1038/s41598-018-24504-x
4. Fagan, K.A., Luo, J., **Lagoy, R.C.**, *et al.* (2018). "A single-neuron chemosensory switch determines the valence of a sexually dimorphic sensory behavior." Current Biology. 28(6), 902–914. doi.org/10.1016/j.cub.2018.02.029
5. **Lagoy, R.C.**, Albrecht, D.R. (2015). "Simple microfluidic devices for *C. elegans* behavioral analysis, microscopy, and neuronal imaging." Springer Methods. Chapter 12. 2<sup>nd</sup> ed.
6. **Lagoy, R.C.**, Gongs, T., Albrecht, D.R. (2015). "Mapping sensory diversity using microfluidic-driven high-throughput neural imaging in *C. elegans*." IEEE. doi:10.1109/NEBEC.2015.7117107.
7. Huang, F., Bladon, J., **Lagoy R.C.**, *et al.* (2014). "A photosensitive surface capable of inducing electrophysiological changes in NG108-15 neurons." Acta Biomaterialia. doi:10.1016/j.actbio.2014.10.023

## PLATFORM PRESENTATIONS (of 7)

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1. **Lagoy, R.C.**, Albrecht, D.R. "New automated screening technologies identify acute and chronic modulators of neural activity in *C. elegans*." *Boston Area Worm Meeting, MIT, Cambridge, MA (2018)*.
2. **Lagoy, R.C.**, Albrecht, D.R. "A pipeline for screening therapeutic perturbations of neural activity in whole-organism channelopathy models." *CeNeuro, Nagoya, Japan (2016)*. The Company of Biologists Travel Award.
3. **Lagoy, R.C.**, Kim, H., Albrecht, D.R. "Accelerated drug screening in a whole-organism model for calcium channelopathies." *WPI-UMMS Seed Funding, Worcester, MA (2016)*.
4. **Lagoy, R.C.**, Huang, Y., Alkema, M., Albrecht, D.R. "A quantitative tool to study *C. elegans* models of neuropsychiatric disease." *Worcester Area Worm Meeting, UMass Medical School, Worcester, MA (2015)*.
5. **Lagoy, R.C.** "Worms and computer science." *Computer Science Education Week, Mass Academy of Math & Science, Worcester, MA (2014-2017)*.
6. **Lagoy, R.C.**, Albrecht, D.R. "High-throughput imaging in a *C. elegans* autism model." *WPI Journal Club Seminar, Worcester, MA (2014)*.

## POSTER PRESENTATIONS (of 13)

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1. **Lagoy, R.C.**, Albrecht, D.R. "An *in vivo* automated functional screening method identifies modulators of neural activity for accelerated drug discovery." *SfN Annual Meeting, San Diego, CA (2018)*.
2. **Lagoy, R.C.**, Albrecht, D.R. "Automated whole-organism functional screening technologies identify modulators of optogenetically-evoked calcium activity in *C. elegans*." *CeNeuro, Madison, WI (2018)*.
3. **Lagoy, R.C.**, Kim, H., Albrecht, D.R. "An automated high-throughput functional screen of neuromodulators for neuropsychiatric disease models." *International C. elegans Conference, Los Angeles, CA (2017)*.
4. **Lagoy, R.C.**, Kim, H., Albrecht, D.R. "Functional screening of neuromodulators for *C. elegans* models of human calcium channelopathies." *SfN Chapter Meeting, Amherst, MA (2017)*. 1<sup>st</sup> Place DataBlitz & Poster.
5. **Lagoy, R.C.**, Gongs, T., Albrecht, D.R. "Mapping sensory diversity using microfluidic-driven high-throughput neural imaging in *C. elegans*." *IEEE, 41st Annual NEBEC, RPI, Troy, NY (2015)*.
6. Dick, C., **Lagoy, R.C.**, Albrecht, D.R. "A system for identifying modulators of neural activity in a whole-organism channelopathy model." *BMES, Tampa, FL (2015)*.
7. Gongs, T., **Lagoy, R.C.**, Albrecht, D.R. "Mapping sensory diversity using high-throughput neural imaging in *C. elegans*." *BMES, San Antonio, TX (2014)*.

## POSTER PRESENTATIONS (CONTINUED) (of 13)

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8. **Lagoy, R.C.**, Albrecht, D.R. "Development of a *C. elegans* autism model for high-throughput neural imaging and drug screening." *GRIE, WPI, Worcester, MA (2014\*-2017\*\*)*. \*Honorable Mention, \*\*Finalist
9. **Lagoy, R.C.**, Huang, F., Lambert, C.R. "Electrophysiological proof-of-concept studies of a sub-retinal prosthesis based on an okayama-type design." *NanoWorcester Symposium, WPI, Worcester, MA (2012)*.

## INNOVATION PITCHES

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1. **Lagoy, R.C.**, Albrecht, D.R. "Modular robotic system for fluid delivery to microfluidic devices." *WPI Innovation Showcase, WPI Seaport, Boston, MA (2018)*.
2. **Lagoy, R.C.**, Burnett, K.R., Albrecht, D.R. "Hydrogel encapsulation of living organisms for long-term microscopy and screening applications." *WPI Innovation Showcase, WPI Seaport, Boston, MA (2018)*.

## FELLOWSHIPS & GRANTS

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Postdoctoral Fellow (Interim), WPI	2018-2019
NSF IGERT Competitive Innovation Incentive Funding Award, PI (15K)	2018
Research Assistant, WPI	2014-2018
NSF IGERT Directorate for Education & Human Resources Grant (35K)	2016-17
Teaching Assistant, WPI	2013-15/17

## PROFESSIONAL SOCIETIES

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Sigma Xi	2019-pres.
Society for Neuroscience (SfN)	2018-pres.
Genetics Society of America (GSA)	2017
Biomedical Engineering Society (BMES)	2014
American Association for the Advancement of Science (AAAS)	2013
Alpha Eta Mu Beta (BME honor society)	2012

## CERTIFICATIONS

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Water Safety Instructor, Waterfront Lifeguard, First Aid; American Red Cross	2008/9-pres.
CPR/AED; American Heart Association	2008-pres.
National Association of State Boating Law Administrators (NASBLA), Hawaii	2013-pres.

## REFERENCES

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### **Dr. Dirk R. Albrecht, PhD** (Doctoral Advisor)

Associate Professor, WPI Department(s) of Biomedical Engineering and Biology & Biotechnology  
LSBC Gateway Park, 60 Prescott Street, USA, Worcester MA, 01609  
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### **Dr. Mark Alkema, PhD** (Doctoral Committee Member)

Professor, UMass Medical School Department of Neurobiology  
UMMS LRB, 364 Plantation Street, USA, Worcester MA, 01605  
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### **Dr. David S. Adams, PhD** (Doctoral Committee Member)

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