

Elizabeth A. Ronan, Ph.D.

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Ann Arbor, MI 48109

email: lizronan@umich.edu

EDUCATION AND TRAINING:

Postdoctoral Research Fellow, Department of Biologic and Materials Sciences 2022-present
University of Michigan School of Dentistry, Ann Arbor, MI

Summary: Determining the role of trigeminal sensory neurons in oral somatosensation

Advisor: Joshua J. Emrick, D.D.S., Ph.D.

Doctor of Philosophy, Molecular and Integrative Physiology 2015-2022

University of Michigan Medical School, Ann Arbor, MI

Dissertation: Neural and genetic mechanisms of sensory reception in *C. elegans*

Advisor: XZ Shawn Xu, Ph.D.

Master of Science, Molecular and Integrative Physiology 2012-2013

University of Michigan Medical School, Ann Arbor, MI

Thesis: Characterization of *in vitro* engineered ligament constructs and assessment of cellular migration following anterior cruciate ligament repair

Advisors: Lisa Larkin, Ph.D., Deneen Wellik, Ph.D.

Bachelor of Science, Neuroscience 2009-2012

University of Michigan, Ann Arbor, MI

Thesis: Examining dexterous motor control in a rat Parkinsonian model

Advisor: Martin Sarter, Ph.D.

PUBLICATIONS:

ORCID ID: <https://orcid.org/0000-0001-7400-5718>

Research Articles:

1. Su XY, **Ronan EA**, Perry SK, Lee H, Hor CC, Fatima M, Zheng XY, Wang J, Liu S, Koecklin KHU, Wan S, Jha A, Li P, Du W, Cai D, Emrick JJ, Duan B. A touch-guided neural circuit regulates motivated gnawing to maintain dental alignment. **Neuron**. 2026 Mar 10:S0896-6273(26)00046-2. doi: 10.1016/j.neuron.2026.01.021. Epub ahead of print. PMID: 41812659.
2. Wan S*, **Ronan EA***, Jha A, Gandhi AR, Constantinescu BSC, Pipe KP, Emrick JJ. Protocol for the precise activation of intradental neurons in mice via electrical stimulation. **STAR Protoc**. 2026 Mar 2;7(1):104386. doi: 10.1016/j.xpro.2026.104386. Epub ahead of print. PMID: 41779615; PMCID: PMC12969412. *Contributed equally.

3. Xu LA, Son HJ, Bai X, Li R, **Ronan EA**, Kim GH, Ye B. Cold Sensing By A Glutamate Receptor Drives Avoidance Behavior In *Drosophila* Larvae. *bioRxiv [Preprint]*. 2025 Oct 6:10.05.680544; doi: <https://doi.org/10.1101/2025.10.05.680544>
4. Xu LA, Liu H, Li Z, Xu XZS, Ye B, Hu Y, **Ronan EA**. Automated analysis of *C. elegans* behavior by LabGym: an open-source, AI-powered platform. *bioRxiv [Preprint]*. 2025 Sep 3:2025.08.28.672961. doi: 10.1101/2025.08.28.672961. PMID: 40950071; PMCID: PMC12424692.
5. **Ronan EA**, Gandhi AR, Uchima Koecklin KH, Hu Y, Wan S, Constantinescu BSC, Guenther ME, Nagel M, Liu L, Jha A, Dakhilalla L, Blumberg KJ, Berthaume IT, Stern T, Pipe KP, Ye B, Li P, Emrick JJ. Intradental mechano-nociceptors serve as sentinels that prevent tooth damage. *Cell Reports*. 2025 Aug 26;44(8):116017. doi: 10.1016/j.celrep.2025.116017. Epub 2025 Jul 16. PMID: 40679913; PMCID: PMC12442953.
6. Guo Y, Zhang Q, Zhang B, Pan T, **Ronan EA**, Huffman A, He Y, Inoki K, Liu J, Xu XZS. Dietary cinnamon promotes longevity and extends healthspan via mTORC1 and autophagy signaling. *Aging Cell*. 2025 Jan 6;:e14448. doi: 10.1111/ace1.14448. PMID: 39760475.
7. Wang C*, **Ronan EA***, Iliff AJ, Al-Ebidi R, Kitsopoulos P, Grosh K, Liu J, Xu XZS. Characterization of auditory sensation in *C. elegans*. *Biophysics Reports*. 2024 Dec 31;10(6):351-363. doi: 10.52601/bpr.2024.240027. PMID: 39758425; PMCID: PMC11693501. *Contributed equally. (cover story)
8. Wang C*, **Ronan EA***, Kim SK, Kitsopoulos P, Iliff AJ, Grosh K, Kim GH, Liu J, Xu XZS. Sensing of sound pressure gradients by *C. elegans* drives phonotaxis behavior. *Current Biology*. 2023 Sep 25;33(18):3985-3991.e4. doi: 10.1016/j.cub.2023.08.005. Epub 2023 Aug 28. PMID: 37643623 PMCID: PMC10575617. *Contributed equally.
9. Li Z, Zhou J, Wani KA, Yu T, **Ronan EA**, Piggott BJ, Liu J, Xu XZS. A *C. elegans* neuron both promotes and suppresses motor behavior to fine tune motor output. *Front. Mol. Neuro*. 2023 Aug 15:16:1228980. doi: 10.3389/fnmol.2023.1228980. eCollection 2023. PMID: 37680582, PMCID: PMC10482346.
10. Iliff AJ, Wang C, **Ronan EA**, Hake AE, Guo Y, Li X, Zheng M, Liu J, Grosh K, Duncan RK, Xu XZS. The nematode *C. elegans* senses airborne sound. *Neuron*. 2021 Nov 17;109(22):3633-3646.e7. doi: 10.1016/j.neuron.2021.08.035. Epub 2021 Sep 22. PMID: 34555314; PMCID: PMC8602785.
11. Zhang W, He F, **Ronan EA**, Liu H, Gong J, Liu J, Xu XZS. Regulation of photosensation by hydrogen peroxide and antioxidants in *C. elegans*. *PLoS Genet*. 2020 Dec 10;16(12):e1009257. doi: 10.1371/journal.pgen.1009257. PMID: 33301443; PMCID: PMC7755287.
12. Gong J*, Liu J*, **Ronan EA***, He F*, Cai W, Fatima M, Zhang W, Lee H, Li Z, Kim GH, Pipe KP, Duan B, Liu J, Xu XZS. A Cold-Sensing Receptor Encoded by a Glutamate Receptor

Gene. **Cell**. 2019 Sep 5;178(6):1375-1386.e11. doi: 10.1016/j.cell.2019.07.034. Epub 2019 Aug 29. PMID: 31474366; PMCID: PMC6743979. *Contributed equally.

13. Wescott SA, **Ronan EA**, Xu XZ. Insulin signaling genes modulate nicotine-induced behavioral responses in *Caenorhabditis elegans*. **Behav Pharmacol**. 2016 Feb;27(1):44-9. doi: 10.1097/FBP.000000000000186. PMID: 26317299; PMCID: PMC4684988.
14. Zhang B, Xiao R, **Ronan EA**, He Y, Hsu AL, Liu J, Xu XZ. Environmental Temperature Differentially Modulates *C. elegans* Longevity through a Thermosensitive TRP Channel. **Cell Reports**. 2015 Jun 9;11(9):1414-24. doi: 10.1016/j.celrep.2015.04.066. Epub 2015 May 28. PMID: 26027928; PMCID: PMC4758836.
15. Xiao R, Chun L, **Ronan EA**, Friedman DI, Liu J, Xu XZ. RNAi Interrogation of Dietary Modulation of Development, Metabolism, Behavior, and Aging in *C. elegans*. **Cell Reports**. 2015 May 19;11(7):1123-33. doi: 10.1016/j.celrep.2015.04.024. Epub 2015 May 7. PMID: 25959815; PMCID: PMC4439342.
16. Mahalingam VD, Behbahani-Nejad N, **Ronan EA**, Olsen TJ, Smietana MJ, Wojtys EM, Wellik DM, Arruda EM, Larkin LM. Fresh versus frozen engineered bone-ligament-bone grafts for sheep anterior cruciate ligament repair. **Tissue Eng Part C Methods**. 2015 Jun;21(6):548-56. doi: 10.1089/ten.TEC.2014.0542. Epub 2014 Dec 29. PMID: 25397990; PMCID: PMC4442592.

Review Articles:

1. **Ronan EA**, Nagel M, Emrick JJ. The anatomy, neurophysiology, and cellular mechanisms of intradental sensation. **Front Pain Res (Lausanne)**. 2024 Mar 25;5:1376564. doi: 10.3389/fpain.2024.1376564. PMID: 38590718; PMCID: PMC11000636.

Commentaries:

1. Pan, T*, **Ronan, EA***, and Xu, X.Z.S. Thermosensation: How a human-infective nematode finds its host. **Current Biology**. 2022 May 23;32(10):R464-R466. doi: 10.1016/j.cub.2022.04.049. PMID: 35609543 PMCID: PMC9980427. *Contributed equally
2. **Ronan EA**, Xiao R, Xu XZS. TRP channels: Intestinal bloating TRiPs up pathogen avoidance. **Cell Calcium**. 2021 Sep;98:102446. doi: 10.1016/j.ceca.2021.102446. Epub 2021 Jul 11. PMID: 34303264; PMCID: PMC8419106.

PATENTS:

Precision cooling of oral tissues for dental anesthesia. 2025. Provisional patent application: #63/758,585. Inventors: Wan, Shuhao; **Ronan, Elizabeth A**; Pipe, Kevin P, Emrick, Joshua J.

ABSTRACTS:

1. **Ronan EA**, Wan S, Gandhi AR, Perry SK, Donnelly CR, Pipe KP, Emrick JJ. Determining the Functional and Anatomical Basis of *Scn10a*+ Somatosensory Neurons Encoding Jaw Movement. 2025 *REJOIN Annual Meeting*.
2. Xu LA, Li Z, Hu Y, Ye B, Xu XZS, **Ronan EA**. LabGym: An Open-Source, AI-Powered Platform for *C. elegans* Behavior Analysis. 2025 *25th International Worm Meeting*.
3. **Ronan EA**, Hu Y, Dakhilalla L, Wan S, Ye B, Emrick JJ. Chemogenetic activation of intradental neurons produce tooth pain. 2025 *U-M Neuroscience Conference*.
4. Wan S*, **Ronan EA***, Gandhi AR, Jha A, Pipe KP, Emrick JJ. Intradental Neurons Are Polymodal Nociceptors That Encode Noxious Cold. 2025 *AADOOCR/CADR Annual Meeting*. *Contributed equally.
5. **Ronan EA**, Gandhi AR, Constantinescu BSC, Uchima Koecklin KH, Hu Y, Wan S, Guenther ME, Nagel M, Jha A, Dakhilalla L, Blumberg KJ, Berthaume I, Stern T, Pipe KP, Ye B, Li P, Emrick JJ. Intradental Mechano-Nociceptors Serve as Sentinels That Prevent Tooth Damage. 2025 *AADOOCR/CADR Annual Meeting*.
6. **Ronan EA**, Wan SH, Gandhi AR, Jha A, Perry SK, Jayachandran S, Cai D, Pipe KP, Donnelly CR, Emrick JJ. Functional and Molecular Dissection of Trigeminal Sensory Neurons involved in TMD. 2024 *REJOIN Annual Meeting*.
7. **Ronan EA**, Gandhi AR, Constantinescu BSC, Cai D, Donnelly CR, Stern T, Emrick JJ. Defining functional responses in trigeminal sensory neurons during temporomandibular joint movement. 2023 *RE-JOIN Annual Meeting*.
8. **Ronan EA**, Guenther ME, Nagel M, Constantinescu BSC, Gandhi AR, Ghitani N, Chesler AT, Emrick JJ. Determining the function of tooth-innervating trigeminal sensory neurons. 2022 *Society for Neuroscience Annual Meeting*.
9. Gandhi AR, Constantinescu BSC, Guenther ME, **Ronan EA**, Emrick JJ. S100b-positive trigeminal sensory neurons innervate the dentinal tubules of murine molars, 2022 *Society for Neuroscience Annual Meeting*.
10. Wang C*, **Ronan EA***, Guo Y, Iliff AJ, Liu, J, Xu XZS. Mechanisms of auditory sensation in *C. elegans*. 2022 *Midwest Auditory Research Conference*.
11. **Ronan EA**, Guo Y, Gong J, Liu J, Kim D, He F, Sartbaeva E, Zhang X, Wu J, Xu XZS. Genetic screening of novel cinnamaldehyde receptors stimulating thermogenic and metabolic responses in adipocytes. 2019 *Life Sciences Institute Celebration of Excellence Symposium*. Ann Arbor, MI
12. **Ronan EA**, LaHaie AR, Sartbaeva E, Sami M, Xu XZS. Neural and genetic mechanisms of menthol sensation in *C. elegans*. 2018 *CeNeuro Meeting*.
13. **Ronan EA**, Ma N, Mandair GS, Esmonde-White KA, Roessler BJ, Xu XZS. Characterization and prevention of aging extracellular matrix deterioration in *C. elegans*. 2017 *University of Michigan Biogerontology Symposium Abstract*.

14. Rauthan M, Gong J, **Ronan EA**, Liu J, Wescott SA, Liu J, Xu XZS. MicroRNA regulation of nicotine-dependent behavior in *C. elegans*. 2017 *International Worm Meeting Abstract*.
15. Xiao R, Chun L, **Ronan EA**, Friedman, DI, Liu J, Xu XZS. MTORC2 and neuroendocrine signaling modulates *C. elegans* physiology and aging in a diet-dependent manner. 2015 *International Worm Meeting Abstract*.
16. Zhang B, Xiao R, **Ronan EA**, He Y, Hsu AL, Liu J, Xu XZS. Environmental temperature differentially modulates *C. elegans* longevity through a thermosensitive channel. 2015 *International Worm Meeting Abstract*.
17. Wescott SA, Rauthan M, **Ronan EA**, Xu, XZS. *Caenorhabditis elegans*: a small, but mighty, tool in understanding addiction. 2014 *Society for Neuroscience Annual Meeting Abstract*.
18. **Ronan EA**, Wescott SA, Xu XZS. A role for neuropeptide signaling in acute nicotine challenge. 2014 *CeNeuro Meeting Abstract*.
19. Kucinski AJ, Paolone G, Peterson C, **Ronan EA**, Albin RL, Sarter M. Deficits in the attentional control of posture and complex movements in a rat model of early state, multisystem Parkinson's disease. 2012 *Society for Neuroscience Annual Meeting Abstract*.

PEER REVIEWER:

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|--|--------------|
| Biosystems | 2025-present |
| Ad hoc Reviewer | |
| Frontiers in Behavioral Neuroscience | 2023-present |
| Review Editor, Individual and Social Behaviors | |

HONORS AND AWARDS:

| | |
|---|-----------------|
| Outstanding Postdoctoral Fellow Award | 2024 |
| Oral Health Sciences Program, University of Michigan, School of Dentistry | |
| Davenport Research Award Finalist | 2020 |
| Molecular and Integrative Physiology, University of Michigan | |
| Student Development Grant Award , Science, Technology, and Public Policy | 2019 |
| Ford School of Public Policy, University of Michigan | |
| 12th Annual Gramlich Showcase Participant | 2019 |
| Ford School of Public Policy, University of Michigan | |
| John A. Williams Award for Outstanding Graduate Student Service | 2018 |
| Molecular and Integrative Physiology, University of Michigan | |
| Kroin Family Travel Scholarship Award , UM Life Sciences Institute | 2017-2019 |
| Rackham Conference Travel Awards , University of Michigan | 2016-2019, 2021 |
| Graduate Education Travel Awards , | 2017-2019 |
| Molecular and Integrative Physiology, University of Michigan | |
| NSF Graduate Research Fellowship (Honorable Mention) , National Science Foundation | 2016 |

Benard L. Maas Fellowship Award

Molecular and Integrative Physiology, University of Michigan

2015

University Honors, University of Michigan

2011

FUNDING:

T32-DC00011 (Trainee)

2024-2025

NIH/NIDCD

Hearing, Balance, and Chemical Senses Training Grant

T32-DE007057-45 (Trainee)

2022-2024

NIH/NIDCR

Tissue Engineering and Regeneration Training Grant

Rackham Predoctoral Fellowship, University of Michigan

2021-2022

Fellowship for outstanding dissertations that are unusually creative, ambitious, and impactful

Rackham Graduate Student Research Award, University of Michigan

2019

T32-DC00011 (Trainee)

2019-2021

NIH/NIDCD

Hearing, Balance, and Chemical Senses Training Grant

T32-AG000114 (Trainee)

2017-2019

NIH/NIA

Predoectional Biology of Aging Training Grant

LSI Cubed Award, UM Life Sciences Institute

2017

SUBMITTED GRANT:

K99DE036046-01 (PI)

1st Submission, June 2025

NIDCR

Dissecting the neural and molecular mechanisms of trigeminal low temperature sensation

SERVICE:

Institutional Service:

President, Dental Postdocs Committee, University of Michigan School of Dentistry

2025-present

President, Postdoc Wellness Committee, University of Michigan

2025-present

Member, Dean's Office Diversity, Equity, and Inclusion Art Initiative Committee

2019-2021

University of Michigan Medical School

Student Representative, RISE Advisory Council, University of Michigan Medical School

2018-2021

Member, Graduate Trainees Committee, Life Sciences Institute, University of Michigan

2018-2020

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|---|-----------|
| Member , Graduate Social Committee Molecular and Integrative Physiology, University of Michigan | 2016-2019 |
| Student Representative , Graduate Committee, Molecular and Integrative Physiology, University of Michigan | 2017-2018 |
| Lead Recruitment Host , Molecular and Integrative Physiology, University of Michigan | 2017 |
| Recruitment Host , Molecular and Integrative Physiology, University of Michigan | 2016 |

Science Policy Service:

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| Student Representative , ACE Committee, American Physiological Society <i>Visited Capitol Hill with the ACE Committee to provide lawmakers with scientific insight into current legislation regarding research funding and regulation.</i> | 2019 |
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Science Outreach:

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| Volunteer Speaker , Aspirnaut Summer Research Internship Program Life Sciences Institute, University of Michigan | 2019 |
| Board Member , Curriculum Leadership Committee SEEK: Science Education and Engagement for Kids, University of Michigan | 2017-2018 |
| Volunteer Educator , SEEK: Science Education and Engagement for Kids, University of Michigan | 2016-2018 |
| Volunteer Educator , Association for Multicultural Sciences, University of Michigan | 2016-2018 |
| Volunteer Scientist , Ann Arbor Hands-On Museum, Ann Arbor, MI | 2016-2018 |
| Volunteer Educator , Females Excelling More in Math, Engineering, and the Sciences (FEMMES), University of Michigan | 2016 |

Media Appearances:

Video feature: "Worms sense sound pressure gradients" — [Current Biology YouTube channel](#), August 28, 2025.

"Tiny worms 'hear' without an eardrum, surprising scientists" *National Geographic*, October 4, 2021. Interviewed by Rebecca Dzombak, Ph.D.

TEACHING:

| Role | Year | Qtr | Course No. & Title | Class Size |
|--------------------------------|------|-----|--|------------|
| Guest Lecturer | 2019 | F | BIO 402: Seminar in Biology Eastern Michigan University | 50 |
| Graduate Student Instructor | 2017 | W | PHYSIOL 201: Human Physiology University of Michigan | 100 |

PROFESSIONAL ASSOCIATIONS:

| | |
|---|--------------|
| International Association for Dental, Oral, and Craniofacial Research | 2025-present |
| Genetics Society of America | 2013-present |
| Society for Neuroscience | 2018-present |

American Physiological Society
Michigan Physiological Society

Elizabeth A. Ronan
Curriculum Vitae
2018-2020
2018-2020