TAYLER D. SHEAHAN, PH.D.

Assistant Professor
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ACADEMIC APPOINTMENTS

Medical College of Wisconsin, Milwaukee, WI (10/2024-present)
Assistant Professor of Cell Biology, Neurobiology, and Anatomy

EDUCATION & TRAINING

University of Pittsburgh School of Medicine, Pittsburgh, PA (01/2018-09/2024)
Postdoctoral Fellowship | Advisor: Sarah E. Ross, Ph.D.
Research Focus: Understanding spinal neuropeptide signaling in itch and pain

Washington University in St. Louis, St. Louis, MO (08/2012-12/2017)
Ph.D., Neurosciences | Advisor: Robert W. Gereau IV, Ph.D.
Dissertation: Bridging the translational gap between rodent and human pain research

Marquette University, Milwaukee, WI (08/2008-05/2012)
B.S., Physiological Sciences, Minor: German, *summa cum laude* | Advisor: Edward M. Blumenthal, Ph.D.
Research Focus: Organization of extracellular matrices in *Drosophila melanogaster*

GRANTS & FELLOWSHIPS

MCW Neuroscience Research Center Brain Clearing and Imaging Grant — 2025
"Visualizing neurons in the mouse nervous system that encode itch"

NIH K99/R00 Pathway to Independence Award (NINDS, K99NS126569) — 2022-2024
"Understanding spinal neuropeptide signaling in itch"

NIH Loan Repayment Program Award in Clinical Research (NINDS, L30NS113129) — 2021-2023, 2019-2021
"Understanding the spinal circuitry of cold"; "Identifying the spinal neurons of itch"

NIH National Research Service Award Postdoctoral Fellowship (NINDS, F32NS110155) — 2018-2022
"Understanding the spinal circuitry of cold"

NIH Postdoctoral Training Grant (NINDS, T32 NS086749) — 2018

Marquette University Honors Program Undergraduate Research Grant — 2011-2012

DAAD-RISE Research Fellowship, Max Delbrück Center for Molecular Medicine — 2011
(German Academic Exchange Service - Research Internships in Science & Engineering)

Marquette University Summer Undergraduate Research Fellowship — 2010

ACADEMIC & PROFESSIONAL AWARDS

University of Pittsburgh School of Medicine

Best Presentation, Pittsburgh Center for Pain Research Current Research on Pain Series — 2023
Travel Award, International Association for the Study of Pain (IASP) World Congress — 2018, 2022
Trainee Travel Award, US Association for the Study of Pain Annual Scientific Meeting — 2022
Trainee Professional Development Award, Society for Neuroscience — 2020
Panel Travel Fellow Awardee, Winter Conference on Brain Research — 2020
Hermann Handwerker Prize, International Forum for the Study of Itch World Congress — 2019
Travel Grant, International Forum for the Study of Itch World Congress — 2019
Best Basic Science Early Career Poster, American Pain Society Scientific Meeting — 2019

Washington University in St. Louis (WUSTL)

Fine Science Tools Travel Fellowship — 2017
Outstanding Abstract, Department of Anesthesiology Academic Evening — 2017
Young Investigator Travel Award, American Pain Society — 2014, 2015, 2017

Marquette University

Biological Sciences Academic Achievement Award — 2012

Klinger College of Arts and Sciences Gold Medal Award	2012
Catherine Welsch Smith Research Award	2011
Barry Goldwater Scholarship Honorable Mention	2011

PUBLICATIONS

Google Scholar; [UG] undergraduate mentee

Preprints and Submitted Manuscripts

1. Madasu MK, Thang LV, Chilukuri P, Palanisamy S, Arackal JS, **Sheahan TD**, Foshage AM, Houghten RA, McLaughlin JP, McCall JG, Al-Hasani R. Peripheral kappa opioid receptor activation drives cold hypersensitivity in mice. bioRxiv: 2020. doi:10.1101/2020.10.04.325118

Peer-Reviewed Articles

13. Liu AW, Zhang YR, Chen C-S, Edwards TN, Ozyaman S, Ramcke T, McKendrick LM, Weiss ES, Gillis JE, Laughlin CR, Randhwa SK, Phelps CM, Kurihara K, Kang HM, Nguyen S-LN, Kim J, **Sheahan TD**, Ross SE, Meisel M, Sumpter TL, Kaplan DH (2025). Scratching promotes allergic inflammation and host defense via neurogenic mast cell activation. Science, 387, eadn9390. doi:10.1126/science.adn9390
    Why it feels good to scratch an itch: the immune benefits of scratching
12. McIlvried LA, Del Rosario JS, Pullen MY, Wangzhou A, **Sheahan TD**, Shepherd AJ, Slivicki RA, Lemen JA, Price TJ, Copits BA, Gereau RW, IV (2024). Intrinsic adaptive plasticity in mouse and human sensory neurons. Journal of General Physiology 157(1): e202313488. doi: 10.1085/jgp.202313488.
11. **Sheahan TD***, Warwick CA*, Cui AY, Baranger DAA, Perry VJ[UG], Smith KM, Manalo AP[UG], Nguyen EK, Koerber HR, Ross SE. Kappa opioids inhibit spinal output neurons to suppress itch (2024). Science Advances, 10, eadp6038. doi:10.1126/sciadv.adp6038
    Itching for connection: Pitt scientists a network of spinal cord neurons that encode itch
    Editor's Pick, International Association for the Study of Pain, Papers of the Week
10. Warwick C, Salsovic J, Hachisuka J, Smith KM, **Sheahan TD**, Chen H, Ibinson J, Koerber HR, Ross SE (2022). Cell type-specific calcium imaging of central sensitization in mouse horsal horn. Nature Communications 13, 5199. doi:10.1038/s41467-022-32608-2
9. Warwick C, Cassidy C, Hachisuka J, Wright MC, Baumbauer KM, Adelman PC, Lee KH, Smith KM, **Sheahan TD**, Ross SE, Koerber HR (2021). *Mrgprd*^{Cre} lineage neurons mediate optogenetic allodynia through an emergent polysynaptic circuit. Pain: 162 (7) 2120-2131. doi:10.1097/j.pain.0000000000002227
8. **Sheahan TD**, Warwick CA, Fanien FG[UG], Ross SE (2020). The neurokinin-1 receptor is expressed with gastrin-releasing peptide receptor in spinal interneurons and modulates itch. Journal of Neuroscience: 40(46):8816–8830. doi:10.1523/JNEUROSCI.1832-20.2020
    Scratching a scientific itch: Pitt scientists untangle the mysterious intricacies of itchiness
7. Snyder LM, Chiang MC, Loeza-Alcocer E, Omori Y, Hachisuka J, **Sheahan TD**, Gale JR, Adelman PC, Sypek EI, Fulton SA, Friedman RL, Wright MC, Duque MG, Lee YS, Hu Z, Huang H, Cai X, Meerschaert KA, Nagarajan V, Hirai T, Scherrer G, Kaplan DH, Porreca F, Davis BM, Gold MS, Koerber HR, Ross SE (2018). Kappa opioid receptor distribution and function in primary afferents. Neuron 99 (6): 1274-1288. doi:10.1016/j.neuron.2018.08.044
6. Shepherd AJ, Copits BA, Mickle AD, Karlsson P, Kadunganattil S, Haroutounian S, Tadinada SM, de Kloet AD, Valtcheva MV, McIlvried LA, **Sheahan TD**, Jain S, Ray PR, Usachev YM, Dussor G, Krause EG, Price TJ, Gereau RW, IV, Mohapatra DP (2018). Angiotensin II triggers peripheral macrophage-to-sensory neuron redox to elicit pain. Journal of Neuroscience 38(32): 7032-7057. doi:10.1523/JNEUROSCI.3542-17.2018
5. **Sheahan TD**, Valtcheva MV, Pullen MY, McIlvried LA, Baranger DAA, Gereau RW, IV (2018). Metabotropic glutamate receptor 2/3 (mGluR2/3) activation suppresses TRPV1 sensitization in mouse, but not human sensory neurons. eNeuro. doi:10.1523/ENEURO.0412-17.2018
4. **Sheahan TD**, Siuda ER, Bruchas MR, Shepherd AJ, Mohapatra DP, Gereau RW, IV, Golden JP (2017). Inflammation and nerve injury minimally affect mouse voluntary behaviors proposed as indicators of pain. Neurobiology of Pain 2:1-12. doi:10.1016/j.ynpai.2017.09.001

3. Valtcheva MV, Copits BA, Davidson S, **Sheahan TD**, Pullen MY, McCall JG, Dikranian K, Gereau RW, IV (2016). Surgical extraction of human dorsal root ganglia from organ donors and preparation of primary sensory neuron cultures. Nature Protocols 11(10): 1877-1888. doi:10.1038/nprot.2016
2. **Sheahan TD**, Copits BA, Golden JP, Gereau RW, IV (2015). Voluntary exercise training: Analysis of mice in uninjured, inflammatory, and nerve-injured pain states. PLoS ONE 10(7): e0133191. doi:10.1371/journal.pone.0133191
1. **Sheahan TD**, Grewal A, Korthuaer LE, Blumenthal EM (2023). The *Drosophila drop-dead* gene is required for eggshell integrity. PLoS ONE 18(12):e0295412. doi:10.1371/journal.pone.0295412

Commentaries & Book Chapters

2. **Sheahan TD**, Hachisuka J, Ross SE (2018). Small RNAs, but sizable itch: TRPA1 activation by an extracellular microRNA. Neuron: 99(3):421-422. doi:10.1016/j.neuron.2018.07.040
1. Iadarola M, McMahon SB, Ross SE, **Sheahan TD**, Verhaagen J. Emerging techniques in basic science and translation. In: Gold MS, Pogatzki-Zahn EM, Wallace MS, eds. Pain 2018: Refresher Courses: 17th World Congress on Pain. Washington, DC: IASP Press; 2018:1-14.

SEMINARS & ORAL PRESENTATIONS

8 additional intramural talks given between 2010-2023

22. **Medical College of Wisconsin**, Department of Pharmacology and Toxicology, February 2025
"Understanding neuropeptide signaling in the neural circuitry of itch"
Departmental Seminar Series
21. **Winter Conference on Brain Research**, Lake Tahoe, CA, January 2025
"Neural basis of kappa opioid receptor inhibition of itch"
Part of *Cells and Circuits of Somatosensation and Pain: From the Periphery to the Brain* Symposium
20. **Marquette University**, Department of Biological Sciences, January 2025
"Understanding neuropeptide signaling in the neural circuitry of itch"
Spring Seminar Series
19. **Texas A&M**, Department of Biology, June 2024
"Understanding neuropeptide signaling in the neural circuitry of itch"
Faculty candidate seminar *same presentation title used for all faculty candidate seminars
18. **Northwestern University Feinberg School of Medicine**, Department of Anesthesiology, May 2024
Faculty Candidate Seminar
17. **Rutgers New Jersey Medical School**, Department of Pharmacology, Physiology, & Neuroscience and The Rutgers Brain Health Institute, April 2024
Faculty Candidate Seminar
16. **Washington University in St. Louis School of Medicine**, Department of Anesthesiology, March 2024
Faculty Candidate Seminar
15. **University of Minnesota Medical School**, Department of Anesthesiology, March 2024
Faculty Candidate Seminar
14. **Medical College of Wisconsin**, Department of Cell Biology, Neurobiology, & Anatomy, February 2024
Faculty Candidate Seminar
13. **Cincinnati Children's Hospital Medical Center**, Department of Anesthesiology, February 2024
Faculty Candidate Seminar
12. **Louisiana State University Health Sciences Center**, Department of Physiology, January 2024
Faculty Candidate Seminar
11. **Saint Louis University School of Medicine**, Department of Pharmacology and Physiology, January 2024
Faculty Candidate Seminar
10. **Society for Neuroscience Annual Meeting**, Washington DC, November 2023
"Identification of a convergent spinal neuron population that encodes itch"
Part of *Setting the Somatosensory Tone: The Spinal Cord Dorsal Horn as a Node for Somatosensory Modulation* mini-symposium

9. **US Association for the Study of Pain Annual Scientific Meeting**, Cincinnati, OH, May 2022
   "Putting the pieces together: Assembling itch spinal neuron networks"
   Part of *Spinal Coding of Somatosensation* Symposium; *symposium moderator
8. **US Association for the Study of Pain Annual Scientific Meeting**, Cincinnati, OH, May 2022
   "Unraveling the spinal coding of itch"
   Part of *Basic Science SIG* Data Blitz
7. **Kappa Therapeutics Virtual Conference**, April 2021
   "Probing the cellular basis of kappa opioid receptor inhibition of itch and chemical pain"
   Part of *Kappa Mechanisms and Translation for Itch* Symposium
6. **Pain Research Forum Virtual Seminar Series**, September 2020
   "The neurokinin-1 receptor is expressed with gastrin-releasing peptide receptor in spinal interneurons and modulates itch"
5. **Winter Conference on Brain Research**, Big Sky, MT, January 2020
   "Itching for relief: Dissecting the role of neurokinin-1 receptor spinal neurons in itch"
   Part of *Pain and itch: how are they motivating you?* Symposium
4. **World Congress on Itch**, Sydney, Australia, November 2019
   "NK1R antagonists for the treatment of chronic itch: Where's the action?"
3. **North American Pain School**, Montebello, Canada, June 2019
   "Itching for relief: Dissecting the role of neurokinin-1 receptor spinal neurons in itch"
2. **Washington University in St. Louis**, Department of Anesthesiology Academic Evening, April 2017
   "Using human tissue to validate preclinical rodent findings: mGluR2/3 suppress sensory neuron sensitization in mouse and human"
1. **University of Pittsburgh**, Pittsburgh Center for Pain Research, March 2017
   "Bridging the translational gap between rodent and human pain research"

POSTER PRESENTATIONS

^{UG} denotes undergraduate mentee

Sheahan TD, Warwick CA, Perry VJ^{UG}, Manalo AM^{UG}, Fanien LF^{UG}, Baranger DAA, Ross SE. Visualizing the spinal coding of itch. (1) *US Association for the Study of Pain Annual Scientific Meeting*, 2023; (2) *Society for Neuroscience Annual Meeting,* 2023.

Sheahan TD, Manalo AP^{UG}, Perry VJ^{UG}, Fanien FG^{UG}, Warwick CA, Smith KM, Ross SE. Identification of itch spinal neuron networks and their inhibition by kappa opioid receptor signaling. (1) *US Association for the Study of Pain Annual Scientific Meeting,* 2022; (2) *University of Pittsburgh Postdoctoral Data & Dine Symposium,* 2022; (3) *University of Pittsburgh Annual Safar Symposium*, 2022.

Sheahan TD, Manalo AP^{UG}, Fanien FG^{UG}, Ross SE. Probing the cellular basis of kappa opioid receptor inhibition of itch. *International Forum for the Study of Itch World Congress,* 2021.

Sheahan TD, Manalo AP^{UG}, Fanien FG^{UG}, Ross SE. Probing the cellular basis of kappa opioid receptor inhibition of pain. *NIH Pain Consortium Symposium,* 2021. Invited junior investigator presentation.

Sheahan TD, Warwick CA, Fanien FG^{UG}, Ross SE. The neurokinin-1 receptor is expressed with gastrin-releasing peptide receptor in spinal interneurons and modulates itch. (1) *US Association for the Study of Pain Annual Scientific Meeting,* 2020; (2) *Society for Neuroscience Global Connectome,* 2021.

Sheahan TD, Chiang MC, Chestang JA^{UG}, Ross SE. Anatomical organization and functional contributions of NK1R spinal neurons in pain and itch. (1) *Spring Pain Scientific Meeting,* 2019; (2) *American Pain Society Scientific Meeting,* 2019; (3) *University of Pittsburgh Postdoctoral Data & Dine Symposium,* 2019.

Sheahan TD, Davidson S, Golden JP, Valtcheva MV, Copits BA, Pullen MY, Baranger DAA, McIlvried LA, Ghetti A, Schmidt RE, Ray PR, Price TJ, Gereau RW, IV**.** mGluR2/3 suppress TRPV1 sensitization in mouse, but not human sensory neurons. *International Association for the Study of Pain World Congress*, 2018.

Sheahan TD, Davidson S, Golden JP, Valtcheva MV, Copits BA, Pullen MY, Baranger DAA, McIlvried LA, Ghetti A, Schmidt RE, Ray PR, Price TJ, Gereau RW, IV**.** mGluR2/3 differentially modulate TRPV1 sensitization in mouse and human sensory neurons. *American Pain Society Scientific Meeting,* 2017.

Sheahan TD, Siuda ER, Shepherd AJ, Mohapatra DP, Gereau RW, IV, Golden JG. Voluntary behaviors as readouts for persistent pain in mice. *Society for Neuroscience Annual Meeting*, 2016.

Sheahan TD, Davidson S, Golden JP, Valtcheva MV, Copits BA, Pullen MY, Ghetti A, Schmidt RE, Ray PR, McIlvried LA, Price TJ, Gereau RW, IV. mGluR2/3 suppress sensory neuron sensitization in mouse and human. *Washington University in St. Louis Neuroscience Retreat*, 2016.

Sheahan TD, Siuda ER, Webb JM, Gereau RW IV, Golden JP. Non-reflexive measures of persistent pain in mice. (1) *Society for Neuroscience Annual Meeting,* 2015; (2) *Washington University in St. Louis Graduate Student Research Symposium*, 2016.

Sheahan TD, Webb JM[UG], Gereau RW, IV, Golden JP. Non-reflexive measures of persistent pain in mice. (1) *American Pain Society Scientific Meeting,* 2015; (2) *Washington University in St. Louis Anesthesiology Academic Evening*, 2015; (3) *Washington University in St. Louis Neuroscience Retreat*, 2015.

Sheahan TD, Copits BA, Golden JP, Gereau RW, IV. The effects of voluntary exercise on inflammatory and neuropathic pain. *Society for Neuroscience Annual Meeting,* 2014.

Sheahan TD, O'Brien DE, Golden JP, Gereau RW, IV**.** The effects of voluntary wheel running on pain. *American Pain Society Scientific Meeting*, 2014.

Sheahan TD, Korthauer LE, Blumenthal EM. Female sterility and compromised eggshell integrity of drop-dead mutants in *Drosophila melanogaster*. (1) *Drosophila Research Conference,* 2011; (2) *Marquette University Summer Research Symposium*, 2010.

ACADEMIC SERVICE

Chair, US Association for the Study of Pain (USASP) Early Career Forum Committee	2025-present
Member, USASP Education and Professional Development Committee	2024-present
Moderator and organizer, US Association for the Study of Pain Annual Scientific Meeting "Spinal Coding of Somatosensation Symposium"	2022
Panelist, University of Pittsburgh Mentoring and Advising Summit "Career Development Plans: A Purposeful Approach to Postdoctoral Training"	2022
Secretary, IASP Itch Special Interest Group	2021-present
Selection Committee, IASP Pain Research Forum Correspondents Program	2021
Trainee Representative, Pittsburgh Center for Pain Research Executive Committee	2020, 2021, 2023
Panelist, US Association for the Study of Pain Annual Scientific Meeting "Training Grant Applications"	2020
Guest, NINDS Building Up the Nerve Podcast "Plan Before You Build"	2020
Participant, NINDS Training and Diversity Strategic Planning Panel	2020
Graduate Student Representative, WUSTL Neuroscience Program Steering Committee	2013-2015
Peer reviewer *Ad hoc*: eNeuro, Pain, Itch, Journal of Pain, Scientific Reports, eLife, Neuroscience, Neuroscience Letters, European Journal of Pharmacology	2012-present

TEACHING

STEM Education Certification | *Washington University in St. Louis*

Associate Certification, WU-CIRTL — 2017
Developed understanding of and application of evidence-based active learning-pedagogies through the Center for the Integration of Research, Teaching, and Learning (CIRTL) Program

Guest Lecturer

Washington University in St. Louis

Molecular Biology on the Cutting Edge (BIOL 4933) — S2016, S2017
Gave undergraduate lecture on methodology and applications of Ca^{2+} imaging; assigned reading questions

University of Pittsburgh

Neuroscience Undergraduate Proseminar (NROSCI 1027) — S2020, F2021, F2022, S2023
Gave undergraduate-level overview of current research; assigned reading questions

Center for Neuroscience at the University of Pittsburgh SURF 2022
Gave undergraduate-level overview and led discussion on current research with summer fellows

Course Master | *Washington University in St. Louis*
Molecular Biology on the Cutting Edge (BIOL 4933) S2017
Created syllabus, lectured, and coordinated guest lectures; responsible for all grading

Teaching Assistantship | *Washington University in St. Louis*
Neurophysiology Lab (BIOL 404) F2013
Taught undergraduate electrophysiology section on rat cochlea; graded assignments

SCIENCE COMMUNICATION & OUTREACH

Host, "The Pain Beat" Podcast, IASP Pain Research Forum 2021-2022
Facilitate discussion and debate surrounding important ideas in pain research

Freelance Science Communicator, IASP Pain Research Forum 2019-2020
Published news coverage as well as interviews for the research community and lay audiences

Organizer & Presenter, Neuroanatomy Outreach at St. Louis University High School S2014-2017
High school-level overview of pain neurobiology; hands-on human brain anatomy demonstrations

Peer Mentor, NIH BP-ENDURE, WUSTL program 2016
Mentored undergraduate students in neuroscience from underrepresented backgrounds

Presenter, St. Louis Science Center Neuroscience Outreach 2013
Led hands-on activities demonstrating neuroscience concepts to kids of all ages

MENTORED TRAINEES

*co-authored at least one manuscript

Medical College of Wisconsin

Nicole Kooij graduate student, Interdisciplinary Doctoral Program 2025-present

University of Pittsburgh School of Medicine

Vijay Perry* undergraduate research assistant → research technician, Ross Lab 2021-2024
Madeline Fontana undergraduate research assistant 2022-2023
Elizabeth Chiyka master's research assistant → biostatistician, Henry Ford Foundation 2021-2022
Thomas Smith postbac research assistant → PhD student at UTD 2020-2021
Louis Fanien* undergraduate research assistant → MD student at Drexel U 2019-2021
Allison Manalo* undergraduate research assistant → postbac, NIH IRTA 2019-2021
Justin Chestang undergraduate research assistant → MD student at Columbia U 2019