Rebecka J. Sepela, Ph.D.

rsepela@fas.harvard.edu
513-418-1155

Department of Molecular and Cellular Biology
Harvard University
16 Divinity Avenue
Biological Laboratories 3010
Cambridge, MA 02138

RESEARCH INTERESTS

Understanding how the intertwined past of animals and microbes defines the sensory experience of animals, drives animal nervous system evolution, and creates long-lasting symbiotic relationships.

EDUCATION

Molecular Evolution 2025
The Marine Biological Laboratory, Woods Hole, MA

Doctor of Philosophy 2015-2022
The University of California, Davis Medical School, Davis, CA

Bachelor of Science 2011-2015
Miami University, Oxford, OH
Magna Cum Laude & Departmental Honors

RESEARCH EXPERIENCE

Postdoctoral Fellow 2022-Pres.
Harvard University
Laboratory of Dr. Nicholas Bellono
Research Topic: Sensory Biology

Graduate Student 2015-2022
University of California, Davis
Laboratory of Dr. Jon Sack
Research Topic: Ion Channel Biophysics

Undergraduate Research Scientist 2011-2015
Miami University
Laboratory of Dr. Ann Hagerman
Research Topic: Tannin Biochemistry

PUBLICATIONS

1. Sepela, R.J., Jiang, H., Shin, Y.H., Clardy, J., Hibbs, R.E., Bellono, N.W. Environmental microbiomes drive chemotactile sensation in octopus. ***Cell,*** (2025). In press.
2. Sepela, R.J., Stewart R.G., Valencia, L.A., Thapa, P., Wang, Z., Cohen, B.E., Sack, J.T. The AMIGO1 adhesion protein activates Kv2.1 voltage sensors. ***Biophysical Journal,*** (2022). doi: 10.1016/j.bpj.2022.03.020.
3. Thapa*, P.T., Stewart*, R.G., Sepela, R.J., Lillya, M., Vivas, O., Parajuli, L., Fletcher-Taylor, S., Zito, K., Cohen, B., Sack, J.T. EVAP: A two-photon imaging tool to study conformation changes in endogenous Kv2 channels in live tissues. ***J Gen Physiol,*** 153, e202012858 (2021). doi: 10.1085/jgp/202012858.
4. Fletcher-Taylor, S., Thapa, P.T., Sepela, R.J., Kaakati, R., Yarov-Yarovoy, V., Sack, J.T., Cohen, B.E. Observation of Multiple Potassium Channel Closed State Structures in Live Cells by Voltage Clamp Spectroscopy. ***ACS. Chem. Neuro****, 11, 2316-2326* (2020). doi: 10.1021/acschemneuro.0c00276.
5. Sepela, R.J., and Sack, J.T. (2018) Taming unruly chloride channel inhibitors with rational design. ***PNAS***. DOI: 10.1073/pnas.1805589115
6. Naumann, H., Sepela, R.J., Rezaire, A., Masih, S.E., Zeller, W., Reinhardt, L., Robe J., Sullivan, M., and Hagerman, A.E. (2018) Relationships between Structures of Condensed Tannins from Texas Legumes and Methane Production During In Vitro Rumen Digestion. ***Molecules***. doi: 10.3390/molecules23092123.

HONORS & AWARDS

Salk Institute Rising Star	2025
Harvard Brain Science Initiative Postdoc Pioneers Grant	2024 – Pres.
$50,000 in research funds over two years	
NIH F32 NRSA Individual Postdoctoral Fellowship	2022–2025
$210,154 in research funds over three years	
NSF Postdoctoral Research Fellowship in Biology (Nominated)	Declined
NIH F31 NRSA Individual Predoctoral Fellowship	2019 - 2022
$105,139 for postdoctoral stipend and research funds over three years	
NIH NIGMS T32 Training Program in MCB Fellow	2016 - 2018
American Society for Cell Biology COMPASS Outreach Grant	2017
University of California Davis Graduate Research Fellowship	2015
Miami University Dean's Scholar	2014
James H. Hershberger Scholarship	2014
$1,500 in undergraduate stipend and research funds	
Undergraduate Summer Scholar Fellowship	2014
Sandy Newman Memorial Scholarship	2014
John H. Buckingham Scholarship	2013
$1,500 in undergraduate stipend and research funds	
Hughes Summer Scholar Fellowship	2013
Student Employee Service Award	2012
Raymond M. Hughes Scholarship	2012
$3,600 in undergraduate stipend and research funds	
George & Ann Mack Award	2012
$1,000 in undergraduate stipend and research funds	
Sandy Newman Memorial Scholarship	2012
Redhawk Excellence Scholarship	2011 - 2015

INVITED RESEARCH TALKS

Harvard-LMU Young Scientists' Forum, Martinsried, Germany.	2025
Grass Fellow's Symposium, The Marine Biological Laboratory, Woods Hole, MA.	2025
The Salk Institute Rising Stars Symposium, La Jolla, CA.	2025
The Paul G. Allen Frontiers Group and The Kavli Foundation, Neurobiology in Changing Ecosystems Symposium, Seattle, WA.	2025
MCB130: The Pharmacy of Life, Cambridge, MA.	2025
Harvard Program in Neuroscience Recruitment, Cambridge, MA.	2025
Society for General Physiology Annual Meeting, Woods Hole, MA.	2024
Novel Ion Channel Symposium 2.0, virtual.	2024
Harvard MCB Seminar, Cambridge, MA.	2024
Harvard Program in Neuroscience Recruitment, Cambridge, MA.	2024
EMBL 25th PhD Symposium, Heidelberg, Germany.	2023
Harvard MCB Department Retreat, Falmouth, MA.	2023
Harvard gNeuro Symposium, Cambridge, MA.	2023
Harvard Center for Brain Science Symposium, Cambridge, MA.	2023
Harvard Invertebrate Meeting, Cambridge, MA.	2022
UC Davis Biophysics Seminar Series, Davis, CA.	2021
Molecular and Cellular Biology T32 Annual Retreat, South Lake Tahoe, CA.	2020
Molecular and Cellular Biology T32 Annual Retreat, South Lake Tahoe, CA.	2019
Molecular and Cellular Biology T32 Annual Retreat, South Lake Tahoe, CA.	2018
Molecular and Cellular Biology T32 Annual Retreat, South Lake Tahoe, CA.	2017
SPIE Biophotonics West, San Francisco, CA.	2017

Molecular and Cellular Biology T32 Annual Retreat, South Lake Tahoe, CA. 2016

POSTER PRESENTATIONS

1. Sepela R.J.*, Vaelli P.M., Nowicki, A., Moulton, A.L., Kilian, P.B., Bellono, N.W. (2022) Octopus 'taste-by-touch' sensation is mediated by environmental microbiomes. Harvard Brain Science Initiative Symposium, Cambridge, MA.
2. Vaelli P.M., Sepela, R.J,* Nowicki, A., Moulton, A.L., Kilian, P.B., Bellono, N.W. (2022) Octopus 'taste-by-touch' sensation is mediated by environmental microbiomes. Boston Microbial Meeting, Cambridge, MA.
3. Thapa, P.T., Fletcher-Taylor, S., Sepela, R.J., Yarov-Yarovoy, V., Sack, J.T., Cohen, B.E. (2020). Observation of Multiple Potassium Channel Closed State Structures by Voltage Clamp Spectroscopy. Annual Biophysical Society Meeting, San Diego, CA.
4. Marquis, M.J., Sepela, R.J., Sack, J.T. (2019) Decoupling between Voltage Sensor Movement and Pore Opening of Kv2.1 Channels. Annual Biophysical Society Meeting, Baltimore, MD.
5. Zeller, W., Reinhardt, L., Hardcastle, E., Robe, J., Mueller-Harvey, I., Ramsay, A., Ropiak H., Fryganas, C., Brown, R., Drake, C., Sepela, R.J., Hagerman, A.E. (2019) Elucidating composition and structure of purified condensed tannins: Corroboration of thiolysis and spectroscopic data. American Chemical Society Meeting, New Orleans, LA.
6. Thapa, P., Sepela, R.J., Stewart, R., Lillya, M., Vivas, O., Parajuli, L., Fletcher-Taylor, S., Zito, K., Cohen, B.E., Sack, J.T. (2018) Imaging Voltage Gating of Endogenous Neuronal Ion Channels with Fluorescent Tarantula Toxin. Annual Biophysical Society Meeting, San Francisco, CA.
7. Naumann H., Sepela R., Rezaire, A., Hagerman, A., Reinhardt, L., Robe, J., and Zeller, W. (2018) Composition and Structural Features of Condensed Tannins from Texas Legumes Exhibiting Methane Abatement Activity during in vitro Rumen Digestion. American Chemical Society Meeting: New Orleans, LA.
8. Sepela, R.J., Thapa, P.T., Sherlock, B.E., Tian, L., Marcu, L., Sack, J. A strategy to measure electrophysiological changes in deep tissue. (2016) *3rd Annual NIH BRAIN Investigators Meeting, Rockville, MD.* (2015) Decreasing
9. Sepela, R.J.*, Hagerman, A.E., (2015) Ruminant Methane Production with 5-Deoxyproanthocyanidin Rich Forages. Undergraduate Research Forum, Oxford, OH.
10. Sepela, R.J.*, Hagerman, A.E., (2015) Decreasing Ruminant Methane Production with 5-Deoxyproanthocyanidin Rich Forages. Experimental Biology National Meeting: American Society of Biochemistry and Molecular Biology Annual Meeting, Boston, MA.
11. Sepela, R.J., Hagerman, A.E., (2014) Decreasing Ruminant Methane Production with 5-Deoxyproanthocyanidin Rich Forages. Undergraduate Research Forum, Oxford, OH.

TEACHING EXPERIENCE

Teaching Fellow, MCB175: Principles of Cell Physiology 2024
Harvard University

Teaching Assistant, NPB100: Neurobiology Course 2019
University of California, Davis

Teaching Assistant, Neurobiology Course 2018
Marine Biological Laboratory

Teaching Assistant, Neurobiology Course 2018
Marine Biological Laboratory

Visual Translation Assistant for Chemistry Lab & Genetics 2013-2014
Miami University

Peer Tutor 2012
Miami University

VOLUNTEERING & OUTREACH

Harvard Natural History Museum 2024
Role: Interactive Exhibit Volunteer

Harvard Evolution Day 2022-2024
Role: Present my research organisms to garner scientific interest whilst providing high school students with information regarding careers in science

Harvard College Research Program 2022-Pres.
Role: Fellowship Reviewer

Young Scientist Program 2016-2017
Role: Head Communications Officer for a club that provides scientific demonstrations for ESL middle school classrooms

Designated Emphasis in Biotechnology 2015-2021
Role: Outreach Volunteer

REFERENCES

Dr. Nicholas Bellono, Harvard University	Email: Nbellono@harvard.edu
Postdoctoral Advisor, Professor	Phone: (617) 496-0713
Dr. Jon Clardy, Harvard University Medical School	Email: jon_clardy@hms.harvard.edu
Collaborator, Professor	Phone: (617) 432-2845
Dr. Ryan Hibbs, University of California, San Diego	Email: Rehibbs@ucsd.edu
Collaborator, Professor and Chair of Neurobiology	Phone: (619) 206-4639
Dr. Jon Sack, University of California, Davis	Email: Jsack@ucdavis.edu
Thesis Advisor, Associate Professor	Phone: (530) 752-4131
Dr. Karen Zito, University of California, Davis	Email: Kzito@ucdavis.edu
Thesis Committee Member and TA instructor, Professor	Phone: (530) 752-7832
Dr. Ann Hagerman, Miami University	Email: Hagermae@miamioh.edu
Undergraduate Research Advisor, Professor	Phone: (513) 529-2827