

# Charles R. Heller

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Laboratory of Brain Hearing and Behavior  
Oregon Hearing Research Center  
Oregon Health and Science University  
3181 S.W. Sam Jackson Park Road, Portland, OR, 97239

## Education

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**Oregon Health and Science University**, Portland, OR

2016 to Present

Neuroscience, Ph.D

**Saint Olaf College**, Northfield, MN

2012 to 2016

Physics, B.A.

## Selected Coursework

### Graduate

Cellular neurophysiology	Speech Signal Processing
Cellular and molecular neurobiology	Auditory system topics
Systems neuroscience	Probability and Statistical Inference

### Undergraduate

Partial differential equations	Software Design
Statistical modeling	Cellular and Molecular Neuroscience
Linear Algebra	Cell Biology
Electronics	Genetics

## Scientific Skills

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*Laboratory proficiencies:* *In-vivo* electrophysiology, *in-vitro* electrophysiology, spike sorting, multi-unit data analysis, multi-electrode array recording, patch clamp electrophysiology, confocal microscopy, basic electronics, basic metal working

*Computer proficiencies:* Python, MATLAB, R, IGOR, MySQL, C++

## Research Experience

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**Doctoral Student – Dr. Stephen David, OHSU**

2017 to Present

Behavioral state dependence of population coding in auditory cortex.

**Graduate Research Assistant – Dr. Henrique von Gersdorff, OHSU**

2017

Time-resolved capacitance measurements in type2 OFF-cone bipolar cells reveals capacity for high speed synaptic transmission in the mammalian retina.

**Undergraduate Research Assistant – Dr. Jay Demas, St. Olaf College**

2014 to 2017

Identification and characterization of intrinsically photosensitive retinal ganglion cells in the common snapping turtle retina

A Hodgkin-Huxley model for conduction velocity in the median giant fiber of the earthworm

## Awards and Fellowships

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Travel Award – Association for Research in Otolaryngology (ARO) MidWinter Meeting	2020
Travel Award – Advances and Perspectives in Auditory Neuroscience (APAN)	2018
N.L. Tartar Trust Fellowship	2018
Neuroscience Graduate Program Student Achievement Award	2018
Graduate Research Fellowship, National Science Foundation (NSF GRFP)	2018
Achievement Rewards for College Scientists (ARCS) Foundation Scholar	2017
Matthew J Vogel Scholarship	2014
Hauge Family Endowed Scholarship	2013
St. Olaf Academic Scholarship	2012

## Professional Development

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Advanced Neural Data Analysis - G-Node	2019
Summer Workshop on the Dynamic Brain - Allen Institute	2017

## Teaching Experience

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Python programming in experimental neuroscience, TA, OHSU	2018
Python programming bootcamp, co-organizer and TA, OHSU	2018
Cellular neurophysiology, TA, OHSU	2017
Cellular and molecular neuroscience, TA, St. Olaf College	2016
Academic Support Center, Physics tutor, St Olaf College	2015 to 2016
Introductory physics, TA, St. Olaf College	2014 to 2016

## Professional Membership

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Association for Research in Otolaryngology	2019 to Present
Society for Neuroscience	2014 to Present
Nu Rho Psi	2014 to Present

## Publications

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**Heller, C. R.,** Schwartz Z. P., Saderi, D., & David, S. V. (2020). Selective effects of arousal on population coding of natural sounds in primary auditory cortex. *bioRxiv* doi: 10.1101/2020.08.31.276584

- Saderi D., Schwartz Z. P., **Heller C. R.**, Pennington J. R. Pennington, & David, S. V. (2020). Dissociation of task engagement and arousal effects in auditory cortex and midbrain. *bioRxiv* doi: 10.1101/2020.06.16.155432
- Heller C. R.** & Crisp K. (2016). A Hodgkin-Huxley model for conduction velocity in the medial giant fiber of the earthworm, *Lumbricus terrestris*. *IMPULSE*,1:9
- Tien N. W., Pearson J. T., **Heller C. R.**, Demas J., & Kerschensteiner D. (2015). Genetically Identified Suppressed-by- Contrast Retinal Ganglion Cells Reliably Signal Self-Generated Visual Stimuli. *The Journal of Neuroscience*,35(30), 10815-10820.

## Selected Abstracts

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- Heller C. R.**, Saderi D, López Espejo M., David, S. V. Task engagement selectively enhances population discrimination of behavior-relevant categories in primary auditory cortex. Denver, CO: Computational and Systems Neuroscience (COSYNE), 2020
- Heller C. R.**, Saderi D, Schwartz Z. P., David, S. V. Effects of arousal on population coding of natural sounds in primary auditory cortex. San Jose, CA: Association for Research in Otolaryngology (ARO), 2020
- Heller C. R.**, Saderi D, Schwartz Z. P., David, S. V. Effects of arousal on population coding of natural sounds in primary auditory cortex. Chicago, IL: Society for Neuroscience, 2019
- Heller C. R.**, Saderi D, Schwartz Z. P., David, S. V. Arousal enhances reliability of population coding in primary auditory cortex. Lisbon, PT: Computational and Systems Neuroscience (COSYNE), 2019
- Heller C. R.**, Saderi D, Schwartz Z. P., David, S. V. Arousal-dependent variability of correlated neural activity in primary auditory cortex. Baltimore, MD: Association for Research in Otolaryngology (ARO), 2019
- Heller C. R.**, Saderi D, Schwartz Z. P., David, S. V. Behavior state-dependence of correlated neural population activity in ferret primary auditory cortex. San Diego, CA: Society for Neuroscience, 2018
- Heller C. R.**, Saderi D, Schwartz Z. P., David, S. V. Behavior state-dependence of neural variability in ferret primary auditory cortex. San Diego, CA: Advances and Perspectives in Auditory Neuroscience, 2018
- Heller C. R.**, Behling S, Sutter E, Ulanday, E, Demas, J. Identifying and characterizing intrinsically photosensitive retinal ganglion cells in the common snapping turtle, *Chelydra serpentina*. Chicago, IL: Society for Neuroscience, 2015
- Tien N. W., Pearson J. T., **Heller C. R.**, Demas J., Kerschensteiner D. Genetically identified suppressed by contrast retinal ganglion cells in mice reliably signal self-generated visual stimuli. Chicago, IL: Society for Neuroscience, 2015
- Heller C. R.**, Crisp, K. A Hodgkin-Huxley model for conduction velocity in the medial giant fiber of the earthworm, *Lumbricus terrestris*. Chicago, IL: Faculty for Undergraduate Neuroscience, 2015
- Heller C. R.**, Behling S, Sutter E, Ulanday, E, Demas, J. Characterization of phototactic behavior in hatchling snapping turtles (*Chelydra serpentina*). Chicago, IL: Faculty for Undergraduate Neuroscience, 2015
- Heller C. R.**, Behling S, Demas, J. Retinal circuitry underlying hatchling turtle navigation. Washington, D.C.: Faculty for Undergraduate Neuroscience, 2014