DAVID H. GIRE

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CURRENT POSITION

University of Washington — Seattle, WA
Assistant Professor, Department of Psychology — January, 2015-Present

PUBLICATIONS

Jackson BJ, Fatima GL, Oh S, **Gire DH** (2020) Many paths to the same goal: balancing exploration and exploitation during probabilistic route planning. ***eNeuro*** *2020 May 15. pii.0536-19.2020*

Gire DH (2020) Taken out of context: a novel cognitive role for a premotor circuit. ***Neuron*** 106 (2), 206-208

Lucca K, **Gire DH,** Horton R, Sommerville JA (2019) Automated Measures of Force and Motion Can Improve Our Understanding of Infants' Motor Persistence. ***Journal of Motor Learning and Development*** 1 (aop), 1-21

Gire DH, Zak JD, Bourne JN, Goodson NB, Schoppa NE. (2019) Balancing Extrasynaptic Excitation and Synaptic Inhibition within Olfactory Bulb Glomeruli. ***eNeuro*** Aug 7;6(4)

Baker KL, Dickinson M, Findley TM, **Gire DH**, Louis M, Suver MP, Verhagen JV, Nagel KI, Smear MC (2018) Algorithms for Olfactory Search across Species. ***Journal of Neuroscience*** 38(44):9383-9389.

Gire DH, Kapoor V, Arrighi-Allisan A, Seminara A, & Murthy VN (2016) Mice develop efficient strategies for foraging and navigation using complex natural stimuli. ***Current Biology*** 26(10):1261-73.

Li A, **Gire DH,** and Restrepo D (2015) ϒ spike-field coherence in a population of olfactory bulb neurons differentiates between odors irrespective of associated outcome. ***Journal of Neuroscience*** 35(14):5808-22.

Li A, **Gire DH,** Bozza T, and Restrepo D (2014) Precise detection of direct glomerular input duration by the olfactory bulb. ***Journal of Neuroscience*** 34(48):16058-64.

Gire DH*, Whitesell J.D.*, Doucette W., and Restrepo, D. (2013) Information for decision making and stimulus identification is multiplexed in sensory cortex. ***Nature Neuroscience*** 16:991-993.

Gire DH*, Restrepo D*, Sejnowski TJ, Greer C, De Carlos JA, and Lopez-Mascaraque L

(2013) Temporal processing in the olfactory system: can we see a smell? ***Neuron*** 78(3):416-32.

Markopoulos, F*, Rokni, D*, **Gire, DH**, and Murthy VN (2012) Functional properties of cortical feedback projections to the olfactory bulb. ***Neuron*** 76(6):1175-88.

Gire, DH*, Franks, KM*, Zak, JD, Tanaka, K, Whitesell, JD, Mulligan, A, Hen, R, and Schoppa, NE (2012) Mitral cells in the olfactory bulb are mainly excited through a multi-step signaling path. ***Journal of Neuroscience*** 32:2964-75.

Doucette W*, **Gire DH***, Whitesell JD, Carmean V, Lucero, MT, and Restrepo, D (2011) Associative cortex features in the first olfactory brain relay station. ***Neuron*** 69(6):1176-87.

Pandipati, S, **Gire, DH**, and Schoppa, NE (2010) Adrenergic receptor-mediated disinhibition of mitral cells triggers long-term enhancement of synchronized oscillations in the olfactory bulb. ***Journal of Neurophysiology*** 104: 665-674.

Gire, DH and Schoppa, NE (2009) Control of on/off glomerular signaling by a local GABAergic microcircuit in the olfactory bulb. ***Journal of Neuroscience*** 29:13454:13464.

Gire, DH and Schoppa, NE (2008) Long-term enhancement of synchronized oscillations by adrenergic receptor activation in the olfactory bulb. ***Journal of Neurophysiology*** 99: 2021-2025.

CURRENT RESEARCH SUPPORT

R21 NIH Exploratory/Developmental Research Grant Program 2020-2022
National Institute of Deafness and Other Communications Disorders (NIDCD), NIH
$275,000 direct costs over 2 years
Role: Lead PI with Nick Steinmetz (co-PI)

PENDING RESEARCH SUPPORT

R01 NIH Research Project Grant Program 2020-2025
National Institute of Deafness and Other Communications Disorders (NIDCD), NIH
$250,000 direct costs per year; $1,250,000 total direct costs
Role: Principal Investigator
6/4/2020: Recommended for funding by the National Deafness and Other Communication Disorders Advisory Council, NOA upcoming, start date July 2020

COMPLETED RESEARCH SUPPORT

K99/R00 Pathway to Independence Award 2013-2019 (NCE)
National Institute of Deafness and Other Communication Disorders (NIDCD), NIH
$249,000 per year, including indirect costs
Role: Principal Investigator

University of Washington Royalty Research Fund 2016-2017

University of Washington
$38,205 for one year
Role: Principal Investigator

Thomas Jefferson Award 2017-2019
French American Cultural Exchange (FACE) Foundation
$20,000 over 2 years
Role: co-PI with Agnese Seminara (co-PI; CNRS Nice, France)

R21 NIH Exploratory/Developmental Research Grant Program 2017-2020 (NCE)
National Institute of Mental Health (NIMH), NIH
$275,000 direct costs over 3 years
Role: co-PI with Sheri Mizumori (Lead PI)

University of Washington Innovation Award 2017-2020 (NCE)
University of Washington
$426,307 over 3 years
Role: co-PI with Bing Brunton (co-PI)

AWARDS

Thomas Jefferson Award 2017
French American Cultural Exchange (FACE) Foundation

Innovation Award 2017
University of Washington

Polak Young Investigator Award 2012
Association for Chemoreception Sciences (AChemS)

Ruth L. Kirchstein Post-Doctoral National Research Service Award 2011, 2012
National Institute of Deafness and Other Communication Disorders, National Institutes of Health

Post-Doctoral Basic Neuroscience Advanced Training Grant 2010
National Institute of Neurological Disorders and Stroke, National Institutes of Health

Graduate Student Travel Award 2008
Society for Neuroscience (SfN)

Graduate Student Travel Award 2008
International Symposium on Olfaction and Taste (ISOT)

Ruth L. Kirchstein Pre-Doctoral National Research Service Award 2008, 2009
National Institute of Deafness and Other Communication Disorders, National Institutes of Health

Pre-Doctoral Basic Neuroscience Advanced Training Grant 2007, 2008
National Institute of Neurological Disorders and Stroke, National Institutes of Health

Neuroscience Training Grant 2005, 2006
National Institute of Child Health and Human Development, National Institutes of Health

Visiting Scholar Fellowship 2002, 2003
International School for Advanced Studies (ISAS/SISSA), Trieste, Italy

I.L. Chaikoff Memorial Award 2002
University of California at Berkeley

National Merit Scholarship 1998-2002
University of California

MENTORING

Graduate Students

Brian Jackson (Psychology)	2015-June 2020 (**Defended PhD, June 9,2020**)
Suzanne Lewis (Psychology)	2015-present
Dominic Sivitilli (Psychology)	2016-present
Mohammad Tariq (Neuroscience)	2017-present
Jesse Miles (Neuroscience)	2018-present
Lisa Marie Woodward (Psychology)	2019-present

Undergraduate Students

Honors Thesis

Sarahi Carolina Ponton Junes	2015-2017
Devi Klein	2015-2017

Visiting Students

Anna McCann (CSNE intern; University College Dublin, Ireland)	Summer 2016
Jeremea Songco (CSNE intern; San Diego State University)	Summer 2017
Miles Thies (CSNE intern; Truman State University)	Summer 2017
Joseph Hemthorn (CSNE intern; UW)	Summer 2018
Erica Busch (CSNE intern; Dartmouth College)	Summer 2019

Thesis Committee

Mi-Seon Kong (Psychology)
Peter Zambetti (Psychology)
Bryan Schuessler (Psychology)
Aaron Garcia (Neuroscience Program)
Elizabeth Crummy (Neuroscience Program)
Phil Mardoum (Neuroscience Program; GSR)
Christopher W. Johnson (Neuroscience Program; GSR)
Alison Weber (Neuroscience Program; GSR)
Britahny Baskin (Neuroscience Program; GSR)
Raymond Sanchez (Neuroscience Program; GSR)
Jordan Elum (Neuroscience Program; GSR)
Claire Rusch (Biology; GSR)
Jeremy Chan (Biology; GSR)
Ryo Okuba (Biology; GSR)
Molly J. Bishop (Masters student, Museology; GSR)

SERVICE

National Organization Leadership and Service

Program Committee, Association for Chemoreception Sciences (AChemS) 2016-present

Awards Committee, AChemS 2017-present

Co-chair for workshop 2019
"Making Sense of Turbulence: Signal Processing and Integration in Complex Environments",
NSF-Simons Center for Mathematical & Statistical Analysis of Biology and FACE Foundation

National Science Foundation (NSF) Reviewer 2019

Chair of symposium, 2017
"Dynamic Computations for Navigating Complex Odor Environments",
AChemS 2017 annual meeting

UW Service

Guthrie Prize Committee, Department of Psychology 2015-present

Royalty Research Fund (RRF) Reviewer 2018-present
University of Washington

Graduate Program in Neuroscience Admissions Committee 2015-2017

WRFF/Levinson Review Committee 2017

Editorial Service

Review Editor on the Editorial Board of *Frontiers in Systems Neuroscience* 2020-present
Review Editor on the Editorial Board of *Decision Neuroscience* 2020-present
Review Editor on the Editorial Board of *Behavioral Neuroscience* 2019-present

Ad hoc reviewer for the following journals:
Nature Neuroscience, Nature Communications, Current Biology, eLife, Journal of Comparative Neurology, PLoS ONE, eNeuro, Frontiers

OUTREACH ACTIVITIES

February 18, 2020: Science in the City Public Lecture Speaker, Pacific Science Center, Seattle

June 27, 2019: Cephalopod Movie Night with Science Friday, Seattle

March 29, 2017: Allen L Edwards Public Lecture Speaker, UW Department of Psychology

October 20, 2016: Hosted Edwards and Loucks Lecture by Greg Dunn, artist and neuroscientist

March 1, 2016: Produced outreach video for UW Department of Psychology Insider Series

April 10, 2015: Invited Panelist for the Evening with Neuroscience at the University of Washington.

PROFESSIONAL ASSOCIATIONS

Society for Neuroscience
Association for Chemoreception Sciences

INVITED LECTURES

**Invited speaker, International Symposium on Olfaction and Taste (ISOT), Portland, OR, June 2020 – Moved to online format August, 2020

**Invited speaker, Computational Neuroethology, Jackson Lake Lodge, Wyoming, May, 2020

***Central and distributed control of octopus arms. Invited talk, University of Arizona, April, 2020

***Population encoding of turbulent plume dynamics provides signals for odor-guided navigation in mice. March, 2020, Invited Speaker for *Navigational Algorithms and Neural Circuit Computations Directing Olfactory Search Across Species*, Janelia Research Campus, Ashburn, VA

***Talks postponed due to covid-19 pandemic
**Conference moved to an online format

Strategies and circuits for probabilistic search in turbulent environments. Minisymposium speaker, Society for Neuroscience Annual Meeting, November 5, 2018, San Diego, CA

Neural circuits for processing natural odor scenes. November 30, 2017, University of Oregon

Neural circuits for processing natural odor scenes. July 10, 2017, NeuroFutures Conference, University of British Columbia

Sensing, deciding and navigating: bringing complex natural behaviors to the lab. May 15, 2017, University of Washington Program in Neuroscience Seminar Series

Neural circuits for processing natural odor scenes. April 18, 2017, Center for Integrative Neuroscience (CIN) symposium, University of Washington

Sensing and Deciding in the Real World: How Physics Shapes Our Choices. March 29, 2017, Allen L Edwards Public Lecture Series, University of Washington

Navigation across Spatial Scales. October 12, 2016, University of Washington Institute for Neuroengineering Seminar Series

Mice Develop Efficient Strategies for Foraging and Navigation Using Complex Natural Stimuli. Jan 29, 2016, Neural Computation and Engineering Connection, University of Washington

Mice Develop Efficient Strategies for Foraging and Navigation Using Turbulent Odor Plumes. July 2015, Kavli Institute for Theoretical Physics (KITP), UC Santa Barbara, CA

PRESS

"A sucker for octopuses", UW College of Arts and Sciences Perspectives Newsletter, March 2020
https://artsci.washington.edu/news/2020-03/sucker-octopuses

"The many brains of an octopus", UW Daily, March 2, 2020
http://www.dailyuw.com/science/article_592cbb48-5c3d-11ea-b78b-ff1f8e0bf4b8.html

"Why an octopus might think like an alien", Crosscut Human Elements Series, February 2020
https://crosscut.com/2020/02/why-octopus-might-think-alien

"Octopus arms have minds of their own", *Discovery.com*, January 14, 2020
https://www.discovery.com/science/Octopus-arms

"The Octopus from Outer Space", *Seattle Met*, December 2019
https://www.seattlemet.com/news-and-city-life/2019/12/the-octopus-from-outer-space

"High fidelity neural encoding of natural odor scenes", press release from Society for Neuroscience, 2019 annual meeting
http://www.softconference.com/WebcastSystem/Webcast.aspx?WebcastID=93&SessionID=422805

"Octopus arms have minds of their own", *Psychology Today*, July 2019
https://www.psychologytoday.com/us/blog/animal-minds/201907/octopus-arms-have-minds-their-own

"Stranger things: Octopus arms may have minds", *India Today*, July 2019
https://www.indiatoday.in/education-today/latest-studies/story/octopus-arms-decision-making-without-using-brain-1564430-2019-07-08

"Of octopuses and astrobiology: Conference talk speculates on cognition beyond Earth", UW News, June 2019
https://www.washington.edu/news/2019/06/18/of-octopuses-and-astrobiology-conference-talk-speculates-on-cognition-beyond-earth/

"The Distributed Mind: Octopus Neurology" *Science Friday*, June 2019
https://www.sciencefriday.com/videos/the-distributed-mind-octopus-neurology/

"Thinking is for suckers, but if you're an octopus, suckers are for thinking" *NOVA Next*, 2019
https://www.pbs.org/wgbh/nova/article/octopus-suckers-thinking/

"In the arms of an octopus" *The Journal of the San Juan Islands,* August 19, 2018
https://www.sanjuanjournal.com/life/in-the-arms-of-an-octopus/

"Collective decision making among the arms of the Octopus", press release from Association for Chemoreception Sciences, 2017 annual meeting

TEACHING

PSYCH 504A, Core Concepts in Behavioral Neuroscience	2016-present
PSYCH 332A and B, Neurobehavioral Laboratory	2018-present
PSYCH 560, Research Approaches	2018-present
PSYCH 555A, Seminar in Cog/Per and BNS	Spring 2020
PSYCH 552A, Seminar in Behavioral Neuroscience	Spring 2017
PSYCH 538A, Software for Psychological Research	Spring 2015

SELECTED CONFERENCE PRESENTATIONS (FROM GIRE LAB AT UW)

Lewis, S.M., Xu, L., Tariq, M.F., Gopal, V., Seminara, A., Stern, M., **Gire, D.H.** (2020) Dynamics of natural odor plumes structure the activity of neural populations at the first stage of odor processing in mice. Abstract for poster, Computational and Systems Neuroscience (Cosyne) 2020 meeting, Denver, CO

Lewis, S.M., Xu, L., Tariq, M.F., Gopal, V., Seminara, A., Stern, M., **Gire, D.H.** (2019) Processing of intermittent odor plumes through population activity between glomerular networks in the mouse olfactory bulb. Abstract for poster, Society for Neuroscience 2019 meeting, Chiacgo, IL ***Abstract selected for press release**

Jackson, B.J., **Gire, D.H.** (2019) Hippocampal correlates of optimal route planning during open field foraging. Abstract for poster, Society for Neuroscience 2019 meeting, Chiacgo, IL

Tariq, M.F., Lowell, A., Lewis, S.M., Perkel, D., **Gire, D.H.** (2019) Real-Time Measurement of Olfactory Information using Head-Mounted Sensors During Odor-Guided Navigation. Abstract for poster, Association for Chemoreception Sciences (AChemS) 2019 meeting, Bonita Springs, Florida, * **Abstract selected for dynamic poster**

Lewis, S.M., Park, J., Tariq, M.F., Seminara, A., **Gire, D.H.** (2018) Sensory encoding of natural odor dynamics by mitral and tufted cells in the olfactory bulb. Abstract for poster, Society for Neuroscience 2018 meeting, San Diego, CA

Kidder, K.S., Baker, P.M., Rivera, Z.M., Lewis, S.M., **Gire, D.H.**, Mizumori, S.J. (2018) Optogenetic stimulation of the prefrontal cortex induces spatial alternation deficits and alters hippocampal local field potentials in rats. Abstract for poster, Society for Neuroscience 2018 meeting, San Diego, CA

Sivitilli, D.M., Gopal, V., Seminara, A., Sisneros, J., **Gire, D.H.** (2018) Computational strategies underlying octopus arm coordination during naturalistic foraging. Abstract for poster, International Congress on Neuroethology (ICN) 2018 meeting, Brisbane, Australia

Sivitilli, D.M., Gopal, V., Seminara, A., Sisneros, J., **Gire, D.H.** (2017) Computational strategies underlying arm coordination of Octopus rubescens during naturalistic foraging. Abstract for poster, Society for Neuroscience 2017 meeting, Washington, DC, * **Abstract selected for dynamic poster**

Sivitilli, D.M., Gopal, V., Seminara, A., Sisneros, J., **Gire, D.H.** (2017) Characterization of computational strategies underlying arm coordination of Octopus rubescens during chemotaxis. Abstract for poster, Association for Chemoreception Sciences (AChemS) 2017 meeting, Bonita Springs, Florida ***Abstract selected for press release**

Jackson, B.J., Oh, S., Gopal, V., Seminara, A., Gusti Lulu Fatima, **Gire, D.H.** (2017) Memory enhances search strategies during odor-guided foraging. Abstract for poster, Association for Chemoreception Sciences (AChemS) 2017 meeting, Bonita Springs, Florida

Jackson, B.J., Oh, S., Gopal, V., Seminara, A., **Gire, D.H.** (2016) Memory enhances search strategies during odor-guided foraging. Abstract for poster, Society for Neuroscience (SfN) 2016 meeting, San Diego, CA

Jackson, B.J., Oh, S., Gopal, V., Seminara, A., **Gire, D.H.** (2016) Search strategies in complex olfactory environments. Abstract for poster, International Symposium on Olfaction and Taste (ISOT) 2016 meeting, Yokohama, Japan