

Kelsey Tyssowski

PhD, Biological and Biomedical Sciences

BRAIN Initiative K99/R00 Postdoctoral Fellow

Hoekstra Laboratory, Harvard University

Department of Organismic and Evolutionary Biology, Department of Molecular and Cellular Biology

tyssowski@g.harvard.edu

Pronouns: she/her

Education

Doctor of Philosophy
Boston, MA
2013-2019

Harvard University, Department of Medical Science
Biological and Biomedical Sciences
Certificate in Science Communication
NSF Graduate Research Fellow

Bachelor of Arts
Middletown, CT
2007-2011

Wesleyan University
Neuroscience and Behavior, Molecular Biology and Biochemistry
Phi Beta Kappa

Research

Harvard University
Hoekstra Lab
Cambridge, MA
2019-present

- Leveraging comparative single cell sequencing, circuit tracing, and high-throughput automated behavior analysis to uncover the cellular basis of the evolution of skilled motor behavior in *Peromyscus* mice
- Identified neural population expansion associated with skilled motor behavior in both cortex and spinal cord
- Developed tools, including a comparative brain atlas, that enable modern neuroscience experiments in a non-model organism

Harvard Medical School
Gray Lab
Boston, MA
2014-2019

- Studied coupling between the pattern of neuronal activity and the resulting gene expression program
- Investigated the role of neuronal-activity-regulated transcription in neuronal firing rate homeostasis
- Developed optogenetic tools to precisely control neuronal activity *in vitro*
- Developed capture-based methods for sequencing activity-regulated mRNA and enhancer RNA

University of Tokyo
Gotoh Lab
Tokyo, Japan
2011-2013

- Studied the role of polycomb group proteins in fate determination of neuronal precursor cells during neuronal development
- Provided critical feedback on research papers submitted for publication as well as other written documents

Wesleyan University - Worked on an independent project investigating the structural and pharmacological properties of G-protein-coupled receptors
 Olson Lab
 Middletown, CT - Developed insect cell culture for the Olson lab and began the lab's first project using insect cell culture
 2009-2011

Publications

Research

Tyssowski KM, Letai KC, Rendall SD, Nizhnik A, Gray JM. 2019. Firing rate homeostasis can occur in the absence of neuronal-activity-regulated transcription. *Journal of Neuroscience*, doi: <https://doi.org/10.1523/JNEUROSCI.1108-19.2019>.

Tyssowski KM, Gray JM. 2019. Blue light induces neuronal-activity-regulated genes in the absence of optogenetic proteins. *eNeuro*, doi: 10.1523/ENEURO.0085-19.2019.

Tyssowski KM*, DeStefino NR*, Cho JH, Dunn CJ, Poston RG, Carty CE, Jones RD, Chang SM, Romeo P, Wurzelmann MK, Ward JM, Andermann ML, Saha RN⁺, Dudek SM⁺, Gray JM⁺, 2018. Different neuronal activity patterns induce different gene expression programs. *Neuron*, 98:530–546.e11.

*co-first, ⁺co-senior

Cover Story

Morimoto-Suzki N, Hirabayashi Y, **Tyssowski K**, Shinga J, Vidal M, Koseki H, Gotoh Y. 2014. The polycomb component Ring1B regulates the timed termination of subcerebral projection neuron production during mouse neocortical development. *Development*, 141:4343-4353.

Reviews

Tyssowski KM, Gray JM. 2019. The neuronal stimulation-transcription coupling map. *Current Opinion in Neurobiology*, 59:87-94.

Tyssowski K, Kishi Y, Gotoh Y. 2014. Chromatin regulators of neural development. *Neuroscience*, 264: 4-16.

Itoh Y*, **Tyssowski K***, Gotoh Y. 2013. Transcriptional coupling of neuronal fate commitment and the onset of migration. *Current Opinion in Neurobiology*, 23:957-964.

*equal contribution

Grants/Awards

2024 K99/R00 BRAIN Initiative Advanced Postdoctoral Career Transition Award
 2020 Putnam Expedition Grant, Harvard Museum of Comparative Zoology
 2020 Life Sciences Research Foundation Fellowship
 2020 NIH National Institute of Neurological Disorders and Stroke NRSA F32 (*declined*)
 2020 National Science Foundation Postdoctoral Research Fellowship in Biology (*declined*)
 2014 National Science Foundation Graduate Research Fellowship Program
 2011 Phi Beta Kappa
 2011 George H. Acheson and Grass Foundation Prize in Neuroscience, Wesleyan University
 2011 Hawk Prize for effective work in biochemistry, Wesleyan University
 2011 William Firshein Prize for contributing to the interests and character of the Molecular Biology and Biochemistry Department, Wesleyan University
 2010 Howard Hughes Summer Research Fellowship in Life Sciences, Wesleyan University
 2010 American Society for Biochemistry and Molecular Biology Undergraduate Research Award

2007 National Merit Scholar

Presentations

Talks

2023 Harvard Molecular and Cellular Biology TGIF Seminar Series. Cambridge, MA
 2022 Society for Neuroscience Motor Neuroscience Pre-symposium. San Diego, CA
 2022 Harvard Brain Initiative Wild Brains Symposium. Cambridge, MA
 2022 Viruses and Transgenics: Novel Tools for More Species. Virtual Seminar Series
 2020 Mechanistic Cognitive Neuroscience Workshop. Janelia Research Campus, Ashburn, VA
 2019 Neurolunch Symposium. Cambridge, MA
 2018 Program in Genetics and Genomics Seminar Series. Boston, MA
 2018 Harvard Medical School Genetics Department Retreat. Boston, MA
 2017 GEARS Symposium. Cambridge, MA
 2017 Molecular Biosystems Conference. Puerto Varas, Chile
 2016 Department of Genetics Lunch Seminar. Boston, MA

Posters (all first-author)

2023 Neural Control of Movement Annual Meeting. Victoria, BC
 2022 Society for Neuroscience Annual Meeting. San Diego, CA
 2017 Society for Neuroscience Annual Meeting. Washington, DC
 2016 Society for Neuroscience Annual Meeting. San Diego, CA
 2016 Systems Biology: Global Regulation of Gene Expression. Cold Spring Harbor, NY
 2011 American Society for Molecular Biology and Biochemistry Annual Meeting. Washington, DC

Teaching

Courses

2017/2018 Nanocourse Director, From Pipette to Pen
 Harvard Medical School, Boston, MA
 2017/2018 Guest Lecturer, Statistics in RNA-seq Analysis
 Harvard Medical School, Boston, MA
 2018 Tutor, Introductory Genetics for Graduate Students
 Harvard Medical School, Boston, MA
 2016 Textbook Writer, The Secret of Life: RNA-seq and ChIP-seq sections
 The Broad Institute, Cambridge, MA
 2014 Teaching Fellow, Introductory Genetics for Graduate Students
 Harvard Medical School, Boston, MA
 2011 Ford Writing Tutor, Neuroscience Capstone Course
 Wesleyan University, Middletown, CT
 2011 Teaching Assistant, Advanced Molecular Genetics Laboratory
 Wesleyan University, Middletown, CT
 2010 Ford Writing Tutor, Introductory Environmental Science
 Wesleyan University, Middletown, CT

Mentoring

2023-present Deshawnn Ejiogu, Harvard Undergraduate (Thesis Student)
 2023-present Olivia Johnson, Harvard Undergraduate
 2022-present Phoebe Richardson, Research Assistant, Hoekstra lab

2021-2022	Olivia Yoo, Harvard Undergraduate Current position: Computational Associate, McCaroll Lab, Broad Institute
2020-2023	Karen Cortina, Harvard Undergraduate (Thesis Student) Current position: Research Associate, Vir Biotechnology
2017-2019	Kate Letai, Research Assistant, Gray lab Current position: MD/PhD student, Case Western University
2017-2019	Anastasia Nzhnik, Research Assistant, Gray lab Current position: PhD student, Albert Einstein College of Medicine
2016-2017	Sarah Chang, Research Assistant, Gray lab Current position: MD/PhD student, Harvard Medical School
2015-2017	Sam Rendall, Northeastern Co-op Student, Research Assistant, Gray lab Next position: PhD student, University of Texas at Austin

Outreach/Service

2020-present	Board Member Harvard Faculty of Arts & Sciences Postdoctoral Association, Cambridge, MA
2021-2022	President Harvard Faculty of Arts & Sciences Postdoctoral Association, Cambridge, MA
2020-2022	Advocacy Committee Chair Harvard Faculty of Arts & Sciences Postdoctoral Association, Cambridge, MA
2019-present	Ad hoc reviewer Scientific Reports, Science Advances, European Journal of Neuroscience
2017-2022	Organizer Professional Women's Nexus
2021	Anti-Bullying Policy Working Group Member Harvard University, Cambridge, MA
2016-2020	Member/ad-hoc editor, NPR Scicommers A Science Communication Collective
2019	Science Communication Certificate Harvard University, Department of Medical Science, Boston, MA
2015-2018	Editor-in-Chief, Science in the News (SITN) Blog (sitnboston.com) Harvard University, Boston, MA
2013-2015	Editor, Science in the News (SITN) Blog Harvard University, Boston, MA
2010-2011	Science Club Teacher at Middletown Public Schools Wesleyan University, Middletown, CT

Presentations/Publications

2023	Interviewee. Human Footprint Episode 4: The Replacements. PBS
2023	Presenter. Skype a Scientist. International School of Trieste. Trieste, Italy
2022	Presenter. Skype a Scientist. Osceola Magnet School. Vero Beach, FL
2020	Presenter. Skype a Scientist. The Academy of the Holy Cross. Kensington, MD
2020	Presenter. Skype a Scientist. The Walden School. Media, PA
2020	Presenter. Skype a Scientist. Henry Sibley High School. Mendota Heights, MN
2018	Brains keep temporary molecular records before making a lasting memory. Article. The Conversation, republished by Undark Magazine, Discover Magazine Blog, RealClearScience and more

- 2018 Storyteller for Story Collider. Talk. July 19, 2018 show: Molting. Oberon Theater, Cambridge, MA
- 2018 Pee is for Pregnant: The history and science of urine-based pregnancy tests. Article. SITN Blog.
- 2018 How to Give a Science Talk. Workshop. Science and Us, Conference for High School Students. Boston, MA
- 2018 Electricity, Epilepsy, and How Your Brain Stays Balanced. Seminar. Harvard SITN Spring Lecture Series. Cambridge, MA
- 2017 Genetic Engineering in the Fight Against Climate Change. Seminar. Harvard SITN DayCon. Cambridge, MA
- 2016 4 Reasons You Should Be Excited about the BRAIN Initiative: Updates and insight from a conversation with Josh Sanes. Article. SITN Blog
- 2016 How do brains think? Article. Cambridge Science Festival Blog
- 2016 Dear Mister/Madame President: Science Issues in 2016. Edited Collection of Articles. SITN Blog
- 2015 GMOs and Our Food. Edited Collection of Articles. SITN Blog