RyanVThorpe

ryan_thorpe@brown.edu github.com/rythorpe google scholar

computational neuroscientist | neural dynamics ↔ sensorimotor processing ↔ learning

education

2019 → 2024 **PhD** in Neuroscience — Brown University
GPA: 4.0. Advisors: S. R. Jones & C. I. Moore.

2017 → 2019 **ScM** in Biomedical Engineering — Brown University
Thesis: *Charcterizing M/EEG measures of pain through biophysically-principled neuromodeling and spectral event analysis*. GPA: 3.5. Advisors: D. A. Borton & S. R. Jones.

2011 → 2016 **BS** in Bioengineering — Walla Walla University
Minor in Physics. GPA: 3.4. Advisor: J. L. McKenzie.

publications

neural dynamics of somatosensory processing

Distinct neocortical mechanisms underlie human SI responses to median nerve and laser evoked peripheral activation. **Thorpe, R.V.**, Black, C.J., Borton, D.A., Hu, L., Saab, C.Y., & Jones, S.R. *Imaging Neuroscience* (2024).

spectral-event analysis

Age-related differences in transient gamma band activity during working memory maintenance through adolescence. McKeon, S.D., Calabro, F., **Thorpe, R.V.**, ... Jones, S.R., & Luna, B. *NeuroImage* (2023).

Fronto-central resting-state 15-29 Hz transient beta events change with therapeutic transcranial magnetic stimulation for posttraumatic stress disorder and major depressive disorder. Morris, A.T., Temereanca, S., Zandvakili, A., **Thorpe, R.**, ... & Jones, S.R. *Scientific Reports* (2023).

Pain phenotypes classified by machine learning using electroencephalography features. Levitt, J., Edhi, M.M., **Thorpe, R.V.**, ... Borton, D.A., Jones, S.R., & Saab, C.Y. *NeuroImage* (2020).

scientific software tool development

HNN-core: A Python software for cellular and circuit-level interpretation of human MEG/EEG. Jas, M.*, **Thorpe, R.V.***, Tolley, N.*, ... Jones, S.R. *Journal of Open Source Software* (2023).

invited talks

2024 **Thalamocortical Interactions GRS** — Ventura, CA, USA
Layer-specific inhibitory competition mediates deviance detection in the neocortical column

2023 **MEG Group Meeting** — Martinos Center for Biomedical Imaging, Charlestown, MA, USA
Distinct neocortical mechanisms underlie human SI responses to median nerve and laser evoked peripheral activation

workshops given

2022 **BIOMAG International Conference** — University of Birmingham, UK (virtual)
Hands-on workshop on Human Neocortical Neurosolver: a new tool for cell and circuit level interpretation of MEG/EEG signals, with S. R. Jones, M. Jas, & N. Tolley

2022, 2024 **BRAINSTORM Data Challenge** — Carney Institute for Brain Science, Brown University
Using Spectral Event Analysis to characterize shifts in resting-state neural timeseries data

* co-first authors

2021 **CuttingEEG Annual Symposium** Le Cube Université Aix-Marseille, France (virtual)
Human Neocortical Neurosolver (HNN) workshop, with S. R. Jones, M. Jas, & N. Tolley

conference abstracts & presentations

2024 **Thalamocortical Interactions GRC** Ventura, CA, USA
Layer-specific inhibitory competition mediates deviance detection in the neocortical column [poster]

2023 **Lake Conference - Neural Coding and Dynamics** Seattle, WA, USA
Dynamic interactions within and between the deep and superficial layers mediate deviance detection in the neocortical column [poster]

2022 **Society for Neuroscience (SfN) Annual Meeting** San Diego, CA, USA
HNN-core: an open-source Python interface to the Human Neocortical Neurosolver (HNN) software for cellular and microcircuit interpretation of human MEG and EEG signals [poster]

2021 **SfN Annual Meeting** virtual
Distinct neocortical mechanisms underlie human SI responses to median nerve and laser evoked peripheral activation examined with the Human Neocortical Neurosolver modeling tool [poster]

2018 **SfN Annual Meeting** San Diego, CA, USA
Characterization of circuit mechanisms underlying discriminatory EEG neural markers for pain perception in somatosensory cortex [poster]

2016 **WWU Academic Symposium** Walla Walla University
Design and optimization of machines for biomaterials and tissue engineering applications [talk]

2015 **Murdock CSRP Conference** Vancouver, WA, USA
Design and construction of a modular perfusion bioreactor for tissue culture [poster]

teaching & leadership

2021, 2023 **guest lecturer** Dept. of Neuroscience, Brown University
Mechanisms & Meaning of Neural Dynamics (NEUR 1440)

2020, 2022 **teaching assistant** Dept. of Neuroscience, Brown University
Mechanisms & Meaning of Neural Dynamics (NEUR 1440)

2022 **section co-leader** Dept. of Neuroscience, Brown University
Neuroscience Graduate Program Neuropracticum

2021 → 2022 **peer mentor** Dept. of Neuroscience, Brown University
Neuroscience Graduate Program

2020 **program co-organizer** Dept. of Neuroscience, Brown University
Neuroscience Graduate Program Fall Retreat

2018 → 2019 **peer mentor** School of Engineering, Brown University
Biomedical Engineering Master's Program

2018 **tutor** Hope High School, Providence, RI, USA
high school math

2016 **teaching assistant** Dept. of Physics, Walla Walla University
Principles of Physics, lab section

2015 → 2016 **elected social club officer** Walla Walla University
Vice President of the Biology Club

2015 **college newspaper columnist** Walla Walla University
Science & Technology section of *The Collegian*

2013 → 2014 **teacher** Kosrae SDA School, Kosrae, Federated States of Micronesia
5th and 6th grade, all subjects

2012 → 2013 **teaching assistant** Rogers Adventist School, College Place, WA, USA
middle school math

2011 → 2012 **teaching assistant** Dept. of Mathematics, Walla Walla University
algebra II, pre-calculus, & calculus I

mentorship

2023 **co-mentor** Google Summer of Code, Jones Lab / INCF
Carolina Fernandez (U. Miami). Project: *Generalize parameter optimization routines* [for HNN-core].

2023 **co-mentor** Google Summer of Code, Jones Lab / INCF
Rajat Partani (NIT Karnataka). Project: *Develop IO Routines for HNN-core outputs*.

2022 **co-mentor** Google Summer of Code, Jones Lab / INCF
Huzi Cheng (Indiana U. Bloomington). Project: *A GUI for HNN-core with ipywidgets and the calculation and visualization of CSD signals*.

2022 **mentor** The Leadership Alliance SREIP, Brown University
Mattan Pelah (Florida State U.). Project: *Simulating the cellular and circuit dynamics of current source density measurements using the Human Neocortical Neurosolver*.

specialized training & certificates

2023 **Neurotechnology: from Research to Application** Ben-Gurion University of the Negev, Israel
developing neurotechnology solutions for real-world problems

2020 **Sheridan Teaching Certificate I** The Sheridan Center, Brown University
critical reflection, inclusive classroom communication, rhetorical practice, and active learning design

awards & fellowships

2024 **GRS Travel Award** [$350] Thalamocortical Interactions GRS

2021 → 2023 **ICoN T32 Traineeship** Carney Institute for Brain Science, Brown University
Interdisciplinary training in Computational, Cognitive, and Systems Neuroscience

2022 **1^{st} place - BRAINSTORM Data Challenge** [$2,000] Carney Institute for Brain Science, Brown University

2011 → 2016 **WWU Achievement Scholarship** [$36,000] Walla Walla University

2015 → 2016 **Engineering Scholarship** [$750] School of Engineering, Walla Walla University

2012 → 2013 **Stanley Lloyd Scholarship** [$1,000] Walla Walla University

2012 → 2013 **NPUC Grant** [$600] Walla Walla University

2011 → 2012 **Leadership Award** [$2,250] Walla Walla University

software contributions

hnn-core neural simulator based on NEURON+Python [contributor/maintainer: >350 commits, 5,100 lines]

hnn GUI-oriented neural simulator based on NEURON+Python [contributor: 11 commits, 72 lines]

SpectralEvents Python toolbox for spectral event analysis [contributor/maintainer: >90 commits, 6,900 lines]

skills

- programming languages: Python, Matlab, JS, C++
- markup languages: LaTeX
- interfaces: Git, BASH/Linux, SLURM, MPI
- parallel processing: multithreading, multiprocessing
- model optimization/comparison: Bayesian inference, non-linear methods
- signal analysis: Fourier analysis, spectral event analysis, EEG/MEG inverse solution methods

last updated: 2024-08-16