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I'm a postdoc in the Van Essen and Glasser lab at Washington University affiliated with the neuroscience and radiology departments. I study cortical homologies between human and non-human primates with structural and functional neuroimaging as well as single-nucleus and spatial transcriptomics techniques. My research seeks to improve the common spatial framework used to map data between species, better understand the recent evolution of primate neocortex, and ultimately, learn a little about what makes us human.

In 2023 I received my Ph.D. in Computational Neuroscience from the University of California, San Diego, where I studied human corticocortical structural connectivity as well as spontaneous intra- and extracranial electrophysiological correlativity under Eric Halgen. I also have older series of work investigating acute alcohol intoxication and executive function with MEG as well as synthetic M/EEG.

Education

09/15-02/23 University of California, San Diego
PhD Neurosciences, computational specialization
Advisor: Eric Halgren PhD
09/06-06/10 University of California, Davis
B.S. Neurobiology, Physiology, & Behavior, with honors
Minor, Music

Research Experience

03/23-Present Postdoc, Washington University in St. Louis
Mentors: David Van Essen PhD & Matthew Glasser PhD
09/14-09/15 Research Specialist II, San Diego State Univ.
09/10-09/14 Staff Research Associate II, UC San Diego
Mentor: Ksenija Marinkovic PhD
01/10-06/10 Independent Research Project, UC Davis
Mentor: Mark Goldman PhD
12/07-06/10 Student Research Assistant, UC Davis
Mentors: Petr Janata PhD, Frederick Barret PhD

Institutional Service

06/24-06/25 Policy Chair, WashU Postdoc Society
07/23-07/24 Secretary, WashU Postdoc Society
04/23-Present Executive Council Member, WashU Postdoc Society
10/17-10/19 Elected student representative, Neurosciences Graduate Program Executive Committee, UC San Diego
10/15-10/17 Student member, curriculum committee neurosciences graduate program, UC San Diego

I have served as an ad hoc peer-reviewer or co-reviewer for the journals Cell, Cereb. Cortex, Curr. Res. Physiol., Imaging Neuroscience, Nat. Commun., Nat. Neurosci., Nat. Rev. Neurosci., NeuroImage, PLOS Biol., PLOS ONE, and PNAS.

Competitive Fellowships, Grants, & Awards

06/24-06/27 PI, F32MH138113 Postdoctoral fellowship, Evolutionary expansion of human cerebral cortex: spatial patterns and transcriptional correlates, $224,868
04/19-04/20 Co-PI, Innovative Research Grant, Kavli Institute for Brain and Mind, Genetic influences on human cortical variation, $50,000
07/18-07/19 Trainee, T32MH020002 Predoctoral fellowship in Cognitive Neuroscience, Institute for Neural Computation, UC San Diego, On the generation of spontaneous MEG and EEG, $24,324
06/10 Departmental citation for outstanding academic achievement and independent research, UC Davis
03/06 Eagle Scout

Teaching Experience

03/18-06/18 Teaching Assistant, Brain Waves across Scales,
UC San Diego
09/17-12/17 Teaching Assistant, Data Analysis in Matlab,
UC San Diego
01/17-03/17 Course co-organizer & guest lecturer, Mathematical Foundations for Computational Neuroscience, UC San Diego
01/16-03/16 Course co-organizer, Quantitative Foundations of Neuroscience, UC San Diego
11/15 Guest lecturer, Cognitive Neuroscience, San Diego State University
09/12, 09/13, 09/18 Lab Instructor, neurosciences graduate program Magnetoencephalography Bootcamp, UC San Diego

Undergraduate or Junior Staff Mentees
(In concert with presiding faculty mentorship)
07/24-09/25 Yunhao Jiang, master's student, Biomedical Engineering, Columbia University
08/22-11/23 Albert Liu
06/19-06/20 Sophie Kajfez, data analyst, LS Direct
10/18-12/19 Yihan Zi, PhD student, neuroscience, Boston University
05/17-03/18 Taylor Tanita, chief data sci. / co-founder, inplay.ai
08/14-09/15 Edward Nguyen, radiology resident, USC Keck School of Medicine
04/14-09/15 Lauren Beaton, senior UX strategist, McGraw Hill

Technical Skills

Neural Signal Processing | Quantitative Neuroanatomy
Data Science | Statistics | Time-Frequency Analysis
EEG / MEG / Intracranial-EEG | MRI / dMRI / fMRI Bioinformatics | Human Data Collection| Inverse Modeling | Distributed / Cluster Computing | Fieldtrip | FreeSurfer Workbench | matlab | bash | R | python | git | Linux Sys Adm.

Interests & Hobbies

Movies | '80's Mercedes | International Affairs | Dinghy Sailing

Publicly Available Data & Resources

Whole cortex diffusion MRI relative connectivity matrices for 1,065 individuals of the WU-Minn Human Connectome Project cohort in the Glasser 360 parcellation doi:10.5281/zenodo.4060485
An estimation of the absolute number of axons in the above cohort doi:10.5281/zenodo.4060485
Two 35-40 minute lectures on basic digital signal processing concepts for neuroscience for a student-run reverse-classroom courseyoutube.com/watch?v=Of7JQ8BgCi4 and accompanying quizzes and problemsets with keys

Preprints, Publications, Symposia Talks, & Conference Posters

See also Google Scholar or PubMed. †/* Authors contributed equally to the publication

Publications & Preprints

Smith SE, Cellier D, Rigby A, **Rosen BQ**, Garrett J, Simon AJ, Ben-Haim S, Shih JJ, Doelling KB, Voytek B. Simulated field potentials capture multiple simultaneous processes underlying human temporal attention. bioRxiv. 2026. doi:10.64898/2026.09.17.752423

Ding S-L, Bhandiwad AA, **Rosen BQ**, Seeman SC, Long B, Johansen NJ, Bayindir U, Facer B, Fu Y, Halimi Y. Harmonized brain ontology and 3D atlases for human, macaque, and marmoset basal ganglia. Cell. 2026; 189(23):7616-7633.e7. doi:10.1016/j.cell.2026.10.033

Hewitt MN, Turner MA, Johansen N, McMillen DA, Dan S, DeBerardine M, Ruiz A, Huang M, Quon J, Fu Y, Kapen I, Barta S, Martin N, Cuevas NV, Olsen P, Nagra J, Campos J, VanNess MM, Ransford S, Juneau Z, Hastings S, Ching L, Kunst M, Basu S, Höllt T, Li C, Lelieveldt B, Yazdani F, Zhang Q, Levandowski K, Feng G, **Rosen BQ**, Glasser MF, Hayashi T, Garcia AD, Kana O, Maltzer ZM, Campagnola L, Jarsky T, Kruse L, Freiwald W, Keene CD, Van Essen DC, Ariza J, Waters J, Krienen FM, Bakken TE, Hodge RD, Ng L, Zeng H, Lein ES, Close JL, Long B, Seeman SC. Spatial transcriptomics reveals molecular organization of human and nonhuman primate basal ganglia. Cell. 2026; 189(23):7330-7349.e9. doi:10.1016/j.cell.2026.10.023

The BRAIN Initiative Cell Atlas Network (BICAN). Toward an integrated framework for a human and mammalian brain cell atlas. Cell. 2026; 189(23):7289-7308.e6. doi:10.1016/j.cell.2026.10.031

Dickey CW, Verzhbinsky IA, Kajfez S, **Rosen BQ**, Gonzalez CE, Chauvel PY, Cash SS, Pati S, Halgren E. Thalamic spindles and up states coordinate cortical and hippocampal co-ripples in humans. *PLOS Biology*. 2024; 22(11), e3002855. doi:10.1371/journal.pbio.3002855

Cleary D, Tchoe Y, Bourhis A, Dickey CW, Stedelin B, Ganji M, Lee SH, Lee J, Siler DA, Brown EC, **Rosen BQ**, Kaestner E, Yang, JC, Soper SJ, Han SJ, Paulk AC, Cash SS, Raslan AMT, Dayeh SA, Halgren E. Syllable processing is organized in discrete subregions of the human superior temporal gyrus. *PLOS Biology*. 2024; 22(9), e3002774. doi:10.1371/journal.pbio.3002774

Marsh BM, Zuloaga MGN, **Rosen BQ**, Sokolov Y, Delanois JE, Gonzalez OC, Krishnan GP, Halgren E, Bazhenov M. Emergent effects of synaptic connectivity on cortical sleep slow wave amplitude, density and propagation in a large-scale thalamocortical network model of the human brain. *PLOS Computational Biology*. 2024; 20(7), e101224. doi:10.1371/journal.pcbi.1012245

Peterson EJ, **Rosen BQ**, Belger A, Voytek B, Campbell AM. Aperiodic neural activity is a better predictor of schizophrenia than neural oscillations. *Clinical EEG and Neuroscience*. 2023; 54(4):434-445. doi:10.1177/15500594231165589

You Y, Correas A, White DR, RJ, Wagner LC, Jao Keehn RJ, **Rosen BQ**, Alemu K, Müller R-A, Marinkovic K. Mapping access to meaning in adolescents with autism: Atypical lateralization and spatiotemporal patterns as a function of language ability. *NeuroImage: Clinical*. 2023; 39:103467. doi:10.1016/j.nicl.2023.103467

Wilkinson M, Jao Keehn RJ, Linke AC, You, Y, Gao Y, Alemu K, Correas A, **Rosen BQ**, Kohli JS, Wagner L, Sridhar A, Marinkovic K, Müller R-A. fMRI BOLD and MEG theta power reflect complementary aspects of activity during lexicosemantic decision in adolescents with ASD. *Neuroimage: Reports*. 2022; 2(4):100134. doi:10.1016/j.ynirp.2022.100134

Dickey CW, Verzhbinsky IA, Jiang X, **Rosen BQ**, Kajfez S, Eskandar EN, Gonzalez-Martinez J, Cash SS, Halgren E. Cortical ripples provide the conditions for consolidation during NREM sleep in humans. *Journal of Neuroscience*. 2022; 42(42):7931-7946. doi:/10.1523/JNEUROSCI.0742-22.2022

Dickey CW, Verzhbinsky IA, Jiang X, **Rosen BQ**, Kajfez S, Stedelin B, Shih JJ, Ben-Haim S, Raslan AM, Eskandar EN, Gonzalez-Martinez J, Cash SS, Halgren E. Widespread ripples synchronize human cortical activity during sleep, waking, and memory recall. *Proceedings of the National Academy of Sciences of the United States of America*. 2022; 119(28):e2107797119. doi:10.1073/pnas.2107797119
Marinkovic K, **Rosen BQ**. Theta oscillatory dynamic of inhibitory control, error processing, and post-error adjustments: Neural underpinnings and alcohol-induced dysregulation in social drinkers. *Alcoholism: clinical and experimental research*. 2022;46(7):1220-1232. doi:10.1111/acer.14856

Chen Y, **Rosen BQ**, Sejnowski TJ. Dynamical differential covariance recovers directional network structure in multiscale neural systems.*Proceedings of the National Academy of Sciences of the United States of America*. 2022; 119(24):e2117234119. doi:10.1073/pnas.2117234119

Rosen BQ, Halgren E. An estimation of the absolute number of axons indicates that human cortical areas are sparsely connected *PLOS Biology*. 2022; 20(3): e3001575. doi:10.1371/journal.pbio.3001575

Happer JP, Wagner LC, Beaton LE, **Rosen BQ**, Marinkovic K. The "when" and "where" of the interplay between attentional capture and response inhibition during a Go/NoGo variant. *Neuroimage*. 2021; 231:117837. doi:10.1016/j.neuroimage.2021.117837

Correas A, Cuesta P, **Rosen BQ**, Maestu F, Marinkovic K. Compensatory neuroadaptation to binge drinking: Human evidence for allostasis. *Addiction Biology*. 2021; 26(3):e12960. doi:10.1111/adb.12960
You Y, Correas A, Jao Keehn RJ, Wagner LC, **Rosen BQ**, Beaton LE, Gao Y, Brocklehurst WT, Fishman I, Müller R-A, Marinkovic K. MEG Theta during lexico-semantic and executive processing is altered in high-functioning adolescents with autism. *Cerebral Cortex*. 2021; 31(2):1116-1130. doi:10.1093/cercor/bhaa279

Rosen BQ, Halgren E. A whole-cortex probabilistic diffusion tractography connectome. *eNeuro*. 2021; 8(1):ENEURO.0416-20.2020. doi:10.1523/ENEURO.0416-20.2020

Rosen† **BQ**, Krishnan† GP, Sanda P, Komarov M, Sejnowski TJ, Rulkov N, Ulbert I, Eross L, Madsen J, Devonsky O, Doyle W, Fabo D, Cash SS, Bazhenov* M, Halgren* E. Simulating human sleep spindle MEG and EEG from ion channel and circuit level dynamics. *Journal of Neuroscience Methods*. 2019; 316:46-57. doi:10.1016/j.jneumeth.2018.10.002

Marinkovic K, Beaton LE, **Rosen BQ**, Happer JP, Wagner LC. Disruption of frontal lobe neural synchrony during cognitive control by alcohol intoxication. *Journal of Visualized Experiments*. 2019; (144):1-12. doi:10.3791/58839

Gonzalez CE, Mak-McCully RA, **Rosen BQ**, Cash SS, Chauvel PY, Bastuji H, Halgren E. Theta bursts precede, and spindles follow, cortical and thalamic downstates in human NREM sleep. *Journal of Neuroscience*. 2018; 38(46):9989-10001. doi:10.1523/JNEUROSCI.0476-18.201

Krishnan GP, **Rosen BQ**, Chen J-Y, Muller L, Sejnowski TJ, Cash SS, Halgren E, Bazhenov M. Thalamocortical and intracortical laminar connectivity determines sleep spindle properties. *PLOS Computational Biol*ogy. 2018; 14(6):e1006171. doi:10.1371/journal.pcbi.1006171

Rosen BQ, Padovan N, Marinkovic K. Alcohol hits you when it is hard: Intoxication, task difficulty, and theta brain oscillations. *Alcoholism: clinical and experimental research*. 2016; 40(4):743-752. doi:10.1111/acer.13014

Mak-McCully RA, **Rosen BQ**, Rolland M, Régis J, Bartolomei F, Rey M, Chauvel* PY, Cash* SS, Halgren* E. Distribution, amplitude, incidence, co-occurrence, and propagation of human K-complexes in focal transcortical recordings. *eNeuro*. 2015; 2(4):3. doi:10.1523/ENEURO.0028-15.2015

Mak-McCully RA, Deiss SR, **Rosen BQ**, Rolland M, Régis J, Bartolomei F, Rey M, Chauvel PY, Cash* SS, Bazhenov* M, Halgren* E. Synchronization of isolated downstates (K-complexes) may be Caused by cortically-induced disruption of thalamic spindling. *PLOS Computational Biology*. 2014; 10(9). doi:10.1371/journal.pcbi.1003855

Marinkovic K, **Rosen BQ**, Cox B, Hagler DJ. Spatio-temporal processing of words and nonwords: Hemispheric laterality and acute alcohol intoxication. *Brain Research*. 2014; 1558:18-32. doi:10.1016/j.brainres.2014.02.030
Rosen BQ, O'Hara R, Kovacevic S, Schulman A, Padovan N, Marinkovic K. Oscillatory spatial profile of alcohol's effects on the resting state: Anatomically-constrained MEG. *Alcohol*. 2014; 48(2):89-97. doi:10.1016/j.alcohol.2013.12.004

Marinkovic K, **Rosen BQ**, Cox B, Kovacevic S. Event-Related Theta power during lexical-semantic retrieval and decision conflict is modulated by alcohol intoxication: Anatomically constrained MEG. *Frontiers in Psychology*. 2012;3:121. doi:10.3389/fpsyg.2012.00121

Invited Talks

Integrating single-cell multiomics & spatial transcriptomics with MRI. Colloquium Series, Trainee. Ohio State University Center for Cognitive and Behavioral Brain Imaging. 2025. Columbus, OH

Structure, function, and gene expression is human and non-human primate cerebral neocortex. International Center for Primate Brain Research Summer School in Non-human Primate Systems Neuroscience. 2024. Shanghai, China

Expansion of higher-order cortical areas in humans versus chimpanzees reflects human transcriptional topography. Kavli Institute for Brain and Mind Symposium on Innovative Research. 2020. San Diego CA

Conference Posters

(Only posters where I was the primary presenter are listed)

Rosen BQ, Hu D, Seeman SC, Yazdani F, Coalson TS, Reid EK, Harwell J, Huang M, Garcia AD, Hodge RD, Ikeda T, Ng L, Mufti S, Lein E, Van Essen DC, Freiwald W, Glasser MF. 2025. Society for Neuroscience Meeting. San Diego, CA

Rosen BQ, Donahue CJ, Hayashi T, Van Essen DC, Glasser MF. Macaque cell type and gene expression correlates of neuroanatomy. 2024. Organization for Human Brain Mapping Meeting. Seoul, South Korea.

Rosen BQ, Donahue CJ, Coalson TS, Harwell J, Besenczi R, Robinson EC, Hayashi T, Van Essen DC, Glasser MF. Mapping evolutionary cortical expansion with anatomical MSM. 2024. Organization for Human Brain Mapping Meeting. Seoul, South Korea.

Rosen BQ, Kajfez S, Cash S, Davis K, Pati S, Gonzalez-Martinez J, Raslan A, Ben-haim A, Shih J, Halgren E. A frequency-resolved human functional connectome of spontaneous cortical activity from composite SEEG. 2022. Society for Neuroscience Meeting. San Diego, CA

Rosen† **BQ**, Sokolov† Y, Golden R, Delanois JE, González OC, Krishnan GP, Halgren* E, Bazhenov* M. From ion channel dynamics to EEG and MEG: multiscale thalamocortical network model with hierarchical connectivity of sleep spindles and slow oscillations. 2021. BRAIN Initiative Investigators Meeting. Washington D.C.

Rosen BQ, Halgren E. A whole-cortex probabilistic diffusion tractography connectome. BRAIN Initiative Investigators Meeting. 2020. Washington D.C.

Halgren, E, Bazhenov M, **Rosen BQ**, Cash SS, Davis K, Pati S, Gonzalez-Martinez J. A Deep Understanding of the Electroencephalogram (EEG) and Magnetoencephalogram (MEG). 2019. BRAIN Initiative Investigators Meeting. Washington D.C.

Rosen BQ, Peterson E, Campbell A, Belger A, Voytek B. Spectral 1/*f* noise differences account for apparent oscillatory band-specific effects in Schizophrenia. 2016. Society for Neuroscience Meeting. San Diego, CA

Rosen BQ, Kovacevic S, Marinkovic K. Alcohol hits you when it's hard: Intoxication, task difficulty, and theta brain oscillations. 2015. Organization for Human Brain Mapping Meeting. Honolulu, HI

Rosen BQ, Kovacevic S, Marinkovic K. Event-related theta power is attenuated by alcohol intoxication as a function of response conflict difficulty. 2014. International Conference on Biomagnetism. Halifax, NS, Canada

Marinkovic K., **Rosen BQ**, Cox B, Hagler DJ. Spatio-temporal processing of words and nonwords: Hemispheric laterality and acute alcohol intoxication. 2013. Society for Neuroscience Meeting. San Diego, CA