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I'm a neurosciences post-doc in the lab of Profs. David van Essen and Mathew Glasser at Washington University in St. Louis. My current research is mainly focused on quantitatively evaluating inter-species and interareal homology between regions of the cortex. My doctoral thesis was on structural and functional connectivity of the human cortex, as examined with diffusion MRI and intra-cranial depth electrode recordings in patients with drug-resistant epilepsy. My advisor was Prof. Eric Halgren at UC San Diego. In addition to my primary lines of inquiry, I have some tangentially-related projects looking at the transcriptional markers of evolutionarily-recent cortical expansion and producing synthetic M/EEG, as well as an older series of work investigating acute alcohol intoxication and executive function with MEG. More broadly, I'm interested in data-driven approaches to observing the structure, function, and evolution of human cortex.

Education

09/15-02/23 University of California, San Diego
Ph.D. Neurosciences, computational specialization
Advisor: Eric Halgren Ph.D.
09/06-06/10 University of California, Davis
B.S. Neurobiology, Physiology, & Behavior, *cum laude*
Minor, Music

Research Experience

03/23-present Post-doc, 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 Ph.D.
12/07-06/10 Student Research Assistant, UC Davis
Mentors: Petr Janata Ph.D., Frederick Barret Ph.D.
01/10-06/10 Independent Research Project, UC Davis
Mentor: Mark Goldman Ph.D.
09/05-09/06 Lab Assistant, Delta Environmental Laboratories
Mentor: Hussein Khoshkhoo Ph.D.

Technical Skills

Neural Signal Processing | Quantitative Neuroanatomy
Data Science | Statistics | Time-Frequency Analysis
EEG / MEG / Intracranial-EEG | MRI | Human Data Collection
Inverse Modeling | Distributed / Cluster Computing
FreeSurfer | Expert Matlab | Basic Python | Linux System Admin.

Institutional Service

02/22 Peer reviewer, *Proc. Natl. Acad. Sci. U.S.A.*
04/20 Peer reviewer, *Current Research in Physiology*
04/19, 12/19 Peer reviewer, *PLoS ONE*
10/17-10/19 Elected student representative, neurosciences graduate program executive committee, UC San Diego
10/15-10/17 Student member, neurosciences graduate program curriculum committee, UC San Diego

Competitive Fellowships, Grants, & Awards

04/19-04/20 Co-Principal Investigator, Innovative Research Grant, Kavli Institute for Brain and Mind, $50,000
07/18-07/19 Predoctoral fellowship in Cognitive Neuroscience, Institute for Neural Computation, UC San Diego
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)
06/19-06/20 Sophie Kajfez, staff research assoc., UC San Diego
10/18-12/19 Yihan Zi, neuroscience Ph.D. student, Boston Univ.
05/17-03/18 Taylor Tanita, data scientist / co-founder, HotStreak
08/14-09/15 Edward Nguyen, resident physician, UCLA DGSOM
04/14-09/15 Lauren Beaton, learning designer, McGraw Hill

Interests & Hobbies

Film | History | International Affairs | D&D | Dinghy Sailing

Preprints, Publications, Symposia Talks, & Conference Posters

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

Publications & Preprints

1. 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
2. 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
3. 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
4. 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
5. 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
6. **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
7. Peterson EJ, **Rosen BQ**, Belger A, Voytek B, Campbell AM. Aperiodic neural activity is a better predictor of schizophrenia than neural oscillations. *BioRxiv*. 2021. doi:10.1101/113449
8. 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
9. 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
10. 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
11. **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
12. **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
13. 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
14. 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
15. 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 Biology*. 2018; 14(6):e1006171. doi:10.1371/journal.pcbi.1006171
16. **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
17. 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
18. 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
19. 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
20. **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
21. 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

Symposia Talks

1. 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)

1. **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
2. **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.
3. **Rosen BQ**, Halgren E. A whole-cortex probabilistic diffusion tractography connectome. BRAIN Initiative Investigators Meeting. 2020. Washington D.C.
4. 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.
5. **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
6. **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
7. **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
8. 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

Publicly Available Data & Resources

1. 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
2. An estimation of the absolute number of axons in the above cohort doi:10.5281/zenodo.4060485
3. Two 35-40 minute lectures on basic digital signal processing concepts for neuroscience for a student-run reverse-classroom course youtube.com/watch?v=Of7JQ8BgCi4 and accompanying quizzes and problemsets with keys