Brian Gereke

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Education

PhD, **University of Texas at Austin** | Neuroscience expected spring 2018
BS, **Univerandsity of Arizona** | Mathematics 2012

Research Experience

Neural Systems and Data Science Lab | Berkeley National Lab 2018 – 2020
Postdoctoral Researcher Advised by Dr. Kristofer Bouchard
Designed and built a robotically-actuated data acquisition system for complex rodent reaching tasks

Colgin Lab and Zemelman Lab | University of Texas at Austin 2012 – 2018
Graduate Researcher Co-advised by Dr. Laura Lee Colgin and Dr. Boris Zemelman
Thesis: *Experience-dependent trends in hippocampal theta and gamma rhythms*

Neural Coding and Dynamics Lab | University of Texas at Austin 2012
Graduate Research Rotation Advised by Dr. Ila Fiete
Analyzed spike train correlation predictions in a continuous attractor network model for perceptual decision-making

Computational Experimental Neuroscience Lab | University of Arizona 2010 – 2012
Undergraduate Researcher Advised by Dr. Jean-Marc Fellous
Designed and conducted experiments studying spatial route optimization in rodents

Computational Neuroscience Summer Program | Carnegie Mellon summer 2010
Undergraduate Intern Faculty mentor: Dr. David Touretzky
Implemented a computational model of rhythmic spike timing dynamics in populations of hippocampal place cells

Visual Perception Lab | University of Arizona 2008 – 2009
Undergraduate Researcher Faculty mentor: Dr. Mary Peterson
Assisted graduate student in study of perceptual processing underlying figure-ground segregation

Publications

Gereke BJ, Mably AJ, and Colgin LL. Experience-dependent trends in CA1 theta and slow gamma rhythms in freely behaving mice. *J. Neurophys. In Press*.

Mably AJ, **Gereke BJ**, Jones DT, Colgin LL. Impairments in spatial representations and rhythmic coordination of place cells in the 3xTg mouse model of Alzheimer's disease. *Hippocampus* 27:378–392, 2017.

Lyttle D, **Gereke B**, Lin KK, Fellous JM. Spatial scale and place field stability in a grid-to-place cell model of the dorsoventral axis of the hippocampus. *Hippocampus* 23:729–744, 2013.

de Jong LW, **Gereke B**, Martin GM, Fellous JM. The traveling salesrat: insights into the dynamics of efficient spatial navigation in the rodent. *J Neural Eng*. 8(6):065010, 2011. **(co-first author)**

Awards and Honors

NSF Graduate Research Fellowship | full tuition, stipend 2014 – 2017 Professional Development Travel Award, *Big Questions in Neuroscience* 2017 Invited Attendee, Princeton Oscillations Workshop (sponsored by McDonnell Foundation) 2016 Professional Development Travel Award, *SfN Conference* 2016 Professional Development Travel Award, *SfN Conference* 2015 Institute for Neuroscience NIH Training Grant | full tuition, stipend 2012 – 2014 UT Austin College of Natural Sciences Dean's Excellence Award | $2000 cash prize 2012 University of Arizona College of Science Galileo Circle Scholar | $1500 cash prize 2012 Undergraduate Biology Research Program (UBRP), University of Arizona | stipend 2011 – 2012 Computational Neuroscience Summer Program, Carnegie Mellon | stipend 2010 University of Arizona Wildcat Excellence Scholarship | full tuition 2007 – 2011 University of Arizona Dean's List w/distinction 2007 – 2009

Conferences

Gereke BJ, Nelson BR, and Bouchard KE. A 3-dof pneumatically-actuated robotic system for complex reaching tasks in rodents compatible with electrophysiology. *Society for Neuroscience*, Chicago, CA, 2019.

Gereke BJ, Mably AJ, and Colgin LL. Experience-dependent trends in CA1 theta and slow gamma rhythms in freely behaving mice. *Austin Conference on Learning and Memory*, Austin, TX, 2017.

Mably AJ, Jones DT, **Gereke BJ**, and Colgin LL. Impairments in spatial memory representations in freely moving 3xTg mice. *Austin Conference on Learning and Memory*, Austin, TX, 2017.

Gereke BJ, Mably AJ, and Colgin LL. Experience-Dependent Trends in the CA1 cross-spectrum revealed by a generalized additive mixed model. *Society for Neuroscience*, San Diego, CA, 2016.

Mably AJ, Jones DT, **Gereke BJ**, and Colgin LL. Impairments in spatial memory representations in freely moving 3xTg mice. *Society for Neuroscience*, San Diego, CA, 2016.

Gereke BJ, Mably AJ, Jones DT, and Colgin LL. Hippocampal place cells exhibit distinct coding modes in mice. *Society for Neuroscience*, Chicago, IL, 2015.

Mably AJ, Jones DT, **Gereke BJ**, and Colgin LL. Impairments in spatial memory representations in freely moving 3xTg mice. *MCCS*, Chicago, IL, 2015.

Lyttle D, **Gereke B**, Lin K, and Fellous JM. Spatial scale and field stability in a modular grid cell to place cell model. *SIAM*, Minneapolis, MN, 2012.

Gereke B, Compton R, and Fellous JM. Sex differences in rodent optimal spatial navigation: influence of object cues in the traveling salesperson problem. *23rd Annual UBRP Conference*, Tucson, AZ, 2012.

Gereke B, Compton R, and Fellous JM. Sex differences in optimal spatial navigation: influences of estrous cycle and object cues in the traveling salesperson problem. *Society for Neuroscience*, Washington DC, 2011.

Gereke B and Touretzky D. Local field potential constrains temporal delays among place cells. *University of Arizona Student Showcase*, Tucson, AZ, 2010 (award recipient)

de Jong LW, **Gereke B**, Corral-Frias N, Scott K, Martin G, and Fellous JM. The role of the dopaminergic system in optimal spatial navigation. *Society for Neuroscience*, San-Diego, CA, 2010.

Talks

Experience-dependent trends in mouse CA1 local field potentials. *Center for Learning and Memory seminar series*, Austin, TX, 2016.

Optogenetic manipulation of input-dependent spatial coding in mouse CA1. *Institute for Neuroscience Dialogues seminar*, Austin, TX, 2016.

Input-dependent spatial coding in mouse CA1. *Center for Learning and Memory Annual Retreat*, Austin, TX, 2015.

How to choose a grad school. *Institute for Neuroscience Graduate Student Recruitment seminar*, Austin, TX, 2014.

Mentoring, Teaching and Outreach

UT PREP summer camp | Neuroscience and Rate Coding camp 2016, 2017 Nicole Alexander | Colgin lab honors thesis undergraduate researcher, 2016 – 2017
2017 UT CNS Award for Excellence in Neuroscience recipient, Now at Baylor Medical School Ashkan Jahangiri | Zemelman lab undergraduate researcher 2015 – 2016 NEU335 Neural Systems II | Teaching Assistant 2016 Dell Medical School Summer Camp | Neuroscience and Rate Coding camp 2016 Memory Matters | UT Austin Center for Learning and Memory public education event 2014, 2016 Helped found the Brain Matters Podcast 2014

References

Dr. Kristofer Bouchard Postdoc advisor Berkeley National Lab
KEBouchard@lbl.gov (510) 486-5270

Dr. Laura Colgin Primary advisor UT Austin
colgin@mail.clm.utexas.edu (512) 232-6361

Dr. Boris Zemelman Secondary advisor UT Austin
zemelmanb@mail.clm.utexas.edu (512) 232-6364

Dr. Ila Fiete Rotation advisor UT Austin
ilafiete@mail.clm.utexas.edu (512) 232-8439

Dr. Jean-Marc Fellous Undergraduate advisor University of Arizona
fellous@email.arizona.edu (520) 626-2617