EKATERINA GRIBKOVA

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Affiliations: Coordinated Science Laboratory, Neuroscience Program, Center for Artificial Intelligence Innovation

EDUCATION

University of Illinois at Urbana-Champaign

Ph.D., Neuroscience; Major Concentration: Computational Neuroscience — **2020**

Dissertation: "Biologically Inspired Computational Neural Models for Motivated Behavior, Learning, and Memory"

University of Illinois at Urbana-Champaign

B.S., Mathematics, and Molecular and Cellular Biology (MCB) — **2016**

Senior Thesis: "Information Processing in Open Loop Circuit of Thalamoreticular Network"

Graduation Honors: Distinction in Mathematics, High Distinction in MCB

RESEARCH

Coordinated Science Laboratory, University of Illinois at Urbana-Champaign

Postdoctoral Research Associate – Advisor: Prof. Rhanor Gillette — **2020-present**

Cyberoctopus: collaborative multi-PI project for development of an octopus-inspired soft-bodied robot (Office of Naval Research MURI N00014-19-1-2373)

Molluscan behavior and neurophysiology. Computational neuroscience: models of plasticity, behavior, episodic memory, and cognitive mapping.

Neuroscience Program, University of Illinois at Urbana-Champaign

Graduate Researcher – Advisor: Prof. Rhanor Gillette — **2018-2020**

Computational neuroscience, including neuron models of plasticity, models of behavior and memory.

Graduate Researcher – Advisor: Prof. Daniel Llano — **2016-2018**

Computational neuroscience, including neuron models and scientific programming; electrophysiology, and calcium imaging.

Beckman Institute, University of Illinois at Urbana-Champaign

Undergraduate Researcher – Advisor: Prof. Daniel Llano — **2013-2016**

Computational neuroscience, including neuron information processing and scientific programming, and brain tissue processing, including histology and imaging.

TEACHING EXPERIENCE

University of Illinois at Urbana-Champaign

Teaching Assistant – to Profs. Rhanor and Martha Gillette in "MCB 462: Integrative Neuroscience" — **Spring 2018-2020**

Taught review and discussion sections for students, developed online components of the course, collaborated on assignment, quiz, and exam development, met with students for office hours and upon request, and graded student work, including assignments, quizzes, and exams.

Teaching Assistant – to Prof. Daniel Llano in "MCB 314: Introduction to Neurobiology" — **Fall 2019**

Substituted for several lectures, provided technical support, helped manage online components of the course, helped with exam development, and met with students for office hours.

Teaching Assistant – to Prof. Elizabeth Good in "MCB 253: Experimental Techniques in Cell Biology" — **Fall 2018**

Taught lab section, including experimental procedures and principles, supervised student experiments, met with students for office hours, and graded all written work, including lab protocols, reports and final papers.

PUBLICATIONS AND PAPERS

IN REVIEW/PREPARATION

Gribkova, E. D., Chowdhary, G., Gillette, R. (2023). Cognitive Mapping and Episodic Memory Emerge from Simple Associative Learning Rules. In revision for *Neurocomputing*.

Norekian, T., Liu, Y., **Gribkova, E. D.**, Cui, J., Gillette, R. (2023). Peripheral Subepithelial Network for Chemotactile Processing in the Predatory Sea Slug *Pleurobranchaea californica*. In press for *PLOS ONE*.

Akcal, M. U., Raikov, I., **Gribkova, E. D.**, Choudhuri, A., Soltesz, I., Gilette, R., Chowdhary, G. (2023). LoCS-Net: Localizing Convolutional Spiking Neural Network for Fast Visual Place Recognition. In preparation.

Halder, U., **Gribkova, E.**, Gillette, R., Mehta, P. G. (2023). Passive elasticity properties of *Octopus rubescens* arm. Submitted to *Soft Matter as Communications*. arXiv:2311.01798

Wang, T., Halder, U., **Gribkova, E.**, Gillette, R., Gazzola, M., Mehta, P. G. (2023). Neural Models for Sensorimotor Control of an Octopus Arm. In preparation for submission.

Zhao, Q., **Gribkova, E.D.**, Shen, Y., Cui J., Naughton, N., Liu, L., Seo, J., Tong, B., Gazzola, M., Gillette, R., Zhao H. (2023). Highly stretchable and customizable microneedle electrode arrays for intramuscular electromyography. In revision for *Science Advances*.

PUBLISHED

Gribkova E. D., Lee, C.A., Brown, J. W., Cui J., Liu, Y., Norekian, T., Gillette, R. (2023). A common modular design of nervous systems originating in soft-bodied invertebrates. *Frontiers in Physiology*, *14*. DOI=10.3389/fphys.2023.1263453.

Wang, T., Halder, U., **Gribkova, E.**, Gillette, R., Gazzola, M., Mehta, P. G. (2022). A Sensory Feedback Control Law for Octopus Arm Movements. In *2022 61st IEEE Conference on Decision and Control* (CDC). arXiv preprint arXiv:2204.00717.

Wang, T., Halder, U., **Gribkova, E.**, Gazzola, M., Mehta, P. G. (2022). Control-oriented Modeling of Bend Propagation in an Octopus Arm. In *2022 American Control Conference* (ACC) (pp. 1359-1366). IEEE. arXiv preprint arXiv:2110.07211.

Gribkova, E. D., & Gillette, R. (2021). Role of NMDAR plasticity in a computational model of synaptic memory. *Scientific reports*, *11*(1), 1-16.

Chang, H. S., Halder, U., **Gribkova, E.**, Tekinalp, A., Naughton, N., Gazzola, M., & Mehta, P. G. (2021). Controlling a cyberoctopus soft arm with muscle-like actuation. In *2021 60th IEEE Conference on Decision and Control (CDC)* (pp. 1383-1390). IEEE.

Gribkova, E. D., Catanho, M., & Gillette, R. (2020). Simple Aesthetic Sense and Addiction Emerge in Neural Relations of Cost-Benefit Decision in Foraging. *Scientific reports*, *10*(1), 1-11.

Chang, H. S., Halder, U., Shih, C. H., Tekinalp, A., Parthasarathy, T., **Gribkova, E. D.**, Chowdhary, G., Gillette, R., Gazzola, M., & Mehta, P. G. (2020). Energy shaping control of a cyberoctopus soft arm. In *2020 59th IEEE Conference on Decision and Control* (CDC) (pp. 3913-3920). IEEE.

Mohandass, A., Krishnan, V., **Gribkova, E. D.**, Asuthkar, S., Baskaran, P., Nersesyan, Y., Hussain, Z., Wise, L. M., George, R. E., Stokes, N., Alexander, B. M., Cohen, A. M., Pavlov, E. V., Llano, D. A., Zhu, M. X., Thyagarajan, B., & Zakharian, E. (2020). TRPM8 as the rapid testosterone signaling receptor: Implications in the regulation of dimorphic sexual and social behaviors. *The FASEB Journal*, *34*(8), 10887-10906.

Gribkova, E. D., Ibrahim, B. A. E., & Llano, D. A. (2018). A novel mutual information estimator to measure spike train correlations in a model thalamocortical network. *Journal of Neurophysiology*, *120*(6), 2730.

Brown J. W., Caetano-Anollés D., Catanho M., **Gribkova E. D.**, Ryckman N., Tian K., Voloshin M., & Gillette R. (2018). Implementing Goal-Directed Foraging Decisions of a Simpler Nervous System in Simulation. *eNeuro*, 5(1), ENEURO-0400.

Willis, A. M., Slater, B. J., **Gribkova, E. D.**, & Llano, D. A. (2015). Open-loop organization of thalamic reticular nucleus and dorsal thalamus: A computational model. *Journal of Neurophysiology*, 114(4), 2353-2367.

CAMPUS/DEPARTMENTAL TALKS

Gribkova E. D., Gillette R. (2021). Evolution of Memory: from Basic Foraging Decisions to Cognitive Map Construction. Center for Artificial Intelligence Innovation Fall Seminar Series. Full recording: https://www.youtube.com/watch?v=n9QIExc7dEk.
Gribkova E. D., Gillette R. (2021). Evolution of Memory: from Basic Foraging Decisions to Cognitive Map Construction. Neuroscience Program Spring Seminar Series. Full recording: https://mediaspace.illinois.edu/media/t/1_6hb6y42a/199896493.
Gribkova E. D., Gillette R. (2019). The evolution of the aesthetic sense. Undergraduate Neuroscience Society, Beckman Institute.

POSTER PRESENTATIONS

LOCAL

Gribkova E. D., Gillette R. (2023). Modeling Octopus Arm Coordination with Recurrent Inhibition and Serial CPG Circuitry. Society for Neuroscience Night at the Beckman Institute.

Gribkova E. D., Gillette R. (2019-2020, 2023). The evolution of aesthetics in goal-directed foraging. Poster sessions at Neuroscience Open House and Society for Neuroscience Night at the Beckman Institute.

Gribkova E. D., Gillette R. (2018-2019). The emergence of addiction in a computational model of goal-directed foraging. Molecular and Integrative Physiology Retreat in Monticello, IL, the Neuroscience Open House and the Society for Neuroscience Night at the Beckman Institute.

Gribkova E. D., Gillette R. (2017). A novel learning and extinction algorithm enhances goal-directed foraging decisions. Society for Neuroscience Night at the Beckman Institute.

Gribkova E. D., Ibrahim B.A., Llano D.A. (2017). A novel mutual information estimator to measure spike train correlations in a model of the thalamocortical network. Society for Neuroscience Night at the Beckman Institute.

Gribkova E. D., Llano D.A. (2015-2017). Computational studies of a thalamocortical network containing the thalamic reticular nucleus, using a novel mutual information estimator to measure network performance. Molecular and Integrative Physiology Retreat in Monticello, IL, the Neuroscience Open House and the Society for Neuroscience Night at the Beckman Institute in.

NATIONAL

Gribkova E. D., Gillette R. (2023). Modeling Octopus Arm Coordination with Recurrent Inhibition and Serial CPG Circuitry. Poster session at the Society for Neuroscience 2023, Washington, DC.

Gribkova E. D., Gillette R. (2022). Evolving Memory: From basic foraging decisions to cognitive map construction. Ten-minute talk at the Comparative Cognition Society 2022 Virtual Conference.

Gribkova E. D., Gillette R. (2022). Evolving Memory: From Simple Foraging Associations to Cognitive Map Construction with Homeostatic Plasticity. Poster session at the Society for Neuroscience 2022, San Diego, CA.

Gribkova E. D., Gillette R. (2021). Evolution of Memory: from Basic Foraging Decisions to Cognitive Map Construction. Poster session at the Society for Neuroscience 2021, Chicago, IL.

Gribkova E. D., Gillette R. (2019). The evolution of aesthetics in goal-directed foraging. Poster session at the Society for Neuroscience 2019, Chicago, IL.

Gribkova E. D., Gillette R. (2018). The emergence of addiction in a computational model of goal-directed foraging. Poster session at the Society for Neuroscience 2018, San Diego, CA.

Gribkova E. D., Gillette R. (2017). A novel learning and extinction algorithm enhances goal-directed foraging decisions in simulation. Poster session at the Society for Neuroscience 2017, Washington, DC.

Gribkova E. D., Ibrahim B.A., Llano D.A. (2017). A novel mutual information estimator to measure spike train correlations in a model of the thalamocortical network. Poster session at the Society for Neuroscience 2017, Washington, DC.

Gribkova E. D., Llano D.A. (2015). Computational studies of a thalamocortical network containing the thalamic reticular nucleus, using a novel mutual information estimator to measure network performance. Poster session at the Society for Neuroscience 2015, Chicago, IL.

AWARDS AND HONORS

University of Illinois at Urbana-Champaign

Outstanding Teaching Assistant Award in MCB	5/2020
List of Teachers Marked as Excellent by their Students for Fall 2018, Spring 2019, Spring 2020	1/2019 - 5/2020
2nd Best Poster at Molecular and Integrative Physiology Retreat	5/2019
James E. Heath Award for Excellence in Teaching in Physiology	5/2019
Neuroscience Program 2018 Special Recognition Award	5/2018
C. Ladd Prosser Outstanding Achievement Award	5/2016
Neuroscience Certificate in the School of MCB	5/2016
MCB Honors Concentration	4/2014 - 5/2016
James Scholar Honors	8/2012 - 5/2016
Dean's List for Fall 2012, Spring 2013, Fall 2013, Spring 2015	8/2012 - 5/2015

OTHER ACTIVITIES AND INTERESTS

Outreach talk at Rosario Beach Marine Lab, WA: Approach/Avoidance Decisions in the Octopus	2022
Octopus education outreach activities (lab tours, Beckman Open House 2019)	2019-present
Co-founder and COO of Entience, LLC.	2017-present
Ad hoc reviewer (Frontiers in Neural Circuits 2017, J. Comp. Phys. 2022, IFAC 2023)	2017-present
Methods in Computational Neuroscience, course taken at the Marine Biological Laboratory, MA	2017
Computational Neuroscience Journal Club	2016-2019
Graphic design and animation (PowerPoint), painting, sketching, and 3D modeling (Blender)	2014-present
Piano, including performance and composition	2008-present
Computer programming, including games and interactive graph apps	2006-present