EKATERINA D. GRIBKOVA – CURRICULUM VITAE

Postdoctoral Research Associate
Affiliations: Coordinated Science Laboratory, Neuroscience Program, Center for Artificial Intelligence Innovation
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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 octopus-inspired soft-bodied robot (Office of Naval Research MURI N00014-19-1-2373)*. Molluscan behavior and electrophysiology. Computational Neuroscience: models of plasticity, behavior, episodic memory, & cognitive mapping. Artificial intelligence and soft robotics design.
- *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

- **Instructor – CS 591 BAI: Biologically Plausible Artificial Intelligence (AI)** **Fall 2024, Spring 2025**
  Organized and instructed an interdisciplinary seminar course, alongside Profs. Zhai and Rhanor Gillette, that explores a broad range of topics in AI, with a particular focus on biological plausibility. This includes developing the course website (https://publish.illinois.edu/cs591-bai/), reading list, presentation schedule, inviting speakers, and giving lectures on core concepts in biologically plausible AI.

- **Teaching Assistant – to Profs. Rhanor and Martha Gillette** **Spring 2018-2020**
  in MCB 462: Integrative Neuroscience
  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** **Fall 2019**
  in MCB 314: Introduction to Neurobiology
  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** **Fall 2018**
  in MCB 253: Experimental Techniques in Cell Biology
  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.**, Cui, J., & Gillette, R. (2025). Octopus Hypnosis: Non-Chemical Sedation in Studying Arm-Sucker Coordination. Submitted to *Biological Bulletin*. bioRxiv preprint *bioRxiv 2024.04.22.590669*.
- **Gribkova, E. D.**, & Gillette, R. (2025). A Neuroethology of Cost-Benefit Decision. Submitted.
- Wang, T., Halder, U., **Gribkova, E.**, Gillette, R., Gazzola, M., Mehta, P. G. (2025). Neural Models for Sensorimotor Control of an Octopus Arm. In revision for *Biological Cybernetics*. arXiv preprint arXiv:2402.01074

PUBLISHED

- Akcal, M. U., Raikov, I., **Gribkova, E. D.**, Choudhuri, A., Kim, S. H., Gazzola, M., Gilette, R., Soltesz, I., Chowdhary, G. (2025). Localizing Convolutional Spiking Neural Network for Fast Visual Place Recognition. *Frontiers in Neurorobotics*, *18*, 1490267.
- **Gribkova, E. D.**, Chowdhary, G., Gillette, R. (2024). Cognitive Mapping and Episodic Memory Emerge from Simple Associative Learning Rules. *Neurocomputing*, *595*, 127812. DOI= 10.1016/j.neucom.2024.127812.
- Norekian, T., Liu, Y., **Gribkova, E. D.**, Cui, J., Gillette, R. (2024). Peripheral Subepithelial Network for Chemotactile Processing in the Predatory Sea Slug *Pleurobranchaea californica*. *Plos one*, *19*(2), e0296872. DOI=10.1371/journal.pone.0296872.
- Zhao, Q., **Gribkova, E.D.**, Shen, Y., Cui J., Naughton, N., Liu, L., Seo, J., Tong, B., Gazzola, M., Gillette, R., Zhao H. (2024). Highly stretchable and customizable microneedle electrode arrays for intramuscular electromyography. *Science Advances*, *10*(18), eadn7202.
- Halder, U., **Gribkova, E.**, Gillette, R., Mehta, P. G. (2024). Passive elasticity properties of *Octopus rubescens* arm. *Journal of Experimental Biology*, *227*(13).
- **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.

PATENTS

- **Gribkova E. D.**, & Gillette R. (2024). *Artificial Neuronal Network Module with Cognitive Mapping and Episodic Memory* (U.S. Patent No. 18/989,781). U.S. Patent and Trademark Office.

INTERNATIONAL CONFERENCE TALKS

- **Gribkova E. D.**, Gillette R. (2024). Evolution of Memory: From Basic Foraging Decisions to Cognitive Map Construction. Invited Symposium Talk at the International Conference for Neuroethology 2024, Berlin, Germany.
- **Gribkova E. D.**, Gillette R. (2022). Evolving Memory: From basic foraging decisions to cognitive map construction. Short talk at the Comparative Cognition Society 2022 Virtual Conference.

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

NATIONAL

- **Gribkova E. D.**, Cui, J., Gillette R. (2024). Core Beginnings of Consciousness: Eight Qualities of Subjective Experience, in Simulation. Poster session at the Society for Neuroscience 2024, Chicago, IL.
- **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 Simple Foraging Associations to Cognitive Map Construction with Homeostatic Plasticity. Poster session at 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.

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.

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 (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

- Beckman Open House, biologically-inspired AI and robotics demo — 2024
- Outreach talk at Rosario Beach Marine Lab, WA,
  Title: Approach/Avoidance Decisions in the Octopus — 2022
- Octopus Education Outreach Activities,
  including lab tours (from middle schools to university),
  and Beckman Open House 2019 — 2019-present
- Co-founder of Entience, LLC., for naturalistic AI development — 2017-present
- Ad hoc reviewer for Frontiers in Neural Circuits, J. Comp. Phys., IFAC — 2017-present
- Methods in Computational Neuroscience,
  course taken at the Marine Biological Laboratory, MA — 2017
- Computational Neuroscience Journal Club — 2016-2019
- Graphic design, animation, video editing, painting, sketching, & 3D modeling
  (including Blender, PowerPoint, Adobe apps, InkScape, Krita, etc.) — 2014-present
- Piano, including performance and composition — 2008-present
- Computer programming, including simulations,
  games, and interactive graphing apps
  (Python, NetLogo, MATLAB, Godot, & some Unity, Java, Visual Basic, etc.) — 2006-present