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James Goodman

Education

Sep.2013– Dec.2018 **Ph.D. in Computational Neuroscience**, *The University of Chicago*, Chicago, IL.
Dissertation: Representations of the hand in primate sensorimotor cortex
Advisor: Prof. Sliman Bensmaia

Sep.2008– Jun.2013 **B.S. / M.S. in Biomedical Engineering**, *Drexel University*, Philadelphia, PA.
Master's Thesis: Control of isometric hindlimb ground reaction forces with acute epidural spinal cord and cauda equina stimulation in the rat
Advisor: Prof. Karen Moxon

Research Experience

Nov.2019– Present **Post-Doctoral Scientist**, *Deutsches Primatenzentrum, GmbH*, Department of Neurobiology, Scherberger Group.
Research on neural responses in the fronto-parietal cortical grasping network, at both the single-neuron and population levels, when performing hand movements and during observation of others' hand movements.
Participation in the B-CRATOS project (b-cratos.eu), testing a bidirectional brain-computer interface for enabling grasping and perception of somatosensory cues through a neuroprosthetic in an animal model.

Jan.2019– Oct.2019 **Post-Doctoral Scientist**, *The University of Chicago*, Bensmaia Lab.
Continued research on the postural nature of proprioceptive and motor cortical representations of hand postures.

Sept.2013– Dec.2018 **Graduate Student**, *The University of Chicago*, Bensmaia Lab.
Research on the postural nature of proprioceptive and motor cortical representations of hand postures.

Jun.2009– Jun.2013 **Undergraduate Researcher**, *Drexel University*, Moxon Lab.
Research on the topic of reliably recruiting different hindlimb muscle groups via epidural spinal cord stimulation in a rodent model.

Teaching and Service

2021 **Mentor**, *Neuromatch Academy*, Graduate level.
Guided a group of students through an independent data analysis project

Dec. 2016 **Teaching Assistant**, *Brains! Workshops*, Middle school level.
Led 7th grade students from a local Chicago Public School through 3 hands-on experiments in neuroscience.

Jun. 2016 **Guest Teaching Assistant**, *Bret Harte Elementary School*, Elementary school level.
Shadowed a middle school science class. Later designed and led a middle school (grades 6-8) class through a science experiment.

2015–2016 **Mentor**, *Illinois Mathematics and Science Academy (IMSA)*, Student Inquiry and Research (SIR) program, High school level.
Co-mentors: Prof. Sliman Bensmaia and Gregg Tabot
Guided a high-school student through an independent research project

2016 **Teaching Assistant**, *The University of Chicago*, Signal Analysis for Neuroscientists, BIOS 24408 / CPNS 32111, Graduate level.
Instructor: Prof. Wim van Drongelen

2015 **Teaching Assistant**, *The University of Chicago*, Methods in Computational Neuroscience, BIOS 24231 / CPNS 34231, Graduate level.
Instructor: Prof. Sliman Bensmaia

2009–2013 **Teaching Assistant**, *Drexel University*, Computation Lab I-III, Undergraduate level.
Instructors: Prof. Bruce Char and Prof. David Augenblick

Grants and Awards

2015 Graduate Assistance in Areas of National Need (GAANN) Fellowship in Integrative Neuromechanics

Professional Development

2021 Neuromatch Deep Learning Summer School, Student

Academic Output

Publicly Available Thesis Data

** indicates equal contribution*

Suresh, A.K.*, **Goodman, J.M.*,** Okorokova, E.V., Kaufman, M.T., Hatsopoulos, N.G., & Bensmaia, S.J. (2020). Neural population dynamics in motor cortex are different for reach and grasp. *Dryad* Dataset, `https://doi.org/10.5061/dryad.xsj3tx9cm`.

Notes about credit assignment:

The author list reflects that of the paper it accompanies (`https://doi.org/10.7554/eLife.58848`) and does not reflect credit for the data collection *per se*.

The grasping data are the same as those used in `https://doi.org/10.1016/j.neuron.2019.09.004` and collected by **Goodman, J.M.**, Tabot, G.A., Lee, A.S., Rajan, A.T., and Okorokova, E.V. under the supervision of Hatsopoulos, N.G. and Bensmaia, S.J.

The reaching data are the same as those used in `https://doi.org/10.1093/cercor/bhy060` and collected by Paulsen, D., Reimer, J., and Haga, Z. under the supervision of Hatsopoulos, N.G.

First-Author Original Research

** indicates equal contribution*

1. Suresh, A.K.*, **Goodman, J.M.*,** Okorokova, E.V., Kaufman, M.T., Hatsopoulos, N.G., & Bensmaia, S.J. (2020). Neural population dynamics in motor cortex are different for reach and grasp. *eLife* 9, e58848.
2. **Goodman, J.M.,** Tabot, G.A., Lee, A.S., Suresh, A.K., Rajan, A.T., Hatsopoulos, N.G., & Bensmaia, S.J. (2019). Postural Representations of the Hand in Primate Sensorimotor Cortex. *Neuron* 104(5), 1000–1009.e7.
3. **Goodman, J.M.,** & Bensmaia, S.J. (2017). A variation code accounts for the perceived roughness of coarsely textured surfaces. *Scientific Reports* 7.
4. Dougherty, J.B.*, **Goodman, J.M.*,** Knudsen, E.B., & Moxon, K.A. (2012). Controlled unilateral isometric force generated by epidural spinal cord stimulation in the rat hindlimb. *IEEE Transatctions on Neural Systems and Rehabilitation Engineering (TNSRE)* 20(4), 549–556.

Other Original Research

1. Okorokova, E.V., **Goodman, J.M.,** Hatsopoulos, N.G., & Bensmaia, S.J. (2020). Decoding hand kinematics from population responses in sensorimotor cortex during grasping. *Journal of Neural Engineering* 17(4).
2. Yan, Y., **Goodman, J.M.,** Moore, D.D., Solla, S.A., & Bensmaia, S.J. (2020). Unexpected complexity of everyday manual behaviors. *Nature Communications* 11(1).
3. Prendergast, B., Brooks, J., **Goodman, J.M.,** Boyarinova, M., Winberry, J.E., & Bensmaia, S.J. (2019). Finger Posture and Finger Load are Perceived Independently. *Scientific Reports* 9.
4. Dougherty, J.B., Knudsen, E.B., **Goodman, J.M.,** & Moxon, K.A. (2011). Response mapping for epidural spinal stimulation for the restoration of controlled hindlimb movement after spinal cord injury. *2011 5th International IEEE/EMBS Conference on Neural Engineering* Cancun, 338–341.

Book Chapters

1. **Goodman, J.M.,** & Bensmaia, S.J. (2020). The neural mechanisms of touch and proprioception at the somatosensory periphery. In: The Senses: A Comprehensive Reference, Second Edition. Volume 4. Ed. Fritzsch, B., Volume Eds. Kaas, J.H. & Krubitzer, L. Elsevier, Academic Press. 2–27.
2. **Goodman, J.M.,** & Bensmaia, S.J. (2018). The neural basis of haptic perception. In: The Stevens Handbook of Experimental Psychology and Cognitive Neuroscience. Fourth Edition. Volume 2: Sensation, Perception, & Attention. Eds. Wixted, J.T. & Serences, J.T. John Wiley & Sons. 201–240.

Dissertations and Theses

1. **Goodman, J.M.,** (2018). Representations of the Hand in Primate Sensorimotor Cortex. The University of Chicago. Ph.D. Dissertation. https://doi.org/10.6082/uchicago.1408

2. **Goodman, J.M.,** (2013). Control of Isometric Hindlimb Ground Reaction Forces with Acute Epidural Spinal Cord and Cauda Equina Stimulation in the Rat. Drexel University. M.S. Thesis. https://idea.library.drexel.edu/islandora/object/idea%3A4237

Conference Presentations

1. **Goodman, J.M.**, Schaffelhofer, S., & Scherberger, H. (November 2021). How similar are representations of observed and executed grasps in the frontoparietal cortical grasping network? Virtual Poster. Society for Neuroscience, Online. [Abstracts of the Society for Neuroscience 50: P555.04]

2. **Goodman, J.M.**, Schaffelhofer, S., & Scherberger, H. (September 2021). How similar are representations of observed and executed grasps in the frontoparietal cortical grasping network? Virtual Poster. Bernstein Conference, Online.

3. **Goodman, J.M.**, Schaffelhofer, S., & Scherberger, H. (April 2021). Grip-specific neural population dynamics are not shared between action and observation in the frontoparietal cortical grasping network. Data Blitz talk. Meeting of the Society for the Neural Control of Movement (NCM), Online.

4. **Goodman, J.M.**, Schaffelhofer, S., & Scherberger, H. (October 2020). Grip-specific dynamics are not shared between action and observation in the frontoparietal cortical grasping network. Interactive talk. Neuromatch, Online.

5. **Goodman, J.M.**, Schaffelhofer, S., & Scherberger, H. (October 2020). Population-level signatures of action and observation in the frontoparietal grasping network. Virtual Poster. Bernstein Conference, Online.

6. **Goodman, J.M.**, Suresh, A.K., Okorokova, E.V., Hatsopoulos, N.G., & Bensmaia, S.J. (October 2019). Primary motor cortex does not exhibit orderly dynamics during grasp. Nanosymposium talk. Society for Neuroscience, Chicago, IL. [Abstracts of the Society for Neuroscience 49: 722.08]

7. **Goodman, J.M.**, Lee, A.S., Okorokova, E.V., Suresh, A.K., Hatsopoulos, N.G., & Bensmaia, S.J. (November 2018). Neurons in somatosensory and motor cortices encode hand postures, not joint velocities. Poster. Society for Neuroscience, San Diego, CA. [Abstracts of the Society for Neuroscience 48: 310.12]

8. **Goodman, J.M.**, Lee, A.S., Suresh, A.K., Hatsopoulos, N.G., & Bensmaia, S.J. (May 2018). The representation of hand postures and movements in somatosensory cortex. Poster. Janelia conference on the Mechanisms of Dexterous Behavior, Ashburn, VA.

9. **Goodman, J.M.**, Tabot, G.A., Suresh, A.K., Hatsopoulos, N.G., & Bensmaia, S.J. (May 2017). No evidence for hand synergies in sensorimotor cortices of macaques. Poster. Meeting of the Society for the Neural Control of Movement (NCM), Dublin, Ireland.

10. **Goodman, J.M.**, Tabot, G.A., Suresh, A.K., Hatsopoulos, N.G., & Bensmaia, S.J. (November 2016). High-dimensional representation of hand movements in sensory and motor cortices. Poster. Society for Neuroscience, San Diego, CA. [Abstracts of the Society for Neuroscience 46: 151.11]

11. **Goodman, J.M.**, Tabot, G.A., Rajan, A.S., Suresh, A.K., Hatsopoulos, N.G., & Bensmaia, S.J. (October 2015). Do proprioceptive neurons in somatosensory cortex encode muscle length? Poster. Society for Neuroscience, Chicago, IL. [Abstracts of the Society for Neuroscience 45: 706.22]

12. **Goodman, J.M.**, Lieber, J.D., Saal, H.P., & Bensmaia, S.J. (November 2014). Spatial variation of simulated slowly adapting type 1 afferent responses to embossed dot patterns predicts perceived roughness. Poster. Society for Neuroscience, Washington, D.C. [Abstracts of the Society for Neuroscience 44: 441.16]