# Amy L. Orsborn

Curriculum Vitae

Paul G. Allen Center, 185 Stevens Way
University of Washington
Box 352500, Seattle WA 98195-2500
aorsborn@uw.edu
206-616-2049 (work), 415-948-9154 (cell)

## *Education and Training*

| | |
|---|---|
| 2014–2018 | Postdoctoral Researcher, New York University<br>Advisor: Bijan Pesaran |
| 2007 – 2013 | University of California Berkeley/University of California San Francisco<br>Ph.D., Graduate Program in Bioengineering<br>Dissertation: Closed-Loop Design of Brain-Machine Interface Systems<br>Committee: Jose M. Carmena, Philip Sabes, Claire Tomlin, Richard Ivry |
| 2007 | Case Western Reserve University<br>B.S., Engineering Physics, concentration in Biomedical Engineering<br>*Summa cum laude* |

## *Positions and Employment*

| | |
|---|---|
| 2018 – present | Clare Boothe Luce assistant professor, University of Washington<br>Electrical & Computer Engineering, Bioengineering |
| 2018 – present | Core staff scientist, Washington National Primate Research Center |
| 2014 – 2018 | Postdoctoral Researcher, Pesaran Lab, New York University |
| 2007 – 2017 | Graduate Research Assistant, Carmena Lab, University of California, Berkeley |
| 2007 | Undergraduate senior thesis researcher, Kirsch Lab, Case Western Reserve University |
| 2006 | Summer Undergraduate Researcher, Collins Lab, Boston Univeristy |
| 2005 | Summer Undergraduate Researcher, Dept. of Energy REU program, Thomas Jefferson National Accelerator Facility |

## *Awards and Honors*

| | |
|---|---|
| 2020 | Google Research Faculty Award |
| 2020 | Weill Neurohub Investigator |
| 2019 | Movement Sciences & Rehabilitation Career Development Award, NIH |
| 2019 | Broadening Representation of Academic Investigators in Neuroscience (BRAINS) fellow |
| 2019 | L'Oréal USA Changing the Face of STEM award |
| 2018 | Clare Boothe Luce Assistant Professorship |
| 2017 | National Academy of Engineering (NAE) selection for the EU-US Frontiers of Engineering Symposum |
| 2016 | L'Oréal USA for Women in Science postdoctoral fellowship |
| 2016 | 1st runner up, Rosalind Franklin Appathon "Best New App" for promoting women in STEMM |
| 2013 | International Brain-Computer Interface Meeting student travel fellowship |
| 2011 | American Heart Association, Western States Affiliate, Pre-doctoral fellowship |
| 2008 | National Science Foundation Graduate Research Fellowship |

2007 Outstanding Senior in Engineering Physics, CWRU
2006, 2007 Krumhansle Family Prize for Outstanding Achievement in Physics, CWRU
2005 Tau Beta Pi engineering honor society
2004, 2008 Fiat Awards Program Scholarship
2003 - 2007 Case Western Reserve University Provost Scholarship

## *Research Grants*

**Co-I**, NIH BRAIN Initiative UF01, $1.695 M (Orsborn portion) 04/01/2022 – 03/30/2025
"Tracking the emergence of internal models"

**PI**, Simons Foundation Collaboration on the Global Brain Pilot, $400,000 10/01/2021 – 09/30/2023
"Using Brain-machine interfaces to identify and manipulate computational principles of learning"

**PI**, Meta Reality Labs 08/21/2021 – 09/30/2022
"Coadaptation for myoelectric interfaces"

**PI**, National Science Foundation, $300,000 01/15/2021 – 01/14/2023
"EAGER: Bidirectional Body+Brain-Machine Interface (B3MI) for control of complex dynamics"

**Co-I**, National Science Foundation, $15,000,000 10/01/2021 – 09/30/2026
"HDR Institute: Accelerated AI Algorithms for Data-Driven Discovery (A3D3)"

**Co-I**, National Institutes of Health, $3,200,000 08/01/2021 – 06/30/2026
"Engineering neuroplasticity using volitional control of activity-dependent optogenetic stimulation in macaque sensorimotor cortex"

**PI**, Washington National Primate Center Ignition Pilot Award, $75,000 05/01/2021 – 04/30/2022
"Developing and optimizing a behavioral assay to quantify feedforward and feedback control in non-human primates"

**Co-PI**, Weill NeuroHub Pillar Research Project, $230,000 ($57,700 Orsborn) 07/01/2020 – 06/30/2021
"Optimizing Electrical Stimulation to Target Neural Population Dynamics"
PI: Karunesh Ganguly, UCSF

**Co-PI**, Google Research Faculty Award, $66,772 03/01/2020 –
"Identifying and guiding learning dynamics in the brain using brain-machine interfaces"
PI: Guillaume Lajoie

**Fellow**, Interdisciplinary Rehabilitation Engineering K12, $125,000 01/01/2020 – 08/31/2021
PI: Julius Dewald, Northwestern University
"Exploring large-scale network learning mechanisms in brain-machine interfaces"

**PI**, University of Washington Center for Neurotechnology award, $84,282 09/16/2019 – 07/31/2021
"Exploring large-scale network learning mechanisms in brain-machine interfaces"

**PI**, University of Washington Royalty Research Fund, $37,240 08/01/2019 – 07/31/2021
"Assessing how network connectivity shapes learning in brain-machine interfaces"

**Trainee research support**

2020, 2021 University of Washington AccelNet IN-BIC scholarship, Pavithra Rajeswaran
2021 University of Washington TL1 Translational Research Training fellowship, Ryan Canfield
2021 National Science Foundation Graduate Research Fellowship (GRFP), Augusto Millevolte
2020 University of Washington Computational Neuroscience Training Grant, Michael Nolan
2020 Washington Research Foundation (WRF) Innovation Undergraduate Research Fellowship in Neuroengineering, Pamel Kang
2020 National Defense Science and Engineering Graduate Fellowship, Maneeshika Madduri
2019 Washington Research Foundation (WRF) Innovation Postbaccalaureate Research

Fellowship in Neuroengineering, Augusto Millevolte

2019 Washington Research Foundation (WRF) Innovation Undergraduate Research Fellowship in Neuroengineering, Thomas McIlwain

2019 University of Washington Center for Neurotechnology Post-baccalaureate fellowship, Augusto Millevolte

2019 University of Washington Computational Neuroscience Training Grant, Si Jia Li

2019 Washington Research Foundation (WRF) Innovation Undergraduate Research Fellowship in Neuroengineering, Nicholas Thomas

## *Publications*

### Journal Articles

M. Trumpis, C.-H. Chiang, **A.L. Orsborn**, B. Bent, J. Li, J. Rogers, B. Pesaran, G. Cogan, and J. Viventi. (2020) Sufficient sampling for kriging prediction of cortical potential in rat, monkey, and human µECoG. *Journal of Neural Engineering*, doi: 10.1088/1741-2552/abd460

C.H. Chiang*, S.M. Won*, **A.L. Orsborn***, K.J. Yu*, M. Trumpis, B. Bent, C. Wang, Y. Xue, S. Min, V. Woods, C. Yu, B.H. Kim, S.B. Kim, R. Huq, J. Li, K.J. Seo, F. Vitale, H. Fang, Y. Huang, K. Shepard, B. Pesaran, J.A. Rogers, and J. Viventi. (2020) Development of a neural interfaces for high definition, long-term recording in rodents and non-human primates, *Science Translational Medicine*, 12, eaay4682

M. Shanechi*, **A. L. Orsborn***, H.G. Moorman*, S. Gowda*, and J.M. Carmena (2017). Rapid control and feedback rates enhance neuroprosthetic control. *Nature Communications*, 8:13825, doi:10.1038/ncomms13825

M. Shanechi[*], **A.L. Orsborn***, and J.M. Carmena (2016). Robust brain-machine interface design using optimal feedback control modeling and adaptive point process filtering. *PLoS Computational Biology* 12(4):e1004730. doi:10.1371/journal.pcbi.1004730 **(F1000 recommended)**

**A.L. Orsborn**, H.G. Moorman, S.A. Overduin, M. M. Shanechi, D. Dimitrov, and J.M. Carmena (2014) Closed-loop decoder adaptation shapes neural plasticity for skillful neuroprosthetic control, *Neuron* 82, pp. 1380-1393. **(journal cover article)**

S. Dangi, S. Gowda, H.G. Moorman, **A.L. Orsborn**, K. So, M. M. Shanechi, and J.M. Carmena (2014) Continuous closed-loop decoder adaptation with a recursive maximum likelihood algorithm allows for rapid performance acquisition in brain-machine interfaces, *Neural Computation*, 26(9), pp. 1811-1839.

S. Gowda, **A.L. Orsborn**, S.A. Overduin, H.G. Moorman, and J.M. Carmena (2014) Designing dynamical properties of brain-machine interfaces to optimize task-specific performance, *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 22(5), pp. 911 – 920.

K. So*, S. Dangi*, **A.L. Orsborn**, M.C. Gastpar, and J.M. Carmena (2014) Subject-specific modulation of local field potential spectral power during brain-machine interface control in primates, *Journal of Neural Engineering*, 11(2): 026002.

S. Dangi*, **A.L. Orsborn***, H.G. Moorman, and J.M. Carmena (2013) Design and analysis of closed-loop decoder adaptation algorithms for brain-machine interfaces. *Neural Computation*, 25(7), pp. 1693-1731.

**A.L. Orsborn**, S. Dangi, H.G. Moorman, and J.M. Carmena (2012) Closed-loop decoder adaptation on intermediate time-scales facilitates rapid BMI performance improvements independent of decoder initialization conditions. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 20(4), pp. 468 - 477.

[*] **authors contributed equally**

R. Héliot, **A.L. Orsborn**, K. Ganguly, and J.M. Carmena (2010) System architecture for stiffness control in brain-machine interfaces. *IEEE Transactions on Systems, Man and Cybernetics, part A* 40(4), pp. 732-742.

K. Ganguly, L. Secundo, G. Ranade, **A.L. Orsborn**, E. Chang, D. Dimitrov, J.D. Wallis, N.M. Barbaro, R.T. Knight, J.M. Carmena (2009) Cortical representation of ipsilateral arm movements in monkey and man. *Journal of Neuroscience*, 29(41), pp. 12948-12956.

**Review Articles and Chapters**

H.-Y. lu, E. S. Lorenc, H. Zhu, J. Kilmarx, J. Sulzer, C. Xie, P.N. Tobler, A. J. Watrous, **A. L. Orsborn**, J. Lewis-Peacock, and S. R. Santacruz (2021) Multi-scale neural decoding and analysis, *Journal of Neural Engineering,* Aug 16;18(4). doi: 10.1088/1741-2552/ac160f.

R. A. Canfield, **A. L. Orsborn**, G. D. Horwitz (2021) Windows and Periscopes into Primate Behavior. *Cell Reports*, Jul 20;36(3):109435. doi: 10.1016/j.celrep.2021.109435.

P. Rajeswaran and **A. L. Orsborn**. (2021) Neural Interface Translates Thoughts into Type, *Nature*, 593 (7858), 197 – 198.

**A.L. Orsborn** and B. Pesaran (2017) Parsing learning in networks using brain-machine interfaces, *Current Opinions in Neurobiology*, 46:76-83, doi: 10.1016/j.conb.2017.08.002

**A.L. Orsborn** and J.M. Carmena (2013) Creating new functional circuits for action via brain-machine interfaces, *Frontiers in Computational Neuroscience*, 7:157, doi: 10.3389/fncom.2013.00157

**A.L. Orsborn** and J.M. Carmena, (2013) Cortical Control of Limb Prosthesis. In: D. Jaeger, R. Jung (Ed.) Encyclopedia of Computational Neuroscience: Springer Reference. Springer-Verlag Berlin Heidelberg.

***Pre-prints (not yet published)***

M. Nolan, B. Pesaran, E. Shlizerman and **A.L. Orsborn**, "Multi-block RNN Autoencoders Enable Broadband ECoG Signal Reconstruction", *BioRxiv* 2022, https://doi.org/10.1101/2022.09.07.507004

A.K. You, B. Liu, A. Singhal, S. Gowda, H. Moorman, **A.L. Orsborn**, K. Ganguly, and J.M. Carmena. "Flexible Modulation of Neural Variance Facilitates Neuroprosthetic Skill Learning," *BioRxiv* 2019 https://doi.org/10.1101/817346

V. R. Athalye, P. Khanna, S. Gowda, A. L. Orsborn, R. M. Costa, and J. M. Carmena. "The brain sues invariant dynamics to generalize outputs across movements." *BioRxiv* 2021 https://doi.org/10.1101/2021.08.27.457931

***Manuscripts in submission / preparation***

**A.L. Orsborn**, J. Choi, C. Wang, J. Kleinbart, K. Chiang, J. Viventi, and B. Pesaran, "Multi-scale, multi-modal chronic implants for studying large-scale neural circuits in primates"

**Refereed Conference Proceedings**

M. Madduri, M. Yamagami, A. Millevolte, S.J. Li, S. Burckhardt, S. Burden, **A.L. Orsborn**. (2022) Co-Adaptive Myoelectric Interface for Continuous Control. 4th IFAC Workshop on Cyber-Physical & Human-Systems. (in press)

T. Ouchi and **A.L. Orsborn**, (2022) Quantifying the influence of stimulation protocols on neural network connectivity inference to optimize rapid network measurements, *44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, pp. 2369-2372, doi: 10.1109/EMBC48229.2022.9871658.

M.M. Madduri, S.A. Burden, and **A.L. Orsborn**. (2021) A game-theoretic model for co-adaptive brain-machine interfaces. 10th International IEEE EMBS Conference on Neural Engineering (NER), pp. 327-330, doi: 10.1109/NER49283.2021.9441081

J. Choi, E.A. Voinas, **A.L. Orsborn**, B. Ferrentino, B. Pesaran (2019) A projector-scope for spatiotemporal control of macaque cortex. 9th International IEEE EMBS Conference on Neural Engineering (NER), San Francisco, CA

M. Trumpis, K.C-H. Chiang, B. Bent, **A.L. Orsborn**, B. Pesaran, G. Cogan, J. Viventi (2019) Sufficient Sampling for Kriging Prediction of Cortical Potential in Rat and Human µECoG. 9th International IEEE EMBS Conference on Neural Engineering (NER), San Francisco, CA

J. Kleinbart, **A. L. Orsborn**, John S. Choi, C. Wang, S. Qiao, J. Viventi, B. Pesaran (2018) A modular implant system for multimodal recording and manipulation of the primate brain, *39th International conference IEEE EMBS*, Honolulu, HI.

J.S. Choi, V. Goncharov, J. Kleinbart, **A. L. Orsborn**, B. Pesaran (2018) Monkey-MIMMS: Towards automated cellular resolution large-scale two-photon microscopy in the awake macaque monkey, *39th International conference IEEE EMBS*, Honolulu, HI.

S. Qiao, K. Brown, **A. L. Orsborn**, B. Ferrentino, B. Pesaran (2016) Development of semi-chronic microdrive system for large-scale circuit mapping in macaque mesolimbic and basal ganglia systems, *38th International conference IEEE EMBS*, Orlando, FL.

**A. L. Orsborn**, C. Wang, K. Chiang, M. M. Maharbiz, J. Viventi, and B. Pesaran (2015) Semi-chronic chamber system for simultaneous subdural electrocorticography, local field potential, and spike recordings, *Proceedings of the 7th International Conference IEEE EMBS Neural Engineering*, Montpellier, France.

M. Shanechi, **A.L. Orsborn**, H.G. Moorman, S. Gowda, and J.M. Carmena (2014) High-performance brain-machine interface enabled by an adaptive optimal feedback-controlled point process decoder. *Proceedings of the* 3*6th Annual International Conference IEEE EMBS*, Chicago, IL.

**A.L. Orsborn**, K. So, S. Dangi, and J.M. Carmena (2013) Comparison of neural activity during closed-loop control of spike- or LFP-based brain-machine interfaces. *Proceedings of the 6th International Conference IEEE EMBS Neural Engineering*, San Diego, CA.

S. Dangi, K. So, **A.L. Orsborn**, M. Gastpar, and J.M. Carmena (2013) Brain-machine interface control using broadband spectral power from local field potentials. *Proceedings of the 35th Annual International Conference IEEE EMBS*, Osaka, Japan.

S. Gowda, **A.L. Orsborn**, and J.M. Carmena (2012) Parameter estimation for maximizing controllability of linear brain-machine interfaces. *Proceedings of the 34th Annual International Conference IEEE EMBS*, San Diego, CA.

**A.L. Orsborn**[*], S. Dangi*****, H.G. Moorman, and J.M. Carmena (2011) Exploring time-scales of closed-loop decoder adaptation in brain-machine interfaces. *Proceedings of the 33rd Annual International Conference IEEE EMBS*, Boston, MA.

R. Héliot, **A.L. Orsborn**, and J.M. Carmena, (2008) Stiffness control of 2-DOF exoskeleton for brain-machine interfaces. *Proceedings of the 2nd IEEE RAS / EMBS International Conference on Biomedical Robotics and Biomechatronics*, Scottsdale, AZ.

[*] **authors contributed equally**

## *Patents*

### Provisional

*Systems and Methods Related to Electricorticography (ECoG) Electrode Arrays,* W. Doyle, P. Dugan, O. Devinsky, D. Friedman, A. Orsborn, B. Pesaran, S. Devore, C. Wang, C.H. Chiang, G. Cogan, and J. Viventi (provisional)

*Optimal Data-Driven Decision-Making in Multi-Agent Systems,* B. Chasnov, L.J. Ratliff, S.A. Burden, A.L. Orsborn, M.M. Madduri, M. Yamagami, T. Fiez, and J.G. Sullivan. Filing number: *63/224,325*

## *Select Presentations*

### Conferences

M.M. Madduri, M. Yamagami, A.X.T. Millevolte, S.J. Li, S.N. Burckhardt, S.A. Burden, and **A.L. Orsborn**, "Modeling User-decoder learning dynamics in co-adaptive myoelectric interfaces", Neural Control of Movement, Dublin Ireland, July 2022 (poster)

T. Ouchi and **A.L. Orsborn**, "Quantifying the influence of stimulation protocols on neural network connectivity inference to optimize rapid network measurements", IEEE EMBC, Glasgow Scottland, July 2022 (poster)

P. Rajeswaran, J.M. Carmena, **A. L. Orsborn** "Emergence of sparse unit-level representations yet increased population dimensionality in brain computer interface learning" Annual Conference on Research in Encoding and Decoding Neural Ensembles (AREADNE), Santorini, Greece, June 2022 (poster)

P. Rajeswaran, J.M. Carmena, **A. L. Orsborn** "Adaptive brain-computer interfaces allow credit assignment learning and formation of sparse control strategies" Society for Neuroscience annual meeting, Chicago, IL, November 2021 (poster)

S. Li and **A. L. Orsborn**. "Closed-loop simulation of neural feature selection to accelerate initial brain computer interface decoder training" Society for Neuroscience annual meeting, Chicago, IL, November 2021 (poster)

A. Payeur, **A. L. Orsborn**, Guillaume Lajoie, "Probing learning dynamics in brain-machine interfaces using recurrent neural networks," Bernstein Conference on Network Computational Neuroscience, September 2021 (poster)

M. Nolan, B. Pesaran, E. Shlizerman, **A. L. Orsborn**. "Electrocorticograph signal reconstruction with recurrent neural network autoencoders" Society for Neuroscience Connectome Virtual Meeting, Virtual, January 2021 (poster)

V. Athalye, P. Khanna, **A. L. Orsborn**, S. Gowda, R. Costa, J. M. Carmena. "Motor cortex produces an output for behavior by using general activity transitions, not one pattern" Computational Systems Neuroscience (CoSYNE), Virtual, February 2021 (poster)

**A.L. Orsborn**, J. Choi, C. Wang, C. Chiang, J. Viventi, B. Pesaran. "Multi-scale neural resampling to map and monitor neural circuits in non-human primates." Society for Neuroscience annual meeting, Chicago, IL, October 2019 (poster)

C. Chiang, S.M. Won, **A.L. Orsborn**, K. Yu, M. Trumpis, B. Bent, C. Wang, B. Pesaran, J.A. Rogers, J. Viventi. "Kiloscale neural interfaces for long-term learning." Society for Neuroscience annual meeting, Chicago, IL, October 2019 (poster)

V.R. Athalye, P. Khanna, S. Gowda, **A.L. Orsborn**, R.M. Costa, and J.M. Carmena. "Neural dynamics underlying generalization in motor cortex." Society for Neuroscience annual meeting, Chicago, IL, October 2019 (poster)

A. You, B. Liu, A. Singhal, S. Gowda, H.G. Moorman, **A.L. Orsborn**, and J.M. Carmena. "Simultaneous exploration and exploitation of neural strategies during neuroprosthetic learning." Society for Neuroscience annual meeting, Chicago, IL, October 2019 (poster)

**A.L. Orsborn** and B. Pesaran. “A center-out sequence task for studying multiple forms of motor learning in non-human primates.” Society for Neuroscience annual meeting, San Diego, CA, November 2018 (poster)

B. Pesaran, **A.L. Orsborn**, V. Sanchez, M.F. Khazali. “Semi-chronic subdural electrocorticography, local field potentials, and spike recordings over posterior parietal cortex during coordinated visual behavior” Society for Neuroscience annual meeting, San Diego, CA, November 2018 (poster)

J. Kleinbart, **A.L. Orsborn**, J. Choi, C. Wang, S. Qiao, M.F. Khazali, B. Ferrentino, J. Viventi, B. Pesaran. “Enabling multimodal interrogation of the primate brain via a modular neural interface.” Society for Neuroscience annual meeting, San Diego, CA, November 2018 (poster)

J. Choi, V. Goncharov, J. Kleinbart, **A.L. Orsborn**, B. Pesaran. “Stable, flexible positioning for in vivo imaging of neural activity in the awake macaque monkey.” Society for Neuroscience annual meeting, San Diego, CA, November 2018 (poster)

S. Qiao, **A. L. Orsborn**, A. P. Dora, J. Kleinbart, B. Pesaran, “An instrumented volume for continuous neurobehavioral tracking system in unrestrained non-human primates,” Society for Neuroscience annual meeting, Washington, D.C., November 2017 (poster)

**A. L. Orsborn**, C. Wang, K. Chiang, N. C. Boles, J. Viventi, B. Pesaran, “Multi-scale electrophysiology in macaque motor cortex during reaching,” Society for Neuroscience annual meeting, San Diego, Ca, November 2016 (poster)

**A. L. Orsborn**, C. Wang, K. Chiang, N. C. Boles, J. Viventi, B. Pesaran, “Multi-scale, multi-modal neural interface for studying large-scale circuits in primates,” *6th* annual Conference on Research in Encoding and Decoding Neural Ensembles (AREADNE), Santorini, Greece, June 2016 (poster)

**A. L. Orsborn**, C. Wang, K. Chiang, M. M. Maharbiz, J. Viventi, and B. Pesaran, “Semi-chronic chamber system for multi-scale electrophysiology in non-human primates,” Cell Symposia on Engineering the Brain: Technologies for Neurobiological Application, Chicago, IL, 2015 (talk and poster)

**A. L. Orsborn**, C. Wang, K. Chiang, M. M. Maharbiz, J. Viventi, and B. Pesaran, “Semi-chronic chamber system for simultaneous subdural electrocorticography, local field potential, and spike recordings,” International Conference IEEE EMBS Neural Engineering, Montpellier, France (talk)

M. M. Shanechi, **A. L. Orsborn**, H. Moorman, S. Gowda, and J. M. Carmena, “Spike-by-spike control using an adaptive optimal feedback controlled point process decoder improves BMI performance,” Society for Neuroscience annual meeting, Washington D. C., November 2014 (poster)

**A.L. Orsborn** and Jose M. Carmena, “Neural and decoder adaptation in BMI reduces interference from native motor networks,” *Translational and Computational Motor Control meeting*, San Diego, CA, November 2013 (talk)

M. Shanechi*, **A.L. Orsborn***, S. Gowda, and Jose M. Carmena, “Proficient BMI Control Enabled by Closed-Loop Adaptation of an Optimal Feedback-Controlled Point Process Decoder,” *Translational and Computational Motor Control meeting,* San Diego, CA, November 2013 (poster)

**A.L. Orsborn** and J.M. Carmena, “Characterization of neural tuning properties during BMI control with closed-loop decoder adaptation,” Society for Neuroscience annual meeting, San Diego, CA, November 2013 (poster)

**A.L. Orsborn** and J.M. Carmena, “Harnessing plasticity and closed-loop decoder adaptation to achieve robust BMI performance,” International Brain-Computer Interface meeting, Pacific Grove, CA, June 2013 (talk)

* authors contributed equally

**A.L. Orsborn**, S. Dangi, and J.M. Carmena, "Combining neural and decoder adaptation to improve brain-machine interface performance," Society for Neuroscience annual meeting, New Orleans, LA, October 2012 (poster)

K. So, **A.L. Orsborn**, S. Dangi, M.C. Gastpar, and J.M. Carmena, "Implementing closed-loop decoder adaptation algorithms for ECoG-based brain-machine interfaces," Society for Neuroscience annual meeting, New Orleans, LA, October 2012 (poster)

S.A. Overduin, Y.-H. Chang, M. Chen, S. Gowda, **A.L. Orsborn**, K. So, E. Bizzi, C. Tomlin, J.M. Carmena, "Detection of submovement primatives for neuroprosthetic motor control," Society for Neuroscience annual meeting, New Orleans, LA, October 2012 (poster)

**A.L. Orsborn**, S. Dangi, and J.M. Carmena, "Co-adaptive BMIs: Combining Neural and Decoder Plasticity," *4th* annual Conference on Research in Encoding and Decoding Neural Ensembles (AREADNE), Santorini, Greece, June 2012 (poster)

**A.L. Orsborn,** S. Dangi, H.G. Moorman, and J.M. Carmena, "Closed-loop decoder adaptation on intermediate time-scales facilitates rapid BMI performance improvements independent of decoder initialization," Society for Neuroscience annual meeting, Washington, D.C., November 2011 (poster)

**A.L. Orsborn**, S. Dangi, H.G. Moorman, and J.M. Carmena, "Exploring time-scales of closed-loop decoder adaptation in brain-machine interfaces," 33rd Annual International Conference IEEE EMBS, Boston, MA, August 2011 (talk)

**A.L. Orsborn** and J.M. Carmena, "Neural correlates of dynamic limb stiffness modulation in an accuracy constraint task," Society for Neuroscience annual meeting, Chicago, IL, October 2009 (poster)

**Invited Talks and Lectures**

Neuroengineering seminar, University of California – Davis, planned December 2022
Neuroengineering seminar, Rice University, planned November 2022
IEEE Brain Discovery Workshop on Brain, Mind, and Body: Cognitive Neuroengineering for Health and Wellness, San Diego, CA, planned November 2022
Neuroscience seminar, Baylor College of Medicine, September 2022
Whitaker International Neuroengineering Workshop, Cambridge, UK, August 2022
Symposium on using computation to achieve breakthroughs in neuroscience, University of Minnesota, April 2022
Biomedical Engineering seminar, University of Florida, March 2022
Mind-Brain Institute seminar, Johns Hopkins University, December 2021
NeuroTech seminar, Stanford University, December 2021
Neural Engineering seminar, University of Michigan, October 2021
Neuro@Noon seminar, Center for Neuroscience Imaging Research, Sungkyunkwan University, Korea (virtual), October 2021
Neuroscience and Cognitive Science Colloquium, University of Maryland, September 2021
Waterloo International Workshop on Neural Engineering and Rehabilitation, July 2021
Brain Computer Interface Society Annual Meeting, workshop presentation, June 2021
Brain Computer Interface Society "Next Generation" workshop lecture, virtual, April 2021
Center for the Neural Basis of Cognition, University of Pittsburgh/Carnegie Mellon, March 2021
Institute of Neuroscience seminar, University of Oregon, January 2021
Center for Neuroengineering, University of Minnesota, November 2020
Symposium on Neural Interfaces for Neurobiological Insights, Sainsbury Wellcome Center for Neural Circuits and Behavior and Gatsby Computational Neuroscience, University College London, October 2020
Simons – Emory Symposium on Motor Control, June 2020 (approximately 700 live attendees, over 3,000 views)
IEEE Brain Webinar Series, June 2020

Neuroscience seminar, Oregon National Primate Research Center, Division of Neuroscience, *cancelled due to COVID-19*
Keynote, Montreal Artificial Intelligence and Neuroscience (MAIN) meeting, November 2019
Workshop on Mathematical Physiology, Centre de Recherché Mathematiques, University de Montreal, November 2019
Lecturer, Society for Neuroscience Short Course "Neural Prosthetics and Brain Machine Interfaces," October 2019
Keynote, Andrew S. Rachlin Neuroscience Symposium, University of North Carolina Chapel Hill, October 2019
Machine Learning in Science and Engineering Conference, Georgia Institute of Technology, June 2019
Microsoft Research, April 2019
Computational Neuroscience Center seminar, University of Washington, February 2019
Electrical & Computer Engineering seminar, University of Washington, February 2019
Graduate Program in Neuroscience Retreat, University of Washington, September 2018
Rich and Rudebeck group meeting, Icahn School of Medicine at Mount Sinai. September 2018
University of Washington Neural Computation and Engineering Connection, January 2018
Schiff and Victor group meeting, Weill Cornell Medical College, December 2016
Bioengineering seminar, University of Washington, March 2016
Sensory Motor Performance Program Seminar, Rehabilitation Institute of Chicago and Northwestern University, February 2015
Kavli seminar, Center for Sensorimotor Neural Engineering, University of Washington, January 2015
Biomedical Engineering Department Seminar, Arizona State University, March 2014
Computational Statistics and Neuroscience weekly meeting, Columbia University, March 2014
Motor Control guest lecture, University of California Berkeley, December 2013
Pesaran group meeting, New York University, September 2013
Schnitzer group meeting, Stanford University, July 2013
Chang group meeting, University of California San Francisco, January 2013
Center for Neural Engineering and Prostheses annual retreat, University of California Berkeley, December 2012
Sastry group meeting, University of California Berkeley, March 2012
Center for Neural Engineering and Prostheses annual retreat, University of California San Francisco, December 2011
California Cognitive Science Conference, University of California Berkeley, May 2010

## *Teaching Experience*

| | |
|---|---|
| Spring 2022 | Instructor, University of Washington<br>Undergraduate and graduate seminar in Electrical & Computer Engineering (departmental seminar series) |
| Spring 2022 | Instructor, University of Washington<br>Signal Processing II (undergraduate advanced signal processing course) |
| Winter 2022 | Instructor, University of Washington<br>Neural Computation and Engineering Laboratory (undergraduate elective, first-year graduate course) |
| Winter 2021 | Instructor, University of Washington<br>Neural Computation and Engineering Laboratory (undergraduate elective, first-year graduate course) |
| Fall 2020 | Instructor, University of Washington<br>Discrete-Time Linear Systems (undergraduate advanced signal processing course) |
| Spring 2020 | Instructor, University of Washington |

| | |
|---|---|
| | Introduction to Professional Issues (upper-division ethics and professional development for engineering course) |
| Winter 2020 | Instructor and course creator, University of Washington<br>Neural Computation and Engineering Laboratory (undergraduate elective, first-year graduate course) |
| Fall 2012 | Graduate Student Instructor, University of California, Berkeley<br>Senior Design Projects (senior-level capstone design project course) |
| Fall 2011 | Graduate Student Instructor, University of California, Berkeley<br>Motor Control Laboratory (upper-division Integrative Biology course) |
| Winter 2007 | Teaching Assistant, Case Western Reserve University<br>Chemistry of Materials (introductory engineering course) |

## *Trainees and Mentoring*

**Postdoctoral scholars**

- Leo Scholl, Ph.D., 2020 –

**Graduate students**

- Doctoral
    - Si Jia Li, Bioengineering, 2019 –
    - Michael Nolan, Electrical & Computer Engineering, 2019 –
      co-advised with Prof. Eli Shlizerman, UW ECE
    - Maneeshika Madduri, Electrical & Computer Engineering, 2020 –
      co-advised with Prof. Sam Burden, UW ECE
    - Pavithra Rajeswaran, Bioengneering 2020 –
    - Augusto Millevolte, Electrical & Computer Engineering, 2020 –
    - Tomohiro Ouchi, Electrical & Computer Engineering, 2020 –
    - Ryan Mizumori Canfield, Bioengineering, 2020 –
        - Co-advised with Prof. Gregory Horwitz, UW Physiology & Biophysics
    - Katherine Perks, Neuroscience, 2021 –
- Masters
    - Nicholas Thomas, Bioengineering BS/MS, September 2020 – September 2021

**Undergraduate students**

- Jesus Cabrales Quintanilla, Simons Foundation undergraduate fellow, September 2022 –
- Sacha Burckhardt, Neuroscience & Biology, January 2022 –
- Joseph Asfouri, Center for Neurotechnology REU student, June 2022 – August 2022
- Lucas Beidler, Electrical & Computer Engineering, September 2021 – June 2022
- Caroline Jane Johnson, Electrical & Computer Engineering, January 2021 – December 2021
- Pamel Kang, Electrical & Computer Engineering, May 2020 – December 2021
- Mark Nissen, Center for Neurotechnology REU student, June 2021 – August 2021
- Nicholas Thomas, Bioengineering (senior capstone research), September 2018 – September 2020
- Thomas McIlwain, Bioengineering (senior capstone research), April 2019 – June 2020
- Rachel Phuong, Computer Science & Engineering, April 2019 – September 2020
- Seth Richards, Electrical & Computer Engineering, April 2019 – May 2020
- Dallas Warren, Electrical Engineering, September 2018 – December 2019

**Graduate thesis committee member**

*Current*

- Hantao Wang, Speech & Hearing Sciences (Chair: Ludo Max)
- Luke Zhu, Bioengineering (Chair: Kelley Harris)
- Jessica Jones, Neuroscience (Chair: Jon Tuthill)
- Jasmine Zhou, Bioengineering (Chair: Azadeh Yazdan-Shahmorad)
- Dimitrios Gklezakos, Computer Science & Engineering (Chair: Rajesh Rao)
- Daniel Zdeblick, Electrical & Computer Engineering (Chair: Eric Shea-Brown)
- Jonathan Mishler, Bioengineering (Chair: Eberhard Fetz)
- Richy Yun, Bioengineering (Chair: Eberhard Fetz)
- Su-Yee Lee, Neuroscience (Chair: Jon Tuthill)
- Kristen Drummey, Neuroscience (Chair: Steve Perlmutter)
- Veronica Porubsky, Bioengineering (Chair: Herbert Sauro)
- Momona Yamagami, Electrical & Computer Engineering (Chairs: Samuel Burden, Katherine Steele)
- Doris Voina, Applied Mathematics (Chair: Eric Shea-Brown)
- Zhaojie Yao, Bioengineering (Chair: Wyeth Bair)
- Courtnie Paschall, Bioengineering (Chair: Rajesh Rao)
- Julien Bloch, Bioengineering (Chair: Azadeh Yazdan-Shahmorad)
- Samantha Sun, Bioengineering (Chair: Rajesh Rao)

*Completed*

- Christian Pedersen, Bioengineering Ph.D. (Chair: Michael Bruchas)
- Maxim Karrenbach, Electrical & Computer Engineering MS (Chair: Eric Rombokas)
- Yihan Wang, Bioengineering MS (Chair: Andre Berndt)
- Feiran Yang, Bioengineering MS (Chair: Ludo Max)

## *Ad hoc peer-review*

***Journals:*** Nature, Neuron, eLife, Current Biology, Nature Communications, Nature Biotechnology, PLoS Computational Biology, PLoS Biology, Journal of Neuroscience, Journal of Neural Engineering, Journal of Computational Neuroscience, Lancet Neurology, IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE), IEEE Transactions on Biomedical Engineering (TBME), Cerebral Cortex, PLoS ONE, Scientific Reports, Neuropsychologia, NeuroImage, Frontiers in Neuroscience

***Conferences:*** Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Brain-Computer Interface Society annual meeting, Computational and Systems Neuroscience (Cosyne) meeting.

***Grants:*** NIH BRAIN Initiative***,*** NIH NINDS (D-SPAN fellowship panel), National Science Foundation, Swiss National Science Foundation, The Royal Society (UK)

## *Service*

**University of Washington**

| | |
|---|---|
| 2021 - 2022 | Bioengineering Masters of Applied Bioengineering Admissions Committee |
| 2021 - | Electrical & Computer Engineering faculty search committee |
| 2021 - 2022 | Bioengineering Faculty Retreat planning committee |
| 2021 | Women in Science and Engineering Bridge program faculty mentor |
| 2021 | Center for Neurotechnology Research Experience for Undergraduates faculty mentor |
| 2020 | Animal Research Transparency Task Force member, Office of the Provost |
| 2020 | College of Engineering Strategic Planning sub-committee member |
| 2020 - 2021 | Electrical & Computer Engineering Graduate Fellowship Committee |
| 2018 - 2021 | Bioengineering curriculum committee |

2018 - 2019 STARS mentor

**National / international**

2022 National Academy of Engineering US – EU Frontiers of Engineering workshop organizing committee, session organizer
2020 Mentor for Neuromatch course on computational neuroscience
2019 - Women in Neural Engineering (WINE) Executive committee member and founding member
2018, 2020 L'Oréal For Women in Science Fellowship Selection Panel
2020 DoD National Defense Science and Engineering Graduate fellowship reviewer
2015 National Science Foundation Graduate Research Fellowship reviewer

**Student leadership (UC Berkeley, UCSF)**

2010 – 2013 Bioengineering Advising Representatives mentoring program, secretary and co-founder
2010 – 2012 Bioengineering Association of Students qualifying exam advisor
2007 – 2009 Bioengineering Association of Students peer advising committee
2007 – 2009 Bioengineering Joint Graduate Group admissions committee student member