Francis R. Willett
Department of Neurosurgery
Stanford University, Stanford, CA
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Last updated: 01/31/2025

EDUCATION

2012 - 2017 **Ph.D. in Biomedical Engineering**
Case Western Reserve University

2008 - 2012 **B.A. in Psychology with Honors**
The University of Chicago

POSITIONS

2025 - Present **Assistant Professor of Neurosurgery**
Stanford University
Co-director of the Neural Prosthetics Translational Laboratory

2021 - 2025 **Research Scientist**
Stanford University
Led the development of the first large-vocabulary speech BCI & supervised scientific research at the Neural Prosthetics Translational Laboratory

2017 - 2021 **Postdoctoral Scholar**
Stanford University
Developed a handwriting BCI & investigated whole-body representations in motor cortex, advised by Dr. Krishna Shenoy and Dr. Jaimie Henderson

2012 - 2017 **Graduate Student**
Case Western Reserve University
Developed a BCI to restore arm motion via muscle stimulation, advised by Dr. Bolu Ajiboye

2009 - 2012 **Undergraduate Research**
The University of Chicago
BCI research in non-human primates, advised by Dr. Nicholas Hatsopoulos

AWARDS

2022 **Annual BCI Award -** 2nd Place for "A high-performance intracortical speech BCI"
2021 **BCI Society Early Career Award**
2020 **Annual BCI Award -** 1st Place for "A high-performance handwriting BCI"
2018 **Annual BCI Award -** 1st Place for "Restoring Functional Reach-to-Grasp in a Person with Chronic Tetraplegia"
2013 **National Science Foundation Graduate Research Fellowship (GRFP)**

PEER-REVIEWED ORIGINAL RESEARCH (*, **: equal contribution)

1. Willsey MS, Shah NP, Avansino DT, Hahn NV, Jamiolkowski RM, Kamdar FB, Hochberg LR, **Willett FR**, Henderson JM. A high-performance brain–computer interface for finger decoding and quadcopter game control in an individual with paralysis. *Nature Medicine*. 2024. *Role: Supervised and guided the work.*

2. Fan C, Henderson JM, Manning C, **Willett FR**. Towards a Quantitative Analysis of Coarticulation with a Phoneme-to-Articulatory Model. *Interspeech*. 2024.

3. Card NS, Wairagkar M, Iacobacci C, Hou X, Singer-Clark T, **Willett FR**, Kunz EM, Fan C, Nia MV, Deo DR, Srinivasan A, Choi EY, Glasser MF, Hochberg LR, Henderson JM, Shahlaie K, Brandman DB, Stavisky SD. An

accurate and rapidly calibrating speech neuroprosthesis. *New England Journal of Medicine.* 2024. *Role: Contributed neural decoding software and analyzed pre-operative neuroimaging data.*

4. Wilson GH, Stein EA, Kamdar F, Avansino DT, Hochberg LR, Shenoy KV, Druckmann S, Henderson JM**, **Willett FR**.** Long-term unsupervised recalibration of cursor BCIs. *Accepted at Nature Biomedical Engineering*. 2024.

5. Fan C, Hahn N, Kamdar F, Avansino DT, Wilson GH, Hochberg LR, Shenoy KV, Henderson JM**, **Willett FR****. Plug-and-Play Stability for Intracortical Brain-Computer Interfaces: A One-Year Demonstration of Seamless Brain-to-Text Communication. *NeurIPS*. 2024.

6. Deo DR, **Willett FR**, Avansino DT, Hochberg LR, Henderson JM, Shenoy KV. Brain control of bimanual movement enabled by recurrent neural networks. *Scientific Reports*. 2024. *Role: Supervised and guided the study, including experimental design, data analysis and neural decoding methods.*

7. **Willett FR***, Kunz EM*, Fan C*, Avansino DT, Wilson GH, Choi EY, Kamdar F, Glasser MF, Hochberg LR, Durckmann S, Shenoy KV, Henderson JM. A high-performance speech neuroprosthesis. *Nature*. 2023.

8. Rubin DB, Hosman T, Kelemen JN, Kapitonava A, **Willett FR**, Coughlin BF, Kimchi EY, Simeral JD, Hochberg LR, Cash SS. Learned motor patterns are replayed in human motor cortex during sleep. *Journal of Neuroscience.* 2022. *Role: Developed novel computational methods to demonstrate whether patterns of cortical replay were non-random.*

9. **Willett FR**, Avansino DT, Hochberg LR, Henderson JM**, Shenoy KV**. High-performance brain-to-text communication via imagined handwriting. *Nature.* 2021.

10. Rastogi A, **Willett FR**, Abreu J, Crowder DC, Murphy BA, Memberg WD, Vargas-Irwin CE, Miller JP, Sweet J, Walter BL, Rezaii P, Stavisky SD, Hochberg LR, Shenoy KV, Henderson JM, Kirsch RF, Ajiboye AB. The neural representation of force across grasp types in motor cortex of humans with tetraplegia. *eNeuro.* 2021. *Role: Data analysis methods for summarizing neural representation of grasp force.*

11. Wilson GH*, Stavisky SD*, **Willett FR**, Avansino DT, Kelemen JN, Hochberg LR, Henderson JM**, Druckmann S**, Shenoy KV**. Decoding spoken English from intracortical electrode arrays in dorsal precentral gyrus. *Journal of Neural Engineering.* 2020. *Role: Data analysis and deep learning methods for speech decoding.*

12. **Willett FR***, Deo DR*, Avansino DT, Rezaii P, Hochberg LR, Henderson JM**, Shenoy KV**. Hand knob area of premotor cortex represents the whole body in a compositional way. *Cell.* 2020.

13. Stavisky SD, **Willett FR**, Avansino DT, Hochberg LR, Shenoy KV**, Henderson JM**. Speech-related dorsal motor cortex activity does not interfere with iBCI cursor control. *Journal of Neural Engineering.* 2020. *Role: Methods for tracking head motion and task design to instruct head stillness.*

14. Rastogi A, Vargas-Irwin CE, **Willett FR**, Abreu J, Crowder DC, Murphy BA, Memberg WD, Miller JP, Sweet JA, Walter BL, Cash SS, Rezaii PG, Franco B, Saab J, Stavisky SD, Shenoy KV, Henderson JM, Hochberg LR, Kirsch RF, Ajiboye AB. Neural representation of observed, imagined, and attempted grasping force in motor cortex of individuals with chronic tetraplegia. *Scientific reports*. 2020. *Role: Data analysis methods for neural classification of grasp force.*

15. Stavisky SD, **Willett, FR,** Murphy, B, Rezaii, P, Memberg, WD, Miller, J, Kirsch, RF, Hochberg, LR, Ajiboye, AB, Shenoy, KV**, Henderson JM**. Neural Ensemble Dynamics in Dorsal Motor Cortex during Speech in People with Paralysis. *eLife* 2019. *Role: Data analysis methods for quantifying amount of neural population modulation in response to speaking.*

16. **Willett FR**, Young DR, Murphy BA, Memberg WD, Blabe CH, Pandarinath C, Stavisky SD, Rezaii P, Saab J, Walter BL, Sweet JA, Miller JP, Henderson JM, Shenoy KV, Simeral JD, Jarosiewicz B, Hochberg LR, Kirsch RF, Ajiboye AB. Principled BCI Decoder Design and Parameter Selection Using a Feedback Control Model. *Scientific Reports.* 2019.

17. Young D, **Willett FR,** Memberg WD, Murphy BA, Rezaii P, Walter B, Sweet J, Miller J, Shenoy KV, Hochberg LR, Kirsch, RF, Ajiboye, AB. Closed-loop Cortical Control of Virtual Reach and Posture Using Cartesian and Joint Velocity Commands. *Journal of Neural Engineering*. 2019. *Role: Assisted in experiment design and software implementation, data analysis and interpretation, data collection.*

18. Young D, **Willett FR,** Memberg WD, Murphy BA, Walter B, Sweet J, Miller J, Hochberg LR, Kirsch RG, Ajiboye AB. Signal Processing Methods for Reducing Artifacts in Microelectrode Brain Recordings Caused by Functional Electrical

Stimulation. *Journal of Neural Engineering*. 2018. *Role: Developed techniques for artifact reduction, assisted in data analysis and experimental design.*

19. Brandman, DM, Hosman T, Saab J, Burkhart M, Shanahan B, Ciancibello J, Sarma A, Milstein D, Vargas C, Franco B, Kelemen J, Blabe C, Murphy B, Young D, **Willett FR,** Pandarinath C, Stavisky SD, Kirsch RF, Walter B, Ajiboye AB, Cash S, Eskandar E, Miller JP, Sweet J, Shenoy KV, Henderson JM, Jarosiewicz B, Harrison M, Simeral J, Hochberg LR. Rapid calibration of an intracortical brain-computer interface for people with tetraplegia. *Journal of Neural Engineering.* 2018. *Role: Experimental software validation.*

20. **Willett FR**, Murphy BA, Young DR, Memberg WD, Blabe CH, Pandarinath C, Franco B, Saab J, Walter BL, Sweet JA, Miller JP, Henderson JM, Shenoy KV, Simeral JD, Jarosiewicz B, Hochberg LR, Kirsch RF, Ajiboye AB. A Comparison of Intention Estimation Methods for Decoder Calibration in Intracortical Brain-Computer Interfaces. *IEEE Transactions on Biomedical Engineering*. 2017.

21. Ajiboye AB*, **Willett FR***, Young DR, Memberg WD, Murphy BA, Miller JP, Walter BL, Sweet JA, Hoyen HA, Keith MW, Peckham PH, Simeral JD, Donoghue JP, Hochberg LR, Kirsch RF. Restoration of reaching and grasping in a person with tetraplegia through brain-controlled muscle stimulation: a proof-of-concept demonstration. *The Lancet*. 2017.

22. Pandarinath, C*, Nuyujukian, P*, Blabe CH, Sorice BL, Saab J, **Willett FR**, Hochberg LR, Shenoy KV**, Henderson JM**. High performance communication by people with paralysis using an intracortical brain-computer interface. *eLife.* 2017. *Role: Contributed a novel algorithm for counteracting the effect of changes in neural activity that accrue over time.*

23. **Willett FR**, Murphy BA, Memberg WD, Blabe CH, Pandarinath C, Walter BL, Sweet JA, Miller JP, Henderson JM, Shenoy KV, Hochberg LR, Kirsch RF, Ajiboye AB. Signal-independent noise in intracortical brain–computer interfaces causes movement time properties inconsistent with Fitts' law. *Journal of Neural Engineering*. 2017.

24. **Willett FR**, Pandarinath C, Jarosiewicz B, Murphy BA, Memberg WD, Blabe CH, Saab J, Walter BL, Sweet JA, Miller JP, Henderson JM, Shenoy KV, Simeral JD, Hochberg LR, Kirsch RF, Ajiboye AB. Feedback control policies employed by people using intracortical brain–computer interfaces. *Journal of Neural Engineering.* 2016.

25. **Willett FR***, Suminski AJ*, Fagg AH, Hatsopoulos NG. Improving brain–machine interface performance by decoding intended future movements. *Journal of Neural Engineering*. 2013.

NON-PEER REVIEWED RESEARCH (PRE-PRINTS)

1. Kunz EM*, Meschede-Krasa B*, Kamdar F, Avansino D, Nason-Tomaszewski SR, Card NS, Jacques B, Bechefsky P, Hahn N, Iacobacci C, Hochberg LR, Brandman DM, Stavisky SD, Au Yong N, Pandarinath C, Druckmann S, Henderson JM**, **Willett FR**. Representation of verbal thought in motor cortex and implications for speech neuroprostheses. *bioRxiv*. 2024.

2. Deo DR, Okorokova EV, Pritchard AL, Hahn NV, Card NS, Nason-Tomaszewski SR, Jude J, Hosman T, Choi EY, Qiu D, Meng Y, Wairagkar M, Nicolas C, Kamdar FB, Iacobacci C, Acosta A, Hochberg LR, Cash SS, Williams ZM, Rubin DR, Brandman DM, Stavisky SD, AuYong N, Pandarinath C, Downey JE, Bensmaia S, Henderson JM**, **Willett FR**.

3. Shah NP, Willsey MS, Hahn N, Kamdar F, Avansino DT, Fan C, Hochberg LR, **Willett FR**, Henderson JM. A flexible intracortical brain-computer interface for typing using finger movements. *bioRxiv*. 2024. *Role: Supervised and guided the work.*

4. Benster T, Wilson G, Elisha R, **Willett FR**, Druckmann S. A Cross-Modal Approach to Silent Speech with LLM-Enhanced Recognition. *arXiv*. 2024. *Role: Data analysis for testing a neural speech decoding approach on the Brain-to-Text Benchmark '24.*

5. Shah NP, Avansino D, Kamdar F, Nicolas C, Kapitonava A, Vargas-Irwin C, Hochberg LR, Pandarinath C, Shenoy KV, **Willett FR**, Henderson JM. Pseudo-linear Summation explains Neural Geometry of Multi-finger Movements in Human Premotor Cortex. *bioRxiv*. 2023. *Role: Supervised and guided the work.*

CONFERENCE PROCEEDINGS AND PRESENTATIONS

1. Meschede-Krasa B, Kunz E, Kamdar F, Card NS, Wairagkar M, Iacobacci C, Nason-Tomaszewski SR, Bechefsky P, Hochberg LR, Brandman DM, Stavisky SD, AuYong Nicholas, Pandarinath C, Henderson JM, **Willett FR**, Druckmann S. Neural geometry of speech preparation in ventral premotor cortex. *Society for the Neurobiology of Language, 2024.*
2. Fan C, Meschede-Krasa B, Kunz E, Kamdar F, Card NS, Wairagkar M, Iacobacci C, Hochberg LR, Brandman DM, Stavisky SD, Druckmann S, Henderson JM, **Willett FR**. An RNN Encoding Model for Understanding Continuous Speech Production in Motor Cortex. *Society for Neuroscience, 2024.*
3. Kunz EM, Meschede-Krasa B, Kamdar F, Nason-Tomaszewski SR, Card N, Jacques B, Bechefsky P, Hahn N, Iacobacci C, Hochberg LR, Brandman D, Stavisky SD, AuYong N, Pandarinath C, Druckmann S, Henderson JM, **Willett FR**. Representation of verbal thought in motor cortex and implications for speech neuroprostheses. *Society for Neuroscience, 2024 and Society for the Neurobiology of Language, 2024.*
4. Hou X, Iacobacci C, Card NS, Wairagkar M, Singer-Clark T, **Willett FR**, Kunz EM, Fan C, Kamdar F, Hahn N, Hochberg LR, Henderson JM, Brandman DM, Stavisky SD. Characterizing language-related error signals with intracortical arrays in inferior frontal gyrus and ventral precentral gyrus. *Society for Neuroscience, 2024.*
5. Hahn N, Stein E, Simeral JD, Hochberg LR, Henderson JM, **Willett FR**. Long term performance of intracortical microelectrode arrays for cursor control in 14 BrainGate participants. *Society for Neuroscience, 2024.*
6. Hahn N*, Shah N*, Singh A*, Fan C, Levin AD, Avansino D, Kamdar F, Naufel S, Hochberg LR, **Willett FR**, Sussillo D, Henderson JM. Surface muscle activity recordings improve offline motor decoding with intracortical brain-computer interfaces. *Society for Neuroscience, 2024.*
7. **Willett FR.** Towards a clinically viable speech neuroprosthesis. *Talk at the Neural Control of Movement Conference, 2024.*
8. Meschede-Krasa B, **Willett FR**, Deo DR, Kamdar F, Hahn N, Hochberg LR, Shenoy KV, Henderson JM, Druckmann S. Beyond orofacial motor cortex: ventral precentral gyrus represents hand motor gesture sequences. *Society for Neuroscience, 2023.*
9. Levin AD, **Willett FR**, Kamdar F, Avansino DT, Hochberg LR, Shenoy KV, Linderman S, Henderson JM. Cross participant transfer for intracortical handwriting BCIs. *Society for Neuroscience, 2023.*
10. Card NS, Hahn N, Kamdar F, Wairagkar M, Kunz E, **Willett FR**, Hochberg LR, Henderson JM, Brandman D, Stavisky SD. Condition-invariant, rotatory, and low tangling neural ensemble dynamics in ventral motor cortex during attempted speech. *Society for Neuroscience, 2023.*
11. Wairagkar M, **Willett FR**, Kunz E, Fan C, Kamdar F, Hochberg LR, Henderson JM, Brandman DM, Stavisky SD. Speech synthesis by decoding intracortical neural activity of a person with anarthria due to ALS. *Society for Neuroscience, 2023.*
12. Hou X, **Willett FR**, Kunz E, Fan C, Kamdar F, Hochberg LR, Henderson JM, Brandman DM, Stavisky SD. Evidence of task outcome neural error signals during use of a speech brain-computer interface. *Society for Neuroscience, 2023.*
13. **Willett FR**. Decoding handwriting, speech and multi-limb movement from people with paralysis. *Early Career Award Talk at BCI Society, 2023.*
14. Kunz E, **Willett FR**, Levin A, Kamdar F, Hochberg LR, Druckmann S, Henderson JM, Shenoy KV. Broca's Area: A Single-Unit Recording Perspective. *BCI Society, 2023.*
15. Meschede-Krasa B, Kunz E, **Willett FR**, Kamdar F, Hochberg LR, Shenoy KV, Druckmann S, Henderson JM. Single unit recordings reveal high level role of precentral gyrus in speech production. *BCI Society, 2023.*
16. Deo DR, **Willett FR**, Avansino DT, Hochberg LR, Shenoy KV, Henderson JM. Simultaneous brain control of two cursors enabled by online-robust neural networks. *Cosyne 2023.*
17. **Willett FR**. Uncovering the neural representation of speech in a person with paralysis. *Workshop talk at Cosyne 2023.*

18. Shah N, Avansino DT, Kamdar F, **Willett FR**, Hochberg LR, Shenoy KV, Henderson JM. Neural representational geometry of finger movements in human pre-motor cortex. *Society for Neuroscience, 2022.*

19. Fan C, **Willett FR**, Avansino DT, Kamdar F, Hochberg LR, Henderson JM, Shenoy KV. Leveraging Language Structure for Unsupervised Recalibration of Communication BCIs. *Society for Neuroscience, 2022.*

20. Wilson GH, **Willett FR**, Avansino DT, Kamdar F, Hochberg LR, Henderson JM, Druckmann S, Shenoy KV. Leveraging task structure for unsupervised recalibration of cursor BCIs. *Society for Neuroscience, 2022.*

21. Deo DR, **Willett FR**, Kamdar F, Hochberg LR, Shenoy KV, Henderson JM. Representation of the whole body in orofacial versus arm/hand motor cortex in people. *Society for Neuroscience, 2022.*

22. **Willett FR**, Fan C, Kunz EM, Avansino DT, Kamdar F, Hochberg LR, Shenoy KV, Henderson JM. An intracortical speech BCI for high-performance brain-to-text communication. *Society for Neuroscience, 2022.*

23. Shah N, Avansino DT, Kamdar F, **Willett FR**, Hochberg LR, Henderson JM, Shenoy KV. Neural Representation of Hand Gesture sin Human Premotor Cortex. *Cosyne, 2022.*

24. Deo DR, **Willett FR**, Avansino DT, Hochberg LR, Shenoy KV, Henderson JM. Decoding simultaneous dual-effector movements from human premotor cortex in real-time via recurrent neural networks. *Society for Neuroscience, 2021.*

25. **Willett FR**, Vyas S, Michaels JA, Henderson JM, Shenoy KV. Feedback control dynamics explain motor cortical activity. *Society for Neuroscience, 2021.*

26. Shah N, Avansino DT, **Willett FR**, Hochberg LR, Shenoy KV, Henderson JM. Neural representation of hand gestures in human premotor cortex. *Society for Neuroscience, 2021.*

27. **Willett FR,** Avansino DT, Hochberg LR, Henderson JM, Shenoy KV. Motor cortical representation and decoding of attempted handwriting in a person with tetraplegia. *Cosyne 2020, Denver, CO.*

28. **Willett FR,** Avansino DT, Deo DR, Hochberg LR, Henderson JM, Shenoy KV. Motor cortical representation and decoding of attempted handwriting in a person with tetraplegia. *Society for Neuroscience, 2019, Chicago, IL.*

29. Deo DR, **Willett FR**, Avansino T, Vyas S, Even-Chen N, Hochberg LR, Henderson JM, Shenoy KV. Neural representation of attempted movement of a paralyzed limb in a person, and implications for intracortical brain-computer interfaces. *Society for Neuroscience, 2019, Chicago, IL.*

30. Driscoll LN, Yang GR, **Willett FR**, Shenoy KV, Sussillo D. Constraints shape shared vs. separate dynamics in multitask networks. *Society for Neuroscience, 2019, Chicago, IL.*

31. **Willet FR,** Vyas S, Michaels JA, Henderson JM, Shenoy KV. Neural network models for closed-loop musculoskeletal arm control. *Cosyne 2019, Lisbon, Portugal.*

32. **Willett, FR,** Rezaii P, Hochberg LR, Henderson JM, Shenoy KV. Representation of face, head, and leg movements in "arm/hand" area of human motor cortex. *Society for Neuroscience, 2018, San Diego, CA.*

33. Vyas S, O'Shea DJ, Trautmann E, **Willett FR,** Shenoy KV. Motor cortical preparatory activity is causally involved in visuomotor learning. *Society for Neuroscience, 2018, San Diego, CA.*

34. Flesher SN, Chndrasekaran C, **Willett FR,** Stavisky SD, Wang M, Rezaii PG, Hochberg LR, Henderson JM, Shenoy KV. Decision related signals at single-neuron resolution in human motor cortex. *Society for Neuroscience, 2018, San Diego, CA.*

35. Stavisky SD, **Willett FR,** Murphy BA, Rezaii P, Memberg WD, Walter B, Sweet JA, Miller JP, Kirsh RF, Hochberg LR, Ajiboye AB, Shenoy KV, Henderson JM. Single neuron population dynamics in dorsal motor cortex during human speech. *Society for Neuroscience, 2018, San Diego, CA.*

36. Stavisky SD, Rezaii P, **Willett FR,** Hochberg LR, Shenoy KV, Henderson JM. Decoding Speech from Intracortical Multielectrode Arrays in Dorsal 'Arm/Hand Areas' of Human Motor Cortex. *IEEE EMBS, 2018, Honolulu, HI.*

37. **Willett FR,** Young DR, Murphy B, Memberg WD, Blabe CH, Saab J, Jarosiewicz B, Kelemen J, Brandman DM, Walter B, Sweet JA, Miller JP, Henderson JM, Shenoy KV, Simeral JD, Hochberg LR, Kirsch RF, Ajiboye AB. Neural population activity in the decoder's null space observed in people controlling a brain-computer interface. *Society for Neuroscience, 2017, Washington, DC.*

38. **Willett FR,** Murphy B, Memberg WD, Blabe CH, Saab J, Jarosiewicz J, Pandarinath C, Walter B, Sweet J, Miller J, Henderson JM, Shenoy KV, Simeral JD, Hochberg LR, Kirsch RF, Ajiboye AB. Using direction-independent, movement magnitude information from motor cortex to enhance intracortical brain-computer interface performance. *Society for Neuroscience, 2016, San Diego, CA.*

39. Rastogi A, Murphy BA, **Willett FR**, Memberg WD, Walter BL, Miller JP, Sweet JA, Vargas-Irwin CE, Hochberg LR, Kirsch RF, Ajiboye AB. Evaluating force representation in motor cortex of intracortical BCI users with chronic tetraplegia. *Society for Neuroscience, 2016, San Diego, CA.*

40. **Willett FR**, Pandarinath C, Jarosiewicz B, Murphy BA, Memberg WD, Blabe CH, Saab J, Walter BL, Sweet JA, Miller JP, Henderson JM, Shenoy KV, Simeral JD, Hochberg LR, Kirsch RF, Ajiboye AB. Feedback control methods for improving iBCI performance. *Workshop talk at the International Brain-Computer Interface Meeting, 2016, Monterey, CA*

41. Ajiboye, AB, **Willett FR,** Young D, Memberg W, Murphy B, Miller J, Sweet J, Walter B, Simeral J, Hochberg L, Kirsch R. Functional electrical stimulation arm and hand neuroprosthesis controlled by an intracortical brain-computer interface. *Society for Neuroscience, 2015, Chicago, IL.*

42. **Willett FR**, Kalodimos H, Cox J, Taylor DM. Cortical control of nonlinear, musculoskeletal systems with a brain-machine interface. *Society for Neuroscience, 2014, Washington, DC.*

43. **Willett FR,** Suminski AJ, Fagg AH, Hatsopoulos NG. Differences in motor cortical representations of kinematic variables between action observation and action execution and implications for brain-machine interfaces. *IEEE EMBS, 2014, Chicago, IL.*

44. Jiang J, **Willett FR**, Taylor DM. Relationship between microelectrode array impedance and chronic recording quality of single units and local field potentials. *IEEE EMBS, 2014, Chicago, IL.*

45. **Willett FR,** Kalodimos, H, and Taylor DM. Direct cortical control of muscle stimulators in a simulated upper-limb neuroprosthesis. *Society for Neuroscience, 2013, San Diego, CA.*

46. Suminski, AJ, Fagg AH, **Willett FR**, Bodenhamer M, and Hatsopoulos NG. Hybrid online adaptive decoding of intended movements using a feedback error learning approach. *Society for Neuroscience, 2013, San Diego, CA.*

47. Suminski AJ, Fagg AH, **Willet FR,** Bodenhamer M, Hatsopoulos NG. Online Adaptive Decoding of Intended Movements with a Hybrid Kinetic and Kinematic Brain Machine Interface. *IEEE EMBS, 2013, Osaka, Japan.*

48. **Willett FR**, Suminski AJ, Fagg AH, Hatsopoulos NG. Compensating for Delays in Brain-Machine Interfaces by Decoding Intended Future Movement. *IEEE EMBS, 2012, San Diego, CA.*

49. **Willet FR,** Suminski AJ, Fagg AH, Hatsopoulos NG. Improving neural control of a simulated arm by decoding intended future movement. *Cosyne 2012, Salt Lake City, Utah.*

50. Bodenhamer M, **Willett FR,** Suminski AJ, Hatsopoulos NG, Fagg AH. A feedback error learning approach to online-adaptive decoding for dynamic prosthetic arm control. *Cosyne, 2012, Salt Lake City, Utah.*

51. Suminski AJ, **Willett FR**, Fagg AH, Bodenhamer M, Hatsopoulos NG 2011. Continuous Decoding of Intended Movements with a Hybrid Kinetic and Kinematic Brain Machine Interface. *IEEE EMBS, 2011, Boston, MA.*

52. **Willett FR,** Hatsopoulos NG, Fagg AH, Suminski AJ. Improving brain-machine interface performance by decoding both kinematic and kinetic signals. *Society for Neuroscience, 2011, Washington, DC.*

TEACHING

- Teaching Assistant, *Biomedical Signals and Systems Laboratory*, Case Western Reserve University (2014, 2015)
- Teaching Assistant, *Biomedical Instrumentation Laboratory*, Case Western Reserve University (2016)

INTELLECTUAL PROPERTY

1. Systems and methods for decoding intended symbols from neural activity. Pub. No.: US12,026,311 B2. Pub. Date: Jul. 2, 2024. Shenoy KV, Henderson JM, **Willett FR**. Assignee: The Board of Trustees of the Leland Stanford Junior University, Stanford, CA. LICENSED to Neuralink Corp. and Blackrock Neurotech Inc.
2. Systems and methods for unsupervised calibration of brain-computer interfaces. Pub. No.: WO2024020571A1. Pub. Date: Jan. 25, 2024. **Willett FR,** Wilson G, Henderson JM, Shenoy KV, Druckmann S. Assignee: The Board of Trustees of the Leland Stanford Junior University, Stanford, CA.
3. Systems and methods for decoding speech from neural activity. Pub. No.: WO2024036213A1. Pub. Date: Feb. 15, 2024. Henderson JM, Kunz E, Fan C, **Willett FR**, Shenoy KV. Assignee: The Board of Trustees of the Leland Stanford Junior University, Stanford, CA.

ACADEMIC TRAINING PROVIDED TO LAB MEMBERS

Postdoctoral Scholars

2024 - Present	Sasi Madugula

Graduate Students

2021 - Present	Alisa Levin; Computer Science
2021 - Present	Benyamin Meschede-Krasa; Neurosciences
2020 – Present	Chaofei Fan; Computer Science
2020 - Present	Erin Kunz; Electrical Engineering

Undergraduates

2024 - Present	Sean Yoon; Directed Study (BIOE 391)
2024 - Present	Loran Baxter
2024 - Present	Ellie Tanimura
2024 - Present	Kamran Hussein; Shenoy Undergraduate Research Fellowship in Neuroscience