




Krishna Shenoy

 NIH Biosketch available Online

 Curriculum Vitae available Online

CONTACT INFORMATION

- **Faculty Administrator**

Beverly Davis - Faculty Administrator

Email beverlyd@stanford.edu

Tel 650.723.1458

Bio

BIO

Krishna V. Shenoy, PhD, is the Hong Seh and Vivian W. M. Lim Professor of Engineering. He is with the Departments of Electrical Engineering (EE) and, by courtesy, of Bioengineering (BioE), Neurobiology and Neurosurgery in the Schools of Engineering (SOE) and Medicine (SOM) at Stanford University. He is also a Howard Hughes Medical Institute (HHMI) Investigator. Prof. Shenoy holds a BS in Electrical and Computer Engineering from UC Irvine (1987-1990), a PhD in Electrical Engineering and Computer Science from MIT (1990-1995), was a postdoctoral fellow in Neurobiology at Caltech (1995-2001), and has been on faculty at Stanford since then (Assistant Prof. 2001-2008, Associate Prof. 2008-2012, Full Prof. 2012-2017, HHMI Investigator 2015 to present (and at least 2028), Endowed Chair 2017 to present). Prof. Shenoy directs the Stanford Neural Prosthetic Systems Lab (basic neuroscience and engineering) and co-directs the Stanford Neural Prosthetics Translational Laboratory (clinical trials), which aim to help restore lost motor function to people with paralysis. Honors and awards include a Burroughs Wellcome Fund Career Award in the Biomedical Sciences, a Sloan Fellow, a McKnight Technological Innovations in Neurosciences Award, an NIH EUREKA Award, an NIH Director's Pioneer Award, the 2010 Stanford University Postdoc Mentoring Award, election as a Fellow of the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows, and the 2018 recipient of the Andrew Carnegie Mind and Brain Prize from Carnegie Mellon University. In 2022 he was Elected to the National Academy of Medicine (NAM) and as an IEEE Fellow. Prof. Shenoy (1) serves on the Scientific Advisory Boards (SABs) of The University of Washington's Center for Neurotechnology (an NSF Engineering Research Center), MIND-X Inc., Inscopix Inc. and Heal Inc., (2) is also a consultant / advisor for CTRL-Labs and was on the Founding SAB, which was acquired in 2019 by Reality Labs, Meta Platforms (previously Facebook) and (3) is a co-founder and consultant / advisor for Neuralink Corp.

ACADEMIC APPOINTMENTS

- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Co-Chair of Diversity, Equity, Inclusion and Belonging (DEIB) Committee, Neurosciences PhD Program, Stanford University, (2020- present)

HONORS AND AWARDS

- Elected Fellow, IEEE (2022-)
- Elected Member, National Academy of Medicine (NAM) (2022-)
- Recipient, Andrew Carnegie Mind and Brain Prize from Carnegie Mellon University (2018)
- Elected Fellow, American Institute for Medical and Biological Engineering (AIMBE) College of Fellows (2017-)
- Investigator, Howard Hughes Medical Institute (2015-)
- Distinguished Alumnus Award, The Henry Samueli School of Engineering, University of California at Irvine (2013)
- Postdoc Mentoring Award, Stanford University (2010)
- NIH Director's Pioneer Award, National Institutes of Health (2009)
- NIH EUREKA Award, National Institutes of Health (2009)
- Technological Innovations in Neurosciences Award, McKnight Foundation (2007)
- Research Fellow, Alfred P. Sloan Foundation (2002)
- Career Award in the Biomedical Sciences, Burroughs Wellcome Fund (1999)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Scientific Advisory Board, MIND-X Inc. (acquired by Blackrock Microsystems, 2022) (2018 - present)
- Scientific Advisory Board, Inscopix Inc. (merged with Brucker, 2022) (2018 - present)
- Consultant / Advisor (2020-), Scientific Advisory Board (2016-2020), CTRL-Labs Inc (acquired by Facebook Reality Labs, Facebook, 2019; now Reality Labs, Meta Platforms) (2016 - present)
- Consultant / Advisor, co-founder, Neuralink Inc. (2016 - present)
- Scientific Advisory Board, U Washington's Ctr for Sensorimotor Neural Eng (an NSF Eng Research Ctr), 2016-2020 (2016 - present)
- Scientific Advisory Board, Heal Inc., 2015-2020 (2015 - present)

PROGRAM AFFILIATIONS

- Symbolic Systems Program

PROFESSIONAL EDUCATION

- Endowed Chair Professorship, Stanford University , Hong Seh and Vivian W. M. Professor of Engineering (2017)
- Investigator, Howard Hughes Medical Institute (HHMI) , Investigator (appointed in 2015) (2015)
- Professor, Stanford University , Departments of Electrical Engineering, Bioengineering & Neurobiology (2012)
- Associate Professor, Stanford University , Departments of Electrical Engineering, Bioengineering & Neurobiology (2008)
- Assistant Professor, Stanford University , Departments of Electrical Engineering, Bioengineering & Neurobiology (2001)
- Senior Postdoc, Caltech , Systems Neuroscience, Division of Biology (2001)
- Postdoc, Caltech , Systems Neuroscience, Division of Biology (1998)
- Ph.D., MIT , Electrical Engineering & Computer Science (1995)
- S.M., MIT , Electrical Engineering & Computer Science (1992)
- B.S., UC Irvine , Electrical Engineering (1990)
- N/A, UCSD , Electrical Engineering (1987)

PATENTS

- Nir Even-Chen, Krishna V. Shenoy. "United States Patent US 10,949,086 B2 Systems and methods for virtual keyboards for high dimensional controllers", Leland Stanford Junior University, Mar 16, 2021

- Krishna V. Shenoy, Jaimie M. Henderson, Frank Willett. "United States Patent US 2021/0064135 A1 Systems and methods for decoding intended symbols from neural activity", Leland Stanford Junior University, Mar 4, 2021
- Nir Even-Chen, Krishna V. Shenoy, Jonathan C. Kao, Sergey Stavisky. "United States Patent US 10,779,764 B2 Task-outcome error signals and their use in brain-machine interfaces.", Leland Stanford Junior University, Sep 22, 2020
- Sergey Stavisky, Krishna V. Shenoy, Jaimie M. Henderson. "United States Patent US 2019/0333505 A1 Systems and methods for decoding intended speech from neuronal activity", Leland Stanford Junior University, Oct 31, 2019
- David Sussillo, Jonathan C. Kao, Sergey Stavisky, Krishna V. Shenoy.. "United States Patent US 10,223,634 B2 Multiplicative recurrent neural network for fast and robust intracortical brain machine interface decoders", Leland Stanford Junior University, Mar 5, 2019
- Paul Nuyujukian, Jonathan C. Kao, Krishna V. Shenoy.. "United States Patent US 9,373,088 B2 Brain machine interface utilizing a discrete action state decoder in parallel with a continuous decoder for a neural prosthetic device", Leland Stanford Junior University, Jun 21, 2016
- Jonathan C. Kao, Chethan Pandarinath, Paul Nuyujukian, Krishna V. Shenoy. "United States Patent US 2015/0245928 A1 Brain-machine interface utilizing interventions to emphasize aspects of neural variance and decode speed and angle", Leland Stanford Junior University, Sep 3, 2015
- Jonathan C. Kao, Paul Nuyujukian, Mark M. Churchland, John P. Cunningham, Krishna V. Shenoy. "United States Patent US 9,095,455 B2 Brain machine interfaces incorporating neural population dynamics", Leland Stanford Junior University, Aug 4, 2015
- Vikash Gilja, Paul Nuyujukian, Cynthia A. Chestek, John P. Cunningham, Byron M. Yu, Stephen I. Ryu, Krishna V. Shenoy. "United States Patent US 8,792,976 B2 Brain machine interface", Leland Stanford Junior University, Jul 29, 2014
- Krishna V. Shenoy, Richard A. Andersen, Sohaib A. Kureshi. "United States Patent US 6,609,017 B1 Processed neural signals and methods for generating and using them", Caltech, Aug 19, 2003
- Richard A. Andersen, Bijan Pesaran, Partha Mitra, Daniella Meeker, Krishna V. Shenoy, Shiyao Cao, Joel W. Burdick. "United States Patent WO 03/005934 A3 Cognitive state machine for prosthetic systems", Caltech, Jan 23, 2003
- Richard A. Andersen, Bijan Pesaran, Partha Mitra, Daniella Meeker, Krishna V. Shenoy, Shiyao Cao, Joel W. Burdick. "United States Patent US 2003/0023319 A1 Cognitive state machine for prosthetic systems", Caltech, Jun 10, 2001
- Krishna Shenoy. "United States Patent US 7,058,445 B2 Decoding of neural signals for movement control", Jun 6, 2001

LINKS

- Neural Prosthetic Systems Lab, Director Krishna Shenoy: <https://npsl.sites.stanford.edu/>
- Neural Prosthetics Translational Lab, Co-Directors Krishna Shenoy & Jaimie Henderson: <https://nptl2022.sites.stanford.edu/>
- Krishna Shenoy's personal homepage: <https://npsl.sites.stanford.edu/krishna-v-shenoy-phd>

Research & Scholarship

RESEARCH INTERESTS

- Brain and Learning Sciences
- Diversity and Identity
- Elementary Education
- Higher Education
- Math Education
- Poverty and Inequality
- Religion
- Science Education
- Technology and Education

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Overview. We conduct neuroscience, neuroengineering and translational research to better understand how the brain controls movement, and to design medical systems to assist people with paralysis (see Fig. 1). These medical systems are referred to as brain-machine interfaces (BMIs), brain-computer interfaces (BCIs) and intracortical neural prostheses. We conduct this research as part of our Neural Prosthetic Systems Lab (NPSL), which focuses on more basic systems and computational neuroscience and neuroengineering, and as part of our Neural Prosthetics Translational Lab (NPTL), which focuses on translating these advances to people with paralysis via clinical trials, which I co-direct with Prof. Jaimie Henderson, M.D. in Neurosurgery.

Neuroscience. Our neuroscience research investigates the neural basis of movement preparation and generation using a combination of electro- / opto-physiological (e.g., chronic electrode-array recordings and optogenetic stimulation), behavioral, computational and theoretical techniques (e.g., dynamical systems, dimensionality reduction, single-trial neural analyses). For example, how do neurons in premotor (PMd) and primary motor (M1) cortex plan and guide reaching arm movements, which focuses on more translational systems and computational neuroscience and neuroengineering.

Neuroengineering. Our neuroengineering research investigates the design of high-performance and robust intra-cortical neural prostheses. These systems translate neural activity from the brain into control signals for prosthetic devices, which can assist people with paralysis by restoring lost motor functions. This work includes statistical signal processing, machine learning, and real-time system modeling and implementation. For example, how can we design motor prostheses with performance rivaling the natural arm, or communication prostheses rivaling the throughput of spoken language.

Translational. Our translational research including an FDA pilot clinical trial (BrainGate2) is conducted as part of the NPTL. For example, how do pre-clinical laboratory designs actually work with people with paralysis in real-world settings?

CLINICAL TRIALS

- BrainGate2: Feasibility Study of an Intracortical Neural Interface System for Persons With Tetraplegia, Recruiting

PROJECTS

- Overview - Stanford University & HHMI

Teaching

COURSES

2021-22

- Introduction to Neuroelectrical Engineering: EE 124 (Win)

2020-21

- Introduction to Neuroelectrical Engineering: EE 124 (Win)

STANFORD ADVISEES

Med Scholar Project Advisor

Neal Patel

Doctoral Dissertation Reader (AC)

Michael Silvernagel, Javier Weddington

Postdoctoral Research Mentor

Lea Duncker

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Large-scale neural recordings with single neuron resolution using Neuropixels probes in human cortex.** *Nature neuroscience*
Paulk, A. C., Kfir, Y., Khanna, A. R., Moustroph, M. L., Trautmann, E. M., Soper, D. J., Stavisky, S. D., Welkenhuysen, M., Dutta, B., Shenoy, K. V., Hochberg, L. R., Richardson, R. M., Williams, et al
1800
- **Cortical preparatory activity indexes learned motor memories.** *Nature*
Sun, X., O'Shea, D. J., Golub, M. D., Trautmann, E. M., Vyas, S., Ryu, S. I., Shenoy, K. V.
1800
- **Effects of Peripheral Haptic Feedback on Intracortical Brain-Computer Interface Control and Associated Sensory Responses in Motor Cortex** *IEEE TRANSACTIONS ON HAPTICS*
Deo, D. R., Rezaii, P., Hochberg, L. R., Okamura, A. M., Shenoy, K., Henderson, J. M.
2021; 14 (4): 762-775
- **Non-linear dimensionality reduction on extracellular waveforms reveals cell type diversity in premotor cortex.** *eLife*
Lee, E. K., Balasubramanian, H., Tsolias, A., Anakwe, S. U., Medalla, M., Shenoy, K. V., Chandrasekaran, C.
2021; 10
- **Home Use of a Percutaneous Wireless Intracortical Brain-Computer Interface by Individuals With Tetraplegia** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Simeral, J. D., Hosman, T., Saab, J., Flesher, S. N., Vilela, M., Franco, B., Kelemen, J. N., Brandman, D. M., Ciancibello, J. G., Rezaii, P. G., Eskandar, E. N., Rosler, D. M., Shenoy, et al
2021; 68 (7): 2313-2325
- **High-performance brain-to-text communication via handwriting.** *Nature*
Willett, F. R., Avansino, D. T., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2021; 593 (7858): 249-54
- **The Neural Representation of Force across Grasp Types in Motor Cortex of Humans with Tetraplegia.** *eNeuro*
Rastogi, A., Willett, F. R., Abreu, J., Crowder, D. C., Murphy, B. A., Memberg, W. D., Vargas-Irwin, C. E., Miller, J. P., Sweet, J., Walter, B. L., Rezaii, P. G., Stavisky, S. D., Hochberg, et al
2021
- **Decoding and perturbing decision states in real time.** *Nature*
Peixoto, D., Verheine, J. R., Kiani, R., Kao, J. C., Nuyujukian, P., Chandrasekaran, C., Brown, J., Fong, S., Ryu, S. I., Shenoy, K. V., Newsome, W. T.
2021
- **Measurement, manipulation and modeling of brain-wide neural population dynamics.** *Nature communications*
Shenoy, K. V., Kao, J. C.
2021; 12 (1): 633
- **Dendritic calcium signals in rhesus macaque motor cortex drive an optical brain-computer interface.** *Nature communications*
Trautmann, E. M., O'Shea, D. J., Sun, X., Marshel, J. H., Crow, A., Hsueh, B., Vesuna, S., Cofer, L., Bohner, G., Allen, W., Kauvar, I., Quirin, S., MacDougall, et al
2021; 12 (1): 3689
- **Decoding spoken English from intracortical electrode arrays in dorsal precentral gyrus.** *Journal of neural engineering*
Wilson, G. H., Stavisky, S. D., Willett, F. R., Avansino, D. T., Kelemen, J. N., Hochberg, L. R., Henderson, J. M., Druckmann, S., Shenoy, K. V.
2020; 17 (6): 066007
- **Structure in Neural Activity during Observed and Executed Movements Is Shared at the Neural Population Level, Not in Single Neurons.** *Cell reports*
Jiang, X., Sagar, H., Ryu, S. I., Shenoy, K. V., Kao, J. C.
2020; 32 (6): 108006
- **Power-saving design opportunities for wireless intracortical brain-computer interfaces.** *Nature biomedical engineering*
Even-Chen, N., Muratore, D. G., Stavisky, S. D., Hochberg, L. R., Henderson, J. M., Murmann, B., Shenoy, K. V.

2020

- **Computation Through Neural Population Dynamics.** *Annual review of neuroscience*
Vyas, S., Golub, M. D., Sussillo, D., Shenoy, K. V.
2020; 43: 249–75
- **Hand Knob Area of Premotor Cortex Represents the Whole Body in a Compositional Way.** *Cell*
Willett, F. R., Deo, D. R., Avansino, D. T., Rezaei, P., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2020
- **Speech-related dorsal motor cortex activity does not interfere with iBCI cursor control.** *Journal of neural engineering*
Stavisky, S. D., Willett, F. R., Avansino, D. T., Hochberg, L. R., Shenoy, K. V., Henderson, J. M.
2020; 17 (1): 016049
- **Discovering Precise Temporal Patterns in Large-Scale Neural Recordings through Robust and Interpretable Time Warping** *NEURON*
Williams, A. H., Poole, B., Maheswaranathan, N., Dhawale, A. K., Fisher, T., Wilson, C. D., Brann, D. H., Trautmann, E. M., Ryu, S., Shusterman, R., Rinberg, D., Olveczky, B. P., Shenoy, et al
2020; 105 (2): 246+
- **Neural Representation of Observed, Imagined, and Attempted Grasping Force in Motor Cortex of Individuals with Chronic Tetraplegia.** *Scientific reports*
Rastogi, A. n., Vargas-Irwin, C. E., Willett, F. R., Abreu, J. n., Crowder, D. C., Murphy, B. A., Memberg, W. D., Miller, J. P., Sweet, J. A., Walter, B. L., Cash, S. S., Rezaei, P. G., Franco, et al
2020; 10 (1): 1429
- **An Open Resource for Non-human Primate Optogenetics.** *Neuron*
Tremblay, S. n., Acker, L. n., Afraz, A. n., Albaugh, D. L., Amita, H. n., Andrei, A. R., Angelucci, A. n., Aschner, A. n., Balan, P. F., Basso, M. A., Benvenuti, G. n., Bohlen, M. O., Caiola, et al
2020
- **Causal Role of Motor Preparation during Error-Driven Learning.** *Neuron*
Vyas, S. n., O'Shea, D. J., Ryu, S. I., Shenoy, K. V.
2020
- **A low-power band of neuronal spiking activity dominated by local single units improves the performance of brain-machine interfaces.** *Nature biomedical engineering*
Nason, S. R., Vaskov, A. K., Willsey, M. S., Welle, E. J., An, H. n., Vu, P. P., Bullard, A. J., Nu, C. S., Kao, J. C., Shenoy, K. V., Jang, T. n., Kim, H. S., Blaauw, et al
2020
- **High-fidelity musculoskeletal modeling reveals a motor planning contribution to the speed-accuracy tradeoff.** *eLife*
Al Borno, M. n., Vyas, S. n., Shenoy, K. V., Delp, S. L.
2020; 9
- **Neural ensemble dynamics in dorsal motor cortex during speech in people with paralysis.** *eLife*
Stavisky, S. D., Willett, F. R., Wilson, G. H., Murphy, B. A., Rezaei, P., Avansino, D. T., Memberg, W. D., Miller, J. P., Kirsch, R. F., Hochberg, L. R., Ajiboye, A. B., Druckmann, S., Shenoy, et al
2019; 8
- **Publisher Correction: Development of an optogenetic toolkit for neural circuit dissection in squirrel monkeys.** *Scientific reports*
O'Shea, D. J., Kalanithi, P., Ferenczi, E. A., Hsueh, B., Chandrasekaran, C., Goo, W., Diester, I., Ramakrishnan, C., Kaufman, M. T., Ryu, S. I., Yeom, K. W., Deisseroth, K., Shenoy, et al
2019; 9 (1): 18775
- **Discovering Precise Temporal Patterns in Large-Scale Neural Recordings through Robust and Interpretable Time Warping.** *Neuron*
Williams, A. H., Poole, B., Maheswaranathan, N., Dhawale, A. K., Fisher, T., Wilson, C. D., Brann, D. H., Trautmann, E. M., Ryu, S., Shusterman, R., Rinberg, D., Olveczky, B. P., Shenoy, et al
2019
- **Simultaneous motor preparation and execution in a last-moment reach correction task.** *Nature communications*
Ames, K. C., Ryu, S. I., Shenoy, K. V.
2019; 10 (1): 2718

- **Macaque dorsal premotor cortex exhibits decision-related activity only when specific stimulus-response associations are known** *NATURE COMMUNICATIONS*
Wang, M., Montanede, C., Chandrasekaran, C., Peixoto, D., Shenoy, K. V., Kalaska, J. F.
2019; 10
- **Macaque dorsal premotor cortex exhibits decision-related activity only when specific stimulus-response associations are known.** *Nature communications*
Wang, M., Montanede, C., Chandrasekaran, C., Peixoto, D., Shenoy, K. V., Kalaska, J. F.
2019; 10 (1): 1793
- **Volitional control of single-electrode high gamma local field potentials by people with paralysis** *JOURNAL OF NEUROPHYSIOLOGY*
Milekovic, T., Bacher, D., Sarma, A. A., Simeral, J. D., Saab, J., Pandarinath, C., Yvert, B., Sorice, B. L., Blabe, C., Oakley, E. M., Tringale, K. R., Eskandar, E., Cash, et al
2019; 121 (4): 1428–50
- **Brain-machine interface cursor position only weakly affects monkey and human motor cortical activity in the absence of arm movements (vol 8, 16357, 2018)** *SCIENTIFIC REPORTS*
Stavisky, S. D., Kao, J. C., Nuyujukian, P., Pandarinath, C., Blabe, C., Ryu, S. I., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2019; 9
- **Publisher Correction: Brain-machine interface cursor position only weakly affects monkey and human motor cortical activity in the absence of arm movements.** *Scientific reports*
Stavisky, S. D., Kao, J. C., Nuyujukian, P., Pandarinath, C., Blabe, C., Ryu, S. I., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2019; 9 (1): 5528
- **Structure and variability of delay activity in premotor cortex.** *PLoS computational biology*
Even-Chen, N., Sheffer, B., Vyas, S., Ryu, S. I., Shenoy, K. V.
2019; 15 (2): e1006808
- **Volitional control of single-electrode high gamma local field potentials (LFPs) by people with paralysis.** *Journal of neurophysiology*
Milekovic, T., Bacher, D., Sarma, A. A., Simeral, J. D., Saab, J., Pandarinath, C., Yvert, B., Sorice, B. L., Blabe, C., Oakley, E. M., Tringale, K. R., Eskandar, E., Cash, et al
2019
- **Frequency shifts and depth dependence of premotor beta band activity during perceptual decision-making.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
Chandrasekaran, C., Bray, I. E., Shenoy, K. V.
2019
- **Accurate Estimation of Neural Population Dynamics without Spike Sorting.** *Neuron*
Trautmann, E. M., Stavisky, S. D., Lahiri, S. n., Ames, K. C., Kaufman, M. T., O'Shea, D. J., Vyas, S. n., Sun, X. n., Ryu, S. I., Ganguli, S. n., Shenoy, K. V.
2019
- **Principled BCI Decoder Design and Parameter Selection Using a Feedback Control Model.** *Scientific reports*
Willett, F. R., Young, D. R., Murphy, B. A., Memberg, W. D., Blabe, C. H., Pandarinath, C. n., Stavisky, S. D., Rezaii, P. n., Saab, J. n., Walter, B. L., Sweet, J. A., Miller, J. P., Henderson, et al
2019; 9 (1): 8881
- **Closed-loop cortical control of virtual reach and posture using cartesian and joint velocity commands.** *Journal of neural engineering*
Young, D., Willett, F., Memberg, W. D., Murphy, B. A., Rezaii, P., Walter, B., Sweet, J. A., Miller, J., Shenoy, K. V., Hochberg, L., Kirsch, R. F., Ajiboye, A. B.
2018
- **Brain-machine interface cursor position only weakly affects monkey and human motor cortical activity in the absence of arm movements.** *Scientific reports*
Stavisky, S. D., Kao, J. C., Nuyujukian, P., Pandarinath, C., Blabe, C., Ryu, S. I., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2018; 8 (1): 16357
- **Inferring single-trial neural population dynamics using sequential auto-encoders** *NATURE METHODS*
Pandarinath, C., O'Shea, D. J., Collins, J., Jozefowicz, R., Stavisky, S. D., Kao, J. C., Trautmann, E. M., Kaufman, M. T., Ryu, S. I., Hochberg, L. R., Henderson, J. M., Shenoy, K. V., Abbott, et al
2018; 15 (10): 805–+

- **A Comparison of Intention Estimation Methods for Decoder Calibration in Intracortical Brain-Computer Interfaces** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Willett, F. R., Murphy, B. A., Young, D., Memberg, W. D., Blabe, C. H., Pandarinath, C., Franco, B., Saab, J., Walter, B. L., Sweet, J. A., Miller, J. P., Henderson, J. M., Shenoy, et al
2018; 65 (9): 2066–78
- **Single Neuron Firing Rate Statistics in Motor Cortex During Execution and Observation of Movement.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual Conference*
Jiang, X., Ryu, S. I., Shenoy, K. V., Kao, J. C.
2018; 2018: 981–86
- **Development of an optogenetic toolkit for neural circuit dissection in squirrel monkeys** *SCIENTIFIC REPORTS*
O'Shea, D. J., Kalanithi, P., Ferenczi, E. A., Hsueh, B., Chandrasekaran, C., Goo, W., Diester, I., Ramakrishnan, C., Kaufman, M. T., Ryu, S. I., Yeom, K. W., Deisseroth, K., Shenoy, et al
2018; 8: 6775
- **ERAASR: an algorithm for removing electrical stimulation artifacts from multielectrode array recordings** *JOURNAL OF NEURAL ENGINEERING*
O'Shea, D. J., Shenoy, K. V.
2018; 15 (2): 026020
- **Neural Population Dynamics Underlying Motor Learning Transfer** *NEURON*
Vyas, S., Even-Chen, N., Stavisky, S. D., Ryu, S. I., Nuyujukian, P., Shenoy, K. V.
2018; 97 (5): 1177–+
- **Feasibility of Automatic Error Detect-and-Undo System in Human Intracortical Brain-Computer Interfaces.** *IEEE transactions on bio-medical engineering*
Even-Chen, N. n., Stavisky, S. D., Pandarinath, C. n., Nuyujukian, P. n., Blabe, C. H., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2018; 65 (8): 1771–84
- **Cortical control of a tablet computer by people with paralysis.** *PloS one*
Nuyujukian, P., Albites Sanabria, J., Saab, J., Pandarinath, C., Jarosiewicz, B., Blabe, C. H., Franco, B., Mernoff, S. T., Eskandar, E. N., Simeral, J. D., Hochberg, L. R., Shenoy, K. V., Henderson, et al
2018; 13 (11): e0204566
- **Stable long-term BCI-enabled communication in ALS and locked-in syndrome using LFP signals.** *Journal of neurophysiology*
Milekovic, T. n., Sarma, A. A., Bacher, D. n., Simeral, J. D., Saab, J. n., Pandarinath, C. n., Sorice, B. L., Blabe, C. n., Oakley, E. M., Tringale, K. R., Eskandar, E. n., Cash, S. S., Henderson, et al
2018
- **Rapid calibration of an intracortical brain-computer interface for people with tetraplegia.** *Journal of neural engineering*
Brandman, D. M., Hosman, T. n., Saab, J. n., Burkhart, M. C., Shanahan, B. E., Ciancibello, J. G., Sarma, A. A., Milstein, D. J., Vargas-Irwin, C. E., Franco, B. n., Kelemen, J. n., Blabe, C. n., Murphy, et al
2018; 15 (2): 026007
- **Unsupervised Discovery of Demixed, Low-Dimensional Neural Dynamics across Multiple Timescales through Tensor Component Analysis.** *Neuron*
Williams, A. H., Kim, T. H., Wang, F. n., Vyas, S. n., Ryu, S. I., Shenoy, K. V., Schnitzer, M. n., Kolda, T. G., Ganguli, S. n.
2018
- **Laminar differences in decision-related neural activity in dorsal premotor cortex** *NATURE COMMUNICATIONS*
Chandrasekaran, C., Peixoto, D., Newsome, W. T., Shenoy, K. V.
2017; 8: 614
- **A High-Performance Neural Prosthesis Incorporating Discrete State Selection With Hidden Markov Models** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Kao, J. C., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
2017; 64 (4): 935-945
- **High performance communication by people with paralysis using an intracortical brain-computer interface.** *eLife*
Pandarinath, C., Nuyujukian, P., Blabe, C. H., Sorice, B. L., Saab, J., Willett, F. R., Hochberg, L. R., Shenoy, K. V., Henderson, J. M.
2017; 6
- **Trial-by-Trial Motor Cortical Correlates of a Rapidly Adapting Visuomotor Internal Model.** *journal of neuroscience*

- Stavisky, S. D., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 37 (7): 1721-1732
- **Feedback control policies employed by people using intracortical brain-computer interfaces** *JOURNAL OF NEURAL ENGINEERING*
Willett, F. R., Pandarinath, C., Jarosiewicz, B., Murphy, B. A., Memberg, W. D., Blabe, C. H., Saab, J., Walter, B. L., Sweet, J. A., Miller, J. P., Henderson, J. M., Shenoy, K. V., Simeral, et al
2017; 14 (1)
 - **Corrigendum: Making brain-machine interfaces robust to future neural variability.** *Nature communications*
Sussillo, D., Stavisky, S. D., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 8: 14490-?
 - **A Nonhuman Primate Brain-Computer Typing Interface** *PROCEEDINGS OF THE IEEE*
Nuyujukian, P., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 105 (1): 66-72
 - **A Non-Human Primate Brain-Computer Typing Interface.** *Proceedings of the IEEE. Institute of Electrical and Electronics Engineers*
Nuyujukian, P., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 105 (1): 66-72
 - **Leveraging neural dynamics to extend functional lifetime of brain-machine interfaces.** *Scientific reports*
Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 7 (1): 7395
 - **Motor Cortical Visuomotor Feedback Activity Is Initially Isolated from Downstream Targets in Output-Null Neural State Space Dimensions.** *Neuron*
Stavisky, S. D., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 95 (1): 195–208.e9
 - **Feasibility Analysis of Genetically-Encoded Calcium Indicators as a Neural Signal Source for All-Optical Brain-Machine Interfaces**
Sun, X., Kao, J. C., Marshel, J. H., Ryu, S. I., Shenoy, K. V., IEEE
IEEE.2017: 174–80
 - **Augmenting intracortical brain-machine interface with neurally driven error detectors.** *Journal of neural engineering*
Even-Chen, N. n., Stavisky, S. D., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2017; 14 (6): 066007
 - **Signal-independent noise in intracortical brain-computer interfaces causes movement time properties inconsistent with Fitts' law.** *Journal of neural engineering*
Willett, F. R., Murphy, B. A., Memberg, W. D., Blabe, C. H., Pandarinath, C. n., Walter, B. L., Sweet, J. A., Miller, J. P., Henderson, J. M., Shenoy, K. V., Hochberg, L. R., Kirsch, R. F., Ajiboye, et al
2017; 14 (2): 026010
 - **The need for calcium imaging in nonhuman primates: New motor neuroscience and brain-machine interfaces** *EXPERIMENTAL NEUROLOGY*
O'Shea, D. J., Tiautmann, E., Chandrasekaran, C., Stavisky, S., Kao, J. C., Sahani, M., Ryu, S., Deisseroth, K., Shenoy, K. V.
2017; 287: 437-451
 - **Making brain-machine interfaces robust to future neural variability** *NATURE COMMUNICATIONS*
Sussillo, D., Stavisky, S. D., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2016; 7
 - **The Importance of Planning in Motor Learning.** *Neuron*
O'Shea, D. J., Shenoy, K. V.
2016; 92 (4): 669-671
 - **Tensor Analysis Reveals Distinct Population Structure that Parallels the Different Computational Roles of Areas M1 and V1.** *PLoS computational biology*
Seely, J. S., Kaufman, M. T., Ryu, S. I., Shenoy, K. V., Cunningham, J. P., Churchland, M. M.
2016; 12 (11)
 - **The need for calcium imaging in nonhuman primates: New motor neuroscience and brain-machine interfaces.** *Experimental neurology*
O'Shea, D. J., Trautmann, E., Chandrasekaran, C., Stavisky, S., Kao, J. C., Sahani, M., Ryu, S., Deisseroth, K., Shenoy, K. V.
2016

- **The Largest Response Component in the Motor Cortex Reflects Movement Timing but Not Movement Type.** *eNeuro*
Kaufman, M. T., Seely, J. S., Sussillo, D., Ryu, S. I., Shenoy, K. V., Churchland, M. M.
2016; 3 (4)
- **A high-performance neural prosthesis incorporating discrete state selection with hidden Markov models.** *IEEE transactions on bio-medical engineering*
Kao, J. C., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
2016: -?
- **Virtual typing by people with tetraplegia using a self-calibrating intracortical brain-computer interface.** *Science translational medicine*
Jarosiewicz, B., Sarma, A. A., Bacher, D., Masse, N. Y., Simeral, J. D., Sorice, B., Oakley, E. M., Blabe, C., Pandarinath, C., Gilja, V., Cash, S. S., Eskandar, E. N., Friehs, et al
2015; 7 (313): 313ra179-?
- **Virtual typing by people with tetraplegia using a self-calibrating intracortical brain-computer interface.** *Science translational medicine*
Jarosiewicz, B., Sarma, A. A., Bacher, D., Masse, N. Y., Simeral, J. D., Sorice, B., Oakley, E. M., Blabe, C., Pandarinath, C., Gilja, V., Cash, S. S., Eskandar, E. N., Friehs, et al
2015; 7 (313): 313ra179-?
- **Clinical translation of a high-performance neural prosthesis.** *Nature medicine*
Gilja, V., Pandarinath, C., Blabe, C. H., Nuyujukian, P., Simeral, J. D., Sarma, A. A., Sorice, B. L., Perge, J. A., Jarosiewicz, B., Hochberg, L. R., Shenoy, K. V., Henderson, J. M.
2015; 21 (10): 1142-1145
- **Clinical translation of a high-performance neural prosthesis** *NATURE MEDICINE*
Gilja, V., Pandarinath, C., Blabe, C. H., Nuyujukian, P., Simeral, J. D., Sarma, A. A., Sorice, B. L., Perge, J. A., Jarosiewicz, B., Hochberg, L. R., Shenoy, K. V., Henderson, J. M.
2015; 21 (10): 1142-?
- **Optogenetics: 10 years after ChR2 in neurons-views from the community** *NATURE NEUROSCIENCE*
Adamantidis, A., Arber, S., Bains, J. S., Bamberg, E., Bonci, A., Buzsaki, G., Cardin, J. A., Costa, R. M., Dan, Y., Goda, Y., Graybiel, A. M., Haessler, M., Hegemann, et al
2015; 18 (9): 1202-12
- **Assessment of brain-machine interfaces from the perspective of people with paralysis.** *Journal of neural engineering*
Blabe, C. H., Gilja, V., Chestek, C. A., Shenoy, K. V., Anderson, K. D., Henderson, J. M.
2015; 12 (4): 043002-?
- **Auto-deleting brain machine interface: Error detection using spiking neural activity in the motor cortex.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual Conference*
Even-Chen, N., Stavisky, S. D., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2015; 2015: 71-75
- **Assessment of brain-machine interfaces from the perspective of people with paralysis** *JOURNAL OF NEURAL ENGINEERING*
Blabe, C. H., Gilja, V., Chestek, C. A., Shenoy, K. V., Anderson, K. D., Henderson, J. M.
2015; 12 (4)
- **A neural network that finds a naturalistic solution for the production of muscle activity** *NATURE NEUROSCIENCE*
Sussillo, D., Churchland, M. M., Kaufman, M. T., Shenoy, K. V.
2015; 18 (7): 1025-?
- **Single-trial dynamics of motor cortex and their applications to brain-machine interfaces** *NATURE COMMUNICATIONS*
Kao, J. C., Nuyujukian, P., Ryu, S. I., Churchland, M. M., Cunningham, J. P., Shenoy, K. V.
2015; 6
- **Neural population dynamics in human motor cortex during movements in people with ALS** *ELIFE*
Pandarinath, C., Gilja, V., Blabe, C. H., Nuyujukian, P., Sarma, A. A., Sorice, B. L., Eskandar, E. N., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2015; 4
- **A high performing brain-machine interface driven by low-frequency local field potentials alone and together with spikes.** *Journal of neural engineering*
Stavisky, S. D., Kao, J. C., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.

2015; 12 (3): 036009-?

- **A high performing brain-machine interface driven by low-frequency local field potentials alone and together with spikes** *JOURNAL OF NEURAL ENGINEERING*
Stavisky, S. D., Kao, J. C., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
2015; 12 (3)
- **Comparison of spike sorting and thresholding of voltage waveforms for intracortical brain-machine interface performance.** *Journal of neural engineering*
Christie, B. P., Tat, D. M., Irwin, Z. T., Gilja, V., Nuyujukian, P., Foster, J. D., Ryu, S. I., Shenoy, K. V., Thompson, D. E., Chestek, C. A.
2015; 12 (1): 016009-?
- **Comparison of spike sorting and thresholding of voltage waveforms for intracortical brain-machine interface performance.** *Journal of neural engineering*
Christie, B. P., Tat, D. M., Irwin, Z. T., Gilja, V., Nuyujukian, P., Foster, J. D., Ryu, S. I., Shenoy, K. V., Thompson, D. E., Chestek, C. A.
2015; 12 (1): 016009-?
- **A High-Performance Keyboard Neural Prosthesis Enabled by Task Optimization** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Nuyujukian, P., Fan, J. M., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2015; 62 (1): 21-29
- **Vacillation, indecision and hesitation in moment-by-moment decoding of monkey motor cortex.** *eLife*
Kaufman, M. T., Churchland, M. M., Ryu, S. I., Shenoy, K. V.
2015; 4
- **Neural population dynamics in human motor cortex during movements in people with ALS.** *eLife*
Pandarinath, C., Gilja, V., Blabe, C. H., Nuyujukian, P., Sarma, A. A., Soricce, B. L., Eskandar, E. N., Hochberg, L. R., Henderson, J. M., Shenoy, K. V.
2015; 4
- **Single-trial dynamics of motor cortex and their applications to brain-machine interfaces.** *Nature communications*
Kao, J. C., Nuyujukian, P., Ryu, S. I., Churchland, M. M., Cunningham, J. P., Shenoy, K. V.
2015; 6: 7759-?
- **Performance sustaining intracortical neural prostheses.** *Journal of neural engineering*
Nuyujukian, P., Kao, J. C., Fan, J. M., Stavisky, S. D., Ryu, S. I., Shenoy, K. V.
2014; 11 (6): 066003-?
- **Performance sustaining intracortical neural prostheses** *JOURNAL OF NEURAL ENGINEERING*
Nuyujukian, P., Kao, J. C., Fan, J. M., Stavisky, S. D., Ryu, S. I., Shenoy, K. V.
2014; 11 (6)
- **Combining Decoder Design and Neural Adaptation in Brain-Machine Interfaces** *NEURON*
Shenoy, K. V., Carmena, J. M.
2014; 84 (4): 665-680
- **A freely-moving monkey treadmill model** *JOURNAL OF NEURAL ENGINEERING*
Foster, J. D., Nuyujukian, P., Freifeld, O., Gao, H., Walker, R., Ryu, S. I., Meng, T. H., Murmann, B., Black, M. J., Shenoy, K. V.
2014; 11 (4)
- **A freely-moving monkey treadmill model.** *Journal of neural engineering*
D Foster, J., Nuyujukian, P., Freifeld, O., Gao, H., Walker, R., I Ryu, S., H Meng, T., Murmann, B., J Black, M., V Shenoy, K.
2014; 11 (4): 046020-?
- **Information Systems Opportunities in Brain-Machine Interface Decoders** *PROCEEDINGS OF THE IEEE*
Kao, J. C., Stavisky, S. D., Sussillo, D., Nuyujukian, P., Shenoy, K. V.
2014; 102 (5): 666-682
- **Self-recalibrating classifiers for intracortical brain-computer interfaces.** *Journal of neural engineering*
Bishop, W., Chestek, C. C., Gilja, V., Nuyujukian, P., Foster, J. D., Ryu, S. I., Shenoy, K. V., Yu, B. M.
2014; 11 (2): 026001-?
- **Self-recalibrating classifiers for intracortical brain-computer interfaces.** *Journal of neural engineering*
Bishop, W., Chestek, C. C., Gilja, V., Nuyujukian, P., Foster, J. D., Ryu, S. I., Shenoy, K. V., Yu, B. M.

2014; 11 (2): 026001-?

- **Cortical activity in the null space: permitting preparation without movement.** *Nature neuroscience*
Kaufman, M. T., Churchland, M. M., Ryu, S. I., Shenoy, K. V.
2014; 17 (3): 440-448
- **Cortical activity in the null space: permitting preparation without movement.** *Nature neuroscience*
Kaufman, M. T., Churchland, M. M., Ryu, S. I., Shenoy, K. V.
2014; 17 (3): 440-448
- **Intention estimation in brain-machine interfaces.** *Journal of neural engineering*
Fan, J. M., Nuyujukian, P., Kao, J. C., Chestek, C. A., Ryu, S. I., Shenoy, K. V.
2014; 11 (1): 016004-?
- **Intention estimation in brain-machine interfaces.** *Journal of neural engineering*
Fan, J. M., Nuyujukian, P., Kao, J. C., Chestek, C. A., Ryu, S. I., Shenoy, K. V.
2014; 11 (1): 016004-?
- **Neural Dynamics of Reaching following Incorrect or Absent Motor Preparation** *NEURON*
Ames, K. C., Ryu, S. I., Shenoy, K. V.
2014; 81 (2): 438-451
- **Cortical activity in the null space: permitting preparation without movement** *Nature Neuroscience*
Kaufman, M., T.
2014
- **Hybrid decoding of both spikes and low-frequency local field potentials for brain-machine interfaces.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual Conference*
Stavisky, S. D., Kao, J. C., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
2014; 2014: 3041-3044
- **Intention estimation in brain-machine interfaces** *Journal of Neural Engineering*
Fan, J., M., Nuyujukian, P., Kao, J., Chestek, C. A., Ryu, S. I., Shenoy, K. V.
2014; 11:016004
- **DataHigh: graphical user interface for visualizing and interacting with high-dimensional neural activity.** *Journal of neural engineering*
Cowley, B. R., Kaufman, M. T., Butler, Z. S., Churchland, M. M., Ryu, S. I., Shenoy, K. V., Yu, B. M.
2013; 10 (6): 066012-?
- **DataHigh: graphical user interface for visualizing and interacting with high-dimensional neural activity.** *Journal of neural engineering*
Cowley, B. R., Kaufman, M. T., Butler, Z. S., Churchland, M. M., Ryu, S. I., Shenoy, K. V., Yu, B. M.
2013; 10 (6): 066012-?
- **Context-dependent computation by recurrent dynamics in prefrontal cortex.** *Nature*
Mante, V., Sussillo, D., Shenoy, K. V., Newsome, W. T.
2013; 503 (7474): 78-84
- **Context-dependent computation by recurrent dynamics in prefrontal cortex** *NATURE*
Mante, V., Sussillo, D., Shenoy, K. V., Newsome, W. T.
2013; 503 (7474): 78-?
- **A coaxial optrode as multifunction write-read probe for optogenetic studies in non-human primates.** *Journal of neuroscience methods*
Ozden, I., Wang, J., Lu, Y., May, T., Lee, J., Goo, W., O'Shea, D. J., Kalanithi, P., Diester, I., Diagne, M., Deisseroth, K., Shenoy, K. V., Nurmikko, et al
2013; 219 (1): 142-154
- **The roles of monkey M1 neuron classes in movement preparation and execution** *JOURNAL OF NEUROPHYSIOLOGY*
Kaufman, M. T., Churchland, M. M., Shenoy, K. V.
2013; 110 (4): 817-825
- **194 High Performance Computer Cursor Control Using Neuronal Ensemble Recordings From the Motor Cortex of a Person With ALS.** *Neurosurgery*
Henderson, J. M., Gilja, V., Pandarinath, C., Blabe, C., Hochberg, L. R., Shenoy, K. V.

2013; 60: 184-?

- **Cortical control of arm movements: a dynamical systems perspective.** *Annual review of neuroscience*
Shenoy, K. V., Sahani, M., Churchland, M. M.
2013; 36: 337-359
- **Investigating the role of firing-rate normalization and dimensionality reduction in brain-machine interface robustness.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Kao, J. C., Nuyujukian, P., Stavisky, S., Ryu, S. I., Ganguli, S., Shenoy, K. V.
2013; 2013: 293-298
- **Design and validation of a real-time spiking-neural-network decoder for brain-machine interfaces.** *Journal of neural engineering*
Dethier, J., Nuyujukian, P., Ryu, S. I., Shenoy, K. V., Boahen, K.
2013; 10 (3): 036008-?
- **Design and validation of a real-time spiking-neural-network decoder for brain-machine interfaces.** *Journal of neural engineering*
Dethier, J., Nuyujukian, P., Ryu, S. I., Shenoy, K. V., Boahen, K.
2013; 10 (3): 036008-?
- **Hand posture classification using electrocorticography signals in the gamma band over human sensorimotor brain areas.** *Journal of neural engineering*
Chestek, C. A., Gilja, V., Blabe, C. H., Foster, B. L., Shenoy, K. V., Parvizi, J., Henderson, J. M.
2013; 10 (2): 026002-?
- **Hand posture classification using electrocorticography signals in the gamma band over human sensorimotor brain areas** *JOURNAL OF NEURAL ENGINEERING*
Chestek, C. A., Gilja, V., Blabe, C. H., Foster, B. L., Shenoy, K. V., Parvizi, J., Henderson, J. M.
2013; 10 (2)
- **A recurrent neural network that produces EMG from rhythmic dynamics.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Sussillo, D., Churchland, M. M., Kaufman, M. T., Shenoy, K. V.
2013: III-67
- **Quantifying representational and dynamical structure in large neural datasets.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Seely, J., Kaufman, M. T., Kohn, A., Smith, M., Movshon, A., Priebe, N., Shenoy, Krishna, V.
2013
- **Selective integration of sensory evidence by recurrent dynamics in prefrontal cortex.** *Nature.*
Mante, V., Sussillo, D., Shenoy, K. V., Newsome, W. T.
2013; 503: 78-8, 45-47
- **Characterization of dynamical activity in motor cortex.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Elsayed, G., Kaufman, M. T., Ryu, S. I., Shenoy, K. V., Churchland, M. M., Cunningham, J. P.
2013
- **Neural dynamics following optogenetic disruption of motor preparation.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
O'Shea, D., Goo, W., Kalanithi, P., Diester, I., Ramakrishnan, C., Deisseroth, K., Shenoy, Krishna, V.
2013
- **High performance computer cursor control using neuronal ensemble recordings from the motor cortex of a person with ALS.** *Neurosurgery.*
Henderson, J. M., Gilja, V., Pandarinath, C., Blabe, C., Hochberg, L. R., Shenoy, K. V.
2013; 1:184: 60
- **DataHigh: Graphical user interface for visualizing and interacting with high-dimensional neural activity.** *Journal of Neural Engineering.*
Cowley, B. R., Kaufman, M. T., Butler, Z. S., Churchland, M. M., Ryu, S. I., Shenoy, K. V.
2013; 10:066012
- **Dimensionality, dynamics, and correlations in the motor cortical substrate for reaching.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*

- Gao, P., rautmann, E., Yu, B. M., Santhanam, G., Ryu, S. I., Shenoy, K. V.
2013
- **A high-performance neural prosthesis enabled by control algorithm design** *NATURE NEUROSCIENCE*
Gilja, V., Nuyujukian, P., Chestek, C. A., Cunningham, J. P., Yu, B. M., Fan, J. M., Churchland, M. M., Kaufman, M. T., Kao, J. C., Ryu, S. I., Shenoy, K. V.
2012; 15 (12): 1752-1757
 - **Neural population dynamics during reaching** *NATURE*
Churchland, M. M., Cunningham, J. P., Kaufman, M. T., Foster, J. D., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
2012; 487 (7405): 51-?
 - **An L (1)-regularized logistic model for detecting short-term neuronal interactions** *JOURNAL OF COMPUTATIONAL NEUROSCIENCE*
Zhao, M., Batista, A., Cunningham, J. P., Chestek, C., Rivera-Alvidrez, Z., Kalmar, R., Ryu, S., Shenoy, K., Iyengar, S.
2012; 32 (3): 479-497
 - **A recurrent neural network for closed-loop intracortical brain-machine interface decoders** *JOURNAL OF NEURAL ENGINEERING*
Sussillo, D., Nuyujukian, P., Fan, J. M., Kao, J. C., Stavisky, S. D., Ryu, S., Shenoy, K.
2012; 9 (2)
 - **HermesE: A 96-Channel Full Data Rate Direct Neural Interface in 0.13 mu m CMOS** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*
Gao, H., Walker, R. M., Nuyujukian, P., Makinwa, K. A., Shenoy, K. V., Murmann, B., Meng, T. H.
2012; 47 (4): 1043-1055
 - **Brain Enabled by Next-Generation Neurotechnology: Using Multiscale and Multimodal Models** *IEEE PULSE*
Shenoy, K. V., Nurmikko, A. V.
2012; 3 (2): 31-36
 - **A brain machine interface control algorithm designed from a feedback control perspective** *34th Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*
Gilja, V., Nuyujukian, P., Chestek, C. A., Cunningham, J. P., Yu, B. M., Fan, J. M., Ryu, S. I., Shenoy, K. V.
IEEE.2012: 1318-1322
 - **Concurrent integration and gating of sensory information with orthogonal mixed representations.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Mante, V., Sussillo, D., Shenoy, K. V., Newsome, W. T.
2012: II-58
 - **Long-term decoding stability without retraining for intracortical brain computer Interface.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Bishop, W., Nuyujukian, P., Chestek, C. A., Gilja, V., Ryu, S. I., Shenoy, K. V.
2012: III-40
 - **Dimensionality in motor cortex: differences between models and experiment.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Seely, J., Kaufman, M. T., Ryu, S. I., Cunningham, J. P., Shenoy, K. V., Churchland, M. M.
2012: II-67
 - **2010 DARPA neural engineering, science, and technology forum [Guest Editorial].** *IEEE EMBS.*
Schnitzer, J. J.
2012; 0.1319444444444444
 - **Brain models enabled by next-generation neurotechnology.** *Pulse Magazine, IEEE Engineering in Medicine and Biology Society.*
Shenoy, K. V., Nurmikko, A. V.
2012; 3: 31-36.
 - **Neural dynamics of reaching following incomplete or incorrect planning.** *Frontiers in Neuroscience.*
Ames, K. C., Ryu, S. I., Shenoy, K. V.
2012: T-5.
 - **Neural Prosthetics** *In Encyclopedia of Motor Control*
Shenoy, K. V., Chestek, C. A.

edited by Wolpert, D.
Scholarpedia..2012: 1

- **A recurrent neural network that produces EMG from rhythmic dynamics.** *Translational and Computational Motor Control (TCMC) pre-meeting to Society for Neuroscience annual meeting, New Orleans, LA.*
Sussillo, D., Churchland, M. M., Kaufman, M. T., Shenoy, K. V.
2012
- **Identifying the neural initiation of a movement.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Petreska, B., Kaufman, M. T., Churchland, M. M., Ryu, S. I., Shenoy, K. V., Sahani, M.
2012: I-66
- **A high-performance, robust brain-machine interface without retraining.** *Frontiers in Neuroscience.*
Nuyujukian, P., Kao, J., Fan, J. M., Stavisky, S., Ryu, S. I., Shenoy, K. V.
2012: III-65
- **A framework for relating neural activity to freely moving behavior** *34th Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*
Foster, J. D., Nuyujukian, P., Freifeld, O., Ryu, S. I., Black, M. J., Shenoy, K. V.
IEEE.2012: 2736–2739
- **DataHigh: Graphical user interface for visualizing and interacting with high-dimensional neural activity** *34th Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*
Cowley, B. R., Kaufman, M. T., Churchland, M. M., Ryu, S. I., Shenoy, K. V., Yu, B. M.
IEEE.2012: 4607–4610
- **Single-Trial Neural Correlates of Arm Movement Preparation** *NEURON*
Afshar, A., Santhanam, G., Yu, B. M., Ryu, S. I., Sahani, M., Shenoy, K. V.
2011; 71 (3): 555-564
- **Long-term stability of neural prosthetic control signals from silicon cortical arrays in rhesus macaque motor cortex** *39th Neural Interfaces Conference (NIC2010)*
Chestek, C. A., Gilja, V., Nuyujukian, P., Foster, J. D., Fan, J. M., Kaufman, M. T., Churchland, M. M., Rivera-Alvidrez, Z., Cunningham, J. P., Ryu, S. I., Shenoy, K. V.
IOP PUBLISHING LTD.2011
- **Challenges and Opportunities for Next-Generation Intracortically Based Neural Prostheses** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Gilja, V., Chestek, C. A., Diester, I., Henderson, J. M., Deisseroth, K., Shenoy, K. V.
2011; 58 (7): 1891-1899
- **Toward Clinically Viable Brain-Machine Interfaces** *66th Annual Meeting of the Society-of-Biological-Psychiatry*
Shenoy, K. V.
ELSEVIER SCIENCE INC.2011: 193S–193S
- **A closed-loop human simulator for investigating the role of feedback control in brain-machine interfaces** *JOURNAL OF NEUROPHYSIOLOGY*
Cunningham, J. P., Nuyujukian, P., Gilja, V., Chestek, C. A., Ryu, S. I., Shenoy, K. V.
2011; 105 (4): 1932-1949
- **Combining Wireless Neural Recording and Video Capture for the Analysis of Natural Gait.** *International IEEE/EMBS Conference on Neural Engineering : [proceedings]. International IEEE EMBS Conference on Neural Engineering*
Foster, J. D., Freifeld, O., Nuyujukian, P., Ryu, S. I., Black, M. J., Shenoy, K. V.
2011; 2011: 613–16
- **Adaptive Resolution ADC Array for an Implantable Neural Sensor** *IEEE TRANSACTIONS ON BIOMEDICAL CIRCUITS AND SYSTEMS*
O'Driscoll, S., Shenoy, K. V., Meng, T. H.
2011; 5 (2): 120-130
- **An optogenetic toolbox designed for primates** *NATURE NEUROSCIENCE*
Diester, I., Kaufman, M. T., Mogri, M., Pashaie, R., Goo, W., Yizhar, O., Ramakrishnan, C., Deisseroth, K., Shenoy, K. V.
2011; 14 (3): 387-397

- **A Brain-Machine Interface Operating with a Real-Time Spiking Neural Network Control Algorithm.** *Advances in neural information processing systems*
Dethier, J., Nuyujukian, P., Eliasmith, C., Stewart, T., Ellassaad, S. A., Shenoy, K. V., Boahen, K.
2011; 2011: 2213-2221
- **Spiking Neural Network Decoder for Brain-Machine Interfaces.** *International IEEE/EMBS Conference on Neural Engineering : [proceedings]. International IEEE EMBS Conference on Neural Engineering*
Dethier, J., Gilja, V., Nuyujukian, P., Ellassaad, S. A., Shenoy, K. V., Boahen, K.
2011
- **A 96-channel full data rate direct neural interface in 0.13 um CMOS.**
Walker, R. M., Gao, H., Nuyujukian, P., Makinwa, K., Shenoy, K. V., Meng, T. H.
2011
- **A brain-machine interface operating with a real-time spiking neural network control algorithm.** *Advances in Neural Information Processing Systems (NIPS)*
Dethier, J., Nuyujukian, P., Ellassaad, S., Stewart, T., Eliasmith, C., Shenoy, K. V.
edited by Shawe-Taylor, J., Zemel, R., S., Bartlett, P.
MIT Press Cambridge, MA..2011: 1
- **Extracting rotational structure from motor cortical data.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Cunningham, J. P., Churchland, M. M., Kaufman, M. T., Shenoy, K. V.
2011: II-33.
- **The role of horizontal long-range connections in shaping the dynamics of multi-electrode array data.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Lerchner, A., Shenoy, K. V., Sahani, M.
2011: I-27.
- **A dynamical systems view of motor preparation: Implications for neural prosthetic system design.** *Chapter 3 in Andrea*
Shenoy, K. V., Kaufman, M. T., Sahani, M., Churchland, M. M.
edited by Green, M., Chapman, C., Elaine, Kalaska, F., John
Amsterdam: The Netherlands..2011: 33–58
- **Firing rate oscillations underlie motor cortex responses during reaching in monkey.** *Frontiers in Neuroscience.*
Churchland, M. M., Cunningham, J. P., Kaufman, M. T., Ryu, S., Shenoy, K. V.
2011: III-32.
- **Previews: New insights into motor cortex.** *Neuron.*
Graziano, M. S.
2011; 71: 387-388
- **Dynamical segmentation of single trials from population neural data.** *Advances in Neural Information Processing Systems (NIPS)*
Petreska, B., Yu, B. M., Cunningham, J. P., Santhanam, G., Ryu, S. I., Shenoy, K. V.
edited by Shawe-Taylor, J., Zemel, R., S., Bartlett, P.
MIT Press.2011: 1
- **Modelling low-dimensional dynamics in recorded spiking populations.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Macke, J., Busing, L., Cunningham, J. P., Yu, B. M., Shenoy, K. V., Sahani, M.
2011: I-34.
- **Detecting changes in neural dynamics within single trials.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Petreska, B., Cunningham, J. P., Santhanam, G., Yu, B. M., Ryu, S. I., Shenoy, K. V.
2011: I-33.
- **Cortical preparatory activity avoids causing movement by remaining in a muscle-neutral space.** *Frontiers in Neuroscience.Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Kaufman, M. T., Churchland, M. M., Shenoy, K. V.
2011: II-61.

- **Empirical models of spiking in neural populations.** *Advances in Neural Information Processing Systems (NIPS)*
Macke, J., Buesing, L., Cunningham, J. P., Yu, B. M., Shenoy, K. V., Sahani, M.
edited by Shawe-Taylor, J., Zemel, R., S., Bartlett, P.
MIT Press Cambridge, MA..2011: 1
- **Combining Wireless Neural Recording and Video Capture for the Analysis of Natural Gait** *5th International IEEE Engineering-in-Medicine-and-Biology-Society (EMBS) Conference on Neural Engineering (NER)*
Foster, J. D., Freifeld, O., Nuyujukian, P., Ryu, S. I., Black, M. J., Shenoy, K. V.
IEEE.2011: 613–616
- **Spiking Neural Network Decoder for Brain-Machine Interfaces** *5th International IEEE Engineering-in-Medicine-and-Biology-Society (EMBS) Conference on Neural Engineering (NER)*
Dethier, J., Gilja, V., Nuyujukian, P., Elassaad, S. A., Shenoy, K. V., Boahen, K.
IEEE.2011: 396–399
- **A dynamical systems view of motor preparation: Implications for neural prosthetic system design** *ENHANCING PERFORMANCE FOR ACTION AND PERCEPTION: MULTISENSORY INTEGRATION, NEUROPLASTICITY AND NEUROPROSTHETICS, PT II*
Shenoy, K. V., Kaufman, M. T., Sahani, M., Churchland, M. M.
2011; 192: 33-58
- **Monkey Models for Brain-Machine Interfaces: The Need for Maintaining Diversity** *33rd Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*
Nuyujukian, P., Fan, J. M., Gilja, V., Kalanithi, P. S., Chestek, C. A., Shenoy, K. V.
IEEE.2011: 1301–1305
- **Cortical Preparatory Activity: Representation of Movement or First Cog in a Dynamical Machine?** *NEURON*
Churchland, M. M., Cunningham, J. P., Kaufman, M. T., Ryu, S. I., Shenoy, K. V.
2010; 68 (3): 387-400
- **Autonomous head-mounted electrophysiology systems for freely behaving primates** *CURRENT OPINION IN NEUROBIOLOGY*
Gilja, V., Chestek, C. A., Nuyujukian, P., Foster, J., Shenoy, K. V.
2010; 20 (5): 676-686
- **Roles of Monkey Premotor Neuron Classes in Movement Preparation and Execution** *JOURNAL OF NEUROPHYSIOLOGY*
Kaufman, M. T., Churchland, M. M., Santhanam, G., Yu, B. M., Afshar, A., Ryu, S. I., Shenoy, K. V.
2010; 104 (2): 799-810
- **HermesD: A High-Rate Long-Range Wireless Transmission System for Simultaneous Multichannel Neural Recording Applications** *IEEE TRANSACTIONS ON BIOMEDICAL CIRCUITS AND SYSTEMS*
Miranda, H., Gilja, V., Chestek, C. A., Shenoy, K. V., Meng, T. H.
2010; 4 (3): 181-191
- **Stimulus onset quenches neural variability: a widespread cortical phenomenon** *NATURE NEUROSCIENCE*
Churchland, M. M., Yu, B. M., Cunningham, J. P., Sugrue, L. P., Cohen, M. R., Corrado, G. S., Newsome, W. T., Clark, A. M., Hosseini, P., Scott, B. B., Bradley, D. C., Smith, M. A., Kohn, et al
2010; 13 (3): 369-U25
- **Low-Dimensional Neural Features Predict Muscle EMG Signals** *32nd Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBC 10)*
Rivera-Alvidrez, Z., Kalmar, R. S., Ryu, S. I., Shenoy, K. V.
IEEE.2010: 6027–6033
- **The roles of monkey premotor neuron classes in movement preparation and execution.** *Journal of Neurophysiology.*
Kaufman, M. T., Churchland, M. M., Santhanam, G., Yu, B. M., Afshar, A., Ryu, S. I., Shenoy, Krishna, V.
2010; 104: 799-810.
- **A high-performance cortically-controlled motor prosthesis enabled by a feedback control perspective.**
Gilja, V., Nuyujukian, P., Chestek, C. A., Cunningham, J. P., Yu, B. M., Ryu, S. I., Shenoy, Krishna, V.
2010

- **An online, closed-loop testing platform for neural prosthetic systems.**
Cunningham, J. P., Nuyujukian, P., Gilja, V., Chestek, C. A., Ryu, S. I., Shenoy, K. V.
2010
- **Waveform stability and neural decoder performance across 7 weeks.**
Chestek, C. A., Gilja, V., Nuyujukian, P., Foster, J. D., Kaufman, M. T., Ryu, S. I., Shenoy, Krishna, V.
2010
- **Low dimensional neural features predict specific muscle EMG signals.**
Rivera-Alvidrez, Z., Kalmar, R., Ryu, S. I., Shenoy, K. V.
2010
- **Ensemble activity underlying movement preparation in prearcuate cortex.** *Frontiers in Neuroscience. Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Kalmar, R., Reppas, J., Ryu, S. I., Shenoy, K. V., Newsome, W. T.
2010
- **High-performance continuous neural cursor control enabled by a feedback control perspective.** *Frontiers in Neuroscience. Conference Abstract: Computational and Systems Neuroscience (COSYNE)*,
Gilja, V., Nuyujukian, P., Chestek, C. A., Cunningham, J. P., Yu, B. M., Ryu, S. I., Shenoy, Krishna, V.
2010
- **Toward human cortical prostheses: Addressing the performance barrier to clinical reality. Abstract #164.** *Congress of Neurological Surgeons Annual Meeting Abstracts*
Ryu, S. I., Gilja, V., Nuyujukian, P., Chestek, C. A., Yu, B. M., Shenoy, K. V.
2010
- **Neural decoding for motor and communication prostheses.** *Chapter in Statistical Signal Processing for Neuroscience*
Yu, B. M., Santhanam, G., Sahani, M., Shenoy, K. V.
edited by Elsevier.
Elsevier.2010: 219–263.
- **Editorial overview -- Special section on New Technologies.** *Current Opinion in Neurobiology.*
Schuman, E., Zhuang, X.
2010; 20: 608-609.
- **Preparatory tuning in premotor cortex relates most closely to the population movement-epoch response.** *Frontiers in Neuroscience. Conference Abstract: Computational and Systems Neuroscience (COSYNE)*
Churchland, M. M., Kaufman, M. T., Cunningham, J. P., Shenoy, K. V.
2010
- **Motor systems** *CURRENT OPINION IN NEUROBIOLOGY*
El Manira, A., Shenoy, K.
2009; 19 (6): 570-571
- **Methods for estimating neural firing rates, and their application to brain-machine interfaces** *NEURAL NETWORKS*
Cunningham, J. P., Gilja, V., Ryu, S. I., Shenoy, K. V.
2009; 22 (9): 1235-1246
- **Factor-Analysis Methods for Higher-Performance Neural Prostheses** *JOURNAL OF NEUROPHYSIOLOGY*
Santhanam, G., Yu, B. M., Gilja, V., Ryu, S. I., Afshar, A., Sahani, M., Shenoy, K. V.
2009; 102 (2): 1315-1330
- **Wireless Neural Recording With Single Low-Power Integrated Circuit** *IEEE TRANSACTIONS ON NEURAL SYSTEMS AND REHABILITATION ENGINEERING*
Harrison, R. R., Kier, R. J., Chestek, C. A., Gilja, V., Nuyujukian, P., Ryu, S., Greger, B., Solzbacher, F., Shenoy, K. V.
2009; 17 (4): 322-329
- **HermesC: Low-Power Wireless Neural Recording System for Freely Moving Primates** *IEEE TRANSACTIONS ON NEURAL SYSTEMS AND REHABILITATION ENGINEERING*
Chestek, C. A., Gilja, V., Nuyujukian, P., Kier, R. J., Solzbacher, F., Ryu, S. I., Harrison, R. R., Shenoy, K. V.

2009; 17 (4): 330-338

- **Gaussian-Process Factor Analysis for Low-Dimensional Single-Trial Analysis of Neural Population Activity** *JOURNAL OF NEUROPHYSIOLOGY*
Yu, B. M., Cunningham, J. P., Santhanam, G., Ryu, S. I., Shenoy, K. V., Sahani, M.
2009; 102 (1): 614-635
- **Human cortical prostheses: lost in translation?** *NEUROSURGICAL FOCUS*
Ryu, S. I., Shenoy, K. V.
2009; 27 (1)
- **Neural Prosthetic Systems: Current Problems and Future Directions** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Chestek, C. A., Cunningham, J. P., Gilja, V., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
IEEE.2009: 3369-3375
- **Guest Editorial -- Special section on wireless neural interfaces.** *IEEE TNSRE*.
Judy, J. W., Markovic, D.
2009; 17: 309-311.
- **Human cortical prostheses: Lost in translation? Neurosurgical Focus**
Ryu, S. I., Shenoy, K. V.
edited by guest, P. P.
2009
- **Guest Editorial -- Special section on wireless neural interfaces.** *IEEE TNSRE*
Judy, J. W., Markovic, D.
2009; 17: 309-311.
- **Stimulus onset quenches neural variability:a widespread cortical phenomenon.** *Frontiers in Systems Neuroscience. Conference Abstract: Computational and systems neuroscience.*
Churchland, M. M., Yu, B. M., Cunningham, J. C., Sugrue, L., Cohen, M., Corrado, G., Shenoy, Krishna, V.
2009
- **Gaussian-process factor analysis for low-d single-trial analysis of neural population activity.** *Frontiers in Systems Neuroscience.*
Yu, B. M., Cunningham, J. P., Santhanam, G., Ryu, S., Shenoy, K., Sahani, M.
2009
- **A high-rate long-range wireless transmission system for multichannel neural recording applications** *IEEE International Symposium on Circuits and Systems (ISCAS 2009)*
Miranda, H., Gilja, V., Chestek, C., Shenoy, K. V., Meng, T. H.
IEEE.2009: 1265-1268
- **Toward Optimal Target Placement for Neural Prosthetic Devices** *JOURNAL OF NEUROPHYSIOLOGY*
Cunningham, J. P., Yu, B. M., Gilja, V., Ryu, S. I., Shenoy, K. V.
2008; 100 (6): 3445-3457
- **Detecting neural-state transitions using hidden Markov models for motor cortical prostheses** *JOURNAL OF NEUROPHYSIOLOGY*
Kemere, C., Santhanam, G., Yu, B. M., Afshar, A., Ryu, S. I., Meng, T. H., Shenoy, K. V.
2008; 100 (4): 2441-2452
- **Cortical neural prosthesis performance improves when eye position is monitored** *IEEE TRANSACTIONS ON NEURAL SYSTEMS AND REHABILITATION ENGINEERING*
Batista, A. P., Yu, B. M., Santhanam, G., Ryu, S. I., Afshar, A., Shenoy, K. V.
2008; 16 (1): 24-31
- **Signal processing challenges for neural prostheses** *IEEE SIGNAL PROCESSING MAGAZINE*
Linderman, M. D., Santhanam, G., Kemere, C. T., Gilja, V., O'Driscoll, S., Yu, B. M., Afshar, A., Ryu, S. I., Shenoy, K. V., Meng, T. H.
2008; 25 (1): 18-28
- **Low-frequency noise characterization of near-IR VCSELs for functional brain imaging** *Conference on Photonic Therapeutics and Diagnostics IV*
Lee, T. T., Lim, P. G., Harris, J. S., Shenoy, K. V., Smith, S. J.

SPIE-INT SOC OPTICAL ENGINEERING.2008

- **Single-trial representation of uncertainty about reach goals in macaque PMd.**
Rivera, Z. A., Kalmar, R., Afshar, A., Santhanam, G., Yu, B. M., Ryu, S. I., Shenoy, Krishna, V.
2008
- **Gaussian-process factor analysis for low-dimensional single-trial analysis of neural population activity.** *Advances in Neural Information Processing Systems (NIPS)*
Yu, B. M., Cunningham, J. P., Ryu, S. I., Shenoy, K. V., Sahani, M.
MIT Press.2008: 1
- **Fast gaussian process methods for point process intensity estimation**
Cunningham, J. P., Sahani, M., Shenoy, K. V.
2008
- **Neural basis of reach preparation.**
Shenoy, K. V.
2008
- **HermesC: RF wireless low-power neural recording system for freely behaving primates.**
Gilja, V., Chestek, C., Nuyujukian, P., Ryu, S. I., Kier, R., Solzbacher, F., Shenoy, Krishna, V.
2008
- **Inferring neural firing rates from spike trains using Gaussian processes.** *Advances in Neural Information Processing Systems (NIPS)*
Cunningham, J., Yu, B. M., Shenoy, K. V., ahani, M.
edited by J, P., D, K., Y, S.
MIT Press Cambridge, MA..2008: 1
- **Brain-computer interfaces [from the guest editors].** *IEEE Signal Processing Magazine.*
Sajda, P., Muller, K. R., Shenoy, K. V.
2008; 25: 16-17.
- **An Efficient Approximation for the Real-Time Implementation of the Mixture of Trajectory Models Decoder** *IEEE Biomedical Circuits and Systems Conference - Intelligent Biomedical Systems*
Bishop, W., Yu, B. M., Santhanam, G., Afshar, A., Ryu, S. I., Shenoy, K. V.
IEEE.2008: 133–136
- **Neural decoding of movements: From linear to nonlinear trajectory models** *14th International Conference on Neural Information Processing (ICONIP 2007)*
Yu, B. M., Cunningham, J. P., Shenoy, K. V., Sahani, M.
SPRINGER-VERLAG BERLIN.2008: 586–595
- **A Wireless Neural Interface for Chronic Recording** *IEEE Biomedical Circuits and Systems Conference - Intelligent Biomedical Systems*
Harrison, R. R., Kier, R. J., Kim, S., Rieth, L., Warren, D. J., Ledbetter, N. M., Clark, G. A., Solzbacher, F., Chestek, C. A., Gilja, V., Nuyujukian, P., Ryu, S. I., Shenoy, et al
IEEE.2008: 125–128
- **A Factor-Analysis decoder for high-performance neural prostheses** *33rd IEEE International Conference on Acoustics, Speech and Signal Processing*
Santhanam, G., Yu, B. M., Gilja, V., Ryu, S. I., Afshar, A., Sahani, M., Shenoy, K. V.
IEEE.2008: 5208–5211
- **The Use of a Virtual Integration Environment for the Real-Time Implementation of Neural Decode Algorithms** *30th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Bishop, W., Yu, B. M., Santhanam, G., Afshar, A., Ryu, S. I., Shenoy, K. V., Vogelstein, R. J., Beaty, J., Harshbarger, S.
IEEE.2008: 628–633
- **Wireless neural signal acquisition with single low-power integrated circuit** *IEEE International Symposium on Circuits and Systems*
Harrison, R. R., Kier, R. J., Greger, B., Solzbacher, F., Chestek, C. A., Gija, V., Nuyujukian, P., Ryu, S. I., Shenoy, K. V.
IEEE.2008: 1748–1751
- **HermesC: RF wireless low-power neural recording system for freely behaving primates** *IEEE International Symposium on Circuits and Systems*
Chestek, C. A., Gija, V., Nuyujukian, P., Ryu, S. I., Shenoy, K. V., Kier, R. J., Solzbacher, F., Harrison, R. R.

IEEE.2008: 1752–1755

- **HermesB: A continuous neural recording system for freely behaving primates** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Santhanam, G., Linderman, M. D., Gija, V., Afshar, A., Ryu, S. I., Meng, T. H., Shenoy, K. V.
2007; 54 (11): 2037-2050
- **Single-neuron stability during repeated reaching in macaque premotor cortex** *JOURNAL OF NEUROSCIENCE*
Chestek, C. A., Batista, A. P., Santhanam, G., Yu, B. M., Afshar, A., Cunningham, J. P., Gilja, V., Ryu, S. I., Churchland, M. M., Shenoy, K. V.
2007; 27 (40): 10742-10750
- **Techniques for extracting single-trial activity patterns from large-scale neural recordings** *CURRENT OPINION IN NEUROBIOLOGY*
Churchland, M. M., Yu, B. M., Sahani, M., Shenoy, K. V.
2007; 17 (5): 609-618
- **Free-paced high-performance brain-computer interfaces** *JOURNAL OF NEURAL ENGINEERING*
Achtman, N., Afshar, A., Santhanam, G., Yu, B. M., Ryu, S. I., Shenoy, K. V.
2007; 4 (3): 336-347
- **Reference frames for reach planning in macaque dorsal premotor cortex** *JOURNAL OF NEUROPHYSIOLOGY*
Batista, A. P., Santhanam, G., Yu, B. M., Ryu, S. I., Afshar, A., Shenoy, K. V.
2007; 98 (2): 966-983
- **Temporal complexity and heterogeneity of single-neuron activity in premotor and motor cortex** *JOURNAL OF NEUROPHYSIOLOGY*
Churchland, M. M., Shenoy, K. V.
2007; 97 (6): 4235-4257
- **Mixture of trajectory models for neural decoding of goal-directed movements** *JOURNAL OF NEUROPHYSIOLOGY*
Yu, B. M., Kemere, C., Santhanam, G., Afshar, A., Ryu, S. I., Meng, T. H., Sahani, M., Shenoy, K. V.
2007; 97 (5): 3763-3780
- **Delay of movement caused by disruption of cortical preparatory activity** *JOURNAL OF NEUROPHYSIOLOGY*
Churchland, M. M., Shenoy, K. V.
2007; 97 (1): 348-359
- **The timecourse of neural variability in visual area MT.**
Churchland, M. M., Bradley, D. C., Clark, A., Hosseini, P., Cohen, M. R., Newsome, W. T., Shenoy, Krishna, V.
2007
- **Optimizing spike sorting for brain computer interfaces with non-stationary waveforms.**
Gilja, V., Santhanam, G., Linderman, M., Afshar, A., Ryu, S. I., Meng, T. H., Shenoy, Krishna, V.
2007
- **Hit and miss.** *Nature.*
Dell, H.
2007; 445:36.
- **Single-trial representation of uncertainty about reach goals in macaque PMd.**
Rivera, Z., Kalmar, R., Afshar, A., Santhanam, G., Yu, B. M., Ryu, S. I., Shenoy, Krishna, V.
2007
- **Potential role of neural preparatory activity in optimal control theory**
Shenoy, K. V., Churchland, M. M.
2007
- **Extracting dynamical structure embedded in premotor cortical activity.**
Shenoy, K. V., Yu, B. M., Afshar, A., Churchland, M. M., Cunningham, J. P., Sahani, M.
2007
- **Neural correlates of movement preparation.**
Churchland, M. M., Shenoy, K. V.

2007

- **Inferring neural firing rates from spike trains using Gaussian processes.**
Cunningham, J., Yu, B. M., Sahani, M., Shenoy, K. V.
2007
- **A central source of movement variability** *NEURON*
Churchland, M. M., Afshar, A., Shenoy, K. V.
2006; 52 (6): 1085-1096
- **Preparatory activity in premotor and motor cortex reflects the speed of the upcoming reach** *JOURNAL OF NEUROPHYSIOLOGY*
Churchland, M. M., Santhanam, G., Shenoy, K. V.
2006; 96 (6): 3130-3146
- **A high-performance brain-computer interface** *NATURE*
Santhanam, G., Ryu, S. I., Yu, B. M., Afshar, A., Shenoy, K. V.
2006; 442 (7099): 195-198
- **Neural variability in premotor cortex provides a signature of motor preparation** *JOURNAL OF NEUROSCIENCE*
Churchland, M. M., Yu, B. M., Ryu, S. I., Santhanam, G., Shenoy, K. V.
2006; 26 (14): 3697-3712
- **Neural recording stability of chronic electrode arrays in freely behaving primates.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Linderman, M. D., Gilja, V., Santhanam, G., Afshar, A., Ryu, S., Meng, T. H., Shenoy, K. V.
2006; 1: 4387-4391
- **The activity of motor cortex neurons during reaches is temporally complex and exceedingly heterogeneous.**
Churchland, M. M., Shenoy, K. V.
2006
- **Extracting dynamical structure embedded in neural activity.** *Neural Information Processing Systems (NIPS)*
Yu, B. M., Afshar, A., Santhanam, G., Ryu, S. I., Shenoy, K. V., Sahani, M.
edited by Y. W., B. S., J. P.
MIT Press, Cambridge, MA..2006: 1545-1552.
- **Hidden Markov models for spatial and temporal estimation for prosthetic control.** *Abstract Viewer / Itinerary Planner.*
Kemere, C., Yu, B. M., Santhanam, G., Ryu, S. I., Afshar, A., Meng, T. H., Shenoy, Krishna, V.
2006
- **Brain-Machine Interfaces introduction: Brain-machine interfaces promise to aid paralyzed patients by re-routing movement-related signals around damaged parts of the nervous system.** *A new study in Nature demonstrates a human with spinal injury manipulating a screen cursor and robotic devices by thought alone (Hochberg et al. Nature 442:164-171, 2006). Implanted electrodes in his motor cortex recorded neural activity, and translated it into movement commands. A second study, in monkeys, shows that brain-machine interfaces can operate at high speed, greatly increasing their clinical potential (Santhanam et al. Nature 442:195-198, 2006). This Nature Web Focus includes exclusive interviews and video footage of experiments, alongside papers that paved the way for these recent advances.*
Shenoy, K. V.
2006; 442: 164-171, 195-198
- **Modulation of neuronal ensemble activity during movement planning in Parkinson's disease patients undergoing deep brain stimulation.**
Henderson, J. M., Afshar, A., Ryu, S. I., Hill, B. C., Bronte-Stewart, H. M., Shenoy, K. V.
2006
- **Generating complex repeatable patterns of activity by gain modulating network neurons.** *Abstract Viewer / Itinerary Planner.*
Schaffer, E. S., Rajan, K., Churchland, M. M., Shenoy, K. V., Abbott, L. F.
2006
- **Multiday electrophysiological recordings from freely behaving primates using an autonomous, multi-channel neural system.** *Abstract Viewer / Itinerary Planner.*
Gilja, V., Linderman, M. D., Santhanam, G., Afshar, A., Ryu, S. I., Meng, T. H., Shenoy, Krishna, V.
2006

- **Neurons to Silicon: Implantable Prosthesis Processor.** *International Solid State Circuits Conference (ISSCC)*
O'Driscoll, S., Meng, T. H., Shenoy, K. V., Kemere, C.
2006: 552-553 & 672.
- **Expectation propagation for inference in non-linear dynamical models with Poisson observations.** *Nonlinear Statistical Signal Processing Workshop*
Yu, B. M., Shenoy, K. V., Sahani, M.
2006
- **Neurological disorders: Mind over machine.** *Nature Reviews Neuroscience*
Barton, S.
2006; 7: 682-683.
- **Heterogeneous reference frames for reaching in macaque PMd.**
Batista, A. P., Santhanam, G., Yu, B., Ryu, S. I., Afshar, A., Shenoy, K. V.
2006
- **A central source of movement variability** *Neuron*.
Churchland, M. M., Afshar, A., Shenoy, K. V.
2006; 52: 1085-1096.
- **Acute implantation of high density microelectrode arrays for investigation of human cortex.**
Henderson, J. M., Afshar, A., Ryu, S. I., Hill, B. C., Bronte-Stewart, H. M., Shenoy, K. V.
2006
- **Optimal target placement for neural communication prostheses.** *Abstract Viewer / Itinerary Planner. Atlanta*
Cunningham, J. P., Yu, B. M., Shenoy, K. V.
2006
- **Influence of eye position on end-point decoding accuracy in dorsal premotor cortex.** *Abstract Viewer / Itinerary Planner.*
Batista, A. P., Yu, B. M., Santhanam, G., Ryu, S. I., Afshar, A., Shenoy, K. V.
2006
- **The relationship between PMd neural activity and reaching behavior is stable in highly trained macaques.** *Abstract Viewer / Itinerary Planner.*
Chestek, C. A., Batista, A. P., Yu, B. M., Santhanam, G., Ryu, S. I., Afshar, A., Shenoy, Krishna, V.
2006
- **Factor analysis with Poisson output.** *Technical Report NPSL-TR-06-1.*
Santhanam, G., Yu, B. M., Shenoy, K. V., Sahani, M.
2006
- **Bionic brains become a reality**
Hopkin, M.
2006
- **Is this the bionic man** *Nature*
Shenoy, K. V.
2006; 442:109
- **Neuroscience: Converting thoughts into action.** *Nature*
Scott, S. H.
2006; 442: 141-142.
- **Preparing for speed. Focus on: Preparatory activity in premotor and motor cortex reflects the speed of the upcoming reach.** *Journal of Neurophysiology*
Cisek, P.
2006; 96: 2842-2843.
- **Neuroprosthetics: In search of the sixth sense.** *Nature*
Abbott, A.
2006; 442: 125-127.

- **Integrated optical sensors for chronic, minimally-invasive imaging of brain function.**
Lee, T. T., O, L., Cang, J., Kaneko, M., Stryker, M. P., Smith, S. J., Shenoy, Krishna, V.
2006
- **Neural rklecording stability of chronic electrode arrays in freely behaving primates** *28th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Linderman, M. D., Gilja, V., Santhanam, G., Afshar, A., Ryu, S., Meng, T. H., Shenoy, K. V.
IEEE.2006: 3784–3788
- **Optimal target placement for neural communication prostheses** *28th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Cunningham, J. P., Yu, B. M., Shenoy, K. V.
IEEE.2006: 1063–1066
- **Integrated semiconductor optical sensors for chronic, minimally-invasive imaging of brain function** *28th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Lee, T. T., Levi, O., Cang, J., Kaneko, M., Stryker, M. P., Smith, S. J., Shenoy, K. V., Harris, J. S.
IEEE.2006: 2443–2446
- **An autonomous, broadband, multi-channel neural recording system for freely behaving primates** *28th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Linderman, M. D., Gilja, V., Santhanam, G., Afshar, A., Ryu, S., Meng, T. H., Shenoy, K. V.
IEEE.2006: 3780–3783
- **Multiday electrophysiological recordings from freely behaving primates** *28th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Gilja, V., Linderman, M. D., Santhanam, G., Afshar, A., Shenoy, K. V.
IEEE.2006: 5723–5726
- **Multiday electrophysiological recordings from freely behaving primates.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Gilja, V., Linderman, M. D., Santhanam, G., Afshar, A., Ryu, S., Meng, T. H., Shenoy, K. V.
2006; 1: 5643-5646
- **An autonomous, broadband, multi-channel neural recording system for freely behaving primates.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Linderman, M. D., Gilja, V., Santhanam, G., Afshar, A., Ryu, S., Meng, T. H., Shenoy, K. V.
2006; 1: 1212-1215
- **Increasing the performance of cortically-controlled prostheses.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Shenoy, K. V., Santhanam, G., Ryu, S. I., Afshar, A., Yu, B. M., Gilja, V., Linderman, M. D., Kalmar, R. S., Cunningham, J. P., Kemere, C. T., Batista, A. P., Churchland, M. M., Meng, et al
2006: 6652-6656
- **Integrated semiconductor optical sensors for chronic, minimally-invasive imaging of brain function.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Lee, T. T., Levi, O., Cang, J., Kaneko, M., Stryker, M. P., Smith, S. J., Shenoy, K. V., Harris, J. S.
2006; 1: 1025-1028
- **Optimal target placement for neural communication prostheses.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Cunningham, J. P., Yu, B. M., Shenoy, K. V.
2006; 1: 2912-2915
- **Power feasibility of implantable digital spike sorting circuits for neural prosthetic systems** *IEEE TRANSACTIONS ON NEURAL SYSTEMS AND REHABILITATION ENGINEERING*
Zumsteg, Z. S., Kemere, C., O'Driscoll, S., Santhanam, G., Ahmed, R. E., Shenoy, K. V., Meng, T. H.
2005; 13 (3): 272-279
- **A high performance neurally-controlled cursor positioning system** *2nd International IEEE/EMBS Conference on Neural Engineering*

- Santhanam, G., Ryu, S. I., Yu, B. M., Afshar, A., Shenoy, K. V.
IEEE.2005: 494–500
- **Extracting dynamical structure embedded in neural activity.** *2005 Abstract Viewer/Itinerary Planner.*
Sahani, M., Yu, B. M., Afshar, G., Santhanam, G., Ryu, S. I., Shenoy, K. V.
2005
 - **PMd delay activity during rapid sequential movement plans.** *2005 Abstract Viewer/Itinerary Planner.*
Kalmar, R. S., Gilja, V., Santhanam, G., Ryu, S. I., Yu, B. M., Afshar, A., Shenoy, Krishna, V.
2005
 - **Reconfigurable Neural-Prosthetics Processors.** *Toward Replacement Parts for the Brain Implantable Biomimetic Electronics as Neural Prostheses*
Mumbru, J., Shenoy, K. V., Panotopoulos, G., Ay, S., An, X., Mok, F.
edited by Berger, T., Glanzman, D.
MIT Press, Cambridge, MA..2005: 335–368.
 - **Extracting dynamical structure embedded in motor preparatory activity.**
Yu, B. M., Afshar, A., Shenoy, K. V., Sahani, M.
2005
 - **Trial-by-trial mean normalization improves plan period reach target decoding.** *2005 Abstract Viewer/Itinerary Planner.*
Gilja, V., Kalmar, R. S., Santhanam, G., Ryu, S. I., Yu, B. M., Afshar, A., Shenoy, Krishna, V.
2005
 - **Free-paced target estimation in a delayed reach task.** *2005 Abstract Viewer/Itinerary Planner.*
Afshar, A., Achtman, N., Santhanam, G., Ryu, S. I., Yu, B. M., Shenoy, K. V.
2005
 - **Complex patterns of motor cortex activity during reaches at different speeds.** *2005 Abstract Viewer/Itinerary Planner.*
Churchland, M. M., Shenoy, K. V.
2005
 - **Heterogeneous coordinate frames for reaching in macaque PMd.** *2005 Abstract Viewer/Itinerary Planner.*
Batista, A. P., Santhanam, G., Yu, B. M., Ryu, S. I., Afshar, A., Shenoy, K. V.
2005
 - **Feedback-directed state transition for recursive Bayesian estimation of goal-directed trajectories.**
Yu, B. M., Santhanam, G., Ryu, S. I., Shenoy, K. V.
2005
 - **Neural variability in premotor cortex provides a signature of motor preparation.**
Churchland, M. M., Yu, B. M., Ryu, S., Santhanam, G., Shenoy, K. V.
2005
 - **Motor preparation and settling activity in PMd.** *Neural Control of Movement (NCM) Annual Meeting*
Churchland, M. M., Yu, B. M., Ryu, S. I., Santhanam, G., Shenoy, K. V.
2005
 - **Mixture of trajectory models for neural decoding of goal-directed movements.** *2005 Abstract Viewer/Itinerary Planner.*
Yu, B. M., Kemere, C., Santhanam, G., Afshar, A., Ryu, S. I., Meng, T. H., Shenoy, Krishna, V.
2005
 - **Intra-cortical communication prosthesis design.** *2005 Abstract Viewer/Itinerary Planner.*
Santhanam, G., Ryu, S. I., Yu, B. M., Afshar, A., Afshar, K. V.
2005
 - **Model-based neural decoding of reaching movements: A maximum likelihood approach** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
Kemere, C., Shenoy, K. V., Meng, T. H.
2004; 51 (6): 925-932

- **Improving neural prosthetic system performance by combining plan and peri-movement activity.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Yu, B. M., Ryu, S. I., Santhanam, G., Churchland, M. M., Shenoy, K. V.
2004; 6: 4516-4519
- **Reaction time and the time-course of cortical pre-motor processing.** *Soc. for Neurosci.*
Churchland, M. M., Yu, B., Ryu, S. I., Santhanam, G., Shenoy, K. V.
2004
- **Behavioral variability predicted from recorded plan activity.**
Churchland, M. M., Shenoy, K.
2004
- **Coordinate frames for reaching in macaque dorsal premotor cortex (PMd).** *Soc. for Neurosci.*
Batista, A. P., Yu, B. M., Santhanam, G., Ryu, S. I., Shenoy, K. V.
2004
- **Contribution of motor preparation and execution noise to goal-irrelevant movement variability.** *Soc. for Neurosci.*
Afshar, A., Churchland, M. M., Shenoy, K. V.
2004
- **Settling recurrent networks underlie motor planning in the primate brain.**
Churchland, M. M., Yu, B. M., Ryu, S. I., Santhanam, G., Shenoy, K. V.
2004
- **The speed at which reach movement plans can be decoded from the cortex and its implications for high performance neural prosthetic arm systems.**
Ryu, S. I., Santhanam, G., Yu, B. M., Shenoy, K. V.
2004
- **Role of movement preparation in movement generation.**
Churchland, M. M., Yu, B. M., Ryu, S. I., Santhanam, G., Afshar, A., Shenoy, K. V.
2004
- **Contribution of motor preparation and execution noise to goal-irrelevant movement variability.**
Afshar, A., Churchland, M. M., Shenoy, K. V.
2004
- **Reconstruction of arm trajectories from plan and peri-movement motor cortical activity.**
Kemere, C., Santhanam, G., Ryu, S. I., Yu, B. M., Meng, T. H., Shenoy, K. V.
2004
- **Improving neural prosthetic system performance by combining plan and peri-movement activity.** *Soc. for Neurosci.*
Yu, B. M., Ryu, S. I., Santhanam, G., Churchland, M. M., Shenoy, K. V.
2004
- **Changes in reaction time induced by microstimulation in PMd.** *Soc. for Neurosci.*
Shenoy, K. V., Churchland, M. M.
2004
- **Improving neural prosthetic system performance for a fixed number of neurons.**
Yu, B. M., Ryu, S., Churchland, M. M., Shenoy, K. V.
2004
- **High speed neural prosthetic icon positioning.** *Soc. for Neurosci.*
Ryu, S. I., Santhanam, G., Yu, B. M., Shenoy, K. V.
2004
- **Premotor cortex plan activity used to decode upcoming reach speed for high-performance neural prosthetic system design.**
Ryu, S. I., Yu, B. M., Churchland, M. M., Shenoy, K. V.
2004

- **High information transmission rates in a neural prosthetic system.** *Soc. for Neurosci.*
Santhanam, G., Ryu, S. I., Yu, B. M., Shenoy, K. V.
2004

- **Reconstruction of arm trajectories from plan and peri-movement motor cortical activity.** *Soc. for Neurosci.*
Kemere, C., Santhanam, G., Ryu, S. I., Yu, B. M., Meng, T. H., Shenoy, K. V.
2004

- **Local field potential measurement with low-power analog integrated circuit** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Harrison, R. R., Santhanam, G., Shenoy, K. V.
IEEE.2004: 4067–4070

- **Validation of adaptive threshold spike detector for neural recording** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Watkins, P. T., Santhanam, G., Shenoy, K. V., Harrison, R. R.
IEEE.2004: 4079–4082

- **Validation of adaptive threshold spike detector for neural recording.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Watkins, P. T., Santhanam, G., Shenoy, K. V., Harrison, R. R.
2004; 6: 4079-4082

- **Power feasibility of implantable digital spike-sorting circuits for neural prosthetic systems** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Zumsteg, Z. S., Ahmed, R. E., Santhanam, G., Shenoy, K. V., Meng, T. H.
IEEE.2004: 4237–4240

- **Improving neural prosthetic system performance by combining plan and peri-movement activity** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Yu, B. A., Ryu, S. I., Santhanam, G., Churchland, M. M., Shenoy, K. V.
IEEE.2004: 4516–4519

- **Model-based decoding of reaching movements for prosthetic systems** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Kemere, C., Santhanam, G., Yu, B. M., Ryu, S., Meng, T., Shenoy, K. V.
IEEE.2004: 4524–4528

- **Local field potential measurement with low-power analog integrated circuit.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Harrison, R. R., Santhanam, G., Shenoy, K. V.
2004; 6: 4067-4070

- **Model-based decoding of reaching movements for prosthetic systems.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Kemere, C., Santhanam, G., Yu, B. M., Ryu, S., Meng, T., Shenoy, K. V.
2004; 6: 4524-4528

- **Power feasibility of implantable digital spike-sorting circuits for neural prosthetic systems.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Zumsteg, Z. S., Ahmed, R. E., Santhanam, G., Shenoy, K. V., Meng, T. H.
2004; 6: 4237-4240

- **An extensible infrastructure for fully automated spike sorting during online experiments.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*
Santhanam, G., Sahani, M., Ryu, S., Shenoy, K.
2004; 6: 4380-4384

- **An extensible infrastructure for fully automated spike sorting during online experiments** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Santhanam, G., Sahani, M., Ryu, S. I., Shenoy, K. V.

IEEE.2004: 4380–4384

- **Neural prosthetic control signals from plan activity** *NEUROREPORT*
Shenoy, K. V., Meeker, D., Cao, S. Y., Kureshi, S. A., Pesaran, B., Buneo, C. A., Batista, A. R., Mitra, P. P., Burdick, J. W., Andersen, R. A.
2003; 14 (4): 591-596
- **Methods for estimating neural step sequences in neural prosthetic applications** *1st International IEEE/EMBS Conference on Neural Engineering*
Santhanam, G., Shenoy, K. V.
IEEE.2003: 344–347
- **Movement speed alters distance tuning of plan activity in monkey pre-motor cortex.** *Soc. for Neurosci.*
Churchland, M. M., Shenoy, K. V.
2003
- **Local field potential activity varies with reach distance, direction, and speed in monkey pre-motor cortex** *Soc. for Neurosci.*
G., Santhanam, Churchland, M. M., Sahani, M., Shenoy, K. V.
2003
- **Neural prosthetic control signals from plan activity.** *NeuroReport*
Shenoy, K. V., Meeker, D., Cao, S., Kureshi, S. A., Pesaran, B., Mitra, P.
2003; 14: 591-596.
- **Influence of movement speed on plan activity in monkey pre-motor cortex and implications for high-performance neural prosthetic system design** *25th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
Shenoy, K. V., Churchland, M. M., Santhanam, G., Yu, B. M., Ryu, S. I.
IEEE.2003: 1897–1900
- **Pursuit speed compensation in cortical area MSTd** *JOURNAL OF NEUROPHYSIOLOGY*
Shenoy, K. V., Crowell, J. A., Andersen, R. A.
2002; 88 (5): 2630-2647
- **Decoding of plan and peri-movement neural signals in prosthetic systems** *IEEE Workshop on Signal Processing Systems (SIPS 02)*
Kemere, C. T., Santhanam, G., Yu, B. M., Shenoy, K. V., Meng, T. H.
IEEE.2002: 276–283
- **Response of MSTd neurons to simulated 3D orientation of rotating planes** *JOURNAL OF NEUROPHYSIOLOGY*
Sugihara, H., Murakami, I., Shenoy, K. V., Andersen, R. A., Komatsu, H.
2002; 87 (1): 273-285
- **Pursuit-Speed Compensation in Cortical Area MSTd.** *Journal of Neurophysiology.*
Shenoy, K. V., Crowell, J., Andersen, R. A.
2002; 88: 2630-2647.
- **Response of MSTd neurons to simulated 3D-orientation of rotating planes.** *Journal of Neurophysiology*
Sugihara, H., Murakami, I., Shenoy, K. V., Andersen, R. A., Komatsu, H.
2002; 87: 273-285.
- **Cognitive control signals for prosthetic systems.** *Soc. For Neurosci.*
Meeker, D., Shenoy, K. V., Cao, S., Pesaran, B., Scherberger, H., Jarvis, M.
2001; 27
- **Neural mechanisms for self-motion perception in area MST.** *International review of neurobiology*
Andersen, R. A., Shenoy, K. V., Crowell, J. A., BRADLEY, D. C.
2000; 44: 219-233
- **Neural mechanisms for self-motion perception in area MST.** *International Review of Neurobiology*
Andersen, R. A., Shenoy, K. V., Crowell, J. A., Bradley, D. C.
Academic Press..2000: 219–233.
- **Toward Adaptive Control of Neural Prosthetics by Parietal Cortex.** *Neural Information and Coding Workshop.*
Meeker, D., Shenoy, K. V., Kureshi, S., Cao, S., Burdick, J., Pesaran, B.

2000

- **Influence of gaze rotation on the visual response of primate MSTd neurons** *JOURNAL OF NEUROPHYSIOLOGY*
Shenoy, K. V., BRADLEY, D. C., Andersen, R. A.
1999; 81 (6): 2764-2786
- **The contributions of vestibular signals to the representations of space in the posterior parietal cortex** *Conference on Otolith Function in Spatial Orientation and Movement - Symposium in Memory of Volker Henn*
Andersen, R. A., Shenoy, K. V., SNYDER, L. H., BRADLEY, D. C., Crowell, J. A.
NEW YORK ACAD SCIENCES.1999: 282-292
- **Toward prosthetic systems controlled by parietal cortex.** *Soc. For Neurosci.*
Shenoy, K. V., Kureshi, S. A., Meeker, D., Gillikin, B. L., Dubowitz, D. J., Batista, A. P.
1999
- **Influence of pursuit speed on the representation of heading in macaque MSTd.** *European Conf. on Visual Percep.*
Shenoy, K. V., Crowell, J. A., Andersen, R. A.
1999
- **Prior visual motion affects self-motion judgments during eye movements.** *OVS/ARVO*
Crowell, J. A., Shenoy, K. V., Andersen, R. A.
1999; 40
- **Influence of gaze rotation on the visual response of primate MSTd neurons.** *Journal of Neurophysiology*
Shenoy, K. V., Bradley, D. C., Andersen, R. A.
1999; 81: 2764-2786.
- **Visual self-motion perception during head turns** *NATURE NEUROSCIENCE*
Crowell, J. A., Banks, M. S., Shenoy, K. V., Andersen, R. A.
1998; 1 (8): 732-737
- **Selectivity of neurons to the 3D orientation of a rotating plane in area MSTd of the monkey.** *Soc. for Neurosci.*
Sugihara, H., Murakami, I., Komatsu, H., Shenoy, K. V., Andersen, R. A.
1998; 24
- **Retinal and extra-retinal motion signals both affect the extent of gaze-shift compensation.** *IOVS/ARVO*
Crowell, J. A., Maxwell, M. A., Shenoy, K. V., Andersen, R. A.
1998; 39
- **Neurons in area MSTd of the monkey have a selectivity to the 3D orientation of a rotating plane.** *Japan Soc. for Neurosci.*
Sugihara, H., Murakami, I., Komatsu, H., Shenoy, K. V., Andersen, R. A.
1998
- **The influence of pursuit speed upon the representation of heading in Macaque cortical area MSTd.** *for Neurosci. Abstracts:*
Shenoy, K. V., Crowell, J. A., Andersen, R. A.
1998; 24
- **Perception of heading is a brain in the neck.** *Nature Neuroscience*
Warren, W. H.
1998; 1: 647-649.
- **Visual self-motion perception during head turns.** *Nature Neuroscience*
Crowell, J. A., Banks, M. S., Shenoy, K. V., Andersen, R. A.
1998; 1: 732-737.
- **Perception and neural representation of heading during gaze-rotation.** *Soc. for Neurosci. Abstracts:*
Shenoy, K. V., Crowell, J. A., Bradley, D. C., Andersen, R. A.
1997; 23
- **Monolithic integration of SEEDs and VLSI GaAs circuits by epitaxy on electronics.** *EEE Photon. Technol. Lett.*
Wang, H., Luo, J., Shenoy, K. V., Fonstad, C. G., Psaltis, D.

1997; 9: 607-609.

- **Self-motion path perception during head and body rotations.** *IOVS/ARVO*
Crowell, J. A., Banks, M. S., Shenoy, K. V., Andersen, R. A.
1997; 38
- **Mechanisms of heading perception in primate visual cortex** *SCIENCE*
BRADLEY, D. C., Maxwell, M., Andersen, R. A., Banks, M. S., Shenoy, K. V.
1996; 273 (5281): 1544-1547
- **Neural mechanisms for heading and structure-from-motion perception** *61st Cold Spring Harbor Symposium on Function and Dysfunction in the Nervous System*
Andersen, R. A., BRADLEY, D. C., Shenoy, K. V.
COLD SPRING HARBOR LAB PRESS, PUBLICATIONS DEPT.1996: 15-25
- **Heading computation during pursuit eye movements in cortical area MSTd.** *Soc. for Neurosci. Abstracts:*
Bradley, D. C., Maxwell, M., Andersen, R. A., Banks, M. S., Shenoy, K. V.
1996; 22
- **Neural mechanisms for heading perception in primate visual cortex.** *Science*
Bradley, D. C., Maxwell, M., Andersen, R. A., Banks, M. S., Shenoy, K. V.
1996; 273: 1544-1547.
- **Heading computation during head movements in macaque cortical area MSTd.** *Soc. for Neurosci. Abstracts:*
Shenoy, K. V., Bradley, D. C., Andersen, R. A.
1996; 22
- **Neuroscience: Researchers find neurons that may help us navigate.** *Science*
Barinaga, M.
1996; 273: 1489-1490.
- **Elevated temperature stability of GaAs digital integrated circuits.** *IEEE Electron Device Lett.*
Braun, E. K., Shenoy, K. V., Fonstad, C. G., Mikkelsen, J. M.
1996; 17: 37-39.
- **Monolithic optoelectronic circuit design and fabrication by epitaxial growth on commercial VLSI GaAs MESFETs.** *IEEE Photon. Technol. Lett.*
Shenoy, K. V., Fonstad, C. G., Grot, A. C., Psaltis, D.
1995; 7: 508-510.
- **A technology for monolithic integration of high indium-fraction resonant tunneling diodes with commercial MESFET VLSI electronics.** *InP and Related Compounds.*
Aggarwal, R. J., Shenoy, K. V., Fonstad, C. G.
1995
- **Monolithic optoelectronic VLSI design and fabrication for optical interconnects.** *Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Ph.D. Thesis.*
Shenoy, K. V.
1995
- **Computation by symmetry operations in a highly structured model of the brain.** *Phys. Rev. E*
McGrann, J. V., Shaw, G. L., Shenoy, K. V., Matthews, R. B.
1994; 49: 5830-5839.
- **Learning and memory processes and the modularity of the brain.** *Neural Bases of Learning and Memory*
Leng, X., McGrann, J. V., Quillfeldt, J. A., Shaw, G. L., Shenoy, K. V.
edited by Delacour, J.
World Scientific Press..1994: 1
- **Integration of LEDs and GaAs circuits by MBE regrowth.** *IEEE Photon. Technol. Lett.*
Grot, A. C., Psaltis, D., Shenoy, K. V., Fonstad, C. G.
1994; 6: 819-821.

- **Comparison of Si/CMOS and GaAs MESFET technologies for analog optoelectronic circuits.**
Grot, A. C., Psaltis, D., Shenoy, K. V., Fonstad, C. G.
1994
- **Large scale integration of LEDs and GaAs circuits fabricated through MOSIS.** *ICO/OSA/SPIE/ LEOS International Conf. On Optical Computing.*
Grot, A. C., Psaltis, D., Shenoy, K. V., Fonstad, C. G.
1994
- **Application specific OEICs fabricated using GaAs IC foundry services.**
Fonstad Jr., C. G., Shenoy, K. V.
1994
- **High temperature stability of refractory-metal VLSI GaAs MESFETs.** *IEEE Electron Device Lett.*
Shenoy, K. V., Fonstad, C. G., Mikkelsen, J. M.
1994; 15: 106-108.
- **GaAs optoelectronic winner-take-all circuit.**
Grot, A. C., Psaltis, D., Shenoy, K. V., Fonstad, C. G.
1994
- **Lowered temperature MBE regrowth of LED structures on high density GaAs circuits fabricated through MOSIS.**
Grot, A. C., Psaltis, D., Shenoy, K. V., Fonstad, C. G.
1993
- **Optoelectronic VLSI circuit fabrication.**
Shenoy, K. V., Nuytkens, P., Fonstad, C. G., Johnson, G. D., Goodhue, W. D., Donnelly, J.
1993
- **MBE regrowth of LEDs on VLSI GaAs MESFETs.**
Shenoy, K. V., Fonstad, C. G., Grot, A. C., Psaltis, D.
1993
- **Learning by selection in the Trion model of cortical organization.** *Cerebral Cortex*
Shenoy, K. V., Kaufman, J., McGrann, J. V., Shaw, G. L.
1993; 3: 239-248.
- **GaAs optoelectronic neuron circuits fabricated through MOSIS.**
Grot, A. C., Psaltis, D., Shenoy, K. V., Fonstad, C. G.
1993
- **Laser diodes and refractory-metal gate VLSI GaAs MESFETs for smart pixels.**
Shenoy, K. V., Fonstad, C. G., Elman, B., Crawford, F. D., Mikkelsen, J. M.
1992
- **Selectional learning in the Trion model of cortical organization.**
Shenoy, K. V., Kaufman, J., McGrann, J., Shaw, G. L.
1989
- **Rotational invariance in the Trion model of cortical organization.**
McGrann, J. V., Shenoy, K. V., Shaw, G.
1989