Curriculum Vitae

STEVEN M. CHASE

115N Mellon Institute • Carnegie Mellon University • 4400 Fifth Avenue • Pittsburgh, PA 15213
schase@cmu.edu • (412) 268-5512
www.cnbc.cmu.edu/~schase

EDUCATION

Ph.D.	Biomedical Engineering	Johns Hopkins University	2006
M.S.	Electrical Engineering	University of California, Berkeley	1999
B.S. *(with honors)*	Applied Physics	California Institute of Technology	1997

ACADEMIC POSITIONS

Associate Professor   **Carnegie Mellon University**   2017-current
CIT Dean's Early Career Fellow

  Neuroscience Institute and Department of Biomedical Engineering
  Courtesy Appointments: Robotics Institute, Electrical & Computer Engineering
Assistant Professor   2011-2017

Visiting Research Scholar   **University of Pittsburgh**   2010-2011
  Department of Neurobiology

Post-doctoral Research Associate   **Carnegie Mellon University**   2006-2010
  Department of Statistics
    Jointly mentored by:
      Dr. Robert E. Kass, Dept. of Statistics, Carnegie Mellon University, and
      Dr. Andrew B. Schwartz, Dept. of Neurobiology, University of Pittsburgh

HONORS AND PROFESSIONAL ACHIEVEMENTS

CIT Dean's Early Career Fellowship	2017
NSF CAREER Award	2016
Wimmer Faculty Fellowship	2013
Individual National Research Service Award, NIH grant DC05742	2002
California Fellowship in Microelectronics	1997
Caltech Merit Scholarship	1996
Caltech Summer Undergraduate Research Fellowships (3)	1994-1996

FUNDING

Current

NIH (2R01-HD071686)   PIs: Chase, Yu, Batista   Total Amount: $2,181,120
Shaping neural population dynamics to facilitate learning
Duration: 4/21/2017-4/20/2022

NSF (IOS1553252) - **CAREER Award**   PI   Total Amount: $800,000
CAREER: Neural mechanisms of skill learning
Duration: 9/1/2016-8/31/2021

NSF (BCS1533672) - **Brain-Initiative Grant**   PI   Total Amount: $868,950
NCS-FO: The structure of neural variability during motor learning
Duration: 9/1/2015-8/31/2019

PA Dept of Health Research Formula Grant   PI   Total Amount: $300,000
Predicting short time scale neural reorganization during learning
Duration: 1/1/2017-12/31/2019

NIH (U01-NS108922)   Co-I (PI: Collinger)   Total Amount: $1,182,379
Context dependent processing in sensorimotor cortex
Duration: 9/1/2018-8/31/2020

Completed

NSF (IIS1650994)   Co-I (PI: Wactler)   Total Amount: $300,000
EAGER: Controlling a robotic third hand - exploring use of distributed intelligence from autonomy to brain machine interfaces for augmenting human capability
Duration: 8/15/2016-7/31/2018

Curci Foundation   PIs: Chase, Gittis, Kuhlman   Total Amount: $250,000
Computational and biological approaches to delineate the neural circuitry of learning
Duration: 3/1/2017-2/28/2018

NIH (R01-HD071686)   Co-I (PIs: Yu & Batista)   Total Amount: $1,575,000
Dissecting brain-computer interfaces: a manifold & feedback-control approach
Duration: 9/1/2011-6/1/2017 (NCE)

DARPA   Co-I (PI: Collinger)   Total Amount: $39,343
Neural control of dexterous manipulation and translation to a portable system   (Chase-lab portion)
Duration: 9/1/2016-8/31/2017

IARPA   Co-I (PI: Lee)   Total Amount: $49,674
MICrONS: Visual cortical neural circuits for compositional learning and inference   (Chase-lab portion)
Duration: 1/15/2016-7/15/2017

Curci Foundation   PIs: Chase, Gittis, Kuhlman   Total Amount: $200,000
Computational and biological approaches to delineate the neural circuitry of learning
Duration: 3/1/2016-2/28/2017

Craig H. Neilsen Foundation   PIs: Chase, Yu   Total Amount: $289,651
A self-recalibrating brain-computer interface
Duration: 1/1/2014-6/30/2016

Curci Foundation   PIs: Chase, Gittis, Kuhlman   Total Amount: $200,000
Computational and biological approaches to delineate the neural circuitry of learning
Duration: 3/1/2015-2/29/2016

CMU ProSEED Grant   PIs: Chase, Gittis, Kuhlman   Total Amount: $50,000
Computational and biological approaches to delineate the neural circuitry of learning
Duration: 1/1/2015-12/31/2015

DARPA   PIs: Chase, Schwartz, Fedder, Cui   Total Amount: $273,527
Reliable cortical interfaces   (Chase-lab portion)
Duration: 3/1/2012-12/31/2012

PA Dept of Health Research Formula Grant   PI   Total Amount: $733,494
Correlated structure in motor cortical populations
Duration: 1/1/2012-12/31/2015

INTELLECTUAL PROPERTY

1. Disclosure (invention): Yu BM, Bishop W, Degenhart A, Oby ER, **Chase SM**, and Batista AP (2018). A stabilized brain-computer interface based on neural manifold alignment. Provisional U.S. Patent Application No. 62/763,874.

2. Disclosure (source code): Golub MD, **Chase SM**, and Yu BM (2017). Matlab code for internal model estimation.
    Code publically available at (https://github.com/mattgolub/internal_model_estimation).

3. Disclosure (invention): Sharma A, Nguyen K, **Chase SM**, and Gittis A (2016). A split-wheel treadmill system for rodents. Provisional U.S. Patent Application No. 62/496,572.

4. Patent: **Chase SM**, Chang-Hasnain CJ, and Waite JM (2004). Apparatus and method for controlled cantilever motion through torsional beams and a counterweight. US Patent #6,813,053 B1

PUBLICATIONS

Peer Reviewed Journal Articles

1. [+]Degenhart AD, [+]Bishop WE, Oby ER, Tyler-Kabara EC, ***Chase SM**, *Batista AP, *Yu BM (*in press*) A stabilized brain-computer interface based on neural manifold alignment. Nature BME.

2. Oby ER, Golub MD, Hennig JA, Degenhart AD, Tyler-Kabara EC, *Yu BM, ***Chase SM**, *Batista AP (2019) New neural activity patterns emerge with long-term learning. PNAS. 116:15210-15215.
    [Subject of a PNAS commentary.]

3. Zhou X, Tien R, Ravikumar S, and **Chase SM** (2019) Distinct types of neural reorganization during long-term learning. J Neurophysiol. 121:1329-1341.

* Denotes equal contribution.

[Received APS*select* award. Subject of a JNP Podcast.]

4. Jeon B, Swain A, Good J, **Chase SM,** and Kuhlman SJ (2018) Feature selectivity is stable in primary visual cortex across a range of spatial frequencies. Sci Rep. 8:15288.

5. Hennig JA, Golub MD, Lund PJ, Sadtler PT, Oby ER, Quick KM, Ryu SI, Tyler-Kabara EC, *Batista AP, *Yu BM, ***Chase SM** (2018) Constraints on neural redundancy. eLife 7:e36774. [Subject of a Trends in Cognitive Sciences Spotlight. Recommended by Faculty of 1000.]

6. Downey J, Schwed N, **Chase SM,** Schwartz AB, and Collinger J (2018) Intracortical recording stability in human brain-computer interface users. J Neural Eng. 15:046016.

7. Golub MD, Sadtler PT, Oby ER, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, ***Chase SM,** and *Yu BM (2018). Learning by neural reassociation. Nature Neurosci. 21:607-616. [Subject of a News & Views review. Recommended by Faculty of 1000.]

8. Zhang Y and **Chase SM** (2018). Optimizing the usability of brain computer interfaces. Neural Comp. 22:1-36.

9. Bittner SR, Williamson RC, Snyder AC, Litwin-Kumar A, Doiron B, ***Chase SM,** *Smith MA, and *Yu BM (2017). Population activity structure of excitatory and inhibitory neurons. PLoS One 12(8): e0181773.

10. Suway SB, Orellana J, McMorland AJC, Fraser GW, Liu Z, Velliste M, **Chase SM,** Kass RE, and Schwartz AB (2017). Temporally segmented directionality in the motor cortex. Cerebral Cortex 7:1-14.

11. Rasmussen RG, Schwartz AB, and **Chase SM** (2017). Dynamic range adaptation in primary motor cortical populations. eLife 2017;6:e21409.

12. Oby ER, Perel S, Sadtler PT, Ruff DA, Mischel JL, Montez DF, Cohen MR, *Batista AP, and ***Chase SM** (2016). Extracellular voltage threshold settings can be tuned for optimal encoding of movement and stimulus parameters. J Neural Eng. 13:036009.

13. Golub MD, *Yu BM, and ***Chase SM** (2015). Internal models for interpreting neural population activity during sensorimotor control. eLife 10.7554/eLife.10015. [Recommended by Faculty of 1000.]

14. Zhang Y and **Chase SM** (2015) Recasting brain-machine interface design from a physical control system perspective. Review. J Comp Neurosci. 39:107-118.

15. Perel S, Sadtler PT, Oby ER, Ryu SI, Tyler-Kabara EC, *Batista AP, and ***Chase SM** (2015). Single-unit activity, threshold crossings and local field potentials in motor cortex differentially encode reach kinematics. J Neurophysiol. 114: 1500-1512.

16. Kozai T, Du Z, Gugel Z, Smith MA, **Chase SM,** Bodily LM, Caparosa EM, Friedlander RM, Cui XT (2015) Comprehensive chronic laminar single-unit, multi-unit, and local field potential recording performance with planar single shank electrode arrays. J Neurosci Meth. 242C:15-40.

17. Sadtler PT, Quick KM, Golub MD, **Chase SM,** Ryu SI, Tyler-Kabara EC, *Yu BM, and *Batista AP (2014). Neural constraints on learning. Nature. 512:423-426. [Cover feature and subject of a research highlight. Recommended by Faculty of 1000.]

18. Todorova S, Sadtler PT, Batista AP, **Chase SM,** and Ventura V (2014). To sort or not to sort: the impact of spike-sorting on neural decoding performance. J Neural Eng. 11:056005.

19. Golub MD, Yu BM, Schwartz AB, and **Chase SM** (2014). Motor-cortical control of movement speed with implications for brain-machine interface control. J Neurophysiol. 112:411-429.

20. **Chase SM,** Kass RE, and Schwartz AB (2012) Behavioral and neural correlates of visuomotor adaptation observed through a brain-computer interface in primary motor cortex. J Neurophysiol. 108:624-644.

21. **Chase SM,** Schwartz AB, and Kass RE (2010) Latent inputs improve estimates of neural encoding in motor cortex. J Neurosci. 30:13873-13882.

22. Legenstein R, **Chase SM**, Schwartz AB, and Maass W (2010) A reward-modulated Hebbian learning rule can explain experimentally observed network reorganization in a brain control task. J Neurosci 30:8400-8410.

23. Koyama S, **Chase SM**, Whitford A, Velliste M, Schwartz AB, and Kass RE (2010) Comparison between decoding algorithms in open-loop and closed-loop performance. J Comp Neurosci 29:73-87.

24. Legenstein R, **Chase SM**, Schwartz AB, and Maass W (2009) Functional network reorganization in motor cortex can be explained by reward-modulated Hebbian learning. In: Advances in Neural Information Processing Systems 22.

25. **Chase SM,** Schwartz AB, and Kass RE (2009) Bias, optimal linear estimation, and the differences between open-loop simulation and closed-loop performance of brain-computer interface algorithms. Neural Networks 22:1203-1213.

26. Fraser GW, **Chase SM**, Whitford A, and Schwartz AB (2009) Control of a brain-computer interface without spike sorting. J Neural Eng 6:055004.

27. *Jarosiewicz B, ***Chase SM**, Fraser GW, Velliste M, Kass RE, and Schwartz AB (2008) Functional network reorganization during learning in a brain-computer interface paradigm. PNAS 105:19486-19491.
[Recommended by Faculty of 1000.]

28. **Chase SM** and Young ED (2008) Cues for sound localization are encoded in different aspects of spike trains in the inferior colliculus. J Neurophysiol 99:1672-1682.

29. **Chase SM** and Young ED (2007) First-spike latency information in single neurons increases when referenced to population onset. PNAS 104:5175-5180.

30. **Chase SM** and Young ED (2006) Spike-timing codes enhance the representation of multiple simultaneous sound-localization cues in the inferior colliculus. J Neurosci 26:3889-3898.
[Recommended by Faculty of 1000.]

31. **Chase SM** and Young ED (2005) Limited segregation of different types of sound localization information among classes of units in the inferior colliculus. J Neurosci 25:7575-7585.
[Recommended by Faculty of 1000.]

Peer Reviewed Conference Papers

32. Zhang Y and **Chase SM** (2016) A control-theoretic approach to brain-computer interface design. American Control Conference (ACC) 2016:5765-5771.

33. Zhang Y and **Chase SM** (2013) A stabilized dual Kalman filter for adaptive tracking of brain-computer interface decoding parameters. Proc 35th Annual Conf IEEE EMBS 7100-7103.

34. Perel S, Sadtler PT, Godlove JM, Ryu SI, Wang W, Batista AP, and **Chase SM** (2013) Direction and speed tuning of motor-cortex multi-unit activity and local field potentials during reaching movements. Proc 35th Annual Conf IEEE EMBS 299-392.

35. Golub MD, ***Chase SM**, *Yu BM (2013) Learning an Internal Dynamics Model from Control Demonstration. JMLR Workshop & Conference Proceedings 28:606-614.

36. Golub MD, *Yu BM, and ***Chase SM** (2012) Internal models engaged by brain-computer interface control. Proc 34th Annual Conf IEEE EMBS 1327-1330.

37. Zhang Y, Schwartz AB, **Chase SM**, and Kass RE (2012) Bayesian learning in assisted brain-computer interface tasks. Proc 34th Annual Conf IEEE EMBS 2740-2743.
[Finalist, student paper competition.]

Reviews, Book Chapters & Invited Commentaries

38. Huggins JE, Guger C, Ziat M, Zander TO, Taylor D, Tangermann M, Soria-Frisch A, Simeral J, Scherer R, Rupp R, Ruffini G, Robinson DKR, Ramsey NF, Nijholt A, Müller-Putz G, McFarland DJ, Mattia D, Lance BJ, Kindermans PJ, Iturrate I, Herff C, Gupta D, Do AH, Collinger JL, Chavarriaga R, **Chase SM**, Bleichner MG, Batista A, Anderson CW, Aarnoutse EJ (2017) Workshops of the sixth international brain-computer interface meeting: brain-computer interfaces past, present, and future. Brain-Computer Interfaces 4:3-36.

39. Golub MD, **Chase SM**, Batista AP, and Yu BM (2016) Brain-computer interfaces for dissecting cognitive processes underlying sensorimotor control. Curr Opin Neurobio 37:53-58.

40. *Yu BM and ***Chase SM** (2014) Shedding light on learning. Nature Neurosci. 17:746-747. *Commissioned commentary (News and Views) on "Voltional modulation of optically recorded calcium signals during neuroprosthetic learning" by Clancy et al., Nature Neurosci. 17:807-809.*

41. **Chase SM** (2012) Single spikes may suffice. J Neurophysiol. 108:1809-1809. *Commissioned commentary (Editorial Focus) on "Comparison of latency and rate coding for the direction of whisker deflection in the subcortical somatosensory pathway" by Storchi et al., J. Neurophysiol. 108:1810-1821.*

42. **Chase SM** and Schwartz AB (2011) Inference from populations: going beyond models. In: Enhancing performance for Action and Perception, Progress in Brain Research Volume 192:103-112 (Green AC, Chapman, E, Kalaska JF, & Lepore F, eds).

43. Guger C, Bin G, Gao X, Guo J, Hong B, Liu T, Gao S, Guan C, Ang KK, Phua KS, Wang C, Chin ZY, Zhang H, Lin R, Chua KSG, Kuah C, Ang BT, George H, Kübler A, Halder S, Hösle A, Münßinger J, Palatucci M, Pomerleau D, Hinton G, Mitchell T, Ryan DB, Sellers EW, Townsend G, **Chase SM**, Whitford AS, Schwartz AB, Kawashima K, Shindo K, Ushiba J, Liu M and Schalk G (2011) State of the art in BCI research: BCI award 2010. In: Recent Advances in Brain-Computer Interfaces (Fazel R, ed).

Reviews & Interviews About My Work

1. Pryluk R and Paz R (2019) Learning outside the box. PNAS. 116:15316-15318.
[Commentary on Oby et al., PNAS, 2019]

2. Yates B (2019) Distinct types of neural reorganization during long-term learning. JNP Podcasts, released 22 May 2019. https://jneurophysiol.podbean.com/e/distinct-types-of-neural-reorganization-during-long-term-learning/.

[Spotlight on Zhou et al., J Neurophysiol. 2019]

3. Kalaska J (2019) F1000Prime Recommendation of [Hennig JA et al., elife 2018 7]. In F1000Prime, 22 May 2019; 10.3410/f.733821237.793560118.

4. Kalaska J (2019) F1000Prime Recommendation of [Golub MD et al., Nat Neurosci 2018 21(4):607-616]. In F1000Prime, 22 May 2019; 10.3410/f.732828264.793560117.

5. Kalaska J (2019) F1000Prime Recommendation of [Sadtler PT et al., Nature 2014 512(7515):423-426]. In F1000Prime, 22 May 2019; 10.3410/f.718546237.793560114.

6. Kao TC and Hennequin G (2018) Null ain't dull: new perspectives on motor cortex. Trends in Cognitive Sciences. 22:1069-1071.
    [Spotlight on Hennig et al., eLife, 2018]

7. Galgali AR and Mante V (2018) Set in one's thoughts. Nature Neurosci 21:459-460.
    [Review of Golub et al., Nature Neurosci, 2018]

8. Destexhe A and Kumar A (2017) F1000Prime Recommendation of [Golub MD et al., elife 2015 4]. In F1000Prime, 12 Apr 2017; 10.3410/f.726000531.793530347.

9. Whalley K (2014) Learning and memory: Putting limits on learning. Nature Reviews Neuroscience 15:631.
    [Review of Sadtler et al., Nature, 2014]

10. Frank M (2014) F1000Prime Recommendation of [Sadtler PT et al., Nature 2014 512(7515):423-426]. In F1000Prime, 01 Sep 2014; 10.3410/f.718546237.793499190.

11. Upson, S (2014) Cyborg confidential. SA Mind 25(6):30-35.

12. Fetz E and Richardson A (2009) F1000Prime Recommendation of [Jarosiewicz B et al., Proc Natl Acad Sci USA 2008 105(49):19486-19491]. In F1000Prime, 30 Mar 2009; 10.3410/f.1158542.618726.

13. King A (2006) F1000Prime Recommendation of [Chase SM and Young ED, J Neurosci 2006 26(15):3889-3898]. In F1000Prime, 27 Apr 2006; 10.3410/f.1011522.371004.

14. Middlebrooks J (2005) F1000Prime Recommendation of [Chase SM and Young ED, J Neurosci 2005 25(33):7575-7585]. In F1000Prime, 25 Aug 2005; 10.3410/f.1027578.331641.

DISSERTATIONS AND THESES

Zhang Y (2018) Provably optimal design of a brain-computer interface. PhD Dissertation, Robotics Institute, Carnegie Mellon University.

Ravikumar S (2017) Tracking chronically recorded neurons using pairwise cross-correlograms. MS Thesis, Biomedical Engineering, Carnegie Mellon University.

Sharma A (2017) Design of a split-running wheel for studies of locomotor learning. MS Thesis, Biomedical Engineering, Carnegie Mellon University. (co-advised by Aryn Gittis)

Jeon B (2016) Design and testing of a closed-loop brain-computer interface system for operation by a mouse. MS Thesis, Biomedical Engineering, Carnegie Mellon University. (co-advised by Sandra Kuhlman)

Golub MD (2015) Interpreting neural population activity during feedback motor control. PhD Dissertation, Electrical and Computer Engineering, Carnegie Mellon University. (co-advised by Byron Yu)

Lund P (2014) Predicting high-dimensional neural activity patterns during brain-computer interface control. MS Thesis, Machine Learning, Carnegie Mellon University. (co-advised by Byron Yu)

Zhao Y (2014) An extended latent Kalman filter for nuisance variable removal in brain-computer interface decoding applications. MS Thesis, Biomedical Engineering, Carnegie Mellon University.

Chase SM (2006) The representation of sound localization information among neural populations in the inferior colliculus. PhD Dissertation, Biomedical Engineering, Johns Hopkins University. (Advisor: ED Young)

Chase SM (1999) A micromechanical red-shifting tunable vertical cavity filter. MS Thesis, Electrical Engineering, University of California, Berkeley. (Advisor: CJ Chang-Hasnain)

TEACHING

Classes

42-101	FCEs: 65 enrolled, 32 responders, 0 audit	Spring 2019
Introduction to BME (12 units)	Instructor: 3.8/5.0, Course: 3.7/5.0	
86-631/42-631	FCEs: 28 enrolled, 21 responders, 1 audit	Fall 2018
Neural Data Analysis (9 units)	Instructor: 4.7/5.0, Course: 4.7/5.0	
42-101	FCEs: 59 enrolled, 48 responders, 0 audit	Spring 2018
Introduction to BME (12 units)	Instructor: 4.1/5.0, Course: 4.0/5.0	
86-631/42-631	FCEs: 28 enrolled, 21 responders, 1 audit	Fall 2017
Neural Data Analysis (9 units)	Instructor: 4.7/5.0, Course: 4.8/5.0	
86-631/42-631	FCEs: 22 enrolled, 21 responders, 2 audit	Fall 2016
Neural Data Analysis (9 units)	Instructor: 4.7/5.0, Course: 4.6/5.0	
42-101	FCEs: 54 enrolled, 37 responders, 0 audit	Fall 2015
Introduction to BME (12 units)	Instructor: 4.1/5.0, Course: 4.0/5.0	
86-631/42-631	FCEs: 17 enrolled, 13 responders, 0 audit	Fall 2015
Neural Data Analysis (9 units)	Instructor: 4.8/5.0, Course: 4.7/5.0	
42-101	FCEs: 76 enrolled, 52 responders, 0 audit	Spring 2015
Introduction to BME (12 units)	Instructor: 4.3/5.0, Course: 4.1/5.0	
86-631/42-631	FCEs: 19 enrolled, 17 responders, 1 audit	Fall 2014
Neural Data Analysis (9 units)	Instructor: 4.8/5.0, Course: 4.8/5.0	
42-101 (co-taught w/Newell Washburn)	FCEs: 55 enrolled, 30 responders, 0 audit	Fall 2013
Introduction to BME (12 units)	Instructor: 3.9/5.0, Course: 3.8/5.0	
86-631/42-631	FCEs: 19 enrolled, 15 responders, 3 audit	Fall 2013
Neural Data Analysis (9 units)	Instructor: 4.8/5.0, Course: 4.7/5.0	
86-601	FCEs: 3 enrolled, 2 responders, 2 audit	Spring 2013
Topics in Motor Control (3 units)	Instructor: 5.0/5.0, Course: 4.5/5.0	
42-699B/86-595	FCEs: 14 enrolled, 14 responders, 1 audit	Fall 2012
Neural Data Analysis (9 units)	Instructor: 4.9/5.0, Course: 4.7/5.0	

86-595/42-595	FCEs: 5 enrolled, 5 responders, 2 audit	Spring 2012
Neural Data Analysis (12 units)	Instructor: 4.8/5.0, Course: 4.8/5.0	

Guest Lectures

1. uPNC Summer Seminar Series — Summer 2019
2. 03-161: Molecules to Mind — Spring 2019
3. 42-630: Introduction to neuroscience for engineers — Spring 2019
4. 85-382/18-782: The psychology and neuroscience of consciousness — Spring 2019
5. NEUS 627 / BEHN 640 (Oregon Health and Science University): Systems Neuroscience — Fall 2018
6. 42-101: Introduction to BME — Fall 2018
7. uPNC Summer Seminar Series — Summer 2018
8. NEUS 627 / BEHN 640 (Oregon Health and Science University): Systems Neuroscience — Fall 2017
9. 42-447: Rehabilitation Engineering — Fall 2017
10. 42-101: Introduction to BME — Fall 2017
11. uPNC Summer Seminar Series — Summer 2017
12. 42-101: Introduction to BME — Spring 2017
13. 42-201: Professional Issues in BME — Spring 2017
14. 42-201: Professional Issues in BME — Fall 2016
15. 42-101: Introduction to BME — Fall 2016
16. uPNC Summer Seminar Series — Summer 2016
17. 42-630: Introduction to Neuroscience for Engineers — Spring 2016
18. 42-201: Professional Issues in BME — Spring 2016
19. 42-101: Introduction to BME — Spring 2016
20. uPNC Summer Seminar Series — Summer 2015
21. 03-161: Molecules to Mind — Spring 2015
22. 42-201: Professional Issues in BME — Spring 2015
23. 42-101: Introduction to BME — Fall 2014
24. 42-632: Neural Signal Processing — Spring 2014
25. 80-270: Philosophy of Mind — Spring 2014
26. 15-386/15-686: Neural Computation — Spring 2014(2)
27. 15-386/15-686: Neural Computation — Spring 2014(1)
28. 18-819: Neural Technology, Sensing and Stimulation — Fall 2013
29. uPNC Summer Seminar Series — Summer 2013
30. 36-759: Statistical Models of the Brain — Spring 2013
31. 42-201: Professional Issues in BME — Spring 2013
32. uPNC Summer Seminar Series — Summer 2012
33. 42-201: Professional Issues in BME — Spring 2012
34. 15-386/15-686: Neural Computation — Spring 2012
35. 18-101: Introduction to Electrical and Computer Engineering — Fall 2012
36. 42-101: Introduction to BME — Spring 2012
37. BIOEN 2696 (Pitt): Control theory in neuroscience — Spring 2012
38. BIOEN 2800 (Pitt): Neurotechnology — Spring 2012
39. 86-375/86-675: Computational Perception — Spring 2012
40. uPNC Summer Seminar Series — Summer 2011
41. 15-386/15-686: Neural Computation — Spring 2011
42. 15-386/15-686: Neural Computation — Spring 2010

43. MSNBIO 2632 (Pitt): Advanced Neurophysiology   Spring 2007

PROFESSIONAL SERVICE

Co-Director, Program in Neural Computation

Editorial & External committee service

Inaugural Editor, Neurons Behavior Data Analysis and Theory, 2018 – current.

Inaugural Editor, Concepts in Computational Neuroscience, 2018 – current.

Program Committee, Cosyne 2018 – current.

Program Committee, Translational and Computational Motor Control Workshop, 2015 – current.

Guest editor, PLoS Comp Bio, 2015-2016.

Workshop organization

Co-organizer: BME track of the Machine Learning in Science and Engineering Conference, Atlanta, GA, June 2019.

Organizer: CMU/Pitt Neuro-Learning Workshop, Pittsburgh, PA, June 2018.

Session chair: Neuroinformatics session, Machine Learning in Science and Engineering 2018.

Session organizer: "Methods: How do you find a manifold, and what do you do when you've found one?" M5: Midwest Monkey Manifolds for Movement Meeting, May 2018.

BCI 2016 Workshop organizer: "Algorithms and performance using implanted devices."

BCI 2016 Workshop organizer, "Studying learning with brain-computer interfaces."

Organizer: CNBC retreat. Nov 2012 & Oct 2013.

Organizer: Biosignals Day Symposium, "Power in numbers: How many neurons are needed to…?" Feb 2012.

Session co-chair: Platform session on neural computation & statistical analysis of neural data, BMES 2009.

Review activities

Grant review: NSF NeuroNex panel, 2019.

Grant review: NIH SPC review panel, 2018.

Grant review: NSF CISS-IIS review panel, 2018.

Grant review: Singapore Ministry of Education, 2018.

Grant review: FNRS (Fonds de la Recherche Scientifique, Belgium), 2018 (once) & 2017 (twice).

Grant review: NSF BIO-IOS review panel, 2016.

Grant review: Department of Defense Peer Reviewed Medical Research Program (PRMRP), 2015.

Ad-hoc reviewer for: American Controls Conference, Biological Cybernetics, Cerebral Cortex, Computational Methods and Programs in Biomedicine, Current Biology, Current Opinions in Neurobiology, eLife, Frontiers in Neuroscience, IEEE Engineering in Medicine and Biology Society, IEEE Signal Processing Letters, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Neural Systems and Rehabilitation Engineering, Journal of the Association for

Research in Otolaryngology, Journal of Neural Engineering, Journal of Neurophysiology, Journal of Neuroscience, Journal of Neuroscience Methods, Nature, Nature Biomedical Engineering, Nature Communications, Nature Medicine, Nature Neuroscience, Neural Computation, Neurobiology of Disease, Neuroinformatics, Neuroscience, Neuron, PLOS Computational Biology, PLOS One, PNAS, Science, Science and Translational Medicine, and Scientific Reports.

Scientific Societies

Founding Member: BCI Society.
Member: AAAS, APS, SfN, NCM.

Internal leadership & committee roles

Chair, Graduate affairs committee, Program in Neural Computation, 2016-current.
CNBC Executive committee, 2011-current.
Graduate affairs committee, BME, 2011-current.
Neuroscience undergraduate education committee, 2017-current.
BME search committee, 2018-current.
CNBC/Biological sciences search committee, 2018-current.
Carnegie Mellon Neuroscience Institute planning committee, 2018.
Graduate affairs committee, Program in Neural Computation, 2013-2016.
BrainHub engineering search committee, 2015.
BME search committee, 2014-2015.

OUTREACH

Media Mentions

12/2018   Quoted by Reuters: Rapaport L "Brain implants might one day help paralyzed patients use tablets."

07/2018   FutureTech podcast: Jacobs R "Mind Control – Steven Chase and Byron Yu, Professors of Biomedical Engineering, Carnegie Mellon University – Computer brain interfaces that could allow control of body movement through thought."

04/2018   Quoted in Wareable: Caddy B "Beyond sci-fi: Building the bioic body."

03/2018   Davis K "When Learning A New Task, Our Brains Are Less Flexible Than We Thought." WESA (Pittsburgh's NPR station).

03/2018   Rennie J "Brain clings to old habits when learning new tricks." Quanta Magazine.

02/2018   Quoted in the Brown Daily Herald, "University study improves interfaces between brain, computers."

05/2017   Quoted in WIRED, "Want a true bionic limb? Good luck without machine learning."

04/2017   Contributed an 'Expert Views' piece to an article published by AXIOS, "When computers merge with our minds."

02/2016   Templeton D "CMU study explores why we make mistakes," Pittsburgh Post-Gazette.

12/2015   Press release about my work "Researchers gain understanding of why the brain makes mistakes," picked up by MedicalXpress (and shared by Neuroscience News, Science Beta, and DeepStuff.org).

07/2013   Interview, IGN (an online news service)

External Outreach

08/2018   Science Briefing, Congressman Keith Rothfus
03/2017   Judge, Pittsburgh Regional Science & Engineering Fair
10/2016   Speaker, Society of Women Engineers high school outreach day
08/2016   Speaker, Andrew Carnegie Society
02/2016   Instructor, OSHER lifelong learning course
05/2015   Science Briefing, Heinz Foundation
03/2014   Science Briefing, Congressman Chaka Fattah
03/2014   Judge, Pittsburgh Regional Science & Engineering Fair
03/2013   Science Briefing, Hillman Foundation
10/2012   Science Briefing, Hillman Foundation

Internal Outreach / Mentorship

05/2018   Panelist, NSF CAREER writing workshop
09/2017   Panelist, Young Investigator Grants information session
08/2017   Panelist, Work/Life Balance workshop
05/2017   Panelist, NSF CAREER writing workshop 04/2014Panelist, CNBC Panel, "Graduate Academic Job Sear
06/2013   Mentor, CNBC Data Blitz
05/2012   Panelist, GBMES Panel, "Discussions at the Interface of Nature & Technology"

PRESENTATIONS

Invited Talks

1. 2019. Action Club, Northeastern, Boston, MA. "Dissecting learning processes with brain-computer interfaces."
2. 2019. Cedars-Sinai, Los Angeles, CA. "Brain-computer interfaces for dissecting motor learning."
3. 2019. Machine Learning in Science and Engineering, Altanta, GA. "A stabilized brain-computer interface based on neural manifold alignment."
4. 2019. Sungkyunkwan University, Suwon, South Korea. "Neural manifolds: from basic science to practical improvements in brain-computer interfaces."
5. 2019. IEEE 2019 Winter BCI Conference, High 1 Resort, South Korea. "Neural manifolds: from basic science to practical improvements in brain-computer interfaces."

6. 2018. Oregon Health & Science University, Portland, OR. Invited to give two classroom lectures on motor system function and brain-machine interfaces.

7. 2018. CMU/Pitt Neuro-Learning Workshop, Pittsburgh, PA. "Dissecting the neural mechanisms of learning with brain-computer interfaces."

8. 2018. Machine Learning in Science and Engineering, Pittsburgh, PA. "Using machine learning to understand biological learning."

9. 2018. Neural control of movement panel, Sante Fe, NM. "BCI learning: fast and slow."

10. 2017. Oregon Health & Science University, Portland, OR. Invited to give two classroom lectures on motor system function and brain-machine interfaces.

11. 2017. TEDxCMU Pittsburgh, PA. "The limits of learnability."

12. 2016. UPMC Enterprises, Pittsburgh, PA. "State-of-the-art in intracortical brain-computer interfaces."

13. 2016. Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA. "Cognitive factors that shape neural prosthetic control."

14. 2016. Department of Biomedical Engineering, University of Rochester, Rochester, NY. "Cognitive factors in neural prosthetic control."

15. 2016. American control conference panel, Boston, MA. "A control-theoretic approach to brain-computer interface design."

16. 2015. International Neuropsychological Symposium, Collioure, France. "Internal conceptions of external systems."

17. 2015. Center for Neural Engineering Prostheses and Redwood Center for Theoretical Neuroscience, UC Berkeley, Berkeley, CA. "Internal models for interpreting neural population activity."

18. 2014. SASP-SSP Continuing Education Symposium, Pittsburgh, PA. "From BrainHub to brain-computer interfaces: new research initiatives at Carnegie Mellon."

19. 2014. Johns Hopkins Biomedical Engineering Retreat, Ocean City, MD. "From goats to brain-computer interfaces."

20. 2014. Computational Motor Control Workshop, Beer-Sheva, Israel. "Internal model mismatch is responsible for the majority of errors in neuroprosthetic control."

21. 2013. 2nd Annual Next Generation Medical Imaging Workshop, Pittsburgh, PA. "Movement-related information conveyed by non-traditional signal sources in motor cortex."

22. 2013. Fourth Annual Aspen Brain Forum, Aspen, CO. "Developing algorithms for enhanced brain-machine interfaces."

23. 2013. International BCI Meeting, Pacific Grove, CA. "Visuomotor adaptation in BCI: differences and similarities from natural reaching."

24. 2011. The IEEE Pittsburgh Section Signal Processing and EMBS Chapters, Pittsburgh, PA. "Important and unimportant factors in neural prosthetic control."

25. 2011. George Mason University, Fairfax, VA. "Visuomotor adaptation observed through a brain-computer interface."

26. 2011. Harvard University, Cambridge, MA. "Visuomotor adaptation observed through a brain-computer interface."

27. 2011. Boston University, Boston, MA. "Visuomotor adaptation observed through a brain-computer interface."

28. 2010. CNUP Annual Retreat, Wheeling, WV. "Visuomotor adaptation observed through a brain-computer interface."

29. 2010. Computational Motor Control Workshop, Beer-Sheva, Israel. "Visuomotor adaptation observed through a brain-computer interface."

30. 2010. Hebrew University, Jerusalem, Israel. "Visuomotor adaptation observed through a brain-computer interface."

31. 2010. Johns Hopkins Applied Physics Laboratory, Laurel, MD. "Important and unimportant factors in neural prosthetic control."

32. 2009. Nertworks: a BMES satellite meeting, Pittsburgh, PA. "Leveraging BCI paradigms to study neural plasticity.

33. 2009. McGowan Institute Annual Retreat, Farmington, PA. "Advances in neural prosthetic control."

Conference Presentations

2019

1. Losey DM, Hennig JA, Oby ER, Golub MD, Sadtler PT, Quick KM, Ryu S, Tyler-Kabara EC, *Batista AP, *Yu BM, ***Chase SM** (2019) Evidence of a memory trace in motor cortex after short term learning. SfN annual meeting.

2. Pavlovsky N, Degenhart AD, Marino P, *Batista AP, ***Chase SM** (2019) Monkeys choke under pressure. SfN annual meeting.

3. Jeon BB, ***Chase SM**, *Kuhlman SJ (2019) Use of optical brain computer interface to identify neural strategies underlying new skill acquisition and performance following extended practice. SfN annual meeting.

4. Herrera AJ, Gaunt RA, Boninger ML, Batista AP, Yu BM, **Chase SM**, Collinger JL (2019) The influence of object presence on M1 activity during movement planning and execution.

5. Fitzgerald J, Zhou W, **Chase SM**, Joiner WM (2019) Sensory dissociation reveals postural influences on motor adaptation. SfN annual meeting.

6. +Stan PL, +Kauttonen J, Jeon BB, Fuchs T, **Chase SM**, Lee TS, Kuhlman SJ (2019) Impact of standard experience on tuning diversity and natural scene discrimination in primary visual cortex. SfN annual meeting.

7. Bahureksa L, Joiner WM, **Chase SM** (2019) Influence of movement workspace on M1 neural representations of arm movement. CMU BME Forum.

8. Koh TH, Bishop WE, ***Chase SM**, *Yu BM (2019) Simultaneous dimensionality reduction and deconvolution of calcium imaging activity. CMU BME Forum.

9. Jeon BB, ***Chase SM**, *Kuhlman SJ (2019) Well-trained mice maintain distinct but multiple neural strategies to solve a task. CNBC Retreat.

10. Koh TH, Bishop WE, ***Chase SM**, *Yu BM (2019) Simultaneous dimensionality reduction and deconvolution of calcium imaging activity. SAND 9 Workshop.

11. Jeon BB, **Chase SM**, Kuhlman SJ (2019) Feature selectivity is stable in primary visual cortex across a range of spatial frequencies. SAND 9 Workshop.

12. Fisac CF and **Chase SM** (2019) Sensory context interferes with volitional modulation of single neurons. NCM annual meeting.

13. Pavlovsky N, Degenhart A, Marino P, *Batista A, ***Chase SM** (2019) Monkeys choke under pressure. Brain initiative PI meeting.

14. Collinger JL, Batista AP, Boninger ML, Herrera AJ, **Chase SM**, Gaunt RA, Karapetyan V, Loughlin P, Tyler-Kabara E, Yu BM (2019) Context-dependent processing in sensorimotor cortex. Brain Initiative PI meeting.

15. Herrera AJ, Downey JE, Gaunt RA, Boninger ML, Batista AP, Yu BM, **Chase SM**, Collinger JL (2019) Object presence changes latent neural activity in motor cortex during reaching. Brain Initiative PI meeting.

<u>2018</u>

16. Nguyen KP, Sharma A, Liu J, Gil-Silva MR, Maheshwari N, *Gittis AH, ***Chase SM** (2018) Mice learn to modulate intra-and inter-limb paw kinematics with training on a novel locomotor behavioral paradigm. SfN annual meeting.

17. Herrera AJ, Degenhart AD, Bishop WE, Oby ER, Tyler-Kabara EC, **Chase SM**, Batista AP, Yu BM, Collinger JL (2018) Neural signal stabilization improves human intracortical BCI control. SfN annual meeting.

18. Whitford AD, **Chase SM**, Schwartz AB (2018) Patterns of cortical population activity during intentional control of single neurons. SfN annual meeting.

19. Fisac CF and **Chase SM** (2018) Dissociating volitional and non-volitional drivers of activity in M1. CMU BME Forum.

20. Nguyen KP, Sharma A, Liu J, Gil-Silva MR, Maheshwari N, *Gittis AH, ***Chase SM** (2018). Mice learn to modulate intra-and inter-limb paw kinematics with training on a novel locomotor behavioral paradigm. CMU BME Forum.
    [Winner, best poster award.]

21. Bahureksa L, Joiner W, **Chase SM** (2018) Comparing M1 neural reorganization during contralateral and ipsilateral visuomotor rotation learning. CMU/Pitt Neuro-Learning Workshop.

22. +Degenhart A, +Bishop W, Oby E, Tyler-Kabara E, ***Chase SM**, *Batista AP, *Yu BM (2018) A stabilized brain-computer interface based on neural manifold alignment. CMU/Pitt Neuro-Learning Workshop.

23. Oby E, Golub M, Hennig J, Degenhart A, Tyler-Kabara E, *Yu B, ***Chase SM**, *Batista A (2018). Long term learning can change neural covariability. CMU/Pitt Neuro-Learning Workshop.

24. Nguyen KP, Sharma A, Liu J, Gil-Silva MR, Maheshwari N, *Gittis AH, ***Chase SM** (2018). Mice learn to modulate intra-and inter-limb paw kinematics with training on a novel locomotor behavioral paradigm. CMU/Pitt Neuro-Learning Workshop.

25. Bishop W, Crowder E, Zandvakili A, Zhou X, **Chase SM**, Kohn A, Olson C, and Yu B (2018). Leveraging low-dimensional structure in neural population activity to combine neural recordings. CMU/Pitt Neuro-Learning Workshop.

26. Herrera AJ, Downey JE, Moran DE, Batista AP, **Chase SM**, Yu BM, Boninger ML, Gaunt RA, Collinger JL (2018) Population-level changes in primary motor cortex induced by the presence of an object. BCI 2018.

27. **Chase SM** and Collinger JL (2018) Practical uses of manifolds. M5: Midwest Monkey Manifolds for Movement Meeting.

28. **Chase SM** (2018) BCI learning: fast and slow. Part of a panel: Torres-Oviedo G, Haith A, Penhune V, **Chase SM** (2018) The role of practice in motor learning: from sensorimotor adaptation to mastering de-novo skills. NCM annual meeting.

29. Jeon BB, **Chase SM**, Kuhlman SJ (2018) Feature selectivity is stable in primary visual cortex across a range of spatial frequencies. Cold Spring Harbor Neural Circuits meeting.

30. Oby E, Golub M, Hennig J, Degenhart A, Tyler-Kabara E, *Yu B, ***Chase SM**, *Batista A (2018). Learning can change neural covariability. Brain initiative PI meeting.

31. Oby E, Golub M, Hennig J, Degenhart A, Tyler-Kabara E, *Yu B, ***Chase SM**, *Batista A (2018). Learning can generate new patterns of neural population activity. Cosyne annual meeting. [Accepted as a talk: 4% acceptance rate.]

32. Bishop W, Crowder E, Zandvakili A, Zhou X, **Chase SM**, Kohn A, Olson C, and Yu B (2018). Leveraging low-dimensional structure in neural population activity to combine neural recordings. Cosyne annual meeting.

2017

33. Bahureksa L, Joiner W, **Chase SM** (2017) Comparing M1 neural reorganization during contralateral and ipsilateral visuomotor rotation learning. SfN annual meeting.

34. Zhou W, Colucci-Chang K, **Chase SM**, Joiner WM (2017) Dissociating the influence of postural and visual shifts on the transfer of motor adaptation to novel workspace locations. SfN annual meeting.

35. Jeon B, Quick K, **Chase SM**, Kuhlman SF (2017) Stability of orientation and spatial frequency tuning in mouse primary visual cortex. SfN annual meeting.

36. Stan P, Kauttonen J, Jeon B, **Chase SM**, Lee TS, Kuhlman SF (2017) Primary visual cortex encodes orientation-invariant attributes of complex images. SfN annual meeting.

37. +Bishop W, +Degenhart A, Oby ER, Tyler-Kabara EC, Batista AP, ***Chase SM**, *Yu BM (2017) Extracting stable representations of neural population state from unstable neural recordings. SAND 8 Workshop.

38. Joiner WM, Colucci-Chang K, Zhou W, and **Chase SM** (2017) Dissociating the influence of postural and visual shifts on the transfer of motor adaptation to novel workspace locations. NCM annual meeting.

39. Hennig JA, Golub MD, Lund PJ, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, *Yu BM, ***Chase SM** (2017) Predicting neural activity in behaviorally irrelevant dimensions. Cosyne annual meeting.

40. +Bishop W, +Degenhart A, Oby ER, Tyler-Kabara EC, ***Chase SM**, *Batista AP, *Yu BM (2017) Extracting stable representations of neural population state from unstable neural recordings. Cosyne annual meeting.

41. Golub MD, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, ***Chase SM**, *Yu BM (2017) Learning by neural reassociation. Cosyne annual meeting.

2016

42. Golub MD, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, ***Chase SM**, *Yu BM (2016) Learning by neural reassociation. Brain-Initiative PI meeting.

43. Flesher SN, Downey JE, Weiss J, Tyler-Kabara EC, **Chase SM**, Schwartz AB, Boninger ML, Collinger JL, Gaunt RA (2016) Grasp Force Control with Somatosensory Feedback in a Brain–Computer Interface. Brain-Initiative PI meeting.

44. Hennig JA, Golub MD, Lund PJ, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, *Yu BM, ***Chase SM** (2016). Predicting neural activity in behaviorally irrelevant dimensions. SfN annual meeting.

45. Golub MD, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, ***Chase SM**, *Yu BM (2016) Population-level changes in neural activity during learning. SfN annual meeting.

46. +Degenhart A, +Bishop W, Oby ER, Tyler-Kabara EC, Batista AP, ***Chase SM**, *Yu BM (2016). Self-recalibrating brain-computer interfaces based on population subspace alignment. SfN annual meeting.

47. Oby ER, Degenhart A, Tyler-Kabara E, Yu B, **Chase SM**, and Batista AP (2016) Learning to generate new patterns of neural activity. Brain Day, University of Pittsburgh.

48. +Degenhart A, +Bishop W, Oby ER, Tyler-Kabara EC, Batista AP, ***Chase SM**, *Yu BM (2016). Self-recalibrating brain-computer interfaces based on population subspace alignment. Brain Day, University of Pittsburgh.

49. Zhang Y and **Chase SM** (2016). A control-theoretic approach to brain-computer interface design. American Controls Conference 2016.

50. **Chase SM** (2016) Provably optimal design of intracortical BCI decoding algorithms. BCI 2016 workshop, "Algorithms and performance using implanted devices" organized by Chase, Batista, Yu, and Carmena.

51. Zhou X, Tien R, and **Chase SM** (2016) Distinct timescales of cortical reorganization in a long-term learning task. BCI 2016.

52. Golub MD, **Chase SM**, Batista AP, and Yu BM (2016) Brain-computer interfaces for dissecting cognitive processes underlying sensorimotor control. Complexity of Neural Computation and Cognition Workshop, Janelia Farms.

53. Oby ER, Degenhart A, Tyler-Kabara E, Yu B, **Chase SM**, and Batista AP (2016) Exploring learning-induced changes in neural population activity. NCM annual meeting.

54. Zhou X, Tien R, and **Chase SM** (2016) Distinct timescales of cortical reorganization in a long-term learning task. Cosyne annual meeting.

55. Bittner S, Williamson RC, Snyder AC, Litwin-Kumar A, Doiron B, ***Chase SM**, *Smith MA, and *Yu BM (2016) Effects of excitatory versus inhibitory neuron sampling on outputs of dimensionality reduction. Cosyne annual meeting.

56. Golub MD, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, *__Chase SM__, and *Yu BM (2016) Learning engages both high- and low-covariance modes of neural population activity. Cosyne annual meeting.

57. Golub MD, Sadtler PT, Quick KM, Ryu SI, Tyler-Kabara EC, Batista AP, **__*Chase SM__**, and *Yu BM (2016) Population-level changes in neural activity during learning. Cosyne workshop, "Sensorimotor learning through multi-dimensional spaces" organized by Golub.

2015

58. Oby ER, *__Chase SM__, *Yu BM, *Batista AP (2015) Exploring learning-induced changes in neural manifolds. Brain Initiative PI meeting.

59. Zhou X, Tien R, and __Chase SM__ (2015) Distinct timescales of cortical reorganization in a long-term learning task. TCMC workshop.

60. Alemayehu B, Pavlovsky N, Chiou J, __Chase SM__, and Batista AP (2015) Eye-centered tuning is weak in dorsal premotor cortex when monkeys are not trained to fixate. SfN annual meeting.

61. Zhou X, Tien R, and __Chase SM__ (2015) Distinct timescales of cortical reorganization in a long-term learning task. SfN annual meeting.

62. Zhang Y and __Chase SM__ (2015) Recasting brain-machine interface design from a physical control system perspective. SAND 7 Workshop.

63. Matano F, __Chase SM__, Shalizi C, and Ventura V (2015). Improved kinematic models for decoding neural activity. SAND 7 Workshop.

64. Golub MD, *Yu BM, and *__Chase SM__ (2015) Internal models for interpreting neural population activity during sensorimotor control. McGovern Institute Spring Symposium.

65. Golub MD, *Yu BM, and *__Chase SM__ (2015) Internal models for interpreting neural population activity during sensorimotor control. Cosyne annual meeting.

2014

66. Kappel D, Pecevski D, Whitford AS, __Chase SM__, Maass W (2014). Stochastic motor control as probabilistic inference in spiking neural networks with noise. SfN annual meeting.

67. Rasmussen RG, __Chase SM__, Schwartz AB (2014). Limits on transmission of information in primary motor cortex during multidimensional reaches. SfN annual meeting.

68. Suway SB, McMorland AJC, Fraser GW, Sohn JW, __Chase SM__, Liu Z, Velliste M, Kass RE, Schwartz AB (2014) Short time-scale stability of directional tuning in motor cortex measured using maximum likelihood estimation. SfN annual meeting.

69. Rasmussen RG, Swartz AB, and __Chase SM__ (2014). Dynamic range adaptation in motor cortical neurons. Cosyne annual meeting.

2013

70. Perel S, Sadtler PT, Ryu SI, Batista AP, __Chase SM__ (2013). Tuning to reach kinematics of single-unit activity, threshold-crossings, and local field potentials in motor cortex. SfN annual meeting.

71. Alemayehu B, Pavlovsky N, Tyler-Kabara EC, __Chase SM__, Batista A (2013). Neurons in monkey dorsal premotor cortex are weakly sensitive to eye position when gaze fixation is untrained. SfN annual meeting.

72. Zhang Y and **Chase SM** (2013) A stabilized dual Kalman filter for adaptive tracking of brain-computer interface decoding parameters. EMBC.

73. Perel S, Sadtler PT, Godlove JM, Ryu SI, Wang W, Batista AP, **Chase SM** (2013) Direction and speed tuning of motor-cortex multi-unit activity and local field potentials during reaching movements. EMBC.

2012

74. Todorova S, **Chase SM,** Ventura V (2012). Simple automatic spike sorting can improve the efficiency of decoding from neuron spike trains. WiML 2012, Lake Tahoe, NV.

75. Todorova S, **Chase SM,** Ventura V (2012). Model-Based Clustering of non-Poisson, non-homogenous Point Processes Events with Application to Neuroscience. 7th Annual Machine Learning Workshop of the NYAS. New York, NY.

76. Golub MD, *Yu BM, and ***Chase SM** (2012) Internal models engaged by brain-computer interface control. SfN annual meeting.

77. Zhang Y, Schwartz AB, **Chase SM**, and Kass RE (2012) Bayesian learning in assisted brain-computer interface tasks. EMBC.

78. Golub MD, *Yu BM, and ***Chase SM** (2012) Internal models engaged by brain-computer interface control. EMBC.

79. Golub MD, Yu BM, Schwartz AB, and **Chase SM** (2012) Enhanced stability of cursor stopping in brain-computer interfaces. EMBC.

80. Todorova S, **Chase SM**, and Ventura V (2012) Model-Based Clustering of non-Poisson, non-homogenous Point Processes Events with Application to Neuroscience. Classification Society Annual Meeting.

81. Golub MD, ***Chase SM**, and *Yu BM (2012) Internal model estimation for closed-loop brain-computer interfaces. Young Investigator Talk, SAND 6 Workshop.

82. Todorova S, **Chase SM**, and Ventura V (2012) Simple automatic spike sorting methods improve decoding accuracy in a 3D movement task. SAND 6 Workshop.

83. Zhang Y, Schwartz AB, **Chase SM**, and Kass RE (2012) Bayesian learning in assisted brain-computer interface tasks. SAND 6 Workshop.

84. Golub MD, ***Chase SM**, and *Yu BM (2012) Internal model estimation for feedback control in brain-computer interfaces. Cosyne annual meeting & Machine Learning, Statistical Inference, and Neuroscience, Janelia Farms.

2011

85. Rao H, Schwartz AB, and **Chase SM** (2011) Adaptation to visuomotor gains applied through a brain-computer interface. SfN annual meeting.

86. Golub MD, Yu BM, Schwartz AB, and **Chase SM** (2011) Improving cursor stops in closed-loop brain-computer interfaces by leveraging trajectory curvature. SfN annual meeting.

2010

87. **Chase SM**, Whitford AS, Kass RE, and Schwartz AB (2010) Operant conditioning to identify volitionally controllable patterns of neural activity. SfN annual meeting.

88. Whitford AS, **Chase SM**, and Schwartz AB (2010) Coordination and control of cortical activity patterns identified via operant conditioning. SfN annual meeting.

89. McMorland AJC, Liu Z, **Chase SM**, Velliste M, Kass RE, and Schwartz AB (2010) Towards better prediction of temporal dynamics of M1 firing rates during reaching. SfN annual meeting.

90. **Chase SM**, Kass RE, and Schwartz AB (2010) Differentiating global and local adaptation responses to visuomotor rotations of a brain-computer interface. CNS10 Workshop.

91. **Chase SM** (2010) Separating intention from action in motor cortical tuning curves. Young Investigator Talk, SAND 5 Workshop.

2009

92. Legenstein R, **Chase SM**, Schwartz AB, and Maass W (2009) A reward-modulated Hebbian learning rule can explain experimentally observed network reorganization in a brain control task. NIPS

93. **Chase SM**, Schwartz AB, and Kass RE (2009) Adaptive gain modulation in the motor system observed through a brain-computer interface. SfN annual meeting.

94. Whitford AS, **Chase SM**, and Schwartz AB (2009) Task-specific tuning properties of motor cortical units used to control a brain-computer interface. SfN annual meeting.

95. Fraser GW, **Chase SM**, Koyama S, Kass RE, and Schwartz AB (2009) Important and unimportant factors for neural prosthetic control. SfN annual meeting.

96. **Chase SM**, Schwartz AB, and Kass RE (2009) Computational approaches for investigating network adaptive behavior in a brain-computer interface. BMES annual meeting.

97. **Chase SM**, Kass RE, and Schwartz AB (2009) Recent advances in neural prosthetic control. BMES annual meeting.

98. Schwartz AB, Kass RE, and **Chase SM** (2009) Learning and decoding in a multielectrode brain-machine interface paradigm. CRCNS PI meeting.

99. Koyama S, **Chase SM**, Whitford A, Velliste M, Schwartz AB, and Kass RE (2009) Comparison between decoding algorithms in open-loop and closed-loop performance. Cosyne annual meeting.

2008

100. **Chase SM**, Kass RE, and Schwartz AB (2008) A framework for modeling the closed-loop performance of brain-computer interface algorithms. SfN annual meeting.

101. Legenstein R, **Chase SM**, Schwartz AB, and Maass W (2008) A model for learning effects in motor cortex that may facilitate the brain control of neuroprosthetic devices. SfN annual meeting.

102. Koyama S, Whitford A, **Chase SM**, Velliste M, Schwartz AB, and Kass RE (2008) Recursive Bayesian algorithms for real-time cortical control of 3D neuroprosthetic devices. SfN annual meeting.

103. **Chase SM**, Schwartz AB, and Kass RE (2008) General adaptation strategies used to compensate for perturbations of a brain-computer interface. SAND 4 Workshop.

pre-2008

104.   **Chase SM**, Fraser GW, Kass RE, and Schwartz AB (2007) Neural adaptation to a 3-dimensional, rotation perturbation in a closed loop brain-computer interface. SfN annual meeting.

105.   **Chase SM**, Kass RE, and Schwartz AB (2007) BCI – A novel paradigm for studies of neural plasticity. BMES annual meeting.

106.   **Chase SM**, Fraser GW, Kass RE, and Schwartz AB (2007) Neural adaptation to a 2-dimensional rotation perturbation in a closed loop brain-computer interface. CRCNS PI meeting.

107.   **Chase SM** and Young ED (2006) Using a population reference for stimulus onset time in first spike latency coding. Cosyne annual meeting.

108.   **Chase SM** and Young ED (2005) Spike timing dependent information on sound location in the inferior colliculus. SfN annual meeting.

109.   **Chase SM** and Young ED (2005) The representation of sound location information among neural populations in the inferior colliculus ARO 28th midwinter meeting.

110.   **Chase SM** and Young ED (2004) The processing of sound location cues by classes of units in the inferior colliculus. ARO 27th midwinter meeting.