

# CHRISTOPHER J. ROZELL

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## RESEARCH INTERESTS

Computational and theoretical neuroengineering; biological and computational vision; machine learning; signal processing; complex dynamical systems; human-computer interaction; biotechnology applications.

## EDUCATION

Ph.D., Electrical and Computer Engineering	Rice University	May 2007
Thesis: <i>Distributed redundant representations in man-made and biological sensing systems</i>		
Advisor: Dr. Don H. Johnson		
M.S., Electrical Engineering	Rice University	May 2002
B.S.E., Computer Engineering (magna cum laude)	University of Michigan — Ann Arbor	April 2000
B.F.A., Performing Arts Technology — Music	University of Michigan — Ann Arbor	April 2000

## POSITIONS

Adjunct Associate Professor	Georgia Institute of Technology, Interactive Computing	2015–present
Associate Professor (with tenure)	Georgia Institute of Technology, School of ECE	2014–present
Demetrius T. Paris Jr. Professor	Georgia Institute of Technology, School of ECE	2013–2014
Graduate Program Faculty	Georgia Institute of Technology, BME	2009–present
Assistant Professor	Georgia Institute of Technology, School of ECE	2008–2014
Postdoctoral Scholar	University of California, Berkeley, School of Optometry	2007–2008
Postdoctoral Scholar	Rice University, ECE Department	2007
Research Assistant	Rice University, ECE Department	2001–2007
Research Assistant	MIT Lincoln Laboratory	2002
Research Assistant	University of Michigan, School of Music & EECS Dept.	1997–1999

## HONORS AND AWARDS

Outstanding Junior Faculty Member Award (School of ECE, Georgia Tech)	2017
James S. McDonnell Foundation 21st Century Science Initiative Award (6 international recipients)	2014
Sigma Xi Young Faculty Research Award (Georgia Tech)	2014
NSF CAREER Award	2014
Demetrius T. Paris Junior Professorship	2013

CETL Class of 1940 Course Survey Teaching Effectiveness Award	2013
CETL/BP Junior Faculty Teaching Excellence Award	2013
CETL “Thank a Teacher” certificate (7 semesters)	2008–2014
Co-author on SAIC-Georgia Tech Student Paper Award (with A. Charles and A. Kressner)	2010
Texas Instruments Distinguished Graduate Fellowship (Rice University)	2000–2007
Walter Karplus Summer Research Grant	2006
Nettie S. Autrey Memorial Fellowship (Rice University)	2004
Llangollen Award for leadership and dedication (U. of Michigan, Men’s Glee Club)	2000
EECS Department Undergraduate Research Fellowship (U. of Michigan)	1999
EECS Department Outstanding Student Instructor Award (U. of Michigan)	1998
R.K. Brown Scholarship for engineering and acoustics (U. of Michigan, EECS)	1999
Tau Beta Pi	1998
Philip A. Duey Scholarship Award (U. of Michigan, Men’s Glee Club)	1997, 1999
Eta Kappa Nu	1996
Jackson Foundation Scholarship Award	1994

## RESEARCH SUPPORT

NIH	Electrophysiological Biomarkers to Optimize DBS for Depression (co-PI)	2017–2022
NSF	BD Spokes: SPOKE: SOUTH: Large-scale Medical Informatics for Patient Care Coordination and Engagement (co-PI)	2016–2019
GT/NEC	Closed-Loop Optogenetic Control of Single Neurons In Vivo (PI)	2016-2017
JSMF	Scholar Award in Studying Complex Systems: Tracking time-varying low- dimensional structure to uncover the building blocks of complex dynamics (PI)	2015–2020
ONR	Moving Towards Zero-Shot Learning via Analogy and Imagination (PI)	2015–2018
ONR	Perpetual Systems Based on Cortical Computation (co-PI)	2015–2016
TI	Sparse Sampling of Multi-Modal Physiological Data (PI)	2015–2016
NSF	CAREER: Exploiting Low-Dimensional Structure in Data for More Effective, Efficient and Interactive Machine Intelligence (PI)	2014–2019
NSF	CIF:Medium:Collaborative Research: Tracking Low-Dimensional Information in Data Streams and Dynamical Systems (PI)	2014–2018
NIH/NEI	Neural Population Coding of Dynamic Natural Scenes (co-PI)	2009–2015
NSF	CIF:Medium: Analog Architectures for Optimization in Signal Processing (PI)	2009–2014
NGA	Compressive Sensing Design of LIDAR sensors (PI)	2009–2013
NGA	Unsupervised Learning of Hierarchical Structure in Multi-Band Imagery (co-PI)	2008–2015
NSF	Collaborative Research: Leveraging Low-Dimensional Structure for Time Series Analysis and Prediction (PI)	2008–2013

## PROFESSIONAL ACTIVITIES

- Associate Editor: *IEEE Transactions on Molecular, Biological and Multi-scale Communications* (inaugural editorial board) 2015–present
- Program committee: *International Conference on Machine Learning (ICML)* 2016  
*IEEE Global Conference on Signal and Information Processing (GlobalSIP) symposium on Information Processing for Big Data* 2014  
*IEEE Global Conference on Signal and Information Processing (GlobalSIP) symposium on New Sensing and Statistical Inference Methods* 2013  
*IEEE Statistical Signal Processing Workshop* 2012
- Organizer: *Computational and Systems Neuroscience (Cosyne) workshop on Closed-loop control of neural systems and circuits for scientific discovery* 2017  
Co-organized with G. Stanley  
*IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP) special session on Low-dimensional Dynamical Systems in Signal Processing and Data Analysis* 2017  
Co-organized with A. Charles, M. Davenport, J. Romberg and M. Wakin  
*Asilomar Conference on Signals, Systems & Computers* invited session on *Extracting information from electrophysiology data* 2013  
*IEEE Conference on Decision and Control* invited session on *Exploiting Sparsity and Compressive Sensing in System Identification* 2010  
Co-organized with M. Wakin and T. Vincent
- Member: Institute of Electrical and Electronics Engineers (S'00-M'09-SM'12)  
American Association for the Advancement of Science  
Society for Neuroscience
- Reviewer (selected): *Biological Cybernetics, eLife Hippocampus, IEEE Transactions (Automatic Control, Biomedical Circuits and Systems, Geoscience and Remote Sensing, Image Processing, Information Theory, Instrumentation & Measurement, Neural Networks, Signal and Information Processing over Networks, Signal Processing)*, *IEEE Letters (Geoscience and Remote Sensing, Signal Processing)*, *Information & Inference, International Conference on Learning Representations (ICLR), Journal of Computational Neuroscience, Journal of Neurophysiology, Neural Computation, Neural Information Processing Systems (NIPS), PLoS Computational Biology, Proceedings of the National Academy of Sciences, Statistica Sinica*, various governmental funding agencies (U.S., Germany, Switzerland, Qatar)

## TEACHING EXPERIENCE AND OTHER ACTIVITIES

- Instructor: Introduction to Signal Processing – recitations (ECE 2025)  
Introduction to Signal Processing – lecture (ECE 2025)  
Introduction to Probability and Statistics for ECE (ECE 3077)  
Signal Detection and Estimation (ECE 7251)  
Information Processing Models of Neural Systems (ECE/BME 6790)

Activities:	Team Mentor, CREATE-X Idea To Prototype team	2017
	CETL Class of 1969 Teaching Fellows program	2011-2012
	Developed new course “Information Processing Models of Neural Systems”	2009
	ECE Effective Teaching Workshop series	2008
	CETL Workshop on Mentoring Graduate Students	2008
	CETL Workshop on Teaching Multitasking Students	2008
	PAESMEM/Stanford Workshop on Mentoring in Engineering	2004
	Teaching Workshops for Current and Future Teachers series (Rice University)	2002–2004

## STUDENT SUPERVISION

### PhD students

Matt O’Shaughnessy	Thesis: <i>Computational Imaging in Ultrasound and Photoacoustics</i> Co-advised with Mark Davenport NDSEG graduate fellowship	2016–present
Stefano Fenu	Thesis: <i>Efficient Human-Computer Interactions for Visual Search</i>	2016–present
Adam Willats	Thesis: <i>Closed-loop Optogenetic Control</i> Co-advised with Garrett Stanley Computational Neuroscience Training Program Graduate Fellow	2016–present
Greg Canal	Thesis: <i>Closed-loop Human-computer Interfaces</i>	2016–present
John Lee	Thesis: <i>Real-time Tracking of Sparse Imagery</i> DSO Postgraduate Scholarship	2015–present
Pavel Dunn	Thesis: <i>Exploiting Dynamic Structure in Non-stationary Data</i>	2015–present
Marissa Connor	Thesis: <i>Learning the Low-dimensional Structure of the Visual World</i> NSF graduate fellowship	2014–present
Nicholas Bertrand	Thesis: <i>Exploiting Low-dimensionality for Biophysical Sensing</i>	2013–present
Abigail Kressner	Thesis: <i>Structure in Time-frequency Binary Masking</i> NSF and NDSEG graduate fellowships; Chih Foundation Research Award Now Postdoctoral Scholar at the Technical University of Denmark (DTU)	2011–2015
Adam Charles	Thesis: <i>Dynamics and Correlations in Sparse Signal Acquisition</i> ECE Outstanding GRA Award; CSIP Outstanding Research Award Sigma Xi Best Dissertation Award Now Postdoctoral Scholar at Princeton University	2010–2015
Mengchen Zhu	Thesis: <i>Sparse Coding Models of Neural Response in the Primary Visual Cortex</i> Fellow in the Insight Data Science Fellows Program Now Associate with BlackRock, Inc.,	2009–2015
Aurèle Balavoine	Thesis: <i>Mathematical Analysis of a Dynamical System for Sparse Recovery</i>	2011–2014

Co-advised with Justin Romberg  
 Now Software Engineer with The MathWorks, Inc.

Han Lun Yap      Thesis: *Constrained Measurement Systems of Low-dimensional Signals*      2009–2013  
 DSO Postgraduate Scholarship  
 ECE Outstanding GRA Award; CSIP Outstanding Research Award  
 Now Acting Head of the RADAR Techniques Lab and Senior Member of  
 Technical Staff with DSO National Laboratories of Singapore

### MS students

Alex Moreno      Thesis: *Restricting Vocabulary Size in Pediatric Augmentative  
 and Alternative Communication*      2014–2015  
 Co-advised with Ayanna Howard

Abigail Kressner      Thesis: *Auditory Models for Evaluating Algorithms*      2010–2011

Robert Ortman      Thesis: *Sensory Input Encoding and Readout Methods for in Vitro  
 Living Neuronal Networks*      2009–2012  
 Co-advised with Steve Potter

### Selected undergraduate students

Allison Del Giorno      Thesis: *A Sparse Coding Model of V1 Produces Surround  
 Suppression Effects in Response to Natural Scenes*      2012–2013  
 Barry M. Goldwater Scholar; NSF and NDSEG graduate fellow  
 Now Ph.D. student in Robotics at Carnegie Mellon University

Sivabalan Manivasagam      Project: *Brain Computer Interfaces in Computer Vision*      2016–present  
 Barry M. Goldwater Scholar; University Interdisciplinary Research Award  
 Georgia Tech University Interdisciplinary Research Award

### UNIVERSITY SERVICE

Co-Director, Georgia Tech Neural Engineering Center      2018–present

Leadership team, Development of interdisciplinary Ph.D. program in neuroscience      2018–present

Faculty Guide, Exploration of Social Justice in South Africa, Stamps President’s Scholars      2017

Associate Director, Georgia Tech Neural Engineering Center      2016–2017

Member, Institute for Robotics & Intelligent Machines      2016–present

Member, Neuro@GT Steering Committee      2016–present

Steering Committee, Emory/GT Kavli Brain Forum      2016–present

Co-Chair, ECE Strategic Planning & Strategic Doing Committee      2016–2017

Faculty Guide, 2014 Class of Stamps President’s Scholars      2014–present

Executive Council, Emory Neuromodulation and Innovation Center (ENTICe)      2014–present

Executive Committee Member, Georgia Tech Neural Engineering Center      2014–2016

Member, Faculty Council on Data Science and Engineering      2014–2016

Member, BME Faculty Recruitment Committee (Neuroengineering)	2014–2015
Member, Neuro@GT Task Force	2014
Panelist, NSF CAREER Award Proposal Workshop (GT OSP)	2014
Member, Mark and Linda Smith Chair Search Committee (ECE)	2013–2015
Member, ECE Faculty Recruitment Committee	2013–present
Member, Parker H. Petit Institute for Bioengineering and Bioscience	2013–present
Member, Center for Signal and Information Processing	2012–present
Faculty Associate, Grand Challenges Living Learning Community	2012–2015
Program Faculty, Interdisciplinary Bioengineering Graduate Program	2009–present
Member, ECE School Chair Search Committee	2011–2012
Admissions Panel, Georgia Tech President’s Scholarship Program	2012–2013
Member, Task Force on Family Friendly Policies	2012
Member, ECE Graduate Student Recruitment Committee	2011–2012
Member, Laboratory for Neuroengineering	2008–2012
Member, ECE Student-Faculty Committee	2008–2011
Member, ECE Student Award Selection Committee	2009–2011
Panelist, ECE Academic Careers CV Workshop	2008, 2010
Member, ECE Research Promotion Committee	2009
Panelist, ECE Academic Careers Seminar Series	2008, 2009
Guest Lecturer, ECE8010 graduate research seminar	2008
University Associate, Martel College (Rice University)	2004–2007
Member, University Council (Presidential advisory committee, Rice University)	2004–2006
Panelist, workshop for new teaching assistants (Rice University, School of Engineering)	2003, 2004
Member, ECE Graduate Student Council (Rice University)	2002–2003
Member, ECE Graduate Committee (Rice University)	2002–2003

## **OUTSIDE SERVICE AND OTHER ACTIVITIES**

Invited participant, The Brain and Computation research program, Simons Institute for the Theory of Computing, University of California, Berkeley	2018
Mentor, CyberLaunch	2015–present
Selected Participant, Kauffman FastTrac TechVenture course (Emory University)	2015
Mentor, NeuroLaunch	2014–present
Technical Consultant, Qualcomm, Inc.	2013
Presenter, K-12 outreach (science/engineering demonstrations and tutoring)	1996–2011
Panelist, BRAIN program panel on neuroscience careers (Center for Behavioral Neuroscience)	2009
Judge, Science and Engineering Fair of Houston	2004
Technical Consultant, AdaptedWave Technologies, Inc.	2000
Project Chair, Tau Beta Pi elementary science demonstrations, (University of Michigan)	1998

**MEDIA COVERAGE****Computational Neuroscience**

- “The Brain, Cosmos in the Cranium”, *Georgia Tech Research Horizons* 2017
- “Unraveling the Secrets of the Brain” (cover article), *Georgia Tech Research Horizons* 2012

**Rejecta Mathematica**

2009

*Science, The Economist, Nature.com, USA Today, Chronicle of Higher Education, AMS Math in the Media, Ars Technica, MathDL, Rice News, Seed Magazine, Slashdot*

**PATENTS**

1. J. Lee and C.J. Rozell. Method for tracking cell membranes for automated electrophysiology, filed August 29, 2017. U.S. provisional patent 62/551,570.
2. N.J. Halas, D.H. Johnson, S.W. Bishnoi, C.S. Levin, C.J. Rozell, and B.R. Johnson. All-optical nanoscale sensor, issued October 25, 2011. U.S. patent 8,045,152.
3. C.J. Rozell, D.H. Johnson, R.B. Baraniuk, B.A. Olshausen, and R.L. Ortman. Neural circuit for computing sparse codes, issued August 24, 2010. U.S. patent 7,783,459.

**BOOK CHAPTERS**

1. D.H. Johnson, I.N. Goodman, and C.J. Rozell. Information theory and systems neuroscience. In S. Grün and S. Rotter, editors, *Analysis of parallel spike trains*. Springer-Verlag, 2010.

**JOURNAL PUBLICATIONS**

1. A. Eftekhari, H.L. Yap, M.B. Wakin, and C.J. Rozell. Stabilizing embedology: Geometry-preserving delay-coordinate maps. *Physical Review E*, 2018. In press.
2. G. Da Poian, C.J. Rozell, R. Bernardini, R. Rinaldo, and G.D. Clifford. Matched filtering for heart rate estimation on compressive sensing ECG measurements. *IEEE Transactions on Biomedical Engineering*, 2018. In press.
3. J. Lee, I. Kolb, C. Forest, and C.J. Rozell. Cell membrane tracking in living brain tissue using differential interference contrast microscopy. *IEEE Transactions on Image Processing*, (4):1847–1861, April 2018.
4. M.F. Bolus, A.A. Willats, C.J. Whitmire, C.J. Rozell, and G.B. Stanley. Design strategies for dynamic closed-loop optogenetic neurocontrol in vivo. *Journal of Neural Engineering*, 15(2):026011, January 2018.
5. B.A. Olshausen and C.J. Rozell. Neuromorphic computation: Sparse codes from memristor grids. *Nature Nanotechnology*, 12(8):722–723, August 2017.

6. A.S. Charles, D. Yin, and C.J. Rozell. Distributed sequence memory of multidimensional inputs in recurrent networks. *Journal of Machine Learning Research*, 18(7):1–37, 2017.
7. A.S. Charles, A. Balavoine, and C.J. Rozell. Dynamic filtering of time-varying sparse signals via L1 minimization. *IEEE Transactions on Signal Processing*, 64(21):5644–5656, November 2016.
8. A.A. Kressner, T. May, and C.J. Rozell. Outcome measures based on classification performance fail to predict the intelligibility of binary-masked speech. *Journal of the Acoustical Society of America*, 139(6):3033–3036, June 2016.
9. A.A. Kressner, A. Westermann, J. Buchholz, and C.J. Rozell. Cochlear implant speech intelligibility outcomes with structured and unstructured binary mask errors. *Journal of the Acoustical Society of America*, 139(2):800–810, February 2016.
10. D. Millard, C. Whitmire, C.A. Gollnick, C.J. Rozell, and G.B Stanley. Electrical and optical activation of mesoscale neural circuits with implications for coding. *Journal of Neuroscience*, 35(47):15702–15715, November 2015.
11. M. Zhu and C.J. Rozell. Modeling inhibitory interneurons in efficient sensory coding models. *PLoS Computational Biology*, 11(7):e1004353, July 2015.
12. A. Balavoine, C.J. Rozell, and J. Romberg. Discrete and continuous-time soft-thresholding with dynamic inputs. *IEEE Transactions on Signal Processing*, 63(12):3165–3176, June 2015.
13. A.A. Kressner and C.J. Rozell. Structure in time-frequency binary masking errors and its impact on speech intelligibility. *Journal of the Acoustical Society of America*, 137(4):2025–2035, April 2015.
14. A. Eftekhari, H.L. Yap, C.J. Rozell, and M.B. Wakin. The restricted isometry property for random block diagonal matrices. *Applied and Computational Harmonic Analysis*, 38(1):1–31, January 2015.
15. A. Balavoine, J. Romberg, and C.J. Rozell. Correction to “Convergence and Rate Analysis of Neural Networks for Sparse Approximation”. *IEEE Transactions on Neural Networks and Learning Systems*, 25(8):1595–1596, August 2014.
16. S. Shapero, M. Zhu, P. Hasler, and C.J. Rozell. Optimal sparse approximation with integrate and fire neurons. *International Journal of Neural Systems*, 24(05):1440001, August 2014.
17. A.S. Charles, H.L. Yap, and C.J. Rozell. Short term memory capacity in networks via the restricted isometry property. *Neural Computation*, 26(6):1198–1235, June 2014.
18. A.S. Charles and C.J. Rozell. Spectral super-resolution of hyperspectral imagery using re-weighted L1 spatial filtering. *IEEE Geoscience and Remote Sensing Letters*, 11(3):602–606, March 2014.
19. A. Balavoine, C.J. Rozell, and J. Romberg. Convergence speed of a dynamical system for sparse recovery. *IEEE Transactions on Signal Processing*, 61(17):4259–4269, September 2013.



20. S. Shapero, C.J. Rozell, and P. Hasler. Configurable hardware integrate and fire neurons for sparse approximation. *Neural Networks*, 45:134–143, September 2013. Special issue on Neuromorphic Engineering: from Neural Systems to Brain-Like Engineered Systems.
21. M. Zhu and C.J. Rozell. Visual nonclassical receptive field effects emerge from sparse coding in a dynamical system. *PLoS Computational Biology*, 9(8):e1003191, August 2013.
22. H.L. Yap, M.B. Wakin, and C.J. Rozell. Stable manifold embeddings with structured random matrices. *IEEE Journal of Selected Topics in Signal Processing*, 7(4):720–730, August 2013. Special issue on Differential Geometry in Signal Processing.
23. A.A. Kressner, D.V. Anderson, and C.J. Rozell. Evaluating the generalization of the hearing aid speech quality index (HASQI). *IEEE Transactions on Audio, Speech and Language Processing*, 21(2):407–415, February 2013.
24. A.S. Charles, P. Garrigues, and C.J. Rozell. A common network architecture efficiently implements a variety of sparsity-based inference problems. *Neural Computation*, 24(12):3317–3339, December 2012.
25. S. Shapero, A.S. Charles, C. Rozell, and P. Hasler. Low power sparse approximation on reconfigurable analog hardware. *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, 2(3):530–541, September 2012. Special issue on Circuits, Systems and Algorithms for Compressive Sensing.
26. A. Balavoine, J. Romberg, and C.J. Rozell. Convergence and rate analysis of neural networks for sparse approximation. *IEEE Transactions on Neural Networks and Learning Systems*, 23(9):1377–1389, September 2012.
27. J.Y. Park, H.L. Yap, C.J. Rozell, and M.B. Wakin. Concentration of measure for block diagonal matrices with applications to compressive signal processing. *IEEE Transactions on Signal Processing*, 59(12):5859–5875, December 2011.
28. H.L. Yap and C.J. Rozell. Stable Takens’ embeddings for linear dynamical systems. *IEEE Transactions on Signal Processing*, 59(10):4781–4794, October 2011.
29. A.S. Charles, B.A. Olshausen, and C.J. Rozell. Learning sparse codes for hyperspectral imagery. *IEEE Journal of Selected Topics in Signal Processing*, 5(5):963–978, September 2011.
30. C.J. Rozell, D.H. Johnson, R.G. Baraniuk, and B.A. Olshausen. Sparse coding via thresholding and local competition in neural circuits. *Neural Computation*, 20(10):2526–2563, October 2008.
31. S.W. Bishnoi, C.J. Rozell, C.S. Levin, M.K. Gheith, B.R. Johnson, D.H. Johnson, and N.J. Halas. All-optical nanoscale pH meter. *Nano Letters*, 6(8):1687–1692, August 2006.
32. C.J. Rozell and D.H. Johnson. Analyzing the robustness of redundant population codes in sensory and feature extraction systems. *Neurocomputing*, 69(10–12):1215–1218, June 2006.
33. C.J. Rozell and D.H. Johnson. Examining methods for estimating mutual information in spiking neural systems. *Neurocomputing*, 65–66C:429–434, June 2005.

34. C.J. Rozell, D.H. Johnson, and R.M. Glantz. Measuring information transfer in crayfish sustaining fiber spike generators. *Biological Cybernetics*, 90(2):89–97, February 2004.
35. C.J. Rozell, D.H. Johnson, and R.M. Glantz. Information processing during transient responses in the crayfish visual system. *Neurocomputing*, 52–54:53–58, June 2003.

## CONFERENCE PUBLICATIONS

1. G. Canal, S. Manivasagam, S. Liang, and C.J. Rozell. Interactive object segmentation with noisy binary inputs. In *Proceedings of the International Conference on Image Processing (ICIP)*, Athens, Greece, October 2018. Submitted.
2. N. Bertrand, J. Lee, A. Charles, P. Dunn, and C.J. Rozell. Sparse dynamic filtering via earth movers distance regularization. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Calgary, Alberta, Canada, April 2018.
3. A. Charles, N. Bertrand, J. Lee, and C.J. Rozell. Earth-Mover’s Distance as a tracking regularizer. In *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Curaçao, Dutch Antilles, December 2017.
4. S. Fenu and C.J. Rozell. Rank learning by ordinal gerrymandering. In *Proceedings of the IEEE International Conference On Machine Learning And Applications (ICMLA)*, Cancun, Mexico, December 2017.
5. J. Lee and C.J. Rozell. Fast ADMM solver for reweighted total variation image deconvolution and inpainting. In *Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Montreal, Canada, November 2017.
6. J. Lee and C.J. Rozell. Precision cell boundary tracking on DIC microscopy video for patch clamping. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, New Orleans, LA, March 2017.
7. A. Moreno, C.J. Rozell, and A. Howard. Restricting vocabulary size in pediatric augmentative and alternative communication. In *Rehabilitation Engineering and Assistive Technology Society of North America (RENSA) annual conference*, Denver, CO, June 2015.
8. A. Charles and C.J. Rozell. Convergence of basis pursuit de-noising with dynamic filtering. In *Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP) symposium on Information Processing for Big Data*, Atlanta, GA, December 2014.
9. A. Charles, D. Yin, and C.J. Rozell. Can random linear networks store multiple long input streams? In *Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP) symposium on Information Processing for Big Data*, Atlanta, GA, December 2014.

10. H.L. Yap, A. Eftekhari, M.B. Wakin, and C.J. Rozell. A first analysis of the stability of Takens' embedding. In *Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP) symposium on Information Processing for Big Data*, Atlanta, GA, December 2014.
11. A. Balavoine, C.J. Rozell, and J.K. Romberg. Iterative soft-thresholding for time-varying signal recovery. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Florence, Italy, May 2014.
12. A. Kressner and C.J. Rozell. Speech understanding in noise provided by a simulated cochlear implant processor based on matching pursuit. In *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, October 2013.
13. A. Balavoine, C.J. Rozell, and J.K. Romberg. Convergence of a neural network for sparse approximation using the nonsmooth Lojasiewicz inequality. In *Proceedings of the International Joint Conference on Neural Networks*, Dallas, TX, August 2013.
14. A. Kressner, D.V. Anderson, and C. Rozell. Causal binary mask estimation for speech enhancement using sparsity constraints. In *Proceedings of the International Congress on Acoustics (ICA)*, Montreal, Canada, June 2013.
15. A. Charles and C. Rozell. Dynamic filtering of sparse signals using reweighted l1. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vancouver, Canada, May 2013.
16. A. Kressner, D.V. Anderson, and C. Rozell. A novel binary mask estimator based on sparse approximation. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vancouver, Canada, May 2013.
17. D. Sale, C.J. Rozell, J.K. Romberg, and A.D. Lanterman. Compressive LADAR detector noise performance. In *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 2012.
18. D. Sale, C.J. Rozell, J.K. Romberg, and A.D. Lanterman. Compressive LADAR in realistic environments. In *IEEE Statistical Signal Processing Workshop*, Ann Arbor, MI, August 2012.
19. H.L. Yap, A. Charles, and C.J. Rozell. The restricted isometry property for echo state networks with applications to sequence memory capacity. In *IEEE Statistical Signal Processing Workshop*, Ann Arbor, MI, August 2012.
20. S. Shapero, C. Rozell, A. Balavoine, and P. Hasler. A scalable implementation of sparse approximation on a Field Programmable Analog Array. In *IEEE Biomedical Circuits and Systems Conference (BioCAS)*, La Jolla, CA, November 2011.
21. A. Kressner, D. Anderson, and C. Rozell. Robustness of the hearing aid speech quality index (HASQI). In *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, October 2011.

22. M.S. Asif, A. Charles, J. Romberg, and C. Rozell. Estimation and dynamic updating of time-varying signals with sparse variations. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Prague, Czech Republic, May 2011.
23. A. Charles, M.S. Asif, J. Romberg, and C. Rozell. Sparsity penalties in dynamical system estimation. In *Proceedings of the Conference on Information Sciences and Systems (CISS)*, Baltimore, MD, March 2011.
24. H.L. Yap, A. Eftekhari, M.B. Wakin, and C.J. Rozell. The restricted isometry property for block diagonal matrices. In *Proceedings of the Conference on Information Sciences and Systems (CISS)*, Baltimore, MD, March 2011.
25. H.L. Yap, M.B. Wakin, and C.J. Rozell. Stable manifold embeddings with operators satisfying the restricted isometry property. In *Proceedings of the Conference on Information Sciences and Systems (CISS)*, Baltimore, MD, March 2011.
26. A. Balavoine, C.J. Rozell, and J.K. Romberg. Global convergence of the Locally Competitive Algorithm. In *Proceedings of the IEEE Digital Signal Processing (DSP) Workshop*, Sedona, AZ, January 2011.
27. A. Charles, A.A. Kressner, and C.J. Rozell. Causal sparse decomposition of audio signals. In *Proceedings of the IEEE Digital Signal Processing (DSP) Workshop*, Sedona, AZ, January 2011.
28. H.L. Yap and C.J. Rozell. Stable Takens' embedding for linear dynamical systems. In *Proceedings of the IEEE Conference on Decision and Control*, Atlanta, GA, December 2010. Invited paper for session on *Exploiting Sparsity and Compressive Sensing in System Identification*.
29. C.J. Rozell and P. Garrigues. Analog sparse approximation for compressed sensing recovery. In *Proceedings of the Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, November 2010.
30. A. Charles and C.J. Rozell. Sparse coding for spectral signatures in hyperspectral images. In *Proceedings of the Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, November 2010.
31. C.J. Rozell, H.L. Yap, J.Y. Park, and M.B. Wakin. Concentration of measure for block diagonal matrices with repeated blocks. In *Proceedings of the Conference on Information Sciences and Systems (CISS)*, Princeton, NJ, March 2010. Invited paper.
32. M.B. Wakin, J.Y. Park, H.L. Yap, and C.J. Rozell. Concentration of measure for block diagonal measurement matrices. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Dallas, TX, March 2010.
33. R.L. Ortman, C.J. Rozell, and D.H. Johnson. Reconstruction of compressively sensed images via neurally plausible local competitive algorithms. In *Proceedings of the Conference on Information Sciences and Systems (CISS)*, pages 476–479, Princeton, NJ, March 2008.

34. C.J. Rozell. Distributed processing in frames for sparse approximation. In *Proceedings of the Conference on Information Sciences and Systems (CISS)*, Princeton, NJ, March 2008. Invited paper.
35. C.J. Rozell, D.H. Johnson, R.G. Baraniuk, and B.A. Olshausen. Locally competitive algorithms for sparse approximation. In *Proceedings of the International Conference on Image Processing (ICIP)*, pages 169–172, San Antonio, TX, September 2007.
36. P. Casazza, G. Kutyniok, S. Li, and C.J. Rozell. Modeling sensor networks with fusion frames. In *Proceedings of SPIE, Wavelets XII at SPIE Optics and Photonics*, volume 6701, pages 67011M–1 – 67011M–11, San Diego, CA, August 2007.
37. C.J. Rozell and D.H. Johnson. Power scheduling for wireless sensor and actuator networks. In *Proceedings of the International Conference on Information Processing in Sensor Networks (IPSN)*, pages 470–478, Cambridge, MA, April 2007. (Acceptance rate of  $38/170 \approx 22\%$ ).
38. S.W. Bishnoi, C.S. Levin, C.J. Rozell, B.R. Johnson, D.H. Johnson, and N.J. Halas. All-optical nanoscale pH meter: a plasmonic nanodevice with quantifiable output. In *Proceedings of the Annual Meeting of the IEEE Lasers and Electro-Optics Society (IEEE LEOS)*, Montreal, Canada, October 2006. Invited paper.
39. C.J. Rozell and D.H. Johnson. Evaluating local contributions to global performance in wireless sensor and actuator networks. *Lecture Notes in Computer Science*, 4026:1–16, June 2006. *Proceedings of the International Conference on Distributed Computing in Sensor Systems (DCOSS)*, San Francisco, CA, June 2006.
40. C.J. Rozell, I.N. Goodman, and D.H. Johnson. Feature-based information processing with selective attention. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Toulouse, France, May 2006.
41. C.J. Rozell and D.H. Johnson. Analysis of noise reduction in redundant expansions under distributed processing requirements. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 185–188, Philadelphia, PA, March 2005.
42. M.A. Lexa, C.J. Rozell, S. Sinanović, and D.H. Johnson. To cooperate or not to cooperate: Detection strategies in sensor networks. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 841–844, Montreal, Canada, May 2004.
43. C.J. Rozell and D. Manolakis. Matched filter performance for unequal target and background covariance matrices. In *Proceedings of the SPIE Defense and Security Symposium: Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery X*, pages 109–117, Orlando, FL, April 2004.
44. M. Simoni, B. Broening, C. Rozell, C. Meek, and G. Wakefield. A theoretical framework for electro-acoustic music. In *International Computer Music Conference (ICMC)*, Beijing, China, 1999.

## CONFERENCE ABSTRACTS

1. A. Willats, M. Bolus, C. Whitmire, G. Stanley, and C. Rozell. State-aware control of neural activity: design & analysis. In *Computational and Systems Neuroscience (COSYNE) Meeting*, Denver, CO, March 2018.
2. J. Lee, A. Charles, N. Bertrand, and C. Rozell. An optimal transport tracking regularizer. In *Neural Information Processing Systems (NIPS) Workshop, Optimal Transport and Machine Learning*, Long Beach, CA, December 2017.
3. M. Bolus, A. Willats, C. Whitmire, C. Rozell, and G. Stanley. Closed loop optogenetic control of thalamocortical activity. In *Society for Neuroscience Annual Meeting*, Washington, D.C., November 2017.
4. I. Kolb, J. Lee, A. Felouzis, C. Landry, M. Yip, C. Lewallen, W. Stoy, C. Rozell, and C. Forest. The patcherBot: a walk-away automated patch-clamp electrophysiology system. In *Society for Neuroscience Annual Meeting*, Washington, D.C., November 2017.
5. A. Alreja, I. Nemenmen, and C. Rozell. Optimal E:I cell ratios in efficient coding models of V1 under volume constraints. In *Society for Neuroscience Annual Meeting*, Washington, D.C., November 2017.
6. G. Canal, Y. Diaz-Mercado, M. Egerstedt, and C. Rozell. Controlling high-complexity robotic swarms with low-complexity EEG brain-machine interfaces. In *Society for Neuroscience Annual Meeting*, Washington, D.C., November 2017.
7. J. Lee, I. Kolb, C. Forest, and C. Rozell. Cell membrane tracking in live brain tissue with differential interference contrast (DIC) microscopy. In *Society for Neuroscience Annual Meeting*, Washington, D.C., November 2017.
8. C. Rozell. Active learning approaches for complex non-invasive brain-computer interfaces. In *Pulsar Workshop*, Lisbon, Portugal, June 2017.
9. C. Rozell, M. Wakin, H.L. Yap, and A. Eftekhari. Stabilizing embedology: Geometry-preserving delay-coordinate maps. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Lisbon, Portugal, June 2017. Selected for oral presentation.
10. A. Charles, J. Lee, N. Bertrand, and C. Rozell. Dynamic filtering with Earth Movers Distance regularization. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Lisbon, Portugal, June 2017.
11. A. Charles, D. Yin, and C. Rozell. Compression of multiple input streams into recursive neural networks. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Lisbon, Portugal, June 2017.

12. A. Eftekhari, H.L. Yap, M.B. Wakin, and C. Rozell. Stabilizing embedology: When do delay-coordinate maps preserve geometry? In *SIAM Conference on Applications of Dynamical Systems (DS17)*, Snowbird, UT, May 2017. Invited.
13. M. Bolus, A. Willats, C. Whitmire, C. Rozell, and G. Stanley. Closed-loop optogenetic control of neural circuits: Tracking dynamic trajectories of firing rate in vivo. In *Minnesota Neuromodulation Symposium*, Minneapolis, MN, April 2017.
14. N. Bertrand, H.L. Yap, A. Charles, and C. Rozell. Efficient randomized filtering for dimensionality reduction in electrophysiology data. In *Neural Information Processing Systems (NIPS) Workshop, Brains and Bits: Neuroscience Meets Machine Learning*, Barcelona, Spain, December 2016.
15. A. Charles, H.L. Yap, D. Yin, and C. Rozell. Short-term sequence memory in recurrent networks. In *Neural Information Processing Systems (NIPS) Workshop, Brains and Bits: Neuroscience Meets Machine Learning*, Barcelona, Spain, December 2016.
16. M. Connor and C. Rozell. Unsupervised learning of manifold models for neural coding of physical transformations in the ventral visual pathway. In *Neural Information Processing Systems (NIPS) Workshop, Brains and Bits: Neuroscience Meets Machine Learning*, Barcelona, Spain, December 2016.
17. M. Bolus, A. Willats, C. Whitmire, Z. Costello, M. Egerstedt, C. Rozell, and G. Stanley. Closed loop optogenetic control of neural circuits in vivo: Developing design principles for controlling patterns of neural firing rate. In *Society for Neuroscience Annual Meeting*, San Diego, CA, November 2016.
18. M. Bolus, A. Willats, C. Whitmire, Z. Costello, M. Egerstedt, C. Rozell, and G. Stanley. Closed loop optogenetic control of neural circuits in vivo: Developing design principles for controlling patterns of neural firing rate. In *Southeastern Medical Scientist Symposium (SEMSS)*, Birmingham, AL, November 2016.
19. M. Bolus, A. Willats, C. Whitmire, Z. Costello, M. Egerstedt, C. Rozell, and G. Stanley. Closed loop optogenetic control of neural circuits: Tracking dynamic trajectories of neural activity. In *Computational and Systems Neuroscience (COSYNE) Meeting*, Salt Lake City, UT, February 2016.
20. C. Rozell and N. Liu. Cortical communication via randomized dimensionality reduction with local synaptic connections. In *Computational and Systems Neuroscience (COSYNE) Meeting*, Salt Lake City, UT, February 2016.
21. C. Rozell and M. Norko. Learning manifold transport operators of 3D transformations from 2D imagery. In *Annual Interdisciplinary Conference*, Breckenridge, CO, January 2016.
22. A. Willats, M. Bolus, C. Whitmire, C. Rozell, and G. Stanley. Closing the loop around firing rate: Following dynamic trajectories. In *Society for Neuroscience Annual Meeting*, Chicago, IL, October 2015.

23. A. Charles and C. Rozell. Learning a dynamics dictionary for time-varying sparse signals. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Cambridge, UK, July 2015.
24. C. Rozell, M. Zhu, A. Charles, H.L. Yap, and M. Norko. The role of sparsity in visual perception. In *Proceedings of the Annual International Conference on Biologically Inspired Cognitive Architectures (BICA)*, Boston, MA, November 2014.
25. A. Kressner and C. Rozell. The influence of structure in binary mask estimation error on speech intelligibility. In *International Hearing Aid Research Conference (IHCON)*, Lake Tahoe, CA, August 2014. Selected for oral presentation.
26. A. Charles, C. Rozell, and N. Tufillaro. Sparsity based spectral super-resolution and applications to ocean water color. In *Proceedings of the International Geoscience and Remote Sensing Symposium (IGARSS)*, Quebec City, Quebec, Canada, July 2014.
27. D.C. Millard, C. Rozell, and G.B. Stanley. Coding consequences of activity propagation from sensory and artificial stimulation of neural circuits. In *Computational and Systems Neuroscience (COSYNE) Meeting*, Salt Lake City, UT, February 2014.
28. M. Zhu and C. Rozell. Modeling single-trial V1 population response to dynamic natural scenes. In *NIPS workshop: High-Dimensional Statistical Inference in the Brain*, Lake Tahoe, NV, December 2013.
29. A. Charles and C. Rozell. Stochastic filtering via reweighted-l1. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Lausanne, Switzerland, July 2013.
30. A. Charles, H.L. Yap, and C. Rozell. Using compressed sensing to study sequence memory capacity in networked systems. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Lausanne, Switzerland, July 2013.
31. A.P. Del Giorno, M. Zhu, and C. Rozell. A sparse coding model of V1 produces surround suppression effects in response to natural scene. In *Computational Neuroscience Meeting (CNS)*, Paris, France, July 2013.
32. A. Kressner and C. Rozell. Speech separation using matching pursuit for time-frequency masking. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Lausanne, Switzerland, July 2013.
33. M. Zhu, I. Stevenson, U. Koster, C. Gray, B. Olshausen, and C. Rozell. Sparse coding model captures V1 population response statistics to natural movies. In *Computational Neuroscience Meeting (CNS)*, Paris, France, July 2013.
34. H.L. Yap, A. Charles, and C. Rozell. Compressed sensing radar using recurrent neural networks. In *SONDRA Workshop*, La Londe les Maures, France, June 2013.



35. M. Zhu, I. Stevenson, U. Koster, C. Gray, B. Olshausen, and C. Rozell. Sparse coding model and population response statistics to natural movies in V1. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2013.
36. A. Charles, H.L. Yap, and C.J. Rozell. Short term memory in neural networks via the restricted isometry property. In *Computational Neuroscience Meeting Workshop on Methods of Information Theory in Computational Neuroscience*, Atlanta, GA, July 2012. Invited talk.
37. M. Zhu and C. Rozell. Biologically realistic excitatory and inhibitory cell properties emerge from a sparse coding network. In *Computational Neuroscience Meeting (CNS)*, Atlanta, GA, July 2012.
38. A. Eftekhari, H.L. Yap, C.J. Rozell, and M.B. Wakin. The restricted isometry property for block diagonal matrices. In *Challenges in Geometry, Analysis and Computation: High Dimensional Synthesis*, New Haven, CT, June 2012.
39. H.L. Yap, A. Charles, and C.J. Rozell. The restricted isometry property for echo state networks with applications to sequence memory capacity. In *Challenges in Geometry, Analysis and Computation: High Dimensional Synthesis*, New Haven, CT, June 2012.
40. A. Charles, H.L. Yap, and C.J. Rozell. Short-term memory capacity in recurrent networks via compressed sensing. In *Janelia Farm Conference on Machine Learning, Statistical Inference, and Neuroscience*, Ashburn, VA, May 2012.
41. M. Zhu and C.J. Rozell. Biophysically accurate non-classical and inhibitory interneuron properties in a sparse coding network. In *Janelia Farm Conference on Machine Learning, Statistical Inference, and Neuroscience*, Ashburn, VA, May 2012.
42. A. Charles, H.L. Yap, and C.J. Rozell. Short-term memory capacity in recurrent networks via compressed sensing. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2012.
43. M. Zhu, B. Olshausen, and C. Rozell. Biophysically accurate inhibitory interneuron properties in a sparse coding network. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2012.
44. A. Kressner, D. Anderson, and C. Rozell. Computational auditory models validate the intelligibility benefits of “efficient filters”. In *International Symposium on Auditory and Audiological Research (ISAAR)*, Nyborg, Denmark, August 2011.
45. D. Sale, C. Rozell, J. Romberg, and A. Lanterman. A compressive sensing LIDAR architecture. In *Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, Durham, NC, July 2011.
46. A. Balavoine, J. Romberg, and C.J. Rozell. Convergence and rate analysis of neural networks for sparse approximation. In *Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, Durham, NC, July 2011.

47. A. Charles, B. Olshausen, and C. Rozell. Learning sparse codes for hyperspectral images. In *Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, Durham, NC, July 2011.
48. H.L. Yap, J.Y. Park, A. Eftekhari, C.J. Rozell, and M.B. Wakin. Concentration inequalities and isometry properties for compressive block diagonal matrices. In *Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, Durham, NC, July 2011.
49. H.L. Yap and C. Rozell. Stable embeddings of time series data. In *Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, Durham, NC, July 2011.
50. C. Rozell and M. Zhu. Recent evidence of sparse coding in neural systems. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Edinburgh, Scotland, June 2011.
51. A. Charles and C. Rozell. A hierarchical re-weighted-l1 approach for dynamic sparse signal estimation. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Edinburgh, Scotland, June 2011.
52. H.L. Yap, J.Y. Park, A. Eftekhari, C.J. Rozell, and M.B. Wakin. Concentration inequalities and isometry properties for compressive block diagonal matrices. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Edinburgh, Scotland, June 2011.
53. H.L. Yap and C. Rozell. Stable embeddings of time series data. In *Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop*, Edinburgh, Scotland, June 2011.
54. D. Sale, C. Rozell, J. Romberg, and A. Lanterman. Compressive LIDAR conceptual model and simulation results. In *American Society for Photogrammetry & Remote Sensing (ASPRS) Annual Conference*, Milwaukee, WI, May 2011.
55. S. Shapero, D. Brüderle, P. Hasler, and C. Rozell. Sparse approximation on a network of locally competitive integrate and fire neurons. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2011.
56. M. Zhu and C. Rozell. Population characteristics and interpretations of ncrf effects emerging from sparse coding. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2011.
57. A. Kressner, C. Rozell, and D. Anderson. Predicting speech quality using a computational auditory model. In *International Hearing Aid Research Conference (IHCON)*, Lake Tahoe, CA, August 2010.
58. M. Zhu and C. Rozell. Sparse coding models demonstrate some non-classical receptive field effects. In *Computational Neuroscience Meeting (CNS)*, San Antonio, TX, July 2010. Selected for oral presentation.
59. A. Khosrowshahi, J. Baker, R. Herikstad, S. Yen, C. Rozell, and B. Olshausen. Exploring the statistical structure of large-scale neural recordings using a sparse coding model. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2010.

60. C.J. Rozell, D.H. Johnson, R.G. Baraniuk, and B.A. Olshausen. Neurally plausible sparse coding via competitive algorithms. In *Computational and Systems Neuroscience (Cosyne) Meeting*, Salt Lake City, UT, February 2007.
61. D.H. Johnson, C.J. Rozell, and I.N. Goodman. Information theory and neuroscience: A tutorial. In *Gulf Coast Consortium Conference on Theoretical & Computational Neuroscience*, Houston, TX, November 2006.
62. B.A. Olshausen, C.J. Rozell, D.H. Johnson, and R.G. Baraniuk. Sparse coding via thresholding and local competition. In *Gordon Research Conference on Sensory Coding and the Natural Environment*, Big Sky, MT, August 2006.
63. D.H. Johnson and C.J. Rozell. Information theory and neuroscience. In *Computational Neuroscience Meeting Workshop on Methods of Information Theory in Computational Neuroscience*, Edinburgh, UK, July 2006.

## OPINION PIECES AND EDITORIALS

1. M. Davenport, J. Laska, C. Rozell, and M. Wakin. The Way I See It: The Lessons of Rejection Shouldn't be Overlooked. *Rice University News*, July 15, 2009.

## OTHER REPORTS

1. H.L. Yap and C.J. Rozell. On the relation between block diagonal matrices and compressive Toeplitz matrices. Technical report, Georgia Institute of Technology, School of Electrical and Computer Engineering, October 2011.
2. C.J. Rozell. *Distributed redundant representations in man-made and biological sensing systems*. PhD thesis, Rice University, Houston, TX, May 2007.
3. C.J. Rozell. Analyzing dynamics and stimulus feature dependence in the information processing of crayfish sustaining fibers. Master's thesis, Rice University, Houston, TX, May 2002.

## INVITED LECTURES

1. Exploiting time-varying low-dimensional signal structure. Redwood Center for Theoretical Neuroscience, University of California, Berkeley, February 2018. Berkeley, CA.
2. Closing the loop between mind and machine: Building algorithms to interface with brains at multiple scales. Data Science Research Forum, Michigan Institute for Data Science (MIDAS), University of Michigan, December 2017. Ann Arbor, MI. **Keynote Address.**
3. Building the algorithmic foundations for interfacing, understanding and exploiting neural systems. Kavli Institute of Theoretical Physics program on Physics of Hearing: From Neurobiology to Information Theory and Back, July 2017. Santa Barbara, CA.

4. Dimensionality reduction as a model of efficient coding in sensory systems. Kavli Institute of Theoretical Physics program on Physics of Hearing: From Neurobiology to Information Theory and Back, July 2017. Santa Barbara, CA.
5. Optimal sensory coding theories for neural systems under biophysical constraints. Theoretical Neuroscience Day, Algorithms and Randomness Center and GT Neural Engineering Center, Georgia Institute of Technology, March 2017. Atlanta, GA.
6. Efficient coding with biophysical constraints can explain properties of networks and neural responses. In *Computational and Systems Neuroscience (COSYNE) Workshop on New Methods for Understanding Neural Dynamics and Computation*, Salt Lake City, UT, February 2017.
7. Open- and closed-loop optogenetic stimulation for injecting sensory information in vivo. Bernstein Sparks Workshop: Naturalistic integration of information from external stimulation into the ongoing neuronal activities of the brain, Hanse-Wissenschaftskolleg Institute for Advanced Study, October 2016. Delmenhorst, Germany.
8. Building models of sensory neural coding and developing tools to test them. Institute for Neuroscience Seminar Series, University of Texas-Austin, September 2016. Austin, TX.
9. Moving toward in vivo closed-loop optogenetic control of neural activity. In *American Control Conference (ACC) Workshop on Modeling, Estimation and Control Across Scales in Neuroscience*, Boston, MA, July 2016.
10. Exploiting low-dimensional geometric structure in high-dimensional data: lessons from neuroscience for machine learning. Center for Nonlinear Studies Seminar, Los Alamos National Laboratory, June 2016. Santa Fe, NM.
11. Exploiting the low-dimensional structure of dynamical system attractors. In *Computational and Systems Neuroscience (COSYNE) Workshop on Dimensionality reduction for the analysis and interpretation of high-dimensional neural datasets*, Salt Lake City, UT, February 2016.
12. The big (BRAIN) data cometh: Low-dimensional models for understanding neural systems. Joint Biomedical Engineering and Center for Systems Neuroscience Seminar, Boston University, January 2016. Boston, MA.
13. The big (BRAIN) data cometh: Low-dimensional models for understanding neural systems. Systems, Information, Learning and Optimization (SILO) seminar, Wisconsin Institute for Discovery, University of Wisconsin, November 2015. Madison, WI.
14. Dimensionality reduction as a model of efficient coding in the visual pathway. Neuroscience Workshop on Dimensionality Reduction Methods, Center for Mind, Brain, and Culture, Emory University, October 2015. Atlanta, GA.

15. Optimal sensory coding theories for neural systems under biophysical constraints. *Conference on Sensing, information and decision at the cellular level*, Abdus Salam International Center for Theoretical Physics (ICTP), July 2015. Trieste, Italy.
16. Dynamical systems and low-dimensional signal models. ECE Department seminar, Carnegie Mellon University, March 2015. Pittsburgh, PA.
17. Optimal sensory coding under constraints. Biomedical Engineering Department seminar, Johns Hopkins University, March 2015. Baltimore, MD.
18. Dimensionality reduction with constrained randomized operators. CDA/Skytree Machine Learning seminar series, April 2014. Atlanta, GA.
19. Signal processing for computational neuroscience. IEEE Atlanta Chapter Signal Processing Society lecture, April 2014. Atlanta, GA.
20. Exploring optimal sensory coding theories for neural systems under biophysical constraints. ECE Department seminar, Rice University, March 2014. Houston, TX.
21. Exploring optimal sensory coding theories under biophysical constraints. Computational Neuroscience seminar, University of Texas-Austin, March 2014. Austin, TX.
22. On the move: Dynamical systems for modeling, measurement and inference in sparse signal models. Institute for Computational Engineering and Sciences seminar, University of Texas-Austin, March 2014. Austin, TX.
23. Exploring optimal sensory coding theories under biophysical constraints. Computational Neuroscience Reading Group seminar, University of Michigan, February 2014. Ann Arbor, MI.
24. On the move: Dynamical systems for modeling, measurement and inference in sparse signal models. Communications and Signal Processing seminar, EECS Department, University of Michigan, February 2014. Ann Arbor, MI.
25. On the move: Dynamical systems for modeling, measurement and inference in compressed sensing. In *Matheon Workshop on Compressed Sensing and its Applications*, Berlin, Germany, December 2013.
26. How can efficient neural coding be exploited for neural interfacing? Brain Workshop: Enabling Health through Neurotechnologies, October 2013. Atlanta, GA.
27. Tracking time-varying sparse signals. In *Advanced Modem Technology Forum, Qualcomm Technologies, Inc.*, San Diego, CA, May 2013.
28. Sparse coding in brains and machines: exploiting insight from neuroscience to improve data analysis with sparsity models. Research Seminar, Qualcomm Technologies, Inc., April 2013. San Diego, CA.
29. Dynamical systems for modeling, measurement and inference with sparse signals. *Electrical and Computer Engineering Seminar*, Duke University, October 2012. Durham, NC.

30. Recursive estimation of dynamic signals with sparsity models via re-weighted l1 minimization. In *Janelia Farm Conference on Machine Learning, Statistical Inference, and Neuroscience*, Ashburn, VA, May 2012.
31. Spectral super-resolution of hyperspectral images. In *SIAM Conference on Imaging Science*, Philadelphia, PA, May 2012.
32. Sparse coding networks and compressed sensing in neural systems. *INC Chalk Talk Series*, Institute for Neural Computation, University of California at San Diego, October 2011. La Jolla, CA.
33. Sparsity models for hyperspectral imaging and compressive sensing LIDAR. *CIS Seminar Series*, Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology, October 2011. Rochester, NY.
34. Sparsity models and constrained systems: What does neuroscience have to do with compressed sensing? *Communications Seminar*, Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, April 2011. Urbana, IL.
35. Compressed sensing design of LIDAR sensors. United States Geospatial Intelligence Foundation GEOINT Symposium, November 2010. New Orleans, LA.
36. Compressed sensing design of LIDAR sensors. NGA Compressive Sensing Workshop, June 2010. McLean, VA.
37. Network models of sparse coding and nonclassical receptive field effects. NSF Workshop on Hybrid Neuro-Computer Vision Systems, April 2010. New York, NY.
38. Sparse representation for image analysis and understanding. Day-long short course attended by representatives from several government agencies, January 2009. Washington, D.C.
39. Low-dimensional models in computational neuroscience and signal processing. *Center for Signal and Image Processing Seminar*, ECE Department, Georgia Institute of Technology, October 2008. Atlanta, GA.
40. Analog and digital sparse approximation with applications to compressed sensing. In *2008 SIAM Conference on Imaging Science*, San Diego, CA, July 2008. Invited talk.
41. Neural architectures for sparse approximation. *Networking, Communications, and DSP Seminar*, EECS Department, UC Berkeley, April 2008. Berkeley, CA.
42. Neural architectures for sparse approximation. In *Information Theory and Applications Workshop*, La Jolla, CA, January 2008. Invited talk.
43. When bits meet brains: Locally competitive algorithms for sparse approximation. *Electrical and Computer Engineering Seminar*, McGill University, May 2007. Montreal, Canada.
44. When bits meet brains: Locally competitive algorithms for sparse approximation. *Electrical and Computer Engineering Seminar*, Georgia Institute of Technology, May 2007. Atlanta, GA.

45. Neurally plausible sparse coding via locally competitive algorithms. *Center for the Neural Basis of Cognition Seminar*, Carnegie Mellon University, April 2007. Pittsburgh, PA.
46. When bits meet brains: Locally competitive algorithms for sparse approximation. *Electrical Engineering Seminar*, UCLA, March 2007. Los Angeles, CA.
47. Signal processing and electronic music. *IEEE Student Chapter Undergraduate Lecture Series*, Rice University, January 2006. Houston, TX.
48. Measuring information consequences of signal processing. *Research Seminar*, Dolby Laboratories, June 2004. San Francisco, CA.