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Guillermo A. Cecchi

Research Staff Member - Computational Neuroscience

Thomas J. Watson Research Center, Yorktown Heights, NY USA

gcecchi@us.ibm.com +1-914-945-1815

Academic background

Guillermo Cecchi received an education in Physics (MSc, University of La Plata, Argentina, 1991), Physics and Biology (PhD, The Rockefeller University, 1994-1999), and Imaging in Psychiatry (Postdoctoral Fellow, Cornell University 2000-2001). He has been interested in diverse aspects of theoretical biology, including Brownian transport, molecular computation, spike reliability in neurons, song production and representation in songbirds, statistics of natural images and visual perception, statistics of natural language, and brain imaging. In 2001 he joined IBM Research to work on computational approaches to brain function.

Areas of research

Behavioral modeling: models of perception, cognition and behavior based on large-scale database analysis, including speech analysis in psychiatry.

Machine learning applications to the study of fMRI signals: utilization of state-of-the-art techniques in Machine Learning to build predictive models of the responses to complex tasks, under the assumption that brain function consists of extended spatio-temporal states.

Statistical network theory approaches for complex biological networks: identification of novel topological and dynamical regularities to characterize the emergent properties of complex biological systems.

Network-based approaches to dysfunctional brain states: application of network theory to characterize and predict complex psychiatric diseases, with an emphasis on schizophrenia and chronic pain.

Large-scale structure of cortical visual maps: analysis and modeling of the spatial structure of responses to visual inputs, and studies of the relationship between self-organized models of map formation and the statistics of visual inputs.

Learning and dynamics in oscillatory neural networks: study of the topological and dynamical effect of experimentally validated rules of synaptic plasticity, and their relationship with the theory of criticality.

Selected Publications

Automated Analysis of Free Speech Predicts Psychosis Onset in High-Risk Youths, NPJ Schizophrenia (2015).

Loss of consciousness is associated with stabilization of distributed cortical dynamics, Journal of Neuroscience (2015).

A Window into the Intoxicated Mind? Speech as an Index of Psychoactive Drug Effects, Neuropsychopharmacology (2014).

Perceptual basis of evolving Western musical styles, PNAS (2013).

Predictive Dynamics of Pain Perception, PLoS Computational Biology (2012).

Self-organized Dynamical Criticality in Human ECoG, Frontiers Integrative Neuroscience (2012).

Speech Graphs Provide a Quantitative Measure of Thought Disorder in Psychosis, PLoS One (2012).

The relevance of the time domain in neural networks models, Springer (2012).

Full-brain Auto-Regressive Modeling (FARM) using fMRI, Neuroimage (2011).

A theory of loop formation and elimination by STDP, Frontiers in Neuroscience (2010).

Predictive network models of schizophrenia, NIPS (2009).

Self-tuned critical networks, Physical Review Letters (2009).

High throughput image analysis and reconstruction, Artech House (2009).

Ordered cyclic motifs contribute to dynamic stability in biological and engineered networks, PNAS (2008).

Unsupervised segmentation with dynamical units, IEEE Transactions on Neural Networks (2008).

Scale-free brain functional networks, Physical Review Letters (2005).

Global properties of the Wordnet lexicon, PNAS (2002).

Unsupervised learning and adaptation in a model of adult neurogenesis, Journal of Computational Neuroscience (2001).

Simple motor gestures for birdsong, Physical Review Letters (2001).

On a common circle: natural scenes and Gestalt rules, PNAS (2001).

Noise in neurons is message-dependent, PNAS (2000).

Toward a Song Code: Syllabic Representation in the Canary Brain, Neuron (1998).

Efficiency of DNA Replication in the Polymerase Chain Reaction, PNAS (1996).

Negative Resistance and Rectification in Brownian Transport, Physical Review Letters (1996).

Recent Press Coverage

[Forbes \(09/2015\)](#)

[The Atlantic \(08/2015\)](#)

[NIMH Director's Blog \(08/2015\)](#)

[IBM Blog \(08/2015\)](#)

[Hay Festival of Literature and the Arts \(10/2014\)](#)

[The Verge \(07/2014\)](#)

[Smarter Planet Blog \(07/2014\)](#)

[Argentina Public TV \(09/2013\)](#)
[Science Magazine Podcast \(07/2013\)](#)
[IBM Blog \(05/2013\)](#)
[Scientific American \(Italy\) \(05/2013\)](#)
[Diario Perfil, Argentina \(2013\)](#)
[La Nacion, Argentina \(2013\)](#)
[IBM Blog \(10/2012\)](#)
[IBM Blog \(5/2012\)](#)
[Folha de Sao Paulo, Brazil \(2012\)](#)
[La Nacion, Argentina \(2011\)](#)
[The Guardian, UK \(2011\)](#)

A theory of loop formation and elimination by STDP, *Frontiers in Neuroscience* (2010).
Predictive network models of schizophrenia, *NIPS* (2009).
Self-tuned critical networks, *Physical Review Letters* (2009).
High throughput image analysis and reconstruction, *Artech House* (2009).
Ordered cyclic motifs contribute to dynamic stability in biological and engineered networks, *PNAS* (2008).
Unsupervised segmentation with dynamical units, *IEEE Transactions on Neural Networks* (2008).
Scale-free brain functional networks, *Physical Review Letters* (2005).
Global properties of the Wordnet lexicon, *PNAS* (2002).
Unsupervised learning and adaptation in a model of adult neurogenesis, *Journal of Computational Neuroscience* (2001).
Simple motor gestures for birdsong, *Physical Review Letters* (2001).
On a common circle: natural scenes and Gestalt rules, *PNAS* (2001).
Noise in neurons is message-dependent, *PNAS* (2000).
Toward a Song Code: Syllabic Representation in the Canary Brain, *Neuron* (1998).
Efficiency of DNA Replication in the Polymerase Chain Reaction, *PNAS* (1996).
Negative Resistance and Rectification in Brownian Transport, *Physical Review Letters* (1996).

Recent Press Coverage

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[Hay Festival of Literature and the Arts \(10/2014\)](#)
[The Verge \(07/2014\)](#)
[Smarter Planet Blog \(07/2014\)](#)
[Argentina Public TV \(09/2013\)](#)
[Science Magazine Podcast \(07/2013\)](#)
[IBM Blog \(05/2013\)](#)
[Scientific American \(Italy\) \(05/2013\)](#)
[Diario Perfil, Argentina \(2013\)](#)

[La Nacion, Argentina \(2013\)](#)
[IBM Blog \(10/2012\)](#)
[IBM Blog \(5/2012\)](#)
[Folha de Sao Paulo, Brazil \(2012\)](#)
[La Nacion, Argentina \(2011\)](#)
[The Guardian, UK \(2011\)](#)

Publications

2015

➔ **Automated Analysis of Free Speech Predicts Psychosis Onset in High-Risk Youths**

F. Carrillo, G. Bedi, [G.A. Cecchi](#), D.F. Slezak, M. Sigman, N. Mota, S. Ribeiro, D.C. Javitt, M. Copelli and C. Corcoran
NPJ Schizophrenia, 2015

[Abstract](#)

➔ **The music of morality and logic**

B. Mesz, P.H. Rodriguez Zivic, [G.A. Cecchi](#), M. Sigman and M.A. Trevisan
Front. in Psychology, 2015

[Abstract](#)

➔ **Loss of consciousness is associated with stabilization of distributed cortical dynamics**

G. Solovey, L. Alonso, T. Yanagawa, N. Fujii, M. Magnasco, [G.A. Cecchi](#), and A. Proekt
Journal of Neuroscience 35(30), 10866-10877, 2015

[Abstract](#)

➔ **Noise-Driven Causal Inference in Biomolecular Networks**

R.J. Prill, R. Vogel, [G.A. Cecchi](#), G. Altan-Bonnet, G. Stolovitzky
PLoS ONE 10(6), e0125777, 2015

[Abstract](#)

➔ **Pain and Machine Learning**

[G.A. Cecchi](#)

The Brain Adapting with Pain, A.V. Apkarian (Ed), Wolters Kluwer, 2015

➔ **Modeling the Brain as a Network**

[G.A. Cecchi](#)

The Brain Adapting with Pain, A.V. Apkarian (Ed.), Wolters Kluwer, 2015

➔ **Automated speech analysis for psychosis evaluation**

F. Carrillo, N. Mota, M. Copelli, S. Ribeiro, M. Sigman, [G.A. Cecchi](#), D. Fernandez Slezak
NIPS - Machine Learning and Interpretation in Neuro Imaging (2014), Lecture Notes in Artificial Intelligence - Springer (in press), 2015

[Abstract](#)

➔ **Fast Distributed Dynamics of Semantic Networks via Social Media**

F. Carrillo, [G.A. Cecchi](#), M. Sigman and D. Fernandez Slezak
Computational Intelligence and Neuroscience, 2015

[Abstract](#)

➔ **Turing a la Freud: Test for an Automated Psychiatrist**

[G.A. Cecchi](#) and [I. Rish](#)

Beyond the Turing Test - AAAI 2015 Workshop

[Abstract](#)

2014

[**➔Reliability Estimation and Enhancement via Spatial Smoothing in Sparse fMRI Modeling**](#)

Carroll, Melissa K., [Guillermo A. Cecchi](#), Irina Rish, Rahul Garg, Marwan Baliki, and A. Vania Apkarian
Practical Applications of Sparse Modeling, pp. 123-150, MIT Press, 2014

[**➔The Challenges of Systems Biology**](#)

Pablo Meyer and [Guillermo A. Cecchi](#)
Practical Applications of Sparse Modeling, pp. 7-15, MIT Press, 2014

[**➔Augmented Human: Human OS for Improved Mental Function**](#)

Steve Heisig, [Guillermo A. Cecchi](#), Ravi Rao and Irina Rish
AAAI'14 Workshop on Cognitive Computing for Augmented Human Intelligence, 2014
[Abstract](#)

[**➔Practical Applications of Sparse Modeling**](#)

Irina Rish, [Guillermo A. Cecchi](#), Aurelie Lozano and Alexandru Niculescu-Mizil
MIT Press, 2014
[Abstract](#)

[**➔A Window into the Intoxicated Mind? Speech as an Index of Psychoactive Drug Effects**](#)

Bedi G, [Cecchi G A](#), Fernandez Slezak D, Carrillo F, Sigman M, de Wit H
Neuropsychopharmacology, 2014
[Abstract](#)

[**➔Dynamical criticality during induction of anesthesia in human ECoG recordings**](#)

L.M. Alonso, A. Proekt, T.H. Schwartz, K.O. Pryor, [G.A. Cecchi](#) and [M.O. Magnasco](#)
Frontiers in Neural Circuits, 2014
[Abstract](#)

[**➔The geometry of expertise**](#)

Maria Juliana Leone, Diego Fernandez_Slezak, [Guillermo A Cecchi](#) and [Mariano Sigman](#)
Frontiers in Psychology, 2014
[Abstract](#)

[**➔Special Topic: Integrated Approaches to Measurement, Analysis and Modeling of Cortical Networks**](#)

[G.A. Cecchi](#), E. Kaplan, A.R. Rao (Editors)
Frontiers in Neural Circuits, 2014
[Abstract](#)

[**➔Spatial localization of the first and last enzymes effectively connects active metabolic pathways in bacteria**](#)

Pablo Meyer, [Guillermo Cecchi](#) and [Gustavo Stolovitzky](#)
*BMC Systems Biology*8:131, 2014
[Abstract](#)

2013

[**➔Multisensory integration using sparse spatio-temporal encoding**](#)

A. Ravishankar Rao, [Guillermo A. Cecchi](#)
International Joint Conference on Neural Networks, IJCNN, IEEE, 2013
[Abstract](#)

[**➔Capacity limits in oscillatory networks: implications for sensory coding**](#)

A. Ravishankar Rao, [Guillermo A. Cecchi](#)
International Joint Conference on Neural Networks, IJCNN, IEEE, 2013
[Abstract](#)

[**➔Perceptual basis of evolving Western musical styles**](#)

P. Zivic, F. Shifres, [G.A. Cecchi](#)
Proc. Natl. Acad. Sci. USA, 2013
[Abstract](#)

➔ **Linking human brain local activity fluctuations to structural and functional network architectures**

A.T. Baria, A. Mansour, L. Huang, M.N. Baliki, [G.A. Cecchi](#), M.M. Mesulam, A.V. Apkarian
*Neuroimage*73, 144-155, 2013

[Abstract](#)

➔ **Schizophrenia as a Network Disease: Disruption of Emergent Brain Function in Patients with Auditory Hallucinations**

[Irina Rish](#), [Guillermo Cecchi](#), Benjamin Thyreau, Bertrand Thirion, Marion Plaze, Marie Laure Paillere-Martinot, Catherine Martelli, Jean-Luc Martinot, Jean-Baptiste Poline
PLoS one 8(1), e50625, Public Library of Science, 2013

[Abstract](#)

2012

➔ **Predictive Dynamics of Human Pain Perception**

[Guillermo A Cecchi](#), Lejian Huang, Javeria Ali Hashmi, Marwan Baliki, Mar\`ia V Centeno, [Irina Rish](#), A Vania
PLoS computational biology 8(10), e1002719, Public Library of Science, 2012

[Abstract](#)

➔ **A quantitative philology of introspection**

C. Diuk, D. Fernandez Slezak, I. Raskovsky, M. Sigman and G.A. Cecchi
Frontiers in Integrative Neuroscience, 2012

[Abstract](#)

➔ **Variable Selection for Gaussian Graphical Models**

J. Honorio, D. Samaras, I. Rish, [G.A. Cecchi](#)
Artificial Intelligence and Statistics (AISTATS), pp. 538-546, MIT Press, 2012

[Abstract](#)

➔ **Schizophrenia classification using functional network features**

[Irina Rish](#), [Guillermo A Cecchi](#), Kyle Heuton
SPIE Medical Imaging, pp. 83170W--83170W, 2012

[Abstract](#)

➔ **Sparse regression analysis of task-relevant information distribution in the brain**

I. Rish, [G.A. Cecchi](#), K. Heuton, N.N. Baliki, A.V. Apkarian
SPIE Medical Imaging, 2012

[Abstract](#)

➔ **Speech Graphs Provide a Quantitative Measure of Thought Disorder in Psychosis**

N.B. Mota, N.A.P. Vasconcelos, N. Lemos, A.C. Pieretti, O. Kinouchi, [G.A. Cecchi](#), M. Copelli, S. Ribeiro
PLoS One, 2012

➔ **Self-regulated dynamical criticality in human ECoG**

G. Solovey, K.J. Miller, J.G. Ojemann, M.O. Magnasco and G.A. Cecchi
*Frontiers in Integrative Neuroscience*6, 44:1-9, 2012

2011

➔ **Notes on a history of the mechanical mind (in Spanish)**

[G.A. Cecchi](#)

*Istor*44, 35-56, Centro de Investigacion y Docencia Economicas, Mexico, 2011

➔ **The effects of feedback and lateral connections on perceptual processing: a study using oscillatory networks**

A.R. Rao and G.A. Cecchi
Proceedings of the International Joint Conference on Neural Networks (IJCNN), 2011

➔ **Seeing with the Eyes Shut: Neural Basis of Enhanced Imagery following Ayahuasca Ingestion**

D.B. de Araujo, S. Ribeiro, [G.A. Cecchi](#), F.M. Carvalho, T. A. Sanchez, J.P. Pinto, B.S de Martinis, J.A. Crippa, J.E.C. Hallak, A. C. Santos
Human Brain Mapping, Wiley, 2011

↪The Relevance of the Time Domain to Neural Network Models

A.R. Rao and G.A. Cecchi (Eds.)
Springer - Series in Cognitive and Neural Systems, 2011

↪Fast computation of functional networks from fMRI activity: a multi-platform comparison

A.R. Rao, R.Bordawekar, G.A. Cecchi
SPIE Conference on Medical Imaging, pp. 79624L, SPIE Press, 2011

↪Brain as a self-predictor: Sparse full-brain auto-regressive modeling in fMRI

R. Garg, G.A. Cecchi, A.R. Rao
Biomedical Imaging: From Nano to Macro, 2011 IEEE International Symposium

↪A spatio-temporal support vector machine searchlight for fMRI analysis

A R Rao, R Garg, G A Cecchi
Biomedical Imaging: From Nano to Macro, 2011 IEEE International Symposium, pp. 1023--1026

↪Full-brain Auto-Regressive Modeling (FARM) using fMRI

R Garg, G A Cecchi, A R Rao
NeuroImage, Elsevier, 2011

↪Characteristics of voxel prediction power in full-brain Granger causality analysis of fMRI data (Proceedings Paper)

R Garg, G A Cecchi, A R Rao
Medical Imaging 2011: Biomedical Applications in Molecular, Structural, and Functional Imaging

2010

↪When the Optimal Is Not the Best: Parameter Estimation in Complex Biological Models

D. Fernandez Slezak, C. Suarez, G.A. Cecchi, G. Marshall, G. Stolovitzky
PLoS ONE, 2010

↪Sparse regression models of pain perception

Irina Rish, Guillermo A Cecchi, Marwan N Baliki, A Vania Apkarian
Brain Informatics, pp. 212--223, Springer, 2010
[Abstract](#)

↪Response time distributions in rapid chess: A large-scale decision making experiment

M Sigman, P Etchemendy, D F Slezak, G A Cecchi
Frontiers in Decision Neuroscience, 2010

↪Statistics of natural scenes and cortical color processing

Guillermo A. Cecchi, A. Ravishankar Rao, Youping Xiao and Ehud Kaplan
Journal of Vision 10(11), 2010

↪Investigating the variation of orientation tuning in a computational model of the visual cortex

A R Rao, G A Cecchi
Neural Networks (IJCNN), The 2010 International Joint Conference on, pp. 1--8

↪An objective function utilizing complex sparsity for efficient segmentation in multi-layer oscillatory networks

A R Rao, G A Cecchi
International Journal of Intelligent Computing and Cybernetics3, Emerald Group Publishing Limited, 2010

↪The emergence of the modern concept of introspection: a quantitative linguistic analysis

I Raskovsky, D F Slezak, CG Diuk, GA Cecchi
Young Investigators Workshop on Computational Approaches to Languages of the Americas, pp. 68, 2010

↪A theory of loop formation and elimination by spike timing-dependent plasticity

J Kozloski, G A Cecchi
Frontiers in Neural Circuits4, 2010

2009

[↪High-throughput image reconstruction and analysis](#)

A R Rao, [G](#) A Cecchi

2009 - books.google.com, Artech House Publishers

[↪Discriminative network models of schizophrenia](#)

[Guillermo Cecchi](#), [Irina Rish](#), Benjamin Thyreau, Bertrand Thirion, Marion Plaze, Marie-Laure Paillere-Martinot, Catherine Martelli, Jean-Luc Martinot, Jean-Baptiste Poline
Advances in Neural Information Processing Systems (NIPS 2009), pp. 252--260, Citeseer

[↪A Cluster Overlap Measure for Comparison of Activations in fMRI Studies](#)

[G](#) Cecchi, R Garg, A Rao
Medical Image Computing and Computer-Assisted Intervention--MICCAI 2009, pp. 1018--1025, Springer

[↪Self-Organizing Map Simulations Confirm Similarity of Spatial Correlation Structure in Natural Images and Cortical Representations](#)

A Rao, [G](#) Cecchi

Artificial Neural Networks--ICANN 2009, 587--597, Springer

[↪Self-Tuned Critical Anti-Hebbian Networks](#)

M O Magnasco, O Piro, [G](#) Cecchi, A Cecchi

Physical Review Letters 102(25), 258102, APS, 2009

[↪Prediction and interpretation of distributed neural activity with sparse models](#)

Melissa K Carroll, [Guillermo A Cecchi](#), [Irina Rish](#), Rahul Garg, A Ravishankar Rao
NeuroImage 44(1), 112--122, Elsevier, 2009

[↪An optimization approach to understanding structure-function relationships in the visual cortex](#)

A R Rao, [G](#) Cecchi, A Cecchi

Proceedings of the 2009 international joint conference on Neural Networks, pp. 1152--1159

2008

[↪Ordered cyclic motifs contribute to dynamic stability in biological and engineered networks](#)

Avi Ma'ayan, [Guillermo A. Cecchi](#), [John Wagner](#), A. Ravi Rao, Ravi Iyengar, and Gustavo Stolovitzky
Proc Natl Acad Sci U S A 105(49), 19235-19240, National Acad Sciences, 2008

[↪Unsupervised segmentation with dynamical units](#)

A R Rao, [G](#) Cecchi, A Cecchi, C C Peck, [J](#) Kozloski

IEEE Transactions on Neural Networks 19(1), 168, IEEE, 2008

[↪Inferring brain dynamics using granger causality on fMRI data](#)

[GA](#) Cecchi, R Garg, AR Rao

5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro, 2008, pp. 604--607

[↪Efficient segmentation in multi-layer oscillatory networks](#)

A Ravishankar Rao, [G](#) Cecchi, A Cecchi, C C Peck, [J](#) Kozloski

Neural Networks, 2008, pp. 2966--2973

[↪Network-related challenges and insights from neuroscience](#)

C Peck, [J](#) Kozloski, [G](#) Cecchi, S Hill, F Schuermann, H Markram, R Rao

Bio-Inspired Computing and Communication, pp. 67--78, Springer, 2008

[↪Improved mapping of information distribution across the cortical surface with the support vector machine](#)

Y Xiao, R Rao, [G](#) Cecchi, E Kaplan

Neural Networks 21(2-3), 341--348, Elsevier, 2008

[↪Spatio-temporal dynamics during perceptual processing in an oscillatory neural network](#)

A Rao, [G](#) Cecchi

Proceedings of the 18th international conference on Artificial Neural Networks, Part II, pp. 685--694, Springer, 2008

↪Closed-form supervised dimensionality reduction with generalized linear models

Irina Rish, Genady Grabarnik, Guillermo Cecchi, Francisco Pereira, Geoffrey J Gordon
Proceedings of the 25th international conference on Machine learning, pp. 832--839, 2008

↪Statistics of natural scenes and the cortical representation of color

GA Cecchi, AR Rao, Y Xiao, E Kaplan
Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, pp. 5, 2008

2007

↪Layer 2/3 Is A Neural Multigrid: Information Maximization In A Local Network Explains V1 Hypercolumn Formation

J Kozloski, C C Peck, G A Cecchi, A R Rao
Cosyne ProceedingsPoster II-70, 2007

↪Emergence of Topographic Cortical Maps in a Parameterless Local Competition Network

A Rao, G Cecchi, C Peck, J Kozloski
Advances in Neural Networks, ISSN 20074492, 552--561, Springer

↪Identifying directed links in large scale functional networks: application to brain fMRI

G Cecchi, A R Rao, M Centeno, M Baliki, A V Apkarian, D Chialvo
BMC Cell Biology 8(Suppl 1), S5, BioMed Central Ltd, 2007

↪Cortical representation of information about visual attributes: one network or many?

Y Xiao, R Rao, G Cecchi, E Kaplan
Proceedings of the international joint conference on neural networks, pp. 1785--1789, 2007

↪Topographic Infomax in a Neural Multigrid

J Kozloski, G Cecchi, C Peck, A Rao
Advances in Neural Networks, ISSN 20074492, 500--509, Springer

↪High performance computing environment for multidimensional image analysis

R A Ravishankar, C Guillermo, M Marcelo
BMC Cell Biology 8(Suppl 1), S9, BioMed Central Ltd, 2007

2006

↪An optimization approach to achieve unsupervised segmentation and binding in a dynamical network

A R Rao, G A Cecchi, C C Peck, J R Kozloski
IEEE International Joint Conference on Neural Networks, 2006, pp. 4159--4166

↪Inference and segmentation in cortical processing

Y Liu, G A Cecchi, A R Rao, J Kozloski, C C Peck
Proceedings of SPIE, pp. 344--353, 2006

↪Translation invariance in a network of oscillatory units

A R Rao, G A Cecchi, C C Peck, J R Kozloski
Proceedings of SPIE, pp. 469--477, 2006

2005

↪Evaluation of the effect of input stimuli on the quality of orientation maps produced through self organization

A Rao, G Cecchi, C Peck, J Kozloski
Image Analysis, 64--71, Springer, 2005

↪Computational models of adult neurogenesis

G A Cecchi, M O Magnasco
Physica A: Statistical Mechanics and its Applications 356(1), 43--47, Elsevier, 2005

↪A Biologically Motivated Classifier that Preserves Implicit Relationship Information in Layered Networks

C C P J K Guillermo, A Cecchi, A R Rao
Adaptive and natural computing algorithms: proceedings of the international conference in Coimbra, Portugal, 2005, pp. 82, Springer

↪A model of the formation of a self-organized cortical representation of color

A R Rao, G Cecchi, C Peck, J Kozloski
Proc. SPIE, pp. 17--26, 2005

↪Scale-free brain functional networks

V M Eguiluz, D R Chialvo, G A Cecchi, M Baliki, A V Apkarian
Physical Review Letters 94(1), 18102, APS, 2005

2003

↪Simulation infrastructure for modeling large scale neural systems

C Peck, J Kozloski, A Rao, G Cecchi
Computational Science, ICCS, 713--713, Springer, 2003

2002

↪Global organization of the Wordnet lexicon

M Sigman, G A Cecchi
Proceedings of the National Academy of Sciences 99(3), 1742, National Acad Sciences, 2002

2001

↪On a common circle: Natural scenes and Gestalt rules

M Sigman, G A Cecchi, C D Gilbert, M O Magnasco
Proceedings of the National Academy of Sciences 98(4), 1935, National Acad Sciences, 2001

↪Simple motor gestures for birdsongs

T Gardner, G Cecchi, M Magnasco, R Laje, G B Mindlin
Physical review letters 87(20), 208101, APS, 2001

↪Unsupervised learning and adaptation in a model of adult neurogenesis

G A Cecchi, L T Petreanu, A Alvarez-Buylla, M O Magnasco
Journal of computational neuroscience 11(2), 175--182, Springer, 2001

2000

■Noise-induced memory in extended excitable systems

Dante R. Chialvo, Guillermo A. Cecchi, and Marcelo O. Magnasco
Physical Review E 61, 5654-5657, 2000

↪Noise in neurons is message dependent

G A Cecchi, M Sigman, J M Alonso, L Mart{\'i}nez, D R Chialvo, M O Magnasco
Proceedings of the National Academy of Sciences 97(10), 5557, National Acad Sciences, 2000

1999

↪DNA Based Molecular Computation: Temp late-Temp late Interactions in PCR

P D Kaplan, G Cecchi, A Libchaber
DNA based computers II: DIMACS workshop, June 10-12, 1996, pp. 97, 1999

↪An automated system for the mapping and quantitative analysis of immunocytochemistry of an inducible nuclear protein

G A Cecchi, S Ribeiro, C V Mello, M O Magnasco
Journal of neuroscience methods 87(2), 147--158, Elsevier, 1999

1998

↪Toward a song code: evidence for a syllabic representation in the canary brain

Sidarta Ribeiro, Guillermo A Cecchi, Marcelo O Magnasco, Claudio V Mello
Neuron 21(2), 359--371, Elsevier, 1998

1996

↪Negative Resistance and Rectification in Brownian Transport

Guillermo A. Cecchi and Marcelo O. Magnasco
Physical Review Letters 76, 1968-1971, 1996

[↪Efficiency of DNA replication in the polymerase chain reaction](#)

G Stolovitzky, G Cecchi
Proceedings of the National Academy of Sciences of the United States of America 93(23), 12947,
National Acad Sciences, 1996

1995

[↪Molecular computation: Adleman's experiment repeated](#)

P Kaplan, G Cecchi, A Libchaber
*Manuscript*130, 1995

1993

[↪Periodically kicked hard oscillators](#)

GA Cecchi, DL Gonzalez, MO Magnasco, GB Mindlin, O Piro, AJ Santillan
Chaos 3(1), 1993

Recently Organized Workshop

- [Machine Learning and Interpretation in Neuroimaging \(NIPS, 2014\)](#)
- [Physics and Neuroscience Summer School \(International Institute of Physics, Natal, Brazil 2014\)](#)
- [Machine Learning and Interpretation in Neuroimaging \(NIPS, 2013\)](#)
- [Machine Learning and Interpretation in Neuroimaging \(NIPS, 2012\)](#)
- [Machine Learning and Inference in Neuroimaging \(NIPS, 2011\)](#)
- [Practical Applications of Sparse Modeling: Open Issues and New Directions \(NIPS, 2010\)](#)
- [The relevance of the time domain to neural network models \(IJCNN, 2009\)](#)
- [New Directions in Statistical Learning for Meaningful and Reproducible fMRI Analysis \(NIPS, 2008\)](#)
- [Sparse Optimization and Variable Selection \(ICML, 2008\)](#)

External Collaborations

- [University of Buenos Aires: computational linguistics for psychiatry](#)
- [Neuromat: developing mathematics for the brain.](#)
- [Northwestern University: predictive modeling of chronic pain](#)
- [Rockefeller University: dynamical criticality in human brain electrophysiology](#)
- [Mt. Sinai School of Medicine: models of spatial organization of the visual cortex](#)
- [Columbia University Medical Center: automated language markers in drug abuse](#)
- [Columbia University Medical Center: automated language markers of psychiatric disorders](#)
- [Memorial Sloan Kettering Cancer Center: reverse engineering of biological networks](#)
- [Natal International Neurosciences Institute, Brazil: global brain function](#)