

CURRICULUM VITAE ET STUDIORUM

RUBEN COEN-CAGLI

AFFILIATIONS

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PERSONAL DATA

Born 08/08/1979, Napoli
Nationality: Italian
Marital Status: Married

RESUME

Since January 2008, I am a Postdoctoral Associate in the Laboratory of Computational Neuroscience led by Odelia Schwartz at the Albert Einstein College of Medicine, New York. I received the PhD degree in Physics in December 2007 from the University of Napoli, Italy.

My broad research goal is to understand biological vision, to clarify its goals and uncover the neural code and the computational operations underlying its function. My recent work addressed the role of spatial context in images and in early vision, focusing on: a) developing a generative model of the statistical regularities of natural images; b) relating inferences in the model to neural and perceptual phenomena due to spatial context in images (in collaboration with Peter Dayan, Gatsby UCL); c) testing model predictions on early-cortical neural responses to natural stimuli (in collaboration with Adam Kohn, AE-COM); d) extending the model to higher-level image features, and extrastriate cortical neurons.



EDUCATION

- 2004 Laurea Degree (MS) Physics, *cum Laude*.
 Università Federico II, Napoli, Italia.
- 2007 Ph.D. Physics.
 Università Federico II, Napoli, Italia.
- 2008–present Postdoctoral Associate, Laboratory of Odelia Schwartz.
 Albert Einstein College of Medicine, New York.

ADDITIONAL TRAINING

- 2003–2004 Undergraduate student internship.
 ST Microelectornics R&D. Napoli, Italia.
- July 2005 Advanced School on Computer Vision, Pattern Recognition
 and Image Processing.
 Università di Verona, Italia.
- March 2010 International Workshop Statistical Analysis of Neuronal Data.
 University of Pittsburgh. Pittsburgh, PA.
- September 2011 Machine Learning Summer School.
 Bordeaux, France.

AWARDS AND FELLOWSHIPS

- 2000–2001 “Erasmus” training grant from the European Commission to
 spend 1 year as an undergraduate visiting student at Uni-
 versidad de Zaragoza, España.
- 2007 Honorary Mention, PhD Thesis competition, Associazione
 Italiana Intelligenza Artificiale (AI*IA).
- 2008 Postdoctoral travel award, Belfer Institute, Albert Einstein
 college of Medicine.
- 2008 Travel grant, Gordon Research Conference on Sensory Cod-
 ing and the Natural Environment, Lucca, Italy.
- 2011 Student fellowship, Machine Learning Summer School, Bor-
 deaux, France.
- 2012 Presenters travel grant, Computational and System Neuro-
 science, **Cosyne** 2012

REVIEWS FOR JOURNALS AND CONFERENCES

Computational Aesthetics Conference, CAe 2008.

Computers and Graphics Journal, Elsevier

Conference of the International Graphonomics Society, 2009.

Digital Creativity Journal, Routledge.

IEE Electronics Letters, IET.

International Symposium on Bio- and Medical Informatics and Cybernetics

Neural Information Processing Systems, NIPS 2010.

Neural Computation

PLoS Computational Biology.

ORGANIZATION OF MEETINGS AND WORKSHOPS

- 2006 Local Organizing Committee – ‘Ethicbots. International Workshop on Ethics of Human Interaction with Bionic, Robotic and AI Systems.’ Napoli. Italia.
- 2009 Workshop on ‘Spatial Context in Biological and Computational Vision’. Computational and Systems Neuroscience, **Cosyne** 2009. Co-organized with Odelia Schwartz.
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TEACHING EXPERIENCE

- 2002–2004 Research and Teaching Collaborator.
Department of Painting, the Academy of Fine Arts, Napoli, Italia.
- 2006 Undergraduate course – *Processing: Introduction to Programming for the Information Design*.
Media Studies Department, Università di Fisciano, Salerno.
- 2007 Undergraduate course – *Object Oriented Programming for the Information Design*.
Media Studies Department, Università di Fisciano, Salerno.
- 2009–present Teaching Assistant – *Systems Neuroscience course*, PhD program in Neuroscience.
Albert Einstein College of Medicine.

INVITED TALKS

- 2012 *Low-level vision and the statistics of the natural environment: a principled explanation of the response properties of cortical neurons and perceptual salience.* Brooklyn College, CUNY.
- 2011 *Context-dependence in visual processing and natural scene statistics.* Society For Neuroscience, Minisymposium.
- 2011 *Visuomotor Atoms of Copy-Drawing.* Teacher's College, Columbia University.
- 2010 *Neurons and the sensory environment: Image processing in the primary visual cortex.* Storefront for Art and Architecture, New York.
- 2009 *Generative modeling of natural scene statistics and spatial context effects.* Computational and System Neuroscience, **Cosyne Workshops.**
- 2007 *Drawing: sensorimotor coordination and computational modeling.* Institute Jean Nicod, Paris.

REFEREED JOURNAL ARTICLES

- 2005 **R.C.C.**, P. Aniello, N. Cesario, F. Foncellino. *Exploring a New Post-Selection Condition for Efficient Linear Optics Quantum Computation.* **International Journal of Quantum Information** 3 4 611-621.
- 2005 P. Aniello, **R.C.C.**, *An Algebraic Approach to Linear-Optical Schemes for Deterministic Quantum Computing.* **J. Opt B: Quantum and Semiclass. Opt.** 7 S711-S720.
- 2007 **R.C.C.**, P. Coraggio, P. Napoletano. *DrawBot — A Bio-Inspired Robotic Portraitist.* **Digital Creativity Journal.** Routledge. 18, 1.
- 2008 **R.C.C.**, P. Napoletano, G. Boccignone, P. Coraggio *What the Draughtsman's Hand Tells the Draughtsman's Eye: A Sensorimotor Account of Drawing.* International Journal of Pattern Recognition and Artificial Intelligence, **IJPRAI** 22(5): 1015-1029.
- 2009 **R.C.C.**, P. Coraggio, P. Napoletano, O. Schwartz, M. Ferraro, G. Boccignone *Visuomotor Characterization of Eye Movements in a Drawing Task.* **Vision Research**, 49, 810–818.

- 2012 **R.C.C.**, P. Dayan, O. Schwartz *Cortical surround interactions and perceptual salience via natural scene statistics*. **PLoS Computational Biology** (in press)
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REFEREED CONFERENCE PROCEEDINGS AND BOOK CHAPTERS

- 2007 **R.C.C.**, P. Coraggio, G. Boccignone, P. Napoletano. *The Bayesian Draughtsman: A Model For Visuomotor Coordination In Drawing*. Advances in Brain Vision and Artificial Intelligence. **LNCS** 4729.
- 2008 **R.C.C.**, P. Napoletano, G. Boccignone, P. Coraggio, A.De Santis *Sensorimotor coupling via Dynamic Bayesian Networks*. Proceedings of the IEEE International Conference on Robotics and Automation 2008, **IEEE ICRA**.
- 2009 **R.C.C.**, P. Dayan, O. Schwartz *Statistical Models of Linear and Nonlinear Contextual Interactions in Early Visual Processing*. Advances in Neural Information Processing Systems, **NIPS** 21, 2009.
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SCIENTIFIC PRESENTATIONS

- 2006 (Talk) **R.C.C.** *DrawBot — A Bio-Inspired Robotic Portraitist*. CMCA06. 1st international workshop Computational Models of Creativity in the Arts. Goldsmiths College, London.
- 2007 (Poster) **R.C.C.**, P. Coraggio, P. Napoletano, G. Boccignone. *What the Draughtsman's Hand Tells the Draughtsman's Eye: A Sensorimotor Account of Drawing*. Perception, Action and Consciousness: Sensorimotor Dynamics and Dual Vision, International Conference, Bristol.
- 2007 (Poster) **R.C.C.**, P. Coraggio, P. Napoletano, G. Boccignone. *The Bayesian Draughtsman: A Model For Visuomotor Coordination In Drawing*. Brain Vision and Artificial Intelligence, International Conference, Napoli.
- 2008 (Talk) **R.C.C.**, P. Napoletano, G. Boccignone, P. Coraggio, A.De Santis. *Sensorimotor coupling via Dynamic Bayesian Networks*. IEEE International Conference on Robotics and Automation 2008, **ICRA**.
- 2009 (Spotlight + Poster) **R.C.C.**, P. Dayan, O. Schwartz. *Statistical Models of Linear and Nonlinear Contextual Interactions in Early Visual Processing*. Neural Information Processing Systems, NIPS 2009.

- 2009 (Poster) F. Roehrbein, **R.C.C.**, O. Schwartz. *Analysis of Human Gaze-Selected Patches from Natural Image Sequences*. Computational Cognitive Neuroscience Conference CCNC, Boston, MA.
- 2009 (Poster) **R.C.C.**, S. Wissig, A. Kohn, O. Schwartz. *Probing the early visual system with naturalistic, synthetic images*. Computational and System Neuroscience, **Cosyne** 2009.
- 2010 (Poster) S. Wissig, **R.C.C.**, O. Schwartz, A. Kohn. *The influence of surround suppression on adaptation in primary visual cortex: implications for adaptation to natural scenes*. Gordon Research Conference: Sensory Coding and the Natural Environment, **GRC** 2010.
- 2010 (Poster) **R.C.C.**, P. Dayan, O. Schwartz. *Saliency and surround interactions via natural scene statistics: A unifying model*. Computational and System Neuroscience, **Cosyne** 2010.
- 2011 (Poster) **R.C.C.**, A. Kohn, O. Schwartz. *Testing a principled statistical model of spatial contextual interactions in V1*. Society for Neuroscience, 2011.
- 2011 (Poster) **R.C.C.**, A. Kohn, O. Schwartz. *Testing a principled statistical model of spatial contextual interactions in V1*. Computational and System Neuroscience, **Cosyne** 2011.
- 2011 (Poster) F. Roehrbein, **R.C.C.**, O. Schwartz. *Dynamic scenes vs. static images: Differences in basic gazing behaviors for natural stimulus sets*. Vision Sciences Society 11th Annual Meeting, **VSS** 2011.
- 2012 (Poster) **R.C.C.**, A. Kohn, O. Schwartz. *Understanding V1 surround modulation with natural stimuli using a principled statistical model*. Computational and System Neuroscience, **Cosyne** 2012.

THESES

- 2004 (MS Thesis) *Quantum Computing: Linear Optical Implementation of Logic Gates*. Università di Napoli Federico II, Italia.
- 2007 (PhD Thesis), *Sensorimotor Coupling: Eye Tracking and Computational Modeling in a Drawing Task*. Università di Napoli Federico II, Italia.

LANGUAGES

Italiano (mother tongue).

English (fluent).

Español (fluent).

Français (elementary).