Adrian Ernesto Radillo

Ph.D. Mathematical Neuroscience, M.A. Psychology

Currently a postdoc in the lab of Josh Gold, I am studying perceptual decision making

Research Publications

Theoretical Neuroscience

2019 **Radillo, A. E.**, Veliz-Cuba, A., Josić, K., & Kilpatrick, Z. P., *Performance of normative and approximate evidence accumulation on the dynamic clicks task*, (pre-print), arXiv:1902.01535.

We analyze the impact of various task parameters on the performance of two evidence accumulation models. We also fit these models to synthetic data with different loss functions to expose a potential bias in parameter recovery.

2017 **Radillo, A. E.**, Veliz-Cuba, A., Josić, K., & Kilpatrick, Z. P., *Evidence accumulation and change rate inference in dynamic environments*, Neural Computation, 29(6), 1561-1610.

We derive an optimal strategy for accumulating evidence in a changing environment, as well as a potential neural network implementation. See here for a summary.

Clinical Psychology

2012 Donard, V., Berget, P., Cramet, M., Gantelmy d'Ille, V., Mörch, C., . . ., **Radillo, A.,** & Virole, B., *Identity and relational stakes in MMORPG*, Pratiques Psychologiques, 18(1), 23-36.

Psychoanalytic and psychosocial exploration of the impact of Massively Multiplayer Online Role Playing Games on gamers.

2010 Virole, B., & **Radillo, A.**, *Cyberpsychologie*, Paris : Dunod.
book Essay on how video games and new technologies in general, affect both the theory and the practice of contemporary clinical psychology.

2009 **Radillo, A.**, *L'expérimentation de l'utilisation des jeux vidéo en remédiation cognitive*,
peer-reviewed Enfance & Psy, n^o 44, Paris : Erès.

Short summary of my Master's thesis in psychology, on cognitive rehabilitation of autistic children through video games. Click here for an English summary.

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Professional Experience

2018-present **Postdoc**, *with Joshua I. Gold*, University of Pennsylvania, USA.
Currently setting up two psychophysics experiments in order to investigate temporal integration of evidence in changing environments. One task uses the random dots motion stimulus (https://osf.io/9wa73), the other one is an auditory task that is used with epileptic patients undergoing electrocorticography (ECoG).

2013-2016 **Teaching Assistant**, *Several undergraduate level courses*, Univ. Warwick/UH, UK/USA.
Calculus, Statistics, Mathematical Biology, French.

2010 (Full year) **Clinical psychologist**, *Adult psychiatry service*, General Public Hospital of Dreux, France.
Counseling, support groups, personality and cognitive skills assessment for patients suffering from grave mental illness. Close collaboration with psychiatrists, nurses and other psychologists.

Education

2014–2018 **Ph.D. Mathematics**, *University of Houston*, Houston, TX, USA.

Advisors: Krešimir Josić & Zachary P. Kilpatrick.

Dissertation: Optimal inference of change rates in decision making theory (pdf)

Key courses:

- **Introduction to Deep Learning** (Rice U), by Ankit Patel
  Hands-on course with TensorFlow where we trained architectures like LeNet5 and LSTMs, on datasets such as MNIST and CIFAR10.
- **Automatic Learning & Data Mining**, by Robert Azencott
  Training of Multi-Layer Perceptron, Auto-encoders and Restricted Boltzmann Machines on MNIST dataset. Introduction to Deep Convolutional Networks.
- **Theor. Neurosc. II: Networks & Learning** (Rice U), by Xaq Pitkow and Harel Shouval
  Mathematical models of retinal networks and synaptic plasticity.

2011–2014 **B.Sc. Mathematics**, *University of Warwick*, Coventry, UK.

2004–2009 **M.A. Clinical Psychology**, *Ecole de psychologues praticiens*, Paris, France.
Advisor: Véronique Donard.
Dissertation: Cognitive rehabilitation through video games.

Awards

2014-2016 **Presidential Cullen and Stella Ehrhardt Fellowship**, $4,000, University of Houston.

2012 **Undergraduate Research Scholarship Scheme**, £1,600, University of Warwick.

Computing Skills

Basic C++, Visual Basic, HTML5/CSS & Django

Intermediate MySQL, ArangoDB

Advanced R, Python, MATLAB, Bash, git, LaTeX

Spoken Languages

Fluent **French, Spanish, English** *French as mother tongue*

Free Open Source Software

- Main developer of IndieK, a new kind of mind mapping app
- Developer of several Python modules for decision making science (see TheGoldLab/Analysis_Audio2AFC_ChangePoint and TheGoldLab/Lab_DotsDB_Utilities on GitHub)

Research Involvement

Internships

2015 (Fall) **Visiting student**, *Instituto de Fisiología Celular*, Universidad Autónoma de México, Mexico City, Mexico.
Ranulfo Romo's lab
Electro-physiology on macaque in tactile frequency discrimination task.

2012 (summer) **Research Intern**, *Institute of Digital Healthcare*, Coventry, UK.
Project on signal processing of sound-evoked EEG signals.

2006–2009 **Psychology Intern**, *Several public hospitals*, Paris/Rivière du Loup, France/Canada.
More than 1600 hours of internship with main emphasis on psychopathology and cognitive rehabilitation.

Organized Workshops

2019 Version Control in Science, University of Pennsylvania, Pennsylvania, USA.
Talk: *Version Control in Science: Why and How?*.

Attended Workshops

2018 Junior Scientist Workshop on Theoretical Neuroscience, Janelia Research Campus, Virginia, USA.
Talk: *Optimal Evidence Accumulation in Changing Environments*.

2018 Probabilities and Optimal Inference to Understand the Brain, Institute of Neurosciences Timone, Marseille, France.
Talk & Poster: *How to cope in a changing environment?*.

2018 Theoretical Neuroscience Workshop, (PIs: Doiron, Shea-Brown, Josić, Kilpatrick, Rosenbaum), University of Colorado Boulder, CO.
Joint Talk: *Decision Making in the Dynamic Clicks Task*.

2017 Theoretical Neuroscience Workshop, (PIs: Kilpatrick, Zylberberg), University of Colorado Boulder, CO.
Talk: *Evidence accumulation in changing environments*.

2017 Workshop on Theoretical Neuroscience, (PIs: Doiron, Shea-Brown, Josić, Kilpatrick, Rosenbaum), University of Pittsburgh, PA.
Talk: *Evidence accumulation in changing environments*.

2017 Memory School (MATHMEM), Centre de Recercà Matematica, Barcelona, Spain.
Topic: biology and mathematics of memory
Poster: *Change rate inference in dynamic environments*.

2016 Gene Golub SIAM Summer School, Drexel University, Philadelphia, PA.
Topic: SDEs and wave propagation
Poster: *Evidence accumulation and change rate inference in dynamic environments*.

2016 CoSyNe - main conference & workshop, Salt Lake City, USA.
Poster: *Evidence accumulation and change rate inference in dynamic environments*.

Attended Conferences

2017-2018 Computational and Systems Neuroscience, (CoSyNe), Salt Lake City, UT.
Poster 2017: *Change rate inference in dynamic environments*.

2017 Gulf Coast Consortium for Theoretical & Computational Neuroscience, (GCC-TCN), Houston, TX.
Poster: *Change rate inference in dynamic environments*.

2016 GCC-TCN, Houston, TX.
Poster (**Award for best poster presentation**): *Evidence accumulation and change rate inference in dynamic environments*.

2015 UT Austin Conference on Learning and Memory, Austin, TX.

Web links

- Personal webpage: https://aernesto.github.io
- Personal blog: https://adrianblogtech.wordpress.com
- GitHub repositories: https://github.com/aernesto
- Twitter account: @AdrianERadillo
- LinkedIn profile: www.linkedin.com/in/adrian-ernesto-radillo