

# Pedro Mediano

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## Education

- Oct 14 – Oct 19 **PhD: Information Theory and Neuroscience**, *Imperial College*, London, UK.  
Pursuing PhD studies in the Computational Neurodynamics group under the supervision of Prof. Murray Shanahan.
- Sep 10 – Jun 14 **MSc in Physics**, *Universidad de Valencia*, Valencia, Spain, 9.5/10.  
Senior (4th) year at *Imperial College*, London, UK. Ranked top 1% of class.
- Sep 08 – Jun 10 **Science and technology high school diploma**, *IES El Bohío*, Cartagena, Spain, 9.95/10.  
Graduated with First Honours, Extraordinary Award (top 0.1%).

## Research experience

- Oct 19 – present **Research associate**, *University of Cambridge*, Cambridge, UK.  
Working in the Consciousness and Cognition group, Department of Psychology.
- Apr 18 – Sep 18 **Research intern**, *DeepMind*, London, UK.  
Working in the *Virtual Brain Analysis* team with Neil Rabinowitz and Matthew Botvinick.
- May 17 – Jun 17 **Visiting researcher**, *University of Sydney*, Sydney, Australia.
- Nov 15 – May 17 **Lead machine learning scientist**, *Emotech Ltd.*, London, UK.  
Member of the ML team building the personal robot Olly. Raised angel and series A funding, hired a team of 30, filed two patents and won four CES Innovation Awards.
- Jun 14 – Aug 14 **Robotics summer scholar**, *Carnegie Mellon Robotics Institute*, Pittsburgh, PA.
- Nov 13 – Jan 14 **Research assistant**, *Harvard University*, Cambridge, MA.
- Jun 13 – Nov 13 **Machine learning software developer**, *Wolfram Research, Inc.*, Oxford, UK.  
Work with Wolfram's Applied Research Group. Initial design and contributions to the Machine Learning library for Wolfram|Alpha and Mathematica 10 (released Oct 14).

## Honours and Awards

- 2018 **Best Poster Award**, *AMCOS Conference*, Barcelona.  
Poster title: *Synergistic Synchronisation in Coupled Oscillators*.
- 2020 **Best Presentation Award**, *OCNS Conference*.  
Talk title: *Multi-target Information Decomposition and Applications to Integrated Information Theory*.
- 2017 **Four CES Innovation Awards**.  
Awarded 4 CES Innovation Awards in the categories Drones and Unmanned Systems, Home Audio and Video, Home Appliances and Smart Home as part of the Olly team at Emotech. To date, highest number of CES awards given to a single start-up or product.
- 2010 **Premio Extraordinario de Bachillerato**.  
Prize awarded to 0.1% of Spanish high school students.

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## Teaching and supervision

Since 2014 I have lectured or acted as a teaching assistant in the following courses at the Department of Computing, Imperial College:

- Computational Neurodynamics, 2014-2016.
- C/C++ Programming, 2015-2016
- Mathematical Methods, 2015-2017.
- Probabilistic Inference, 2017.
- Academic Writing, 2018.
- Introduction to Machine Learning, 2019.
- Deep Learning, 2019.

I also worked as a volunteer in the African Institute for Mathematical Sciences in Kigali, Rwanda, teaching Foundations of Machine Learning in autumn 2018.

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## Invited talks and seminars

Since 2015 I have been regularly invited to give talks about neuroscience, information theory and machine learning in several countries. Selected recent talks are listed below.

- Apr 2019 *Mathematical Challenges of Integrated Information Theory (And what to do about them)*, University of Cambridge.
- Feb 2019 *Informational Theories of Neural Complexity: Synergy, Computation and Integrated Information*, Center for Complexity Science, Imperial College.
- Feb 2019 *Altered States of Consciousness: Linking Mind and Brain Through Neuroimaging*, London Neuroimaging Symposium, King's College.
- Jan 2019 *Information Theory Tutorial*, Latin American Computational Neuroscience summer school, Valparaíso Complex Systems Institute, Chile.

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## Selected publications

This list may not be up to date. A full publication list is available on my [Google Scholar profile](#).

- **P. Mediano\***, F. Rosas\*, R. Carhart-Harris, A. Seth and A. Barrett (2019). *Beyond Integrated Information: A Taxonomy of Information Dynamics Phenomena*. arXiv:1909.02297. [Link](#).
- A. Tacchetti\*, H. F. Song\*, **P. Mediano\*** et al. (2019). *Relational Forward Models for Multi-Agent Learning*. ICLR 2019. [Link](#).
- F. Rosas, **P. Mediano**, M. Gastpar and H. Jensen (2019). *Quantifying high-order Interdependencies via Multivariate Extensions of the Mutual Information*. To appear in Physical Review E. [Link](#).
- **P. Mediano**, A. Seth and A. Barrett (2018). *Measuring Integrated Information: Comparison of Candidate Measures in Theory and Simulation*. Entropy, 21(1), 17 (selected by editors as issue cover). [Link](#).
- T. Tax\*, **P. Mediano\*** and M. Shanahan (2017). *The Partial Information Decomposition of Generative Neural Network Models*. Entropy, 19(9), 474. [Link](#).