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Rashid V. Williams-García

Curriculum Vitae

Professional appointments

- Associated researcher**, *Université de Tours*, Département de Physique. **Sept. 2020–present**
- Invited researcher**, *École Normale Supérieure (ENS, Paris)*, Group for Neural Theory (GNT) **Jan. 2020–Aug. 2020**
PI: Boris Gutkin.
- Postdoctoral fellow**, *Indiana University-Purdue University Indianapolis (IUPUI)*, Department of Mathematical Sciences **Jan. 2020–Aug. 2020**
PI: Alexey Kuznetsov
Project: Computational modeling of transitions between goal-directed and habitual behavior.
- Postdoctoral associate**, *University of Pittsburgh*, Department of Neurobiology, Department of Mathematics **2016–2019**
PI: Nathan N. Urban, Co-PI: G. Bard Ermentrout
Project: Reduced reliability of neural responses to sensory stimulation in a computational model of autism.
- Research assistant**, *Indiana University Bloomington*, Department of Physics, PI: John M. Beggs **2012–2015**
Project: Critical phenomena in animal models of epileptic neural networks.
- Teaching assistant**, *Indiana University Bloomington*, Department of Physics. **2009–2014**
- Research assistant**, *Indiana University Bloomington*, Department of Physics, PI: Robert de Ruyter **2008–2009**
Project: Transmission of sensory information in single neurons.
- Research assistant**, *University of California Los Angeles*, Department of Physics & Astronomy, PI: Dolores Bozovic **2006–2008**
Project: Analyses of nonlinear sensory responses in the bullfrog sacculus.

Education

- Ph.D., Physics**, *Indiana University Bloomington*, **2016**
Thesis title: “Phase Transitions in Living Neural Networks”.
Thesis advisors: Gerardo Ortiz and John M. Beggs.
- M.S., Physics**, *Indiana University Bloomington*, Concentration in condensed matter physics and mathematical physics. **2010**
- B.S., Physics**, *University of California Los Angeles*. **2006**

Publications

L. Fosque, **R. V. Williams-García**, J. M. Beggs, G. Ortiz, “Evidence for quasicritical brain dynamics”, arXiv preprint arXiv:2010.02938 (2020).

R. V. Williams-García, J. M. Beggs, and G. Ortiz, “Unveiling causal activity of complex networks,” *Europhysics Letters*, vol. **119**, p. 18003 (2017).

R. V. Williams-García, M. Moore, J. M. Beggs, and G. Ortiz, “Quasicritical brain dynamics on a nonequilibrium Widom line,” *Physical Review E*, vol. **90**, p. 062714 (2014).

Teaching

Teaching assistant (discussions)

2014 (1 semester): Led discussions in Physics I (calculus-based), Physics majors (about 20 students per section, 5 sections). Topics: Newtonian mechanics, oscillations and waves, properties of matter, heat and thermodynamics. 360 hours per semester.

2011, 2012, & 2013 (4 semesters): Led discussions in General Physics I, undergraduate science majors (about 20 students per section, 10 sections). Topics: Newtonian mechanics, oscillations and waves, properties of matter, thermodynamics. 360 hours per semester.

Teaching assistant (labs)

2010, 2011, & 2014 (3 semesters): Led practical work in General Physics II, undergraduate science majors (about 20 students per section, 10 sections). Topics: electricity and magnetism, optics, optical geometry, modern physics. 360 hours per semester.

2010, 2011, & 2013 (3 semesters): Led practical work in General Physics I, undergraduate science majors (about 20 students per section, 10 sections). Topics: Newtonian mechanics, oscillations and waves, properties of matter, thermodynamics. 360 hours per semester.

2009 & 2010 (2 semesters): Led practical work in Physical Science for Elementary Teachers, undergraduate elementary education majors (about 50 students). Topics: sounds, modeling, balance, forces, simple machines, mobiles, states of matter, light, colors, vision and the eye, electricity, magnetism, movement. 360 hours per semester, contribution to course development.

Teaching assistant (grading)

2014 (1 semester): Correction of homework in Computing Applications in Physics, Master’s and PhD students (about 20 students). Topics: least-squares methods, curve-fitting of non-linear functions, Monte-Carlo methods, data manipulation in C/C++, Bash, Matlab and Mathematica. 60 hours per semester.

Teaching certifications

Practitioner Level Certification in STEM Teaching, *University of Pittsburgh*, **2019**
Center for the Integration of Research, Teaching, and Learning
Completion of a mentored Teaching-as-Research project, presentation of findings to the Pitt-CIRTL learning community, and course requirements.

Associate Level Certification in STEM Teaching, *University of Pittsburgh*, **2016**
Center for the Integration of Research, Teaching, and Learning
Completion of course requirements introducing the Alignment Model and evidence-based teaching practices, creation of a teaching philosophy statement, and attendance of CIRTL Network online seminars.

Interests and skills	<p>Statistical physics: nonequilibrium statistical mechanics; critical phenomena; branching processes; cellular automata; stochastic processes; Monte Carlo methods</p> <p>Information theory: mutual information; transfer entropy; artificial neural networks</p> <p>Programming: MATLAB (10+ years); Mathematica (10+ years); C/C++ & Python (10+ years); LabView (2 years); Bash (2 years); TORQUE distributed resource manager (2 years)</p>
Talks <i>Invited</i>	<p>Séminaire du Laboratoire de Neurosciences Cognitives (ENS-Ulm, Paris), 2020 “Quasicriticality, an organizing principle for catastrophic transitions in the brain”, Indiana University-Purdue University Indianapolis.</p> <p>Pittsburgh Quantum Institute/Condensed Matter Physics Seminar, 2018 “The Physics of Brain Science: Quasicriticality, An Organizing Principle”, University of Pittsburgh.</p> <p>Complexity Science Group Seminar, 2017 “Quasicriticality and Causal Dynamics in Neural Networks”, University of Calgary.</p>
<i>Conference</i>	<p>Complex Systems in Neuroscience, 2018 “From Single Neurons to Perception: Examining the Basis for Sensory Deficits in Autism”, University of Pittsburgh.</p>
<i>Seminar</i>	<p>Center for the Neural Basis of Cognition Postdoctoral Seminar, 2018 “Strategic simplification of neural systems”, University of Pittsburgh/Carnegie Mellon University.</p> <p>LENS/Condensed Matter Physics Seminar, 2014 “Phase Transitions in the Brain”, Indiana University Bloomington.</p>
Grants and fellowships	<p>Course Transformation Award (\$1,000), 2018 University of Pittsburgh, Discipline-Based Science Education Research Center.</p> <p>NIH National Research Service Award T32 NS086749 (\$87,384), 2016 University of Pittsburgh, Department of Neurobiology.</p> <p>Grant-in-Aid of Doctoral Research (\$1,000), 2015 Indiana University Bloomington, The University Graduate School.</p> <p>McCormick Science Grant (\$2,500), 2015 Indiana University Bloomington, College of Arts & Sciences.</p> <p>Faculty Research Support Program Seed Funding (\$29,663), 2014 Indiana University Bloomington, Office of the Vice Provost for Research.</p> <p>Earl Studevart Graduate Fellowship (\$10,000), 2014 Indiana University Bloomington, Department of Physics.</p>

	Lilly Biocomplexity Fellowship (\$5,000), Indiana University Bloomington, Biocomplexity Institute.	2009
	Graduate Scholars Fellowship (\$25,000), Indiana University Bloomington, The University Graduate School.	2008
	NIH Postbaccalaureate Research Education Program (\$42,000), University of California Los Angeles, Department of Chemistry & Biochemistry.	2006
Awards and honors	Methods in Computational Neuroscience Travel Award (\$4,226), Marine Biological Laboratory.	2017
	Criticality in Biology Travel Award (€1,000), Max Planck Institute for the Physics of Complex Systems.	2015
	Dynamics Days XXXIV Travel Award (\$500), American Institute of Physics.	2015
	Dean's Honors, University of California Los Angeles, College of Letters & Science.	2006
	Fellows Award (\$500), University of California Los Angeles, Center for Academic & Research Experience.	2006
Conferences organized	Complex Systems in Neuroscience: Bridging Theory and Experiment, University of Pittsburgh, Department of Mathematics.	2018
Reviewer	Frontiers in Physics, Journal of Statistical Physics, Physical Review, and Scientific Reports	
Affiliations	The American Physical Society (2014–present)	
Outreach	Indiana University Bloomington: Groups Program Mentor, STEM Initiative (2012–2014), Physics Department Open House Volunteer (2008–2013). University of California Los Angeles: URC-CARE Research Mentorship Program (2007–2008), Society of Physics Students Vice President (2005).	