Alexandra Pushkar

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Education

2016 - Present PhD (Expected graduation 2010), Quantitative Biomedicine, Rutgers University, New Brunswick.
Advisor: Yana Bromberg

2013 - 2016 MS, Applied Mathematics & Statistics and Scientific Computation program, Applied Mathematics track, with application area in Physics, University of Maryland, College Park.
Thesis: Phase Transitions in Gene Networks Evolved Under Different Selection Rules, Advisor: Michelle Girvan.

2009 – 2012 BS, National Research University – Higher School of Economics (HSE), Department of Mathematics, Moscow.
Thesis: Dual billiards on hyperbolic plane, Advisor: Vladlen Timorin

Research

Interests

Chaos in dynamical systems, probability and stochastic processes, discrete and continuous modeling, complex networks, biological networks, large network effects and limiting distributions.

Current Research Project

2016 – this day Understanding of evolution of metal binding proteins through structural alignment networks, Advisor: Yana Bromberg.

2014 – this day Modeling Gene Regulatory Networks, Advisor: Michelle Girvan, Results: an MS thesis, portions of which are expected to be published.

Latest work is on dynamics of explosive percolation in Boolean Networks, previous work involved modeling evolution in Gene Regulatory Networks, analyzing structural and dynamical differences of Gene Regulatory Networks of cancerous and healthy tissues, and working on refining initial assumptions on attractors of Boolean models of Gene Regulatory Networks.

Mentorship

2014 Teaching assistant in research, Brown University, ICERM, Undergraduate Summer Research Program on Polygons and Polynomials. Projects ‘Equidecomposability and period collapse’ and ‘Complex Pisot numbers and Newman multiples’.
https://icerm.brown.edu/summerug_2014/

Experience

Summer Schools

2011 Weizmann Institute of Science, The Kupcinet-Getz International Summer Science School for undergraduates, Rehovot, Israrel, Project on 'Some Examples for Poincare and Painleve problems', Adviser: Dmitry Novikov.

I also had a chance to unofficially shadow a lot of labs, I spent a lot of time in delving into work of Uri Alon's System Biology lab, and studying his book and papers.

2011 Institute of Advanced Studies, Princeton, Sparsity and Computation.
https://www.math.ias.edu/wam/2011

2010 Summer REU (Research Experience for Undergraduates) in Pennsylvania State University, State College, Pennsylvania, USA.

Vocational

2014 – 2016 Research Assistant, Girvan Lab, Gene Regulatory Networks.

2009 – 2016 Teaching Assistanship:

- University of Maryland – College Park, Mathematics Department (2013-2015)
  - Calculus-1, Calculus-2, Precollege Algebra and Trig
- Independent University of Moscow, 'Math in Moscow' (2012)
  - Ordinary Differential Equations
- HSE and New School of Economics (2009-2012)
  - Linear Algebra, Calculus 1-2, Risk Modeling, Discrete Mathematics, Basic Mathematical Models in Political Economy

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2009 – 2012 Member of Research and Education Center of Mathematics department at HSE.

Awards

2016 Institute for Quantitative Biomedicine Excellence Award, Rutgers University.

2013 Dean's Fellowship, University of Maryland – College Park.

2013 Best teacher award, New Economics School.

2010, 2011 Fellowships for covering tuition to study abroad programs, HSE.

Skills

Matlab, R, C++.