Natalia M. Pacheco-Tallaj

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Education

Harvard University (GPA: 3.938)
B.A. Candidate, Mathematics, secondary field in Computer Science, May 2020
Coursework in point-set and algebraic topology, group and ring theory, linear
algebra, real analysis, differential topology, algebraic geometry, fukaya categories,
knot theory, statistics, theoretical physics, astrophysics, and computer science

University of Puerto Rico (GPA 4.00)
Dual enrollment high school student, 52 credits, 2012-2016
Coursework in discrete mathematics, number theory, computer science, calculus

Research

SMALL REU, Math Department, Williams College
Knot Theory Group, 2018
Project: Hyperbolic virtual knots

Math Department, University of Michigan
REU Student, 2017
Project: Thurston norms of tunnel-number one manifolds
Pre-print: arxiv:1803.05097

Math and CS Departments, University of Puerto Rico
Student Research Fellow, 2015-2016
Project: Explicit formulas for monomial involutions over finite fields
Published: Advances in Mathematics of Communications

Akamai Labs R&D, Akamai Technologies
MIT Research Science Institute (RSI), 2015
Project: Implementation and analysis of a new memory-hard proof-of-work
algorithm for password hashing and cryptocurrency mining

CS Department, University of Puerto Rico
Student Research Fellow, 2014-2016
Project: Development of an open-source speech-driven programming platform for
people with limited hand mobility
Published: ASSETS 2015 Proceedings

Teaching

Math Department, Harvard University
Course Assistant, Topological Spaces and the Fundamental Group, 2018
Course Assistant, Honors Linear Algebra and Real Analysis, 2017-2018
Duties: graded homework, held weekly office hours, co-led a weekly section

Puerto Rico Math Team
Training Session Leader, Functional Equations, 2018
Training Session Leader, Geometric Inversion, 2017

Awards and Fellowships	**DE Shaw Discovery Fellowship** New York City, USA, 2018 **Ibero-american Math Olympiad (25 countries)** Bronze Medal ($\sim$ top 40), Puerto Rico, 2015 Honorable Mention, Honduras, 2014 **Internaltional Math Olympiad** Honorable Mention, South Africa, 2014 **Central American and the Caribbean Math Olympiad (12 countries)** Silver Medal ($\sim$ top 10), Costa Rica, 2014
Organizations	**Harvard Gender Inclusivity in Mathematics** Co-President, 2018-present Women in Math and Statistics Conference Co-Organizer, 2017-2018 **Harvard College Developers for Development** Director of External Relations, 2017 Software Developer, Tech in the World Fellowship, Shenzhen, China, 2017 Software Developer, Social Impact Projects, Cambridge, MA, 2016
Expository Writing	**Math 91r Term Paper / Junior Thesis** Topic: Slice Knots, Abelian Knot Invariants, Concordance Group **Math 137 Term Paper** Topic: Algebraic Knots, Topology of Singularities **Math 91r Term Paper** Topic: Exterior Algebra, Differential Forms, Bundles
Independent Study	Chapters from Hatcher's *Algebraic Topology*, Fulton's *Algebraic Curves*, Kirwan's *Complex Algebraic Curves*, Warner's *Foundations of Differentiable Manifolds and Lie Groups*, Guillemin and Pollack's *Differential Topology*, Spivak's *Calculus on Manifolds*, Adams' *Knot Book*, Livingston's *Knot Theory*, Lickorish's *Knot Theory*, Milnor's *Singular Points of Complex Hypersurfaces*, Milnor's *Morse Theory*, among others.
Languages and Skills	Spanish (native), English (native), Chinese (intermediate) Python, C, C++, LaTeX, SageMath, HTML/CSS/JavaScript, Mathematica, Java, Adobe PS/AE & basic digital animation, CCD spectroscopy, MaximDL, Telescope Control Software, InkScape