

Eion Blanchard

CONTACT	eionmb2@illinois.edu	
EDUCATION	University of Illinois at Urbana-Champaign <i>Doctor of Philosophy, Mathematics</i> Advanced to candidacy in Apr 2021 (adviser: Philipp Hieronymi) <i>Master of Science, Applied Mathematics</i> Computational Science and Engineering (CSE) concentration	<i>Champaign, IL</i> Expected Aug 2023 May 2020
	University of Florida <i>Bachelor of Science, Mathematics</i> Degree conferred <i>summa cum laude</i> · Honors Program · GPA 3.97	<i>Gainesville, FL</i> May 2018
INTERESTS	applied science, algorithms and complexity theory, mathematical logic, theoretical computer science, voting systems and gerrymandering, optimization, numerical analysis	
PUBLICATIONS	<i>Decidability bounds for Presburger arithmetic extended by sine</i> (2023) with P. Hieronymi (arXiv 2204.00099, under review for publication) <i>Model-Guided Synthesis of Inductive Lemmas for FOL with Least Fixpoints</i> (2022) with P. Madhusudan, et al. (Proc. of the ACM on Programming Languages, vol. 6) <i>Resilient adjudication in non-intrusive inspection with hierarchical object and anomaly detection</i> (2022) with D. Krofcheck, et al. (Proc. of SPIE Defense + Commercial Sensing, vol. 12104) <i>A decoder for the color code with boundaries</i> (2020) with B. La Cour, et al. (arXiv 2003.11602) <i>Measuring Congressional district meandering</i> (2018) with K. Knudson (arXiv 1805.08208)	
WORK	Simons Laufer Mathematical Sciences Institute <i>Postdoctoral Fellow</i>	<i>Berkeley, CA</i> Aug 2023 - Dec 2023
	Microsoft <i>Research Intern</i> <ul style="list-style-type: none">· Reduced runtimes by 12% and resulting file size by 21% for ballot encryption of small plurality and large n-of-m voting contests on Democracy Forward's ElectionGuard· Generated and proved correctness of 34 benchmark sets to prove necessity of election record verification checks and for quality assurance of third-party, end-to-end verifiers <i>Research Intern</i>	<i>Redmond, WA</i> May 2022 - Aug 2022 May 2021 - Aug 2021
	Sandia National Laboratories <i>Mathematics and Analytics Research & Development Intern</i> <ul style="list-style-type: none">· Improved average precision of object detection by 6% over baseline models from FAIR's Detectron2 by developing a graph theoretic ensemble learning method in Python· Crafted graph visualizations and analyzed temporal networks with GCNs	<i>Albuquerque, NM</i> May 2020 - Aug 2020
	Applied Research Laboratories, University of Texas at Austin <i>Research Engineering Scientist Associate</i> <ul style="list-style-type: none">· Bounded quantum color code error thresholds to 4 – 8% for Pauli X errors and 0.7 – 0.8% for Pauli Z errors by implementing decoder with measurement-based lattices in Python	<i>Austin, TX</i> June 2019 - Aug 2019
	MGGG Redistricting Lab, Tufts University <i>Voting Rights Data Institute Fellow</i> <ul style="list-style-type: none">· Gathered and analyzed vast demographic and election voting data sets for districting plans via QGIS visualizations, topological data analysis, and Markov chain Monte Carlo methods· Prototyped <i>Districtr</i> app in Python to empower self-identification of communities of interest	<i>Cambridge, MA</i> June 2018 - July 2018
	University of Washington <i>Research Assistant, NSF Research Experience for Undergraduates</i>	<i>Seattle, WA</i> June 2016 - Aug 2016

SKILLS	Intermediate: Python Basic: Git, C++, MATLAB, SQL, R	
AWARDS	University Fellowship, UIUC Mathematics Department List of Teachers Ranked As Excellent, Outstanding Distinction List of Teachers Ranked As Excellent Anderson Scholarship, Highest Distinction Benacquisto Scholarship Bright Futures Florida Academic Scholarship National Merit Scholarship	Spring 2022 Fall 2019; Spring 2019 & 2020 Fall 2020, Spring 2021 Oct 2016 Aug 2014 Aug 2014 June 2014
TEACHING	University of Illinois at Urbana-Champaign <i>Research Assistant, Department of Mathematics</i> · Developing new Linear Algebra for Data Science course with Python <i>Teaching Assistant, Department of Mathematics</i> · Led Python programming labs for Linear Algebra with Computational Applications; developed weekly lessons and homework assignments; managed 8 classroom assistants · Developed course content and led active-learning sections for Calculus I and II under the Merit program for students underrepresented in STEM <i>Teaching Assistant, Inmas</i> · Developed and led NumPy tutorials; led problem-solving sessions for Python workshop <i>Research Mentor, Illinois Geometry Lab</i> · Managed team of 5 undergraduate researchers in automated theorem proving · Verified mathematical proofs with MSR's Lean and mechanized arithmetic for Ostrowski numeration systems with Walnut University of Florida <i>Teaching Assistant, Department of Computer Science & Engineering</i> · Led weekly discussion sections for Applications of Discrete Structures	<i>Champaign, IL</i> Aug 2022 - Present Aug 2018 - Dec 2021 Jan 2021 - Feb 2021 Aug 2018 - Dec 2020 <i>Gainesville, FL</i> Aug 2016 - May 2018
TALKS	<i>"Decidability bounds for Presburger arithmetic extended by sine"</i> University of Bonn Oberseminar Mathematische Logik American Mathematical Society Spring Central Meeting Fields Institute Model Theory Seminar University of Illinois Logic Seminar <i>"Ensemble learning with graph inference cliques"</i> Sandia Machine Learning & Deep Learning Workshop <i>"When is scalar multiplication decidable?"</i> University of Illinois Computability Seminar <i>"Measuring Congressional district meandering and gerrymandering"</i> Wolfram Research Summer School	<i>Bonn, Germany</i> Oct 2022 <i>West Lafayette, IN</i> Mar 2022 <i>Toronto, ON, Canada</i> Mar 2022 <i>Champaign, IL</i> Apr 2021 <i>Albuquerque, NM</i> Aug 2020 <i>Champaign, IL</i> Apr 2020 <i>Champaign, IL</i> Nov 2019
SERVICE	Association for Women in Mathematics <i>Member, University of Illinois Chapter</i> Varsity Vocals <i>Judge, International Championship of Collegiate A Cappella</i> Gestalt <i>Director of Music, Co-Founder</i> · Created and directed a cappella group to 1 st place at ICCA Quarterfinals and to Runner-up at ICCA Semifinals, SoJam, BOSS, and NACC · Garnered 13 nominations and 3 wins at the Contemporary A Cappella Recording Awards University of Florida Mathematics Society <i>Secretary</i>	<i>Champaign, IL</i> Aug 2018 - Present <i>Chicago, IL</i> Feb 2019 - Present <i>Gainesville, FL</i> May 2016 - Apr 2018 <i>Gainesville, FL</i> Sept 2014 - May 2017