

Samuel (Sam) S. Elder

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SUMMARY	I am currently an MIT PhD student in Applied Mathematics, planning to graduate in 2018. My thesis is split between two major focuses. First, in the theoretical field of adaptive data analysis, I offer a new approach to understanding the overfitting risk of adaptivity. Secondly, in my current line of work, I propose, analyze and test new and improved methods for cross-validation.	
EDUCATION	<i>PhD in Applied Mathematics,</i>	September 2012 - June 2018 Massachusetts Institute of Technology (MIT), Cambridge, MA
	<i>BS in Mathematics and Chemistry,</i>	September 2008 - June 2012 California Institute of Technology (Caltech), Pasadena, CA
RESEARCH EXPERIENCE	<i>PhD Researcher in Applied Mathematics, MIT</i>	September 2012 - Present <ul style="list-style-type: none">• Developed new algorithms for cross-validation, analyzed them theoretically, and tested them against standard approaches on simulated and real data sets.• Studied difficulties with generalization in adaptive data analytic frameworks.• Found and proved new concentration results for the beta distribution.• Discovered novel analysis methods for the k-means algorithm.
	<i>Summer Undergraduate Research Fellow, Caltech</i>	June 2011 - September 2011 <ul style="list-style-type: none">• Applied methods from bipartite graph exclusion to characterize the asymptotics of particular cases of the static membership problem.
	<i>REU Participant, University of Minnesota Duluth</i>	June 2009 - August 2009 <ul style="list-style-type: none">• Developed a new approach to understanding cyclotomic polynomial coefficients, found and proved new families of flat cyclotomic polynomials.
SELECTED ACADEMIC AWARDS	<i>NDSEG Research Fellow (3 years research funding)</i>	September 2013 - August 2016
	<i>Caltech Axline Scholar (25 given/year)</i>	September 2008 - June 2012
	<i>Putnam Fellow (top 5 in US)</i>	December 2011
	<i>USA Mathematics Olympiad Winner (top 12 in US)</i>	April 2008
TEACHING EXPERIENCE	<i>IdeaMath Instructor</i>	September 2012 - present
	<i>MIT Math Department TA and Instructor</i>	September 2015 - January 2016
	<i>Art of Problem Solving Instructor</i>	September 2012 - August 2015
	<i>Caltech Math Department TA and Instructor</i>	September 2010 - December 2011
SELECTED LEADERSHIP EXPERIENCE	<i>MIT Learning Theory Group Coordinator (10 people)</i>	September 2015 - present
	<i>MIT Graduate Christian Fellowship President (100 people)</i>	May 2015 - April 2016
	<i>UMD REU Mentor (9 students)</i>	June 2013 - August 2013
	<i>MIT Applied Math Seminar Coordinator (30 attendees)</i>	February 2013 - May 2014
TECHNICAL SKILLS	LaTeX (13 years), Mathematica (8 years), R (1 year), Python (coursework)	