# Samuel S. **Schiavone**

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## Education

### Dartmouth College
*Hanover, New Hampshire*

PH.D. IN MATHEMATICS — *September 2014 - September 2019*

- Thesis title: *On algebras of low rank and on Belyi maps*
- Advisor: John Voight

### The University of Vermont
*Burlington, Vermont*

M.S. IN MATHEMATICS — *January 2012 - December 2013*

- GPA: 4.00.
- Major: Abstract algebra, Minor: Cryptography.

### Amherst College
*Amherst, Massachusetts*

B.A. IN MATHEMATICS, *magna cum laude* — *September 2006 - May 2010*

- GPA: 3.86 overall, 3.79 in mathematics.
- Member of Phi Beta Kappa.
- Completed a senior honors thesis in applied mathematics.

### Université Paris VII
*Paris, France*

STUDY ABROAD — *September 2008 - December 2008*

- Took courses in math and linguistics, both taught in French.

## Experience

### Massachusetts Institute of Technology
*Cambridge, Massachusetts*

RESEARCH SCIENTIST — *September 2019 - Present*

- Conduct research in arithmetic geometry under the supervision of Bjorn Poonen and Andrew Sutherland.
- Aid in the development and maintainence of the L-functions and Modular Forms Database (`lmfdb.org`).

### Dartmouth College
*Hanover, New Hampshire*

GRADUATE STUDENT INSTRUCTOR — *September 2016 - September 2019*

- Instructed undergraduate students in introductory and intermediate mathematics courses.
- Prepared and gave lectures three to four times per week, teaching courses in differential equations, linear algebra, and calculus.
- Evaluated students' performance on homework assignments, quizzes, and exams.

### Dartmouth College
*Hanover, New Hampshire*

GRADUATE TEACHING ASSISTANT — *September 2014 - August 2016*

- Led evening tutorial sessions three times per week, responding to students' questions about homework.
- Graded students' exams.

### Dartmouth College
*Hanover, New Hampshire*

RESEARCH ASSISTANT — *January 2014 - September 2014*

- Worked with Professor John Voight to improve and extend results from our publication, *Numerical calculation of three-point branched covers of the projective line*.

### The University of Vermont

*Burlington, Vermont*

Graduate Teaching Fellow

*January 2012 - December 2013*

- Instructed undergraduate students in introductory mathematics courses. Planned and gave lectures three times per week.
- Evaluated students' performance on homework assignments, quizzes, and exams.

### The Joshua M. Stimson Mathematics Program

*North Haverhill, New Hampshire*

Mathematics Instructor

*July 2013*

- Instructed middle school students in a mathematics enrichment program at Haverhill Cooperative Middle School.
- Designed a curriculum focusing on combinatorics, probability, and number theory.
- Planned daily lessons and activities with an emphasis on discovery and inquiry.

### French Ministry of National Education

*Vendôme, France*

English Teaching Assistant

*October 2010 - April 2011*

- Instructed French middle school students in English in two schools, as a part of the Teaching Assistant Program in France.
- Planned lessons focusing on oral expression and comprehension, grammar, and vocabulary.

### The Claremont Colleges

*Claremont, California*

Undergraduate Researcher

*June 2009 - July 2009*

- Studied formal groups over the p-adic numbers at the NSF-sponsored research program for undergraduates, working in a small group under Professor Ghassan Sarkis.
- Chronicled results in an individual paper.
- Presented results at WIMIN conference (Smith College, Northampton, Massachusetts) and at undergraduate poster competition at 2010 Joint Math Meetings (San Francisco, California).

## Publications

### Gluing curves of genus 1 and 2 along their 2-torsion

(with Jeroen Hanselman and Jeroen Sijsling), Mathematics of Computation **90** (2021), No. 331, 2333–2379

- Let $X$ (resp. $Y$) be a curve of genus $1$ (resp. $2$) over a base field $k$ whose characteristic does not equal $2$. We give criteria for the existence of a curve $Z$ over $k$ whose Jacobian is up to twist $(2, 2, 2)$-isogenous to the products of the Jacobians of $X$ and $Y$. Moreover, we give algorithms to construct the curve $Z$ once equations for $X$ and $Y$ are given.

### A Database of Belyĭ Maps

(with Michael Musty, Jeroen Sijsling, and John Voight), Proceedings of ANTS XIII, Open Book Series **2** (2019), No. 1, 375-392, Math. Sci. Publ.

- We use a numerical method to compute a database of three-point branched covers of the complex projective line of small degree. We report on some interesting features of this data set, including issues of descent.

### Numerical calculation of three-point branched covers of the projective line

(with Michael Klug, Michael Musty, and John Voight), LMS Journal of Computation and Mathematics, 17 (2014), No. 1, 379-430.

- We exhibit a numerical method to compute three-point branched covers of the complex projective line. We develop algorithms for working explicitly with Fuchsian triangle groups and their finite index subgroups, and we use these algorithms to compute power series expansions of modular forms on these groups.

## Honors & Awards

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|---|---|---|
| 2018 | **Selfridge Prize in Number Theory**, Algorithmic Number Theory Symposium XIII | *Madison, WI* |
| 2014 | **Graduate Assistance in Areas of National Need (GAANN) Fellowship**, Dartmouth College | *Hanover, NH* |
| 2013 | **Kenney award for excellence in graduate mathematics**, University of Vermont | *Burlington, VT* |

## Teaching

### Massachusetts Institute of Technology

Instructor

- Math 18.721: Introduction to Algebraic Geometry, Fall 2021. (Co-taught with Edgar Costa and Raymond van Bommel.)
- Math 18.099: Belyi Maps and Dessins d'Enfants (reading course), Spring 2021.

### Dartmouth College

Graduate Student Instructor

- Math 8: Calculus of Functions of One and Several Variables, Spring 2019
- Math 22: Linear Algebra with Applications, Fall 2017
- Math 23: Differential Equations, Fall 2016

### The University of Vermont

Graduate Teaching Fellow

- Math 19: Fundamentals of Calculus I, Fall 2012, Summer 2013, Fall 2013
- Math 17: Applications of Finite Math, Spring 2012

## Skills

**Programming** Python, SageMath, Magma, Mathematica, R, LaTeX

**Languages** English (native), French (fluent), Spanish (basic)

## Selected Talks

**Computing a database of Belyi maps** — *Virtual*

A Series of Trimester Programs on Triangle Groups, Belyi Uniformization, and Modularity, Bhaskaracharya Pratishthana — *November 2021*

**Belyi maps: Computation and data** — *Virtual*

VaNTAGe: a virtual math seminar on open conjectures in number theory and arithmetic geometry — *September 2021*

**Gluing curves of genus 1 and genus 2 along their 2-torsion** — *Virtual*

Young Researchers in Algebraic Number Theory, University of Bristol — *August 2021*

**Computing Canonical Rings Of Hilbert Modular Surfaces** — *Québec City, Canada*

Québec-Maine Number Theory Conference, Université Laval — *October 2018*

**A Database Of Belyi Maps** — *Madison, Wisconsin*

Thirteenth Algorithmic Number Theory Symposium (ANTS XIII), University of Wisconsin — *July 2018*

**Computing A Database of Belyi Maps: A Progress Report** — *Orono, Maine*

Québec-Maine Number Theory Conference, University of Maine — *October 2017*

**The Szpiro Conjecture For Hyperelliptic Curves** — *Trieste, Italy*

(joint presentation with Nicholas Triantafillou), Curves, L-functions, and Galois Representations summer school, International Centre for Theoretical Physics — *September 2017*

# Service

### Johns Hopkins Center For Talented Youth

*Hanover, New Hampshire*

Family and Academic Programs, Dartmouth College (Joint work with Benjamin Breen) *April 2016*

- Designed a lecture on mathematical game theory.
- Created worksheets that introduced students to matrix games and Nash equilibria.
- Gave two hour-long interactive presentations for middle- and high school students and their parents.

### Exploring Mathematics Summer Camp

*Hanover, New Hampshire*

Dartmouth College *July 2015*

- Designed and taught, in collaboration with other graduate students, two week-long camps for local middle- and high school students on the topics probability and knot theory.
- Created a stock market game based on Markov chains using simulations from *SageMath*.
- Created manipulatives for an activity introducing students to properties of the unknotting number.

### Johns Hopkins Center For Talented Youth

*Hanover, New Hampshire*

Family and Academic Programs, Dartmouth College (Joint work with Michael Musty) *October 2014*

- Designed a lecture on symmetry, group theory, and their applications.
- Created a worksheet and manipulatives to aid students in learning about the dihedral and symmetric groups.
- Gave two hour-long interactive presentations for middle- and high school students and their parents.