

# Michael Musty

Ph.D. Candidate, Mathematics, Dartmouth College

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## Education

<b>Ph.D. Mathematics</b> , Dartmouth College, Hanover, New Hampshire, USA	expected 2019
<b>M.Sc. Mathematics</b> , University of Vermont, Burlington, Vermont, USA	2014
<b>B.A. Mathematics/Scientific Computing</b> , Boston College, Chestnut Hill, Massachusetts, USA	2008

## Research Experience

<b>2-Group Belyi Maps</b> , Ph.D. Thesis	expected 2019
<ul style="list-style-type: none"><li>• Developed and implemented an algorithm to compute a database of 2-group Belyi maps up to degree 256</li><li>• Analyzed this data to steer conjectures about these objects</li><li>• Used this analysis to search for special number fields ramified only at 2</li><li>• Repository: <a href="https://github.com/michaelmusty/solvabledessins">https://github.com/michaelmusty/solvabledessins</a></li><li>• Visualization: <a href="https://dessin-explorer.org">https://dessin-explorer.org</a></li></ul>	
<b>Computing Canonical Rings of Hilbert Modular Forms</b> , Programmer	2018
<ul style="list-style-type: none"><li>• Implemented the data structure to store and compute with Fourier expansions of Hilbert modular forms</li><li>• Worked as part of a 10+ person team</li><li>• Organized the (git) workflow of the team</li><li>• Repository: <a href="https://github.com/edgarcosta/hilbertmodularforms">https://github.com/edgarcosta/hilbertmodularforms</a></li></ul>	
<b>A Database of Belyi Maps</b> , Co-author	2018
<ul style="list-style-type: none"><li>• Implemented the database backend using Magma</li><li>• Computed thousands of Belyi maps up to degree 9</li><li>• Worked in a team of 4 people to migrate this data over to the LMFDB (<a href="http://www.lmfdb.org">www.lmfdb.org</a>)</li><li>• Wrote Magma and Python scripts to convert this Magma database to MongoDB as part of the migration</li><li>• Awarded Selfridge Prize at ANTS-XIII: <a href="http://www.math.grinnell.edu/~paulhusj/ants2018/index.html">http://www.math.grinnell.edu/~paulhusj/ants2018/index.html</a></li><li>• Repository: <a href="https://github.com/michaelmusty/BelyiDB">https://github.com/michaelmusty/BelyiDB</a></li><li>• LMFDB: <a href="http://beta.lmfdb.org/Belyi">http://beta.lmfdb.org/Belyi</a></li><li>• Peer-Reviewed Article: [Mus+19]</li></ul>	
<b>Understanding the cost of dermatologic care: A survey study of dermatology providers, residents, and patients</b> , Co-author	2017
<ul style="list-style-type: none"><li>• Carried out the statistical analysis for survey data of this study using R</li><li>• Generated Likert scale visualizations to analyze the study data using R</li><li>• Peer-Reviewed Article: [Ste+17]</li></ul>	
<b>Numerical calculation of three-point branched covers of the projective line</b> , Co-author	2014
<ul style="list-style-type: none"><li>• Implemented a general numerical method to compute Belyi maps using power series expansions of modular forms</li><li>• Implemented code to visualize dessins d'enfants (equivalent objects to Belyi maps) conformally embedded in the hyperbolic unit disk</li><li>• Used this code to produce figures drawn using PSTricks such as in Figure 1</li><li>• Peer-Reviewed Article: [Klu+14]</li></ul>	
<b>Computing Iwasawa <math>\lambda</math>-Invariants</b> , M.Sc. Thesis	2014
<ul style="list-style-type: none"><li>• Implemented an algorithm to compute the Iwasawa <math>\lambda</math>-invariant of an abelian number field using Magma</li><li>• Repository: <a href="https://github.com/michaelmusty/iwasawa">https://github.com/michaelmusty/iwasawa</a></li></ul>	

## Work Experience

<b>Graduate Research and Teaching Assistant</b> , Dartmouth College, Hanover, NH, USA	2014-Present
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<b>Graduate Research and Teaching Assistant</b> , University of Vermont, Burlington, VT, USA	2012-2014
<b>Adjunct Professor</b> , Norwich University, Northfield, VT, USA	2011-2013
<b>Seasonal Landscaper</b> , JM Landscaping, Bradford, VT, USA	2000-2011
<b>Shipping Assistant</b> , Pleasant View Gardens, Loudon, NH, USA	2009-2010
<b>Permanent Substitute Teacher</b> , Merrimack Valley High School, Penacook, NH, USA	2009-2010
<b>Graduate Research and Teaching Assistant</b> , McGill University, Montreal, QC, Canada	2008-2009
<b>Misc Laborer</b> , Glen Farm, Piermont, NH, USA	1990-2000

## Publications Peer-Reviewed Articles

- [Mus+19] A Database of Belyi Maps  
Michael Musty, Sam Schiavone, Jeroen Sijsling, John Voight  
(to appear in conference proceedings for ANTS-XIII) *The Open Book Series 2* (2019). Mathematical Sciences Publishers, 2019
- [Ste+17] Understanding the cost of dermatologic care: A survey study of dermatology providers, residents, and patients  
Aaron J Steen, Julianne A Mann, Valerie M Carlberg, Alexa B Kimball, Michael J Musty, Eric L Simpson  
*Journal of the American Academy of Dermatology* 76.4 (2017) pp. 609–617. Elsevier, 2017
- [Klu+14] Numerical calculation of three-point branched covers of the projective line  
Michael Klug, Michael Musty, Sam Schiavone, John Voight  
*LMS Journal of Computation and Mathematics* 17.1 (2014) pp. 379–430. London Mathematical Society, 2014

## Selected Talks

- [1] 2-Group Belyi Maps  
*JMM Special Session on Number Theory, Arithmetic Geometry, and Computation*, Baltimore, MD, January 2019
- [2] A Database of Belyi Maps  
*Simons Collaboration Short Talks*, Cambridge, MA, August 2018
- [3] 2-Group Belyi Maps  
*Quebec Maine Number Theory Seminar*, October 2017
- [4] Computing Iwasawa  $\lambda$ -Invariants  
*Dartmouth Number Theory Seminar*, Hanover, NH, February 2015

## Community

- Dartmouth Mathematics Youth Summer Program**, Guest Lecturer, Hanover, NH, USA 2016
- Gave 2 guest lectures on probability
  - Gave 2 guest lectures on knot theory
- Johns Hopkins Program for Talented Youth**, Guest Lecturer, Hanover, NH, USA 2015
- Gave a guest lecture on group theory
- Joshua M. Stimson Math Program**, Organizer, North Haverhill, NH, USA 2011-2012
- Organized a 4 week summer program in mathematics for advanced middle school students
  - Organized and taught the summer program in 2011 and 2012

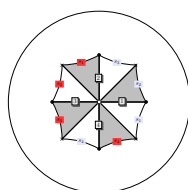


Figure 1: A genus 1 dessin d'enfant drawn using  $\LaTeX$  and PSTricks.