Branden Stone

CONTACT INFORMATION	Department of Mathematics Hamilton College 198 College Hill Road Clinton, NY 13323	http://people.hamilton.edu/bstone mobile: 785-813-1206 e-mail: bstone@hamilton.edu Citizenship: United States

RESEARCH INTERESTS   Commutative Algebra, Boij-Söderberg Theory, Macaulay2, Maximal Cohen-Macaulay Modules, Homological Algebra, Algebraic Combinatorics, Hilbert Functions, Golod Rings

EDUCATION

Doctor of Philosophy, University of Kansas   August 2012
    Dissertation Title: Super-stretched and graded maximal Cohen-Macaulay type
    Advisor: Professor Craig Huneke

M.S. Mathematics, Missouri State University   May 2005
    Thesis: Constructive aspects of the inverse Galois problem
    Advisor: Professor Cameron Wickham

B.S. Mathematics, College of the Ozarks   May 2001

EMPLOYMENT

Visiting Assistant Professor, Hamilton College	Summer 2018 - present
Assistant Professor, Adelphi University	Fall 2014 - Summer 2018
IMMERSE Faculty, University of Nebraska – Lincoln	Summer 2014
Visiting Assistant Professor, Bard College	Fall 2012 - Spring 2014
Mathematics Postdoc, Bard Prison Initiative (BPI)	Fall 2012 - Spring 2014

PUBLICATIONS

`Calculations involving symbolic powers.`
Joint with Ben Drabkin, Eloísa Grifo, and Alexandra Seceleanu. The Journal of Software for Algebra and Geometry, Vol. 9 (2019), 71–80.

`Recursive strategy for decomposing Betti tables of complete intersections.`
Joint with Courtney Gibbons and Robert Huben. International Journal of Algebra and Computation, Vol. 29, No. 7 (2019).

`Advising undergraduate research in prison.`
Mathematical Outreach: Explorations in Social Justice Around the Globe, 255-263. Series on Mathematics Education: Vol 16, World Scientific, November 2019.

`Visualizing combinatorial objects in Macaulay2.`
Joint with Brett Barwick, Thomas Enkosky, and Jim Vallandingham. Sém. Lothar. Combin. 80B (2018), Art. 97, 6 pp.

`Generalized Multiplicative Indices of Polycyclic Aromatic Hydrocarbons and Benzenoid Systems.` Joint with V.R. Kulli, Shaohui Wang, and Bing Wei. Zeitschrift für Naturforschung A, 72.6 (2017): 573-576.

`Non-simplicial decompositions of Betti diagrams of complete intersections.`
Joint with Courtney Gibbons, Jack Jeffries, Sarah Mayes, Claudiu Raicu, and Brian White.
Journal of Commutative Algebra 7 (2015), no. 2, 189-206.

`Non-Gorenstein isolated singularities of graded countable Cohen-Macaulay type.`
Connections between algebra, combinatorics, and geometry, 299–317, Springer Proc. Math. Stat., 76, Springer, New York, (2014).

`A sequence defined by M-sequences.`
Joint with Tom Enkosky. Discrete Math. 333 (2014), 35–38.

`Super-stretched and graded countable Cohen-Macaulay type.`
Journal of Algebra 398 (2014).

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Computing free bases for projective modules.
```
Joint with Brett Barwick. The Journal of Software for Algebra and Geometry, Vol 5 (2013), 26–32.

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Ideals with Larger Projective Dimension and Regularity.
``` Joint with Jesse Beder, Jason Mc-Cullough, Luis Núñez-Betancourt, Alexandra Seceleanu and Bart Snapp. Journal of Symbolic Comp 46 (2011).

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| MACAULAY2 CAS PACKAGES | `Visualize.m2`: Joint with Brett Barwick, Tom Enkosky, and Jim Vallandingham. This package helps visualize algebraic objects in a modern browser using javascript. |

`Decompositions.m2`: Joint with Courtney Gibbons. A supplement to the current Boij-Söderberg Macaulay2 package by computing the coefficients of a Betti table decomposition using the Herzog-Kohl equations.

`QuillenSuslin.m2` This is joint with Brett Barwick. This package uses Logar-Sturmfels' algorithm to calculate the free basis of a projective module over a polynomial ring.

`BigIdeal.m2` This package generates the ideals defined in Ideals with Larger Projective Dimension and Regularity by Beder, McCullough, Núñez-Betancourt, Seceleanu, Snapp and Stone. These ideals have very large projective dimension and regularity relative to the degree and number of generators.

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| AWARDED GRANTS | NSF Conference Grant DMS-1701922, $30,000. | May 2017 |

*Title:* Free resolutions and computations, Berkeley 2017
*PI:* Branden Stone, Adelphi University
*Co-PI:* Sonja Mapes, University of Notre Dame
*Co-PI:* David Swinarski, Fordham University
*Co-PI:* Hal Schenck, University of Illinois at Urbana-Champaign

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| HONOURS AND AWARDS | 2019-2021 Innovations in Digital Pedagogy Fellowship, Hamilton College |

2012-2013 Mathematical Association of America Project NExT Leitzel Fellowship
2011-2012 NSF Graduate STEM Fellow in K-12 Education (GK-12)
2010-2011 NSF Graduate STEM Fellow in K-12 Education (GK-12)

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| RECENT INVITED TALKS | Special Session: *Commutative Algebra* | October 2019 |

Fall Eastern Sectional Meeting of the AMS, Binghamton University, Binghamton, NY

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| Utica College Math Seminar | September 2019 |
| Franklin & Marshall College Math Seminar | April 2019 |
| Special Session: *Homological Commutative Algebra* | April 2018 |

Spring Eastern Sectional Meeting of the AMS, Northeastern University, Boston, MA
*Spoke in place of Courtney Gibbons on joint work.*

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| Mini Workshop in Homological Algebra at University of Virginia | March 2018 |
| MAA Session: *Innovative Mathematical Outreach in Alternative Settings* | January 2018 |

Joint Mathematics Meetings, San Diego, CA

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| Special Session: *Commutative Algebra* | May 2017 |

Spring Eastern Sectional Meeting of the AMS, Hunter College, New York, NY

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| Special Session: *Commutative Algebra: Research for Undergrad and* | January 2017 |

*Early Grad Students* Joint Mathematics Meetings, Atlanta, GA

Special Session: *Innovative Strategies to Inspire & Prepare Potential STEM Majors Who are Not Yet Ready for Calculus, II* — January 2017
Joint Mathematics Meetings, Atlanta, GA

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| SERVICES AND OUTREACH | Referee for various mathematical journals | Spring 2015 - Current |
| | Co-Maintain www.commalg.org | Spring 2015 - Current |
| | *What is?* seminar series organizer, Days-Massolo Center, Hamilton College | Spring 2019-Current |
| | Reviewer for AMS Mathematical Reviews and Zentralblatt MATH | Fall 2014 - Current |

Faculty Advisor for AMS Student Chapter (Adelphi)           Spring 2017 - Spring 2018
*Founded the AMS Student Chapter, Department receives $500 per year from AMS*

Elected Member of the General Education Committee (Adelphi)      Fall 2016 - Spring 2018

Academic advisor for sophomore/junior math majors (Adelphi)      Spring 2016 - Spring 2018

Faculty sponsor for MAA William Lowell Putnam Competition (Adelphi)    Fall 2014 - Spring 2018

MAA Liaison for the math and computer science department (Adelphi)    Fall 2014 - Spring 2018

Represented Math and CS department in Faculty Senate (Adelphi)             Spring 2016

Poster and Presentation Judge for University's Research Day (Adelphi)      Spring 2015, 2016

| GATHERINGS ORGANIZED | | |
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Macaulay2 Workshop, Cleveland State University.                   May 2020

AMS Special Session on Commutative Ring Theory:            January 2019
*Research for Undergraduate and Early Graduate Students*
2019 JMM, Baltimore, MD

Macaulay2 Conference/Workshop:                         July 2017
*Stillman's Conjecture and other Progress on Free Resolutions:*
   *a workshop in honor of the sixtieth birthdays of Dave Bayer and Mike Stillman*

Adelphi University Math and Computer Science Faculty Seminar Series      Fall 2016 - Spring 2018

Adelphi University Math and Computer Science Seminar Series          Fall 2014 - Spring 2018

Project NExT Panel Session on Advising Required Undergraduate Research Projects    July 2013
MAA MathFest, Hartford, CT

Project NExT Panel Session on Mathematics for Social Justice           January 2013
Joint Mathematics Meeting, San Diego, CA

| TEACHING EXPERIENCE | | |
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*Hamilton College:*

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| Math 113, Calculus I | Fall 2019 |
| Math 116, Calculus II | Fall 2018, Spring 2019 |
| Math 216, Multivariable Calculus | Fall 2018 |
| Math 224W, Linear Algebra (with proofs) | Spring 2019 |
| Math 355, Math of Machine Learning | Fall 2019 |

*Adelphi University:*

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| Math 110, Pre-Calculus for Non-Majors | Summer 2015 |
| Math 113, Survey of Statistics (online) | Spring 2017, 2018, Fall 2017 |
| Math 130, Calculus I A | Fall 2014 |
| Math 140, Precalculus | Fall 2017 |
| Math 141, Calculus I | Fall 2014 |
| Math 142, Calculus II | Spring 2015, Fall 2015 |
| Math 201, Bridge to Higher Mathematics | Spring 2018 |
| Math 243, Calculus III | Spring 2016, Fall 2016 |
| Math 253, Linear Algebra | Spring 2015, Fall 2015 |
| Math 351, Number Theory | Fall 2016 |
| Math 362, Mathematical Statistics | Spring 2017 |
| Math 390, Special Topics: Graph Theory | Spring 2016 |
| Math 391, Independent Study: Diff Geometry | Spring 2015 |
| Math 391, Independent Study: Calculus to Cohomology | Fall 2016 |
| Math 391, Independent Study: Research | Fall 2015 - Spring 2018 |

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| CSC 156, Discrete Structures | Spring 2017 |
| CSC 160, Computer Programming for Non-Majors (Python) | Spring 2017 |
| CSC 171, Introduction to Java I | Fall 2016, Spring 2017, 2018 |
| MTP 590, Analyzing the Common Core Mathematics Standards | Fall 2016 |

*Bard College:*

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| Math 141, Calculus I | Fall 2012 |
| Math 142, Calculus II | Fall 2012 |
| Math 213, Linear Algebra with ODE | Spring 2013 |
| Math 241, Vector Calculus | Fall 2013 |

*Eastern Correctional Facility:*

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| Math 231, Discrete Mathematics | Fall 2012 |
| Math 332, Abstract Algebra | Spring 2013 |
| Math 334, Explorations in Mathematics | Fall 2012 |
| Math 361, Real Analysis | Fall 2013 |
| Math IND, Readings: Lebesgue Integration | Spring 2013 |
| Math IND, Readings: Commutative Algebra | Fall 2013 |

*Woodbourne Correctional Facility:*

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| Math 332, Abstract Algebra | Spring 2013 |

NSF Graduate STEM Fellow in K-12 Education      June 2010 - May 2012
I implemented inquiry-based learning in middle school mathematics classrooms in Kansas City and I was a teaching assistant in an inquiry based learning course for undergraduate mathematics education majors.

*Full teaching responsibilities as a graduate student at the University of Kansas for the following:*

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| Math 002, Intermediate Algebra | Fall 2007 |
| Math 109, Math for Elementary School Teachers I | Fall 2008 |
| Math 115, Calculus I | Fall 2005, Spring 2006 and Spring 2007 |
| Math 116, Calculus II | Fall 2006 |
| Math 122, Calculus II | Spring and Fall 2009 |
| Math 290, Elementary Linear Algebra | Summer 2007 and Spring 2008 |

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| RESEARCH WITH UNDERGRADUATES | Classifying nearly complete intersections<br>Charlie Miller, Hamilton College | Summer 2019 |
| | Semi-definite programming with Macaulay2<br>Vincent Schinina, Adelphi University | Spring 2018 |
| | Linear programming with Macaulay2<br>Kyle Murray, Adelphi University | Fall 2017 |
| | Finding complex roots<br>Nicholas DeMarco, Adelphi University (Co-advised with Sarah Wright) | May 2017 |
| | Walks on molecular graphs<br>Marisa Masi, Adelphi University | May 2017 |
| | Matroids on rings with applications to toric ideals<br>Patrick Phelps, Adelphi University | May 2017 |
| | From string theory to elliptic curves over a finite field, $\mathbb{F}_p$<br>Linh Pham, Bard College | May 2014 |
| | Let's walk and explore<br>Bard College (BPI) | May 2014 |

| A new nook at Hadwiger's conjecture | May 2014 |
| Bard College (BPI) | |

| Concrete bridges to abstract algebras | May 2014 |
| Bard College (BPI) | |

| Sifting squared prime intervals efficient prime acquisition and counting | May 2014 |
| Bard College (BPI) | |

| Algebraic structures and Boij-Söderberg theory | May 2013 |
| Fanny Wyrick-Flax, Bard College | |

| Applications of graph theory to chaotic systems | January 2013 |
| Bard College (BPI) | |

| Computing various dimensions of chaotic systems | January 2013 |
| Bard College (BPI) | |

TECHNICAL SKILLS

Proficient in *Macaulay2*, LaTeX, Java, Git, Python, and JavaScript

Experience with R, Sage, C++, html, and Linux Operating Systems

Familiarity with Mathematica, MatLab, Maple, Unix Operating System, and Ruby

PROFESSIONAL MEMBERSHIP

American Mathematical Society (AMS)

Mathematical Association of America (MAA)

RECENT CONFERENCES AND WORKSHOPS ATTENDED

| Fall Eastern Sectional Meeting | October 2019 |
| Binghamton University, Binghamton, NY | |

| 2019 Joint Mathematics Meeting | January 2019 |
| Baltimore, MD | |

| The Undergraduate Faculty Program at Park City Math Institute | July 2018 |
| Workshop on discrete Fourier analysis and the Erdös distance problem. | |
| Park City, UT | |

| Spring Eastern Sectional Meeting | April 2018 |
| Northeastern University, Boston, MA | |

| Mini Workshop in Homological Algebra | March 2018 |
| University of Virginia, Charlottesville, VA | |

| The Homological Conjectures: Resolved! | March 2018 |
| MSRI, Berkeley, CA | |

REFERENCES

**Dr. Craig Huneke** (Academic Advisor)
Marvin Rosenblum Professor of Mathematics
University of Virginia
Charlottesville, VA
phone: *434-924-4946*
e-mail: *huneke@virginia.edu*

**Dr. Irena Swanson** (Research Reference)
Professor of Mathematics
Reed College
Portland, Oregon
phone: *503-517-7399*
e-mail: *iswanson@reed.edu*

**Dr. Courtney Gibbons** (Teaching Reference)
Associate Professor of Mathematics
Hamilton College
Clinton, NY
phone: *315-859-4886*
e-mail: *crgibbon@hamilton.edu*

**Dr. Lee Stemkoski** (Teaching Reference)
Professor of Mathematics
Adelphi University
Garden City, NY
phone: *516-877-4495*
e-mail: *stemkoski@adelphi.edu*