

# Bart Snapp

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## Education

- University of Illinois at Urbana-Champaign, Ph.D. in mathematics, under the supervision of Sankar Dutta, 2007.
- University of Illinois at Urbana-Champaign, master of science in teaching mathematics, 2007.
- Ohio State University, bachelor of science with honors in the liberal arts and distinction in mathematics with a minor in physics, 2001.

## Positions

- Auxiliary Assistant Professor, Ohio State University, 2014–present.
- Bareis Lecturer, Ohio State University, 2009–2014.
- Ross Mathematics Program Seminar Instructor, Ohio State University, summer 2010.
- Assistant Professor, Coastal Carolina University, 2007–2009.
- Visiting Assistant Professor, University of Nebraska-Lincoln, summer 2008.

## Research

- Commutative algebra with emphasis in the homological conjectures.
- Computational questions in commutative algebra.
- Mathematics education.
- Various undergraduate research topics.

## Professional Activities

### Grants

- STEAM Powered Project: Buckeye Virtual Reality (with C. Orban, J. Brown, J. Fowler): \$12000, spring 2016.
- Affordable Learning Exchange Grant (with J. Fowler): \$16000, fall 2015.
- Textbook Affordability Grant: \$1000, fall 2015.
- Young Mathematician's Conference Grant (co-Pi): DMS-1550117, \$133000, spring 2015.
- Math Circle seed grant from the American Institute of Mathematics (co-Pi): \$2000, spring 2014.
- Shuttleworth Flash Grant: \$5000, spring 2014.
- Interactive Textbook (co-Pi): DUE-1245433, \$180000, fall 2013.
- eLearning Professional Development Grant: \$450, spring 2013.
- Young Mathematician's Conference Grant (co-Pi): DMS-1252904, \$179975, spring 2013.

### Professional Development

- *AIM Mathematics in the time of MOOCs Workshop*, spring 2014.
- *AIM Math Circles for Teachers Workshop*, summer 2013.
- *IMA Special Workshop: Macaulay2*, summer 2011.
- *Mathematics Research Communities: Commutative Algebra*, Snowbird, Utah, summer 2010.
- *MSRI Macaulay2 Workshop*, winter 2010.
- IMMERSE Program, University of Nebraska-Lincoln, summer 2008.

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**Fellowships and Research Assistantships**

- Research assistant, University of Illinois, under the supervision of Dan Grayson, spring 2007.
- Research assistant, University of Illinois, under the supervision of Sankar Dutta, fall 2006.
- Research assistant, University of Illinois, under the supervision of Sankar Dutta, summer 2006.
- Research assistant, University of Illinois, under the supervision of Sankar Dutta, fall 2004.
- Participated in a REGS (Research Experience for Graduate Students) on the topic of computation in commutative algebra under the supervision of Sean Sather-Wagstaff, summer 2004.
- Participated in a REGS (Research Experience for Graduate Students) on the topic of regularity and Smoothness under the supervision of Sankar Dutta, summer 2003.

**Teaching Awards and Development**

- Finalist for the Provost's Award for Distinguished Teaching by a Lecturer, Ohio State University, spring 2017.
- Nominated for the Provost's Award for Distinguished Teaching by a Lecturer, Ohio State University, spring 2014.
- Nominated for the Provost's Award for Distinguished Teaching by a Lecturer, Ohio State University, spring 2013.
- Nominated for the Alumni Award for Distinguished Teaching, Ohio State University, spring 2012.
- Math department's Brahana TA instructional award, University of Illinois, spring 2006.
- Math department's candidate for the LAS award for excellence in undergraduate teaching by teaching assistants, University of Illinois, spring 2006.
- Graduate teaching certificate, University of Illinois, spring 2004.
- Honorable mention for the department TA instructional award, University of Illinois, spring 2004.

**Outreach**

- Annual Julia Robinson Math Festival, coorganizer, 2014–2016; table-leader, 2014–present.
- Math Circles for Teachers, coorganizer 2014–2016.
- Young Scholars Program: Calculus instruction, summer 2013.
- STEAM Factory Presentations, 2013–present.
- Math Circles for students, with D. Shapiro, fall 2010–present.
- Volunteering in classrooms at local schools.

**Course Development**

- Lead author for Ximera-based calculus textbook:

<http://ximera.osu.edu/course/mooculus/calculus1/>  
<http://ximera.osu.edu/course/mooculus/calculus2/>  
<http://ximera.osu.edu/course/mooculus/calculusE/>  
<http://ximera.osu.edu/course/mooculus/calculus3/>

- Designed the course *Mathematics for Architects*, Ohio State University. Online course notes:

<http://people.math.osu.edu/snapp.14/1118/>

- Redesigned the course *Geometry and Measurement for Middle School Teachers*, Ohio State University, winter 2010. Online course notes:

<http://people.math.osu.edu/snapp.14/1166/>

- Redesigned the course *Number and Algebraic Structures for Middle School Teachers*, Ohio State University, fall 2009. Online course notes:

<http://people.math.osu.edu/snapp.14/1165/>

- Redesigned the course *Problem Solving for Middle School Teachers*, Coastal Carolina University, spring 2008.
- Redesigned the course *Geometry for Middle School Teachers*, Coastal Carolina University, fall 2009. Currently they use the course notes for Math 1166 at OSU.
- Helped develop the course *Ideas in Geometry*, fall 2005–present. Currently they use the course notes for Math 1166 at OSU.

### Teaching with Technology

- m4th.pro, 2019–present.
- The Ximera Project, 2013–present.
- Massive Open Online Calculus, 2013–2014.
- Instructor for the University of Illinois' *Calculus&Mathematica Program*, 2001–2002.
- Undergraduate teaching assistant for OSU's *Calculus&Mathematica Program*, 1998–2001.
- Undergraduate teaching assistant for OSU's *Calculus Remote at Ohio State Program*, 1997–2001.

### Student Mentoring

- Erin Gray, *Productive Struggle: How Struggle in Mathematics can Impact Teaching and Learning*, Masters in Mathematics for Educators, Ohio State University, spring 2019.
- Sarah Bergen, *Mathematics and Foreign Language: Authentic Texts in Mathematics*, Masters in Mathematics for Educators, Ohio State University, spring 2017.
- David Kish, *Developing a Quantitative Reasoning Course for College Consumption*, Masters in Mathematics for Educators, Ohio State University, spring 2017.
- Jessica Wheeler, *Instructing Group Theory Concepts from Pre-Kindergarten to College through Movement Activities*, Masters in Mathematics for Educators, Ohio State University, spring 2016.
- Hiba Abu-Arish, *Perfect Numbers and Perfect Polynomials: Motivating Concepts From Kindergarten to College*, Masters in Mathematics for Educators, Ohio State University, spring 2016.
- Ayla Lampard, *A Statistical Analysis of Online Homework Systems: Homework Completion vs. Student Knowledge*, Masters in Mathematics for Educators, Ohio State University, spring 2015.
- David Lindberg, *Enhancing Individualized Instruction through Hidden Markov Models*, Masters in Mathematics for Educators, Ohio State University, summer 2014.
- Helene Duke, *A Study of the Rigidity of Regular Polytopes*, Masters in Mathematics for Educators, Ohio State University, spring 2013.
- Deborah Stout, *Graphing Beyond Collatz*, Masters in Mathematics for Educators, Ohio State University, spring 2013.
- Marina David, mentored for the International Baccalaureate Program at Westerville South High School, finished spring 2013.
- Tim Tussing, *Analysis of Effects on Sound Using the Discrete Fourier Transform*, Masters in Mathematics for Educators, Ohio State University, graduated spring 2012.
- Shweta Kulkarni, Sai Prathyusha Peddi, Aditi Singhal, and Diego Zaccai (computer science graduate students) CETI iPad eText Project, spring 2012.
- Joo-Kyung Kim, (computer science graduate student) CETI iPad eText Project, summer 2011. Co-mentored with Jim Fowler.
- Sam Colburn, Gus Coliadis, Will Mohr, and Jhovary Ruiz, (computer science students) Ohio State University, CETI iPad eText Project, fall 2010. Note, this project won *Best Capstone Project* in their CSE 758 course.
- Greg Williams, a MAT student, Coastal Carolina University, fall 2008.

### Service Experience

- Ximera Workshop  $n = 1, 2, \dots$  coorganizer, Ohio State University, 2014–present.

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- TA Summer Training, Active Learning Strategies, (with J. Johnson) summer 2016–present.
  - Steam Factory advisory committee, spring 2013–present.
  - Young Mathematician’s Conference, coorganizer, Ohio State University, 2011–present.
  - Denman Undergraduate Research Forum Judge, spring 2012–2013.
  - Woodrow Wilson Ohio Teaching Fellowship Program Advisory Board, Ohio State University, 2010.
  - Innovate Curriculum Design Team for project ASPIRE, Ohio State University, 2010.
  - College technology committee, Coastal Carolina University, fall 2008–spring 2009.
  - University core assessment committee, Coastal Carolina University, spring 2007–spring 2009.
  - Department curriculum committee, Coastal Carolina University, fall 2007–spring 2009.
  - Chair of the departmental graduate teaching awards committee, University of Illinois, spring 2007.
  - Department fall picnic committee, University of Illinois, fall 2006.
  - Teaching mentor, worked with new graduate teaching assistants before and during the semester, University of Illinois, fall 2005.
  - Course captain for Math 234: Business Calculus, University of Illinois, fall 2005.
  - Undergraduate affairs committee, University of Illinois, fall 2004–spring 2005.
  - Teaching awards committee, University of Illinois, fall 2003.
  - Judged for the Illinois Council of Teachers of Mathematics State Math Contest, University of Illinois, spring 2002.
  - Course Captain for the computer-based *Mathematica* sections, University of Illinois, fall 2002.

### Professional Service

- Content contributor for the Elementary and Middle Childhood Math Open Educational Resources project. Supported by the Ohio Department of Higher Education Innovation Grant, 2019.
- Reviewer for the Abstract Algebra Open Educational Resources project. Supported by the Ohio Department of Higher Education Innovation Grant, 2019.
- Content contributor for the Calculus 1 and 2 Open Educational Resources project. Supported by the Ohio Department of Higher Education Innovation Grant, 2018.
- Referee for *INTEGERS*.
- Referee for *The Journal of Integer Sequences*.
- Referee for *The Journal of Number Theory*.
- Reviewer for *Mathematical Reviews*.
- Consultant for Metallurgical Sensors Inc. Georgetown, South Carolina, 2008–2010.
- Consultant for Precision Graphics. Champaign, Illinois, 2001.

## Publications

### Research

- *Ideals with larger projective dimension and regularity*. Co-authored with J. Beder, J. McCullough, L. Nunez, A. Seceleanu, and B. Stone. *Journal of Symbolic Computation* **46** (2011) no. 10, 1105–1113.
- *A note on the variety of pairs of matrices whose product is symmetric*. In *Commutative Algebra and its Connections to Geometry (PASI 2009)*, A. Corso, C. Polini (eds.), Contemporary Mathematics, volume 555, American Mathematical Society. Co-authored with M. Majidi-Zolbanin.
- *Free summands of syzygies of modules over local rings*. *Journal of Pure and Applied Algebra* **214** (2010), no. 10, 1808–1811.
- *Generalized local cohomology and the canonical element conjecture*. *Journal of Pure and Applied Algebra* **212** (2008), no. 4, 941–954.

**Research with Undergraduates**

- *The no-three-in-line problem on a torus*. In preparation. Working with J. Fowler, A. Groot and D. Pandya.
- *The Collatz problem and analogues*. Journal of Integer Sequences. **11** (2008), no. 4, article 08.4.7. Co-authored with M. Tracy.

**Educational/Popular Mathematics**

- *Derivatives and quotient rings*. In preparation. Co-authored with J. Fowler.
- *Intersecting circles via paper-folding constructions*. In preparation. Co-authored with R. Flatt.
- *Gaming the Law of Large Numbers*. Co-authored with T. Hoffman. Mathematics Teacher. December 2012/January 2013, 378–383.
- *Automotive number theory*. Math Horizons. September 2009. Co-authored with C. Snapp.

**Macaulay2 Packages**

- `SpaceCurvesMultiplierIdeals.m2` co-authored with Claudiu Raicu and Zach Teitler.
- `PowerSeries.m2` co-authored with Chris Cunningham and Jason McCullough.
- `Depth.m2`
- `NoetherNormalization.m2` co-authored with Nat Stapleton.

**Talks and Presentations****Research Talks**

- Ohio State University: Commutative Algebra Seminar, *Strange polynomials*, fall 2017.
- MSRI Macaulay2 workshop: *The power series package*, winter 2010.
- Florida Atlantic University: 2009 AMS sectional meeting, special session on homological aspects of module theory, *A criterion for a ring to be Cohen-Macaulay and the canonical element conjecture*, fall 2009.
- University of Illinois: 2009 AMS sectional meeting, special session on local and homological methods in commutative algebra, *Free summands of syzygies and Cohen-Macaulay rings*, spring 2009.
- University of South Carolina: Georgia State University-University of South Carolina joint commutative algebra meeting, *Free summands of cokernels and syzygies*, fall 2008.
- Georgia State University: Georgia State University-University of South Carolina joint commutative algebra meeting, *Generalized local cohomology and the canonical element conjecture*, fall 2007.
- University of Illinois: Commutative ring theory seminar, organizer, fall 2006–spring 2007.
- University of Illinois: Commutative ring theory seminar, *Syzygies, cokernels, and the canonical element conjecture*, fall 2006.
- University of Illinois: Commutative ring theory seminar, *Cokernels and the canonical element conjecture*, fall 2006.
- University of Illinois: Commutative ring theory seminar, *Homological methods and the canonical element conjecture*, fall 2006.
- Wabash College: Wabash Summer Institute in Algebra, *Cohomology in commutative algebra*, summer 2006.
- University of Illinois: Graduate student computational combinatorial commutative algebra seminar, coorganizer and presenter, spring 2006.
- University of Illinois: Commutative ring theory seminar, *Artin's approximation theorem*, fall 2005.
- University of Illinois: Introductory algebraic geometry seminar, coorganizer and presenter, summer 2005.
- University of Illinois: Commutative ring theory seminar, *Peskine and Szpiro's proof of the intersection theorem part II*, fall 2004.
- University of Illinois: Commutative ring theory seminar, *Peskine and Szpiro's proof of the intersection theorem*, fall 2004.

- University of Illinois: Commutative ring theory seminar, *Regularity and smoothness*, fall 2003.

### Educational/Popular Presentations

- Joint Mathematics Meetings Project NExT Workshop on Flipped Classroom, *Maximizing Student Outcomes in Flipped Classrooms*, (with J. Fowler, D. Pengelley, J. Wilson), spring 2019.
- The Ohio State University, *Using Technology to Empower Students*, TA Professional Development Seminar, fall 2018.
- University of Florida, Ximera Workshop 6, invited guest, fall 2018.
- Ohio State University, Innovate Conference, *Switching from a Commercial Textbook to a > Ximera OER Textbook*, spring 2018.
- SIGMAA on Mathematics Instruction Using the WEB (WEB SIGMAA) Guest Lecture, (with J. Fowler) *Using Ximera to build online interactive math activities*, spring 2018.
- Joint Mathematics Meetings Contribution Paper Session: Assessment, *Ximera: Measuring the effectiveness of an open-source interactive textbook*, spring 2018.
- Joint Mathematics Meetings Contribution Paper Session: Mathematical Technology in the Calculus Classroom, *Teaching calculus with Ximera*, spring 2017.
- Stevens Institute of Technology: Reimagining Calculus Education, *Teaching calculus with Ximera*, fall 2016.
- MathFest General Contributed Paper Sessions on Teaching Calculus: Calculus with Ximera: Building an open-source interactive calculus textbook with  $\LaTeX$ , fall 2016.
- Columbus Museum of Art: Connector-34, *Trapped in a room with mathematicians*, with Jim Fowler, spring 2016.
- Ohio State University: Radical Pi undergraduate math club, *How to find potential research problems part 1 and part 2*, spring 2016.
- Ohio State University: Association for Women in Mathematics, Student Chapter, *Twisted Tangles* with Jessica Wheeler, fall 2015.
- Otterbein University: Ohio-PKAL First Annual Conference, *Online Calculus: Building a Better Classroom*, with Steven Gubkin, spring 2015.
- Ohio State University: Innovate Conference, *Creating a Community to Develop Open Educational Resources*, with Elizabeth Miller and Jenny Sheldon, spring 2015.
- Joint Mathematics Meetings Poster Session: *The Ximera Project: You Can Make an Interactive Textbook*, spring 2015.
- Ohio State University: Advocates for Children&Education Scholars at Ohio State, *Ximera: If I can build an online class, so can you!* spring 2014.
- Missouri Section of MAA: Virtual Panel Discussion: Online Education In Mathematics, spring 2014.
- Ohio State University: Friday Round Table Math Education Seminar, *Ximera: Building online materials*, spring 2014.
- Ohio State University: Innovate Conference, *An interactive classroom via GitHub*, with Jim Fowler, spring 2014.
- Ohio State University: Friday Round Table Math Education Seminar, *MOOCulus*, spring 2014.
- Ohio State University: Innovate Conference. Member of the *MOOC Panel*, spring 2013.
- Ohio State University: Engineering Living-Learning Presentation: *A pure mathematician gets put to work*, spring 2013.
- Ohio State University: Reading Classics Seminar, *Erdős and the no-three-in-line problem*, spring 2013.
- Ohio State University: Reading Classics Seminar, *Descartes, Tangents, and Quotient Rings*, fall 2012.
- Ohio State University: Young Scholars Program, *Math and Music*, (assisted by Danny Lemmon) spring 2012.
- Coastal Carolina University: Department seminar, *Teaching future teachers through problem solving*, fall 2010.
- Ohio State University: Radical Pi undergraduate math club, *Moonlighting in applied mathematics*, winter 2010.
- Ohio State University: Radical Pi undergraduate math club, *The hailstone problem (almost)*, fall 2009.
- Ohio State University: Radical Pi undergraduate math club, *Dungeon geometry*, fall 2009.
- Coastal Carolina University: Engineering 101, *Engineering on the weekends*, fall 2008.

- Coastal Carolina University: Department seminar, *Nonsense and abstract nonsense*, fall 2007.
- University of Illinois: Teaching assistant orientation, *Giving a lecture*, fall 2006.
- University of Illinois: Participated in several panel discussions related to teaching during the math department graduate student orientation, fall 2005.
- University of Illinois: Teaching assistant orientation, *Preparing a lecture*, with Alison Ahlgren, fall 2004.
- University of Illinois: Teaching assistant workshop, *Use of technology in the classroom*, with Micah James, spring 2004.