Rann Bar-On

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Educational History

- Duke University, Durham, NC 2003-2009
  Ph.D. Mathematics Septemeber, 2009
  Thesis title: Small Boolean Networks
  Advisor: John Harer
  M.A. Mathematics 2005
- Warwick University, Coventry, UK 1999-2003
  MMath Mathematics, May 2003

Employment History

Administrative

Lab Supervisor, Duke University

- Math 105L, 106L, 111L, 112L, 122L (old numbers: 25L, 26L, 31L, 32L, and 41L), 2011-2015

As lab supervisor for all of the Mathematics Department's laboratory calculus courses, I recruited new undergraduate teaching assistants (UTAs) to serve in labs and in in our Help Room. I set the schedule for their work, assigning each UTA to a lab according to their experience, leadership ability, and personal schedule. Over the last few years, I decided to begin hiring UTAs coming out of my 106L classes to assist in Math 105L labs. Traditionally, we only hired students who completed higher level courses. This new policy has greatly enhanced the mathematical confidence of these assistants, and has provided current 105L students with lab assistants who understand their specialized needs at a far deeper level than in the past. Additionally, I ran training week each Fall semester for our new graduate students, all of whom are assigned to work in labs during their first semester at Duke, and for new teachers, mostly second-year graduate students.

Course Supervisor, Duke University

- Math $105L$ (old number: $25L$)and $106L$ (old number: $26L$), 2010-present

As course supervisor for the courses listed, I coordinate a team of graduate student teachers teaching a number of sections of each class. These vary from first-time teachers to those with a few semesters' experience. We meet at least once a week to discuss class progress, get suggestions from each other, write tests and quizzes, and share our in-class experiences. Additionally, I set and revise the syllabi

for the classes each semester, and maintain the courses' lab manual, which serves as a primary source for much of the material in the classes. I have also written a number of block final exams for a variety of laboratory classes.

Teaching Experience

Primary Instructor, Duke University

- Math 218, Matrices and Vector Spaces, Fall 2018 and Spring 2019.
- Math 218L, Lab component of Matrices and Vector Spaces, Fall 2018 and Spring 2019. (Note: this course was entirely designed and implement by me. See Publications below.)
- Math $106L$ (old number: $26L$), Lab Calculus/Functions II, Spring 2016, Spring 2015, Spring 2014, SpringSpring 2013, Spring 2012, Spring 2011, Spring 2010 (two sections per semester), Spring 2006 (one section).
- Math $105L$ (old number: $25L$), Lab Calculus/Functions I, Fall 2018, Fall 2017 (one section), Fall 2016, Fall 2015, Fall 2014, Fall 2013, Fall 2012, Fall 2011, Fall 2010, Fall 2009 (two sections per semester).
- Math $111L$ (old number: $31L$), Laboratory Calculus I, Fall 2010, Fall 2005
- Math $112L$ (old number: $32L$), Laboratory Calculus II, Fall 2017, Spring 2011, Spring 2010, Spring 2007, Fall 2007
- Math 216 (old number: 107), Linear Algebra and Differential Equations, Summer 2008.
- Math 41 (no longer offered), Introductory Calculus II, Spring 2007
- Math 32 (no longer offered), One Variable Calculus, Fall 2005

I was the primary grade-giving instructor for my own section in each course and wrote tests and quizzes. For the laboratory courses, I designed worksheets for the students to fill in, both as in-class group work and as homework review. Class sizes varied from 7 to 33 students. The calculus courses had a mixture of engineering and liberal arts students; the Linear Algebra course was almost entirely made up of engineering students.

Co-Primary Instructor, Duke University

- Education 390-T, Learning Theory: Calculus, Fall 2012.

In conjunction with Ben Cooke at the Academic Resource Center, I ran a class aimed at supporting undergraduate teaching assistants in Math 105L. We covered in-class issues, such as grading, assisting students, and teacher interactions, as well as current national educational issues and policies, such as affirmative action.

Teaching Assistant, Duke University

In addition to classes in which I was the primary instructor, I also have had several other teaching experiences which I list below.

- Math $112L$ (old number: $32L$), Laboratory Calculus I, Spring 2005.
- Math $111L$ (old number: $31L$), Laboratory Calculus I, Fall 2004.

  Each section of Laboratory Calculus at Duke has a weekly two and a half hour laboratory session in which students work in groups to explore a newly learned topic in depth and apply their knowledge to problems and data sets based on real-world data. I ran such a session and also helped to grade the lab reports and quizzes.
- Calculus Help Room, Fall 2004-present.

  For two hours a week, I answered questions from students enrolled in the various versions of Calculus I and II.

Service

- Graduate Student Calculus Committee, $2006-7$, Duke University.

  In the fall of 2006, I co-founded a committee whose mission was to provide input to the faculty about the potentially changing calculus curriculum at Duke. This committee, which was comprised of eight experienced graduate student teachers, was initially unofficial. However, it soon gained the department's blessing. We interviewed faculty from our own department to get a sense of the curriculum history and from other departments to get a sense of how calculus was used throughout the university. The end result was a extensive report (to be found at http://math.duke.edu/ adsmith/proposal.pdf) which included a recommendation for a new course, Math 41L. The course has since become the Math Department's flagship Calculus II.
- Mathematics Department Calculus Committee, $2009-$present, Duke University.

  The committee meets once to twice a year to discuss major changes to Duke's calculus program. It consists of all teaching faculty involved in our laboratory and other calculus course, as well as one to two graduate students, and a member of the department's research faculty.
- Success in Science/Math Education Committee, $2011-12$, Duke University.

  This university committee aims to develop an integrated approach to leveling the playing field for under-prepared entering undergraduate students aiming at the scientific, engineering and medical professions.
- Teaching Resource Archive Program, Designer and Maintainer, $2007-2013$, Duke University.

  I continued to help maintain the Teaching Resource Archive Program (TRAP), a wiki-like database of calculus worksheets. During my graduate studies at

Duke, I designed the system in collaboration with Abraham Smith, also a mathematics graduate student at the time. The system continues to be heavily used by graduate student teachers in the department, providing a sound basis both for lesson planning and for extra resources for students.

- Pre-major advisor, Duke University, 2012−present, Duke University.

  I have served as a pre-major advisor to dozens of students. In that role, I have helped guide the decisions made by these students prior to declaring their majors. Many of my advisees declared math majors. In addition, I have found myself counseling quite a few of my own students regarding their academic choices, often providing a second opinion and an open door to discuss any issues they may be having.

- Math major advisor, Duke University, 2016−present, Duke University.

  I have served as a major advisor in the math department to a number of students. In that role, I have helped guide the decisions made by these students as they progress through the math major at Duke.

- Search Committee for Academic Resource Center position, 2018−present.

  I currently serve on the ongoing search committee to replace Dr. Ben Cooke at Duke's Academic Resource Center. The committee will decide on the ideal candidate to serve in this significant role, which includes running and supporting small study groups for a number of undergraduate math classes.

Invited Talks

- *Beyond T.A. training: Calculus curriculum development by graduate teaching assistants.* At the AMS Joint Mathematics Meetings, Washington, DC, January 2009.

Other Talks

- *Leveling the playing field at highly selective universities: bringing students into the peleton.* At the EduLearn 2012 Conference, Barcelona, Spain, July 2012.

Selected Honors and Activities

- L.P. and Barbara Smith Award for Teaching Excellence, Duke University Mathematics Department, Fall 2007.

  According to the department, this award is "presented annually to one or two graduate students who have demonstrated a long-term commitment to teaching and whose teaching has reached a consistent level of excellence."

- Dean's Award for Excellent in Advising, August 2017.

  "The Dean's Award for Excellence in Advising was given to Rann Bar-On for his exceptional ability to guide undergraduates through their first two years

at Duke. Professor Bar-On is committed to supporting first-generation and minority students, encouraging them to be forthcoming about challenges they face."

Publications and Presentations

Note: authors are listed in alphabetical order, as is the convention in the field.

1. *Math 105L/106L Coursepack, Fall 2017 and Spring 2018.* Rann Bar-On, 2016. (Note: this has now been replaced with online resources that can be found at `https://services.math.duke.edu/~rann/project/105lmaterials/` and `https://services.math.duke.edu/~rann/project/106lmaterials/`)

2. *Graduate Calculus Curriculum Review.* Rann Bar-On, Paul Bendich, Benjamin Cooke, Michael Gratton, Timothy Lucas, Michael Nicholas, Nicholas Robbins, Abraham Smith, Joseph Spivey.
   Online at `http://www.curieux.us/abe/proposal.pdf`, 2007.

3. *(Re)discovering SoTL Through a Fundamental Challenge: Helping Students Transition to College Calculus.* Bar-On, R., Bookman, J., Cooke, B., Hall, D., & Schott, S. (2014). In J. Dewar & C. Bennett (Eds.), Doing the Scholarship of Teaching and Learning in Mathematics (pp. 59-66). Mathematical Association of America. doi:10.5948/9781614443186.008.

4. *Leveling the playing field at highly selective universities: bringing students into the peloton.* Rann Bar-On, Jack Bookman, Benjamin Cooke, Sarah Schott. In EDULEARN12 Proceedings, 4th International Conference on Education and New Learning Technologies, pages 1260–1270. IATED. `https://library.iated.org/view/BARON2012BRI`

5. *Applied Linear Algebra Coding Labs for Math 218.* Rann Bar-On. Online at `https://gitlab.oit.duke.edu/Math218D/math218D-notebooks`.

6. *Ripser.py: A Lean Persistent Homology Library for Python.* Tralie, C, Saul, N., & Bar-On, R. Ripser.py: A Lean Persistent Homology Library for Python. Journal of Open Source Software, 3(29), 925, `https://doi.org/10.21105/joss.00925`