Daniel Brice

Associate Software Engineer

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Career Objective

Seeking challenging and rewarding problems.

Education

- **Ph.D. Mathematics** ■ Auburn University ■ June 2014.
  Advisor: Huajun Huang.
  Honors: Baskervil Fellowship, Spring 2009.
- **B.S. Mathematics** ■ California State University, Channel Islands ■ December 2007.
  Emphasis: Mathematics Education.
  Honors: Mathematics Department Program Honors and Cum Laude.

Employment History

- **Associate Software Engineer** ■ CJ Affiliate by Conversant ■ June 2016 to Present
  Responsibilities include: Working within the *Agile* framework to deliver timely software products with customer input. Currently developing models, algorithms, and implementation of a Bayesian-reasoning HTTP server, leveraging technologies such as AWS, Docker, Kubernetes, Kinesis, Kafka, Hadoop, Spark, and Scala, as a framework for solving certain multi-armed bandit problems.
- **Lecturer of Mathematics** ■ California State University, Bakersfield ■ September 2015 to June 2016
  Responsibilities include: 15 credit-hours of instruction per quarter, *Calculus I, Calculus I for Engineering Sciences, Calculus II;* advising undergraduates; member of Calculus-sequence transition committee, responsible for conversion of the Calculus sequence from quarter to semester and for incorporation of computer-algebra system modules.
- **Assistant Professor of Mathematics** ■ Tuskegee University ■ August 2014 to May 2015
  Responsibilities included: 12 credit-hours of instruction per semester, *Pre-Calculus Algebra, Calculus I;* advising undergraduates; member of Uniform-Final-Exam Committee, T-CAEIL (tutoring center) Coordination Committee, Textbook-Selection Committee.
- **Teaching Assistant** ■ Auburn University ■ August 2008 to July 2014
  Responsibilities included: Instruction of various undergraduate courses, *Pre-Calculus Algebra, Business Calculus I, Calculus I, Calculus II, Calculus III, Math for Elementary Education I;* Grading for *Abstract Algebra;* Recitation for *Business Calculus I.*
- **Teaching Assistant** ■ California State University, Channel Islands ■ August 2007 to May 2008
  Responsibilities included: Instruction of *College Algebra;* Recitation for *Abstract Algebra, Real Analysis.*

Technology Skills

- Knowledgeable in functional programing paradigm and languages including Haskell and Scala.
- Currently using Jenkins, Docker, Kubernetes, and AWS to achieve continuous deployment.
- Currently using Kafka, Kinesis, Hadoop, and Spark in machine learning data pipeline.
- Currently employing Bayesian inference and the theory of conjugate priors to develop machine learning algorithms.
- Understanding of principles and patterns of object-oriented programming and working familiarity with Java.
- Experience using Canny edge detection, gradient vector fields, and principle component analysis to perform algorithmic image analysis.
- Understanding of use of tensor decomposition, singular value decomposition, and Perron–Frobenius theorem in structural analysis of graphs, particularly as it applies to the study of networks and the World-wide Web.
- Understanding of the basic ideas of topological data analysis, such as including persistence homology, and a desire to refine this understanding.
- Linux system administration, BASH shell scripting.
- Some experience with C, Python, and Javascript, and a desire to build proficiency.

Research Interests

Lie algebras and Lie theory, Structure theory of Lie algebras, Derivations of Lie algebras, Zero product determined algebras, Linear and multilinear algebra, Tensor decomposition, Category theory, Use of games and puzzles in building Mathematical reasoning, Use of software in providing real-time feedback.

Publications

- "On derivations of parabolic Lie algebras". In: *Journal of Lie Theory* (Feb. 2017). arXiv: `1504.08286 [math.RA]`
- "The matrix Lie algebra on a one-step ladder is zero product determined". In: *Alabama Journal of Mathematics* (Dec. 2015). arXiv: `1510.05072 [math.RA]`
- with Huajun Huang. "On zero product determined algebras". In: *Linear Multilinear Algebra* 63.2 (2015), pp. 326–342
- "A note on zero product determined Lie algebras". Manuscript in preperation.
- "On the derivation algebras of parabolic Lie algebras with applications to zero product determined algebras." PhD thesis. Auburn University, 2014

Presentations

- "Applications of Linear Algebra to Data Analysis". CSUCI Graduate Mathematics and Physics Seminar, Camarillo CA. Feb. 2016
- "Linear Lie Algebras, Block Matrices, and Ladder Matrices". MAA Golden Section/SoCal-Nevada Section Joint Meeting, San Luis Obispo CA. Nov. 2015
- "Upper Triangular Ladder Matrix Algebras, A Preliminary Report". AMS Fall Western Section Meeting, Fullerton CA. Oct. 2015
- "Upper Triangular Ladder Matrix Algebras". CSUB Mathematics Seminar, Bakersfield CA. Sept. 2015
- with Huajun Huang. "Parabolic Lie algebras are zero product determined". AMS Southeastern Section Meeting, Huntsville AL. Mar. 2015
- with Huajun Huang. "Parabolic Lie algebras are zero product determined". Southern Regional Algebra Conference, Lafayette LA. Mar. 2015
- "Derivations of parabolic Lie algebras with applications to zero product determined algebras". AMS Southeastern Section Meeting, Greensboro NC. Nov. 2014
- "Applications of multilinear algebra to World Wide Web search". Auburn U. Linear Algebra Seminar, Auburn AL. Oct. 2014
- "Constructions on zero product determined algebras". Cal State Channel Islands Graduate Mathematics Seminar, Camarillo CA. Nov. 2013
- "Constructions on zero product determined algebras". AMS Wester Section Meeting, Riverside CA. Nov. 2013
- "Zero product determined algebras I, II, & III". Auburn U. Linear Algebra Seminar, Auburn AL. Oct. 2013
- "Characterizing derivation algebras of parabolic subalgebras". Southeast Lie Theory Workshop, Baton Rouge LA. May 2013
- "Constructions on zero product determined algebras". Southern Regional Algebra Conference, Hammond LA. Mar. 2013
- "Derivations of parabolic subalgebras I & II". Auburn U. Linear Algebra Seminar, Auburn AL. Sept. 2012
- "Direct sums of zero product determined algebras". Southern Regional Algebra Conference, Morrow GA. Mar. 2012
- "Symmetry groups". Auburn U. REU in Algebra and Discrete Mathematics, Auburn AL. July 2011
- "Continuous symmetry groups". Auburn U. REU in Algebra and Discrete Mathematics, Auburn AL. July 2010

Teaching Experience

Over 8 years of experience teaching college-level Mathematics, including upper-division courses and specialized courses for pre-service teachers and for engineering majors.

- Instructor of Record for:
  - California State University, Bakersfield
    - *Set Theory and Logic*
      Morris, "Proof and Concepts, The Fundamentals of Abstract Mathematics" (Winter 2016)
    - *Calculus I*

Stewart, “Calculus, Concepts and Contexts” (Fall 2015, Spring 2016)

* *Calculus I for Engineering Sciences*
  Stewart, “Calculus, Concepts and Contexts” (Fall 2015)
* *Calculus II*
  Stewart, “Calculus, Concepts and Contexts” (Fall 2015, Winter 2016, Spring 2016)
* *Calculus II for Engineering Sciences*
  Stewart, “Calculus, Concepts and Contexts” (Winter 2016, Spring 2016)

– Tuskegee University

* *Analytic Geometry and Calculus I*
  Stewart, “Calculus” (Fall 2014)
* *College Algebra and Trigonometry I*
  Ratti and McWaters, “Precalculus, A Right Triangle Approach” (Fall 2014, Spring 2015)

– Auburn University

* *Calculus I*
  Stewart, “Calculus, Early Transcendentals” (Summer 2014)
  Hass and Weir, “University Calculus” (Fall 2009 [2 sections], Summer 2010, Spring 2011, Spring 2012 [2 sections])
* *Calculus II*
  Hass and Weir, “University Calculus” (Spring 2010 [2 sections], Spring 2013)
* *Calculus III*
  Stewart, “Calculus, Early Transcendentals” (Spring 2014 [2 sections])
  Hass and Weir, “University Calculus” (Fall 2012 [2 sections])
* *Calculus with Business Applications I*
  Tan, “Calculus with Business Applications” (Spring 2009 [2 sections], Fall 2011 [2 sections], Fall 2013)
* *Mathematics for Elementary Education I*
  Sowder, Sowder, and Nickerson, “Reconceptualizing Mathematics for Elementary Teachers” (Fall 2010 [2 sections])
* *Pre-Calculus Algebra*
  Blitzer, “Precalculus” (Summer 2012)

– California State University, Channel Islands

* *College Algebra*
  Blitzer, “Precalculus” (Summer 2012)

■ Assistant for:

– Auburn University

* Grader, *Introduction to Abstract Algebra I* (Fall 2013)
* Grader, *Introduction to Abstract Algebra II* (Spring 2013)
* Teaching Assistant, *Mathexcel Business Calculus Workshop I* (Fall 2008)

– California State University, Channel Islands

* Teaching Assistant, *Real Analysis* (Fall 2006)
* Teaching Assistant, *Abstract Algebra* (Spring 2007)

Additional Mathematics Education Coursework

In addition to the standard coursework of a Mathematics Ph.D., I have completed the following courses in Education to develop professionally as a teacher:

- **Graduate** – *Equity Issues in Mathematics Education; Research in Mathematics Education.*
- **Undergraduate** – *Equity, Diversity & Foundations of Education; History of Mathematics; Mathematics and Fine Art; Mathematics for Secondary School Teachers.*

Community Activities

- **Eagle Scout** – *24 April 2002, Troop 110, Rialto CA.*
  From Wikipedia: *Eagle Scout is the highest rank attainable in the Boy Scouting program. Requirements include ... demonstrating Scout Spirit through the Boy Scout Oath and Law, service, and leadership. This includes an extensive service project that the Scout plans, organizes, leads, and manages.*
  My service project involved organizing over 30 youth and adult volunteers, gathering donations, purchasing materials, and coordinating labor for building improvements at Grace Lutheran Church in Rialto, CA.
- **Math Club President** – *Spring 2007, Cal State Channel Islands.*
  Scheduled meetings, reserved room, scheduled presenters, maintained membership list, maintained website.
- **Auburn Puzzle Party 3** – Winning-team participant *Fall 2009, Auburn AL.*
  See description below.
- **Auburn Puzzle Party 4** – Volunteer organizer. *Fall 2010, Auburn AL.*
  See description below.
- **Auburn Puzzle Party 5** – Volunteer organizer. *Fall 2012, Auburn AL.*
  Auburn supports a thriving community of puzzle-hunters that hosts several puzzle-hunts each year. In addition to regular participation, I have served as an organizer for two puzzle-hunts. I contributed through designing puzzles, event production, and event staffing.
- **Linux Club President** – *Fall 2012, Spring 2013, Auburn U.*
  Scheduled meetings, reserved room, scheduled presenters, maintained membership list, maintained website.
- **Science Olympiad** – Habitual volunteer. *various years, Auburn U.*
  Auburn University annually hosts the regional Science Olympiad. I have contributed by staffing events.
- **AMP'd Challenge** – Habitual volunteer. *various years, Auburn U.*
  AMP'd Challenge is an annual mathematics puzzle-hunt for high school and middle school student sponsored by the Auburn U. College of Sciences and Mathematics. I have contributed by designing mathematical puzzles, judging solutions, and staffing events.
- **Global Urban Datafest** – Regional winner, global finalist. *Spring 2015, Auburn AL.*
  Worked on a team with three other amateur programmers to develop a data-intensive web application over the course of one weekend. We created an app that analyzes webcam images via Canny edge detection, gradient vector fields, and principle component analysis to detect arbitrary unusual activity. Applications include automated surveillance, early-warning systems, and disaster recovery.