Daniel Brice, Ph.D.

Mathematician, Programmer

danielbrice@gmail.com (818) 600-2256 California and Remote

Career Objective

To master complex and abstract systems, to solve challenging and rewarding problems, and to make the results palatable to the non-expert.

Research Interests

Multi-armed bandits, Bayesian inference, structure theory of Lie algebras, derivations of Lie algebras, zero product determined algebras, applications of category theory, functional design and architecture.

Eduction

- **Ph.D. Mathematics** □ Auburn University □ June 2014.
  Advisor: Huajun Huang.
  Dissertation: *On the Derivation Algebras of Parabolic Lie Algebras with Applications to Zero Product Determined Algebras.*
  Honors: Recipient, *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.*

Work History

- **Lecturer of Mathematics** □ Cal. State U., Channel Islands □ Fall 2018 to Present
  Teaching duties, including *Strategies and Game Design, Calculus with Business Applications.*
- **Senior Full-stack Engineer** □ Lumi □ July 2018 to March 2020
  Full-stack development of supply-chain-as-a-service software application and associated infrastructure. Refining software requirements. Data modeling. Systems design and architecture. Planning and execution of large, coordinated feature sets. Training. PostgreSQL, Haskell, Purescript. Remote.
- **Software Engineer III** □ CJ Affiliate □ June 2016 to July 2018
  Design and implementation of customer-facing APIs. Design and implementation of machine learning pipelines and applications. Data modeling. Systems design and architecture. Data collection and analysis at scale. Continuous deployment of high-availability systems at scale. Development of training materials. Java, Scala, Spark, Kafka, Kinesis, Kubernetes. On-site.
- **Lecturer of Mathematics** □ Cal. State U., Bakersfield □ Fall 2015, Spring 2016
  Teaching duties, including *Set Theory and Logic, Calculus I, II* (standard track and Engineering track). Advise undergraduates. Serve on various administrative committees.

- **Assistant Professor of Mathematics** □ Tuskegee U. □ Fall 2014, Spring 2015
  Teaching duties, including *Calculus I, Pre-Calculus.* Advise undergraduates. Serve on various administrative committees.
- **Graduate Teaching Assistant** □ Auburn U. □ Fall 2008 to Spring 2014
  Teaching duties, including *Math for Elementary Education I, Calculus I, II, III, Calculus with Business Applications, Pre-Calculus Algebra.* Assist instruction of graduate *Abstract Algebra I, II.*
- **Teaching Assistant** □ Cal. State U., Channel Islands □ Fall 2007 to Spring 2008
  Instruction of *College Algebra.* Assist instruction of *Abstract Algebra, Real Analysis.*

Publications

- "On derivations of parabolic Lie algebras". In: *Journal of Lie Theory* (Feb. 2017)
- "The matrix Lie algebra on a one-step ladder is zero product determined". In: *Alabama Journal of Mathematics* (Dec. 2015)
- with Huajun Huang. "On zero product determined algebras". In: *Linear and Multilinear Algebra* (Feb. 2015)
- "A note on zero product determined Lie algebras". Manuscript in preperation

Selected Presentations

- "Monoid Comprehension Calculus". CSUCI Math and Physics Seminar. Camarillo CA, Feb. 2019
- "Functional References (Lenses and such)". Santa Monica Haskell Users Group. Santa Monica CA, Feb. 2019
- "Delivering GraphQL Services Using Sangria". Los Angeles Scala Users Group. Los Angeles CA, June 2018
- "GraphQL and Sangria: How to get a GraphQL API Server Up and Running". Santa Barbara Java Meetup. Santa Barbara CA, June 2018
- "Applications of Category Theory to Programming Languages". CSUCI Math and Physics Seminar. Camarillo CA, Mar. 2018
- "Impressions and Implications of 'Infinite sets that admit fast exhaustive search' by Martín Escardó". Papers We Love, LA. Santa Monica CA, Sept. 2017
- "Thompson Sampling". Santa Barbara Machine Learning Meetup. Santa Barbara CA, Mar. 2017
- "On 'On the likelihood that one unknown probability exceeds another in view of the evidence of two samples' by W. R. Thompson". Papers We Love, LA. Santa Monica CA, Feb. 2017
- "Applications of Thompson Sampling to Machine Learning". CSUCI Math and Physics Seminar. Camarillo CA, Feb. 2017
- "Automatic Differentiation in Haskell". Santa Monica Haskell Users Group. Santa Monica CA, Aug. 2016
- "Applications of Linear Algebra to Data Analysis". CSUCI Math 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

- 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”. 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
- “Direct sums of zero product determined algebras”. Southern Regional Algebra Conference. Morrow GA, Mar. 2012

Community Activity

- **Global Urban Datafest** □ *Regional winner, global finalist* □ Spring 2015, Auburn AL
  Worked on a team with three others 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.
- **AMP’d Challenge** □ *Volunteer organizer* □ Various years, Auburn AL
  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.
- **Auburn Puzzle Party 3** *Winning team,* **4, 5** *Volunteer organizer* □ Falls 2009, 2010, 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.
- **Eagle Scout** □ April 2002, Rialto CA
  As a youth, organized over 30 other youth volunteers, gathering donations, purchasing materials, and coordinating labor for building improvements at Grace Lutheran Church in Rialto, CA.