Michael J. Bannister

Computer Science Department
Pomona College
333 N College Way, Claremont, CA 91711

michael.bannister@pomona.edu
www.michaeljbannister.com
Citizenship: United States

Teaching Interests

In addition to introductory courses in computer science and discrete mathematics, I am interested in teaching courses in: algorithms and data structures, complexity theory, visualization, image processing, computer graphics and game programming. In general, I am open to teaching any undergraduate computer science course, if given advance notice.

Research Interests

I am interested in the design, implementation, and analysis of geometric and graph algorithms. My current research includes algorithms for social network analysis, graph drawing and network visualization, and parameterized algorithms for NP-hard problems.

Education

University of California, Irvine

- PhD in Computer Science, GPA 3.97/4.00 — 2015
  Thesis: Lower Bounds and Fixed-Parameter Tractability of Drawing Graphs. Advisor: David Eppstein.

University of California, Los Angeles

- MA in Mathematics, GPA 3.87/4.00 — 2007
  Departmental Scholar.
- BS in Mathematics, GPA 3.87/4.00 — 2007
  Summa cum laude. Departmental highest honors.

Employment

Visiting Assistant Professor at Pomona College — July 2015–June 2016

- Taught lower and upper division courses in computer science, and supervised lab sections.

Graduate Student Researcher at University of California, Irvine — Fall 2010–Spring 2015

- Conducted, published, and presented research under the advisement of Professor David Eppstein.

Graduate Student Instructor at University of California, Irvine — Summer 2014

- Taught lower division courses in computer science.

Teaching Assistant at University of California, Irvine — Summer 2011–Spring 2014

- Lead discussion sections with over 100 students, clarifying students understanding of lecture material.

Part-time Faculty and Tutor at Santiago Canyon College — Summer 2008–Spring 2010

- Developed and taught courses in lower division and remedial mathematics.

Part-time Faculty and Tutor at Orange Coast College — Spring 2008–Spring 2010

- Developed honors courses, bringing topics from upper division mathematics to talented lower division students.

Teaching History

Courses Taught at Pomona College

- Discrete Mathematics — *Spring 2016*
- Computation and Cognition Lab — *Spring 2016*
- Data Structures and Advanced Programming — Fall 2015, *Spring 2016*
- Computational Photography — Fall 2015

Courses Taught at University of California, Irvine

- C++ as a Second Language — Summer 2014
- Design and Implementation of Data Structures — Summer 2014

Teaching Assistantships at University of California, Irvine

- Computational Geometry — Spring 2014
- Design and Analysis of Algorithms — Winter 2014, Fall 2013, Fall 2012
- Discrete Mathematics — Summer 2013, Summer 2012
- Operating Systems — Spring 2013
- Graph Algorithms — Winter 2013
- Concepts in Programming Languages — Summer 2011

Courses Taught at Orange Coast College

- Calculus 2 — Spring 2010
- College Algebra — Spring 2010
- Honors Topology — Spring 2010, Fall 2009
- Precalculus — Fall 2009
- Calculus 1 — Spring 2009
- Theory of Computation — Spring 2009, Spring 2008
- Honors Differential Geometry — Spring 2009, Fall 2008
- Intermediate Algebra — Fall 2008

Courses Taught at Santiago Canyon College

- Elementary Algebra — Spring 2010, Spring 2009, Fall 2008(x2)
- College Algebra — Spring 2010, Fall 2009, Spring 2009
- Trigonometry — Fall 2009
- Precalculus — Summer 2008

Awards and Recognitions

Best Presentation Award — 2013

- Awarded at the 21st International Symposium on Graph Drawing.

SIAM Student Travel Award — 2012, 2013, 2014

- Three times received for travel to the ACM-SIAM Symposium on Discrete Algorithms.

Dean's Fellowship, UCI — 2010

- Four-year fellowship for graduate study at UCI.

Sherwood Prize, Mathematics Department, UCLA — 2007

- Highest award given to graduating seniors in mathematics at UCLA.

Phi Beta Kappa, UCLA Chapter — 2007

- Nationwide academic honors society.

Departmental Scholar, Mathematics Department, UCLA — 2005–2007

- Joint B.S./M.A. program for advanced undergraduates.

Dean's Honor List, UCLA — 2004–2007

- Awarded six quarters for a GPA above 3.75 while taking at least twelve units.

Conference Proceedings

C1. M. J. Bannister and D. Eppstein. Hardness of approximate compaction for nonplanar orthogonal graph drawings. *Proceedings of the 19th International Symposium on Graph Drawing (GD'11)*, pp. 367–378. Springer-Verlag, 2011, arXiv:1108.4705.

C2. M. J. Bannister and D. Eppstein. Randomized speedup of the Bellman–Ford algorithm. *Proceedings of the Meeting on Analytic Algorithmics & Combinatorics (ANALCO'12)*, pp. 41–47. Society for Industrial and Applied Mathematics, 2012, arXiv:1111.5414.

C3. M. J. Bannister, D. Eppstein, M. T. Goodrich, and L. Trott. Force-directed graph drawing using social gravity and scaling. *Proceedings of the 20th International Symposium on Graph Drawing (GD'12)*, pp. 414–425. Springer-Verlag, 2012, arXiv:1209.0748.

C4. M. J. Bannister, C. DuBois, D. Eppstein, and P. Smyth. Windows into relational events: data structures for contiguous subsequences of edges. *Proceedings of the Twenty-Fourth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'13)*, pp. 856–864. Society for Industrial and Applied Mathematics, 2013, arXiv:1209.5791.

C5. M. J. Bannister, S. Cabello, and D. Eppstein. Parameterized complexity of 1-planarity. *Proceedings of the Thirteenth Algorithms and Data Structures Symposium (WADS'13)*, pp. 97–108. Springer-Verlag, 2013, arXiv:1304.5591.

C6. M. J. Bannister, D. Eppstein, and J. A. Simons. Fixed parameter tractability of crossing minimization of almost-trees. *Proceedings of the 21th International Symposium on Graph Drawing (GD'13)*, pp. 340–351. Springer-Verlag, 2013, arXiv:1308.5741.

C7. M. J. Bannister, Z. Cheng, W. E. Devanny, and D. Eppstein. Superpatterns and universal point sets. *Proceedings of the 21th International Symposium on Graph Drawing (GD'13)*, pp. 208–219. Springer-Verlag, 2013, arXiv:1308.0403.

C8. M. J. Bannister, W. E. Devanny, and D. Eppstein. Small superpatterns for dominance drawing. *Proceedings of the Meeting on Analytic Algorithmics & Combinatorics (ANALCO'14)*, pp. 92–103. Society for Industrial and Applied Mathematics, 2014, arXiv:1310.3770.

C9. M. J. Bannister, W. E. Devanny, M. T. Goodrich, J. A. Simons, and L. Trott. Windows into geometric events: data structures for time-windowed querying of temporal point sets. *Proceedings of the 24th Canadian Conference on Computational Geometry (CCCG'14)*, pp. 11–19, 2014, arXiv:1409.5452.

C10. M. J. Bannister and D. Eppstein. Crossing minimization for 1-page and 2-page drawings of graphs with bounded treewidth. *Proceedings of the 22nd International Symposium on Graph Drawing (GD'14)*, pp. 210–221. Springer-Verlag, 2014, arXiv:1408.6321.

C11. M. J. Bannister, W. E. Devanny, D. Eppstein, and M. T. Goodrich. The Galois complexity of graph drawing. *Proceedings of the 22nd International Symposium on Graph Drawing (GD'14)*, pp. 149–161. Springer-Verlag, 2014, arXiv:1408.1422.

C12. M. J. Bannister, D. A. Brown, and D. Eppstein. Confluent orthogonal drawings of syntax diagrams. *Proceedings of the 23nd International Symposium on Graph Drawing (GD'15)*. Springer-Verlag, arXiv:1509.00818. To appear.

Refereed Journal Articles

J1. M. J. Bannister, D. Eppstein, and J. A. Simons. Inapproximability of orthogonal compaction. *Journal of Graph Algorithms and Applications* 16(3):651–673, 2012, arXiv:1108.4705.

J2. M. J. Bannister, Z. Cheng, W. E. Devanny, and D. Eppstein. Superpatterns and universal point sets. *Journal of Graph Algorithms and Applications* 18(2):177–209, 2014, arXiv:1308.0403.

J3. M. J. Bannister, W. E. Devanny, D. Eppstein, and M. T. Goodrich. The galois complexity of graph drawing: Why numerical solutions are ubiquitous for force-directed, spectral, and circle packing drawings. *Journal of Graph Algorithms and Applications*, arXiv:1408.1422.

Miscellaneous Publications

M1. M. J. Bannister, C. DuBois, D. Eppstein, and P. Smyth. Windows into Relational Events. NIPS 2012 Workshop: Algorithmic and Statistical Approaches for Large Social Networks (poster), 2012.

M2. M. J. Bannister, M. T. Goodrich, and P. Sampson. Force-Directed 3D Arc Diagrams. 22nd International Symposium on Graph Drawing (poster), 2014.

M3. M. J. Bannister. *Lower Bounds and Fixed-Parameter Tractability of Drawing Graphs*. Ph.D. thesis, University of California, Irvine, 2015.

Professional Service

Undergraduate Research Supervised

- David Brown at UC, Irvine (coadvised with David Eppstein) 2014–2015
  Topic: Confluent orthogonal drawings of syntax diagrams, see [C12].
- Peter Sampson at UC, Irvine (coadvised with Michael T. Goodrich) 2013–2014
  Topic: Force-directed 3D arc diagrams, see [M2].

Senior Projects Supervised

- Noah Mulfinger and Aloke Desai at Pomona College 2015–2016
  Topic: Hierarchical homomorphic encryption schemes for cloud based grade books.
- Archer Wheeler at Pomona College 2015–2016
  Topic: Monte-Carlo search trees for Go with new heuristics.
- Xin Xin at Pomona College 2015–2016
  Topic: Photo-realistic rendering using ray tracing with geometric optimizations.

Invited Talks

- Pomona College CS colloquium. Fall 2015
  Topic: Windows into relational events.
- ICS Prospective Graduate Student Visit Day. Winter 2015
  Topic: Crossing minimization in book embeddings.
- ICS Student Council Lecture Series. Fall 2014
  Topic: Graph drawing and network visualization.
- Panelist at the graduate school application information session. Fall 2014

Refereeing and reviewing

- Referee for Combinatorica, Algorithmica and the Journal of Graph Algorithms and Applications.
- External reviewer for IWOCA'15.

Other service

- Coordinator of weekly social events for the UCI theory group. Winter 2012–Spring 2015
- Administrator of the UCI theory group's wiki and git repository servers. Winter 2012–Spring 2015