Michael J. Bannister

Computer Science Department
Donald Bren School of I&CS
University of California, Irvine, CA, 92697-3425

mbannist@uci.edu
www.ics.uci.edu/∼mbannist

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.

Teaching Interests

In addition to introductory courses in computer science and discrete mathematics, I am interested in teaching advanced courses in algorithms and data structures, complexity, cryptography, visual computing and programming language concepts. I am also open to teaching any undergraduate computer science course, if given advance notice.

Education

UNIVERSITY OF CALIFORNIA, IRVINE

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

- MS in Computer Science   Spring 2012
  GPA: 3.93/4.00.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

- MA in Mathematics   Spring 2007
  GPA: 3.87/4.00.

- BS in Mathematics   Spring 2007
  Summa cum laude. With departmental highest honors. GPA: 3.87/4.00.

Employment

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 upper division mathematics to talented lower division students.

Teaching History

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   Fall 2013

- Awarded at the 21$^{\text{st}}$ 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   Fall 2010

- Four-year fellowship for graduate study at UCI.

SHERWOOD PRIZE, MATHEMATICS DEPARTMENT, UCLA   Spring 2007

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

PHI BETA KAPPA, UCLA CHAPTER   Spring 2007

- Nationwide academic honors society.

DEPARTMENTAL SCHOLAR, MATHEMATICS DEPARTMENT, UCLA   Spring 2005–Spring 2007

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

DEAN'S HONOR LIST, UCLA   Fall 2004–Spring 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.

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.

Professional Service

Undergraduate Research Supervised

- David Brown (coadvised with David Eppstein)   2014–2015
  Topic: Confluent orthogonal drawings of syntax diagrams.

- Peter Sampson (coadvised with Michael T. Goodrich)   2013–2014
  Topic: Force-directed 3D arc diagrams, see [M2].

University Service

- Invited speaker at ICS Prospective Graduate Student Visit Day.   Winter 2015
  Topic: Crossing minimization in book embeddings.

- Invited speaker at ICS Student Council Lecture Series.   Fall 2014
  Topic: Graph drawing and network visualization.

- Panelist at the graduate school application information session.   Fall 2014

- Coordinator of weekly social events for the theory group.   Winter 2012–

- Administrator of the theory group's wiki and git repository servers.   Winter 2012–

Refereeing and reviewing

- Referee for Combinatorica.

- Referee for Algorithmica.

- Referee for Journal of Graph Algorithms and Applications.