Blake A. **Hunter**

Assistant Professor · Applied Mathematics and Computer Science

850 Columbia Ave. Claremont CA, 91711, USA

(+1) 909-607-8526 | blakeahunter@gmail.com | www.cmc.edu/pages/faculty/BHunter/

Education

University of California — *Davis, CA*

PhD in Applied Mathematics — *June 2011*

- Dissertation Title: *Data mining compressed, incomplete and inaccurate high dimensional data*. Advisor: T. Strohmer.

California State Polytechnic University — *Pomona, CA*

MS in Mathematics — *Sept. 2005*

- Thesis Title: *Gambler's Ruin and the Three State Markov Process*. Advisor: A. C. Krinik.

BS in Applied Mathematics — *Dec. 2002*

Experience

Claremont McKenna College, Dept. of Mathematical Sciences — *Claremont, CA*

Assistant Professor, Mathematics and Computer Science — *July 2014 - Current*

- Research in Data Mining and High Dimensional Data Analysis, focusing on Topic Modeling, Deep Learning, and Spectral Methods.
- Advised and graduated 1 PhD student (2017), topic "*High-Dimensional Deep Topic Models*," and 10 senior theses.
- Taught Data Mining, Probability, Linear Algebra, Discrete/Data Structures, Math Finance, Calculus 1 and 3.

University of California, Los Angeles (UCLA), Mathematics Dept. — *Los Angeles, CA*

Assistant Adjunct Professor, Program in Computing (PIC) and **Postdoctoral Scholar** — *July 2011 - June 2014*

- Research in Analysis of Social Networks, Community Detection, Spectral Embeddings, Topic Modeling and Image Clustering.
- Co-advised 2 PhD Students. Co-advised 3 masters students. Directed 16 directed research courses.
- Taught Data Mining, Advanced Programing in Java, Intro. to Programing in C++, Advanced Topics in Java, Adv. Linear Algebra.

Research Mentor/Advisor/Lead, Research Experiences for Undergraduates (REU) — *June - Aug. 2011 - 2015 and 2017*

- Led 7 teams of 6-15 each (students, post docs and researchers) projects included Social Networks and Document Search.

University of California, Davis, Mathematics Dept. — *Davis CA*

Graduate Student Researcher, Teaching Assistant and **Associate Instructor** — *Sept. 2005 - June 2011*

- Research in Applied Harmonic Analysis for Data Analysis with appl. to MR image clustering, anomaly detection, and feature extraction.
- Instructor for 5 courses; Lead Teaching Assistant for 8 courses; and Teaching Assistant for 9 additional courses.

California State Polytechnic University, Pomona, Mathematics Dept. — *Pomona, CA*

Associate Instructor and **Teaching Assistant** — *Mar. 2004 - Aug. 2005*

- Associate Instructor (Instructor of Record) for 6 courses and Teaching Assistant for 3 courses.

Inst. for Computational and Experimental Research in Mathematics at Brown Univ. — *Providence, RI*

Project Lead Mathematics of Crime, Social Networks, Real-Time Media and Society — *Sept. 2016*

- Directed a team of 11 researchers, PhD students, and faculty from around the world *"Topic Modeling of Crime and Social Media."*

Inst. for Pure and Applied Mathematics (IPAM) — *Los Angeles, CA*

Academic Mentor/Project Lead for 2 projects, Research in Industrial Projects for Students (RIPS) — *June - Aug. 2010, 2013*

- *Emerging Topic Detection in Microblogs* with the LAPD, and *Topic Detection and Causal Influence in Microblogs* with IBM Research.

Technical Skills

- **Programming Languages** C, C++, Java, Python, Assembly, JavaScript, CUDA, OpenMP, HTML, XML, Visual Basic, Android, Unity.
- **Mathematical Software** Matlab, Mathematica, Maple, SageMath, Excel/Sheets, SAS, R, Jump, LaTeX.
- **Algorithms for Data Analysis** deep learning, topic modeling, spectral embeddings, clustering, soft SVM, online learning, ISOMAPs.
- **Numerical Optimization Algo.** fast rank one updates, optimal convex relaxations, low rank-sparse decomp., compressed sensing.

Presentations and Publications

Invited Seminars & Colloquia, and Conference & Workshop Presentations — *US, CA, UK, GR, DE*

Over 28 conference presentations, 27 invited seminars and colloquia, and 50 other presentations. — *2006 - Current*

- "*Deep NMF Neural Networks*" (Invited) University of Nottingham Colloquium, Nottingham UK, May 2017.
- "*Deep Learning Meets Matrix Factorizations*" Open Data Science Conference, Boston MA, May 2017.
- Session **Organizer** IEEE, International Conference on Data Mining, Atlantic City NJ 2015.

Journal and Conference Publications

14 journal & conference + 13 other publications available at www.CMC.edu/pages/faculty/BHunter/. — *2006 - Current*

- J. Flenner and B. Hunter *A Deep Nonnegative Matrix Factorization Neural Network*, submitted 2017.
  - + First to show deep conv. neural networks can be solved using matrix factorizations, allowing for sub semi-supervised learning.
- E. Lai, D. Moyer, B. Yuan, E. Fox, B. Hunter, A.L. Bertozzi *Topic Time Series Analysis of Microblogs* IMA J. of Appl. Math. 2016.
- Y. van Gennip, B. Hunter, et. al. *Community detection using spectral clustering on sparse geosocial data* SIAM J. Appl. Math. 2013.
  - + SIAM Nugget Award, highlighting applied math research, Feb. 2013.