Curriculum Vitae   Amy N. Langville

Address   Department of Mathematics
College of Charleston,
Charleston SC 29424-0001, U.S.A.
langvillea@cofc.edu
p: +1.843.953.5730   f: +1.843.953.1410

Education

- North Carolina State University, Raleigh NC, U.S.A:
  Ph.D. in Operations Research (May 2002)
  Dissertation: *Preconditioning for Stochastic Automata Networks*. Director: William J. Stewart;
  Minors: Mathematics, Computational and Engineering Sciences
  M.Sc. in Operations Research (May 1999):
  Minors: Mathematics, Statistics.

- Mt. St. Mary's College, Emmitsburg MD, U.S.A:
  B.S. in Mathematics (May 1997) *valedictorian*

Research Interests

Linear and Integer Optimization. Text mining and Web Search. Numerical Linear Algebra. Ranking and Clustering. Analytics.

Work Experience

- *Professor.* Department of Mathematics, College of Charleston (08/2015–Present).

- *Associate Professor.* Department of Mathematics, College of Charleston (08/2009–08/2015).

- *Assistant Professor.* Department of Mathematics, College of Charleston (08/2005–08/2009).

- *Postdoctoral Fellow.* Information Retrieval and Web Search Algorithms, N. C. State University, Applied Mathematics. (05/2002–08/2005).

- *Research Assistant.* N. C. State University, (08/2000–05/2002).

- *Adjunct Faculty.* Meredith College, (05/2000–08/2001).

- *General Electric Fellow.* N. C. State University, (08/2000–08/2001).

- *NSF Research Trainee.* N. C. State University, (08/1999–08/2000).

- *Teaching Assistant.* N. C. State University, (08/1997–05/1999).

- *Research Fellow.* N. C. State University GAANN award, (08/1997–05/1998).

- *Engineering Fellow.* N. C. State University GAANN award, (08/1997–05/1998).

Teaching Experience

- (May 1998–Present)

  Courses taught: Precalculus, Calculus 1, Calculus 2, Calculus 3, Business Calculus, Linear Algebra, Advanced Linear Algebra (graduate), Elementary Statistics, Linear Programming and Optimization (senior level/graduate), Operations Research (senior level/graduate), Integer Programming (graduate), Special Topics in Sports Analytics, Special Topics in Evolutionary Optimization (graduate), Women's Self-Defense, Feminist Jiu-jitsu

  Independent Studies and Reading Courses: Complex Datasets, Text Mining, Spectral Clustering, Women in Mathematics, Recommendation Systems, Technical Communication

Teaching Awards

- *Professor of the Year Finalist*, SC Governor's Award, 2012.

- *Teacher-Scholar Award*, College of Charleston, 2011. Nominated 2010, 2009, 2007.

- *S.C. Governor's Award*, Excellence in Science. Nominated 2011, 2010, 2008.

- *Faculty of the Year*, College of Charleston EXCEL Award, 2008.

- *Alder Award finalist for Distinguished Teaching*, Mathematical Association of America, 2008.

- *G E. Jones Distinguished Achievement Award*, College of Charleston, 2006.

- *Outstanding Teaching Award*, N.C. State University, 2000, 2001.

- *Outstanding Teaching Assistant*, N.C. State University, 1999, 2000.

Students (College of Charleston)

- Tori Ellison (Math, M.S. 2012, Ph.D. 2017). Ph.D. Thesis: *Using Linear Programming Based Exploratory Techniques in gene expression consensus clustering.*

- Armon Hanks (Math, M.E.S. 2017). M.E.S. Thesis: *Coastal Resiliency: benchmarking emergency operation plans.*

- Kaitlyn Manley (Math, B.S. 2016). Honors Thesis: *The Calculus Deconstruction Series: sequences and sums.*

- Tyler Perini (Math, B.S. 2016). Honors Thesis: *The Humility Project: Textual analysis of the writing of humble vs. non-humble people.*

- Kathryn Pedings (Math, M.Sc. 2011). M.S. Thesis: *Minimum Violations Ranking using Evolutionary Optimization and Binary Integer Linear Programming Approaches.* (NSF-supported.)

- Kirk Boyer (Math, M.Sc. 2011). M.S. Thesis: *Intelligent Selection of new data for Ranking Algorithms.*

- Ryan Parker (Math, B.S. 2010). Honors Thesis: *Modeling Basketball's Points per Possession With Application to Predicting the Outcome of College Basketball Games.*

- Patrick Moran (Computer Science, B.S. 2010). Honors Thesis: *A Mathematical Model of a Programming Language.*

- Emmie Douglas (Math, M.Sc. 2008). M.S. Thesis: *Clustering Datasets with the Singular Value Decomposition.* (NSF-supported.)

- Luke Ingram (Math, M.Sc. 2007). M.S. Thesis: *Ranking NCAA teams using Linear Algebra.* (NSF-supported.)

- Ibai Basabe (Math, M.Sc. 2007). M.S. Thesis: *A New Way to Cluster.*

- Barbara Ball (Math, M.Sc. 2006). M.S. Thesis: *Clustering Directed Graphs without Symmetrization.* (NSF-supported.)

- Ibai Basabe (Math, M.Sc. 2007). Honors Thesis: *A Graph Partition Algorithm, Central Clusters, and k-way conductance.*

Consulting and Advisory Boards

- National Basketball Association, 2014-2015

- Trilogy Sailing Excursions, 2013-2015

- Rootmetrics.com, 2014-2015

- U.S. Olympic Committee Research and Development, 2013-2014

- Sortable.com, 2012-2013

- SKV Law Firm, LLC., 2007-2012

- Tiger Falcon, LLC, 2010

- College Football Performance Awards, 2009-2010

- Your Music On, 2009-2010

- Piffany Search Engine, Inc., 2008-2009

- Semandex Analytics, Inc., 2007-2009

- Fortune Interactive Data Mining, 2007-2008

- The SAS Institute, 2005-2008

- The Boeing Corporation, 2004-2005

Research Awards

- *Distinguished Researcher Nominee*, College of Charleston, 2013, 2012, 2008, 2007.

- *U.S. Patent 20120102113*, System and Process for ranking content on social networks such as Twitter, 2012.

- *Professor of the Year Finalist*, S.C. Governor's Award, 2012.

- *Teacher-Scholar Award*, College of Charleston, 2011. Nominated 2010, 2009, 2007.

- *IEEE podcast*, Mathematically ranking ranking methods, appeared in over 300 online news sources, May 25, 2011.

- *Top-cited Paper Award*, Computational Statistics and Data Analysis, 2010. For period 2005-2010.

- *Matlab functions*, `nmf` algorithms in MATLAB software, 2008-present.

- *SAS procs*, `topicvector` algorithm in SAS software, 2008-present.

- *Distinguished Alumni Award*, N. C. State University, 2008.

- *Young Researcher Award Nominee*, American Association of University Women, 2007.

- *Runner-up for Best New Book in Computer and Information Science*, Association of American Publishers, 2007. (for *Google?s PageRank and Beyond*).

- *G. E. Jones Distinguished Achievement Award*, College of Charleston, 2005-2006.

Books

1. Amy N. Langville and Carl D. Meyer. *Who's #1?: The Science of Rating and Ranking.* Princeton University Press, 2012.

2. Amy N. Langville and Carl D. Meyer. *Google's PageRank and Beyond: The Science of Search Engine Rankings.* Princeton University Press, 2006.

3. Amy N. Langville and William J. Stewart, eds. *Proceedings of the Markov Anniversary Meeting.* Boson Press, 2006.

4. Amy N. Langville and William J. Stewart, eds. *Proceedings of the 4th International Conference on the Numerical Solution of Markov Chains.* Univ. of Illinois at Urbana-Champaign Press, 2003.

Books in Progress

1. Amy N. Langville and Tyler Perini. *Deconstruct this Calculus 1 Journal: derivatives.* College of Charleston Copy Center, 2017.

2. Amy N. Langville. *Deconstruct this Calculus 1.5 Journal: integrals.* College of Charleston Copy Center, 2017.

3. Amy N. Langville. *Deconstruct this Calculus 3 Journal: multivariate functions.* College of Charleston Copy Center, 2017.

Patent

T. P. Chartier, Lake Trask, and Amy N. Langville. *System and Process for Ranking Content in Social Networks such as Twitter.* US. Patent No. 2012/0102113.

Publications in Refereed Journals

20. (with Jennifer C. Wright, Thomas Nadelhoffer, Tyler Perini, Matt Echols, and Kelly Venezia) *The Psychological Significance of Humility.* The Journal of Positive Psychology. 12, p. 3-12, 2017.

19. (with Timothy P. Chartier, Victoria Ellison, and Amy N. Langville) *The Davidson College Multi-Objective Assignment problem: a case study.* 4OR?The Quarterly Journal of Operations Research, 12(4):379-401, 2014.

18. (with Timothy P. Chartier, Kevin Hutson and Charles Wessell) *Reducing the effect of an unequal number of games on rankings.* IMAGE Bulletin of the International Linear Algebra Society, 52, 2014, p 15-23.

17. (with Michael W. Berry, Timothy P. Chartier, Kevin Hutson) *Identifying influential edges in a directed network: big events, upsets, and non-transitivity.* Complex Networks, 2(2):87-109, 2014.

16. (with Carl D. Meyer) *Do the Math: no ranking system is No. 1: why rankings are flawed.* Scientific American, June 26, 2012, p. 1-3.

15. (with Kathryn Pedings, and Yoshitsugu Yamamoto) *A Minimum Violations Ranking Method.* Optimization and Engineering, 2011, p. 1-22.

14. (with Timothy P. Chartier, Erich Kreutzer, and Kathryn Pedings) *Sensitivity and Stability of Ranking Methods.* SIAM Journal on Scientific Computing, 2011, 33(3):1077-1102.

13. (with Timothy P. Chartier, Erich Kreutzer, and Kathryn Pedings) *Sports Ranking with nonuniform weighting.* Journal of Quantitative Analysis in Sports, 2011, 7(3), Article 6.

12. (with Timothy P. Chartier and Peter Simov) *Offense-defense approach to ranking team sports.* March Madness to Movies. Math Horizons, April 2010: 16-19.

11. (with Anjela Y. Govan and Carl D. Meyer) *Offense-defense approach to ranking team sports.* Journal of Quantitative Analysis in Sports. 5(1):1-16, Article 4, 2009.

10. (with Michael W. Berry, Murray Browne, V. Paul Pauca, and Robert J. Plemmons) *Algorithms and Applications for Approximate Nonnegative Matrix Factorization.* Computational Statistics and Data Analysis. 52(1):155-173, 2007.

9. (with Carl D. Meyer) *Updating the Stationary Vector of an Irreducible Markov Chain with an Eye on Google's PageRank.* SIAM Journal of Matrix Analysis, 27(4):968-987, 2006.

8. (with Carl D. Meyer) *A Reordering for the PageRank problem.* SIAM Journal on Scientific Computing, 27(6):2112-2120, 2006.

7. (with Carl D. Meyer) *A Survey of Eigenvectors methods for Web Information Retrieval.* SIAM Review, 47(1):135-161, 2005.

6. (with Carl D. Meyer) *Deeper Inside PageRank.* Internet Mathematics, 1(3):335-380, 2005.

5. (with Carl D. Meyer) *The Use of Linear Algebra by Web Search Engines.* IMAGE Newsletter, 33:2-6, Dec. 2004.

4. (with Gely P. Basharin and Valeriy A. Naumov) *The Life and Work of A. A. Markov.* Linear Algebra and its Applications, 386:3-26, 2004.

3. (with William J. Stewart) *A Kronecker Product Approximate Preconditioner for SANs.* Journal of Numerical Linear Algebra, 11(8):723-752, 2004.

2. *The Kronecker Product and Stochastic Automata Networks.* Journal of Computational and Applied Mathematics, 167(2): 429-447, 2004.

1. (with William J. Stewart) *Testing the nearest Kronecker product preconditioner on MCs and SANs.* INFORMS Journal on Computing, 16(3):300-315, 2004.

Refereed Book Chapters

3. (with Brett W. Bader and Michael W. Berry) *Nonnegative Matrix and Tensor Factorization for Discussion Tracking.* In *Text Mining: Classification, Clustering, and Applications*, Ashok N. Srivastava and Mehran Sahami, Editors, Chapman and Hall, (2009):95-127.

2. (with Michael W. Berry) *Nonnegative Matrix Factorization for Anomaly and Trend Detection.* In *Next Generation of Data Mining*, H. Kargupta, J. Han, P. Yu, R. Motwani, and V. Kumar, Editors, CRC Press, (2008):335-352.

1. (with Carl D. Meyer) *Information Retrieval and Web Search.* In *The Handbook of Linear Algebra*, Leslie Hogben, Editor, 2nd ed., CRC Press, (2017):63-1–63-16.

Refereed Electronic Journal Articles

6. *Who's #1?: The Science of Rating and Ranking.* Mathematics Awareness Month: The Future of Prediction, April 2016.

5. (with E. Aghapour, T. Chartier, B. Kovacevich, K. Pedings) *Google's PageRank: The Mathematics of Google.* SIAM Why do Math? SIAM, 2010.

4. (with Timothy P. Chartier, Erich Kreutzer, and Kathryn Pedings) *Google-opoly.* LOCI, 2010.

3. (with Timothy P. Chartier, Erich Kreutzer, and Kathryn Pedings) *Bracketology: How can math help?* Joint Policy Board of Mathematics, Mathematics Awareness Month 2010.

2. (with Andrew Bartlett, Timothy Chartier, and Timothy Rankin) *An Integer Programming Model for the Sudoku Problem.* Journal of Online Mathematics and its Applications. MAA, (8):1-14 , 2008.

1. *The Linear Algebra behind Search Engines.* Journal of Online Mathematics and its Applications. MAA, (12):1-10, 2005.

Refereed Conference Proceedings

5. (with Timothy P. Chartier, Erich Kreutzer, Kathryn Pedings, and Yoshitsugu Yamamoto) *Mininum Violations Sports Ranking using Evolutionary Optimization and Binary Integer Linear Program Approaches.* Proceedings of the Tenth Australian Conference on Mathematics and Computers in Sports. Mathsport, 2010:13-20.

4. (with Carl D. Meyer) *Updating Markov Chains.* Proceedings of the Markov Anniversary Meeting. Boson Press, 2006:153-168.

3. (with Philipp von Hilgers) *The Five Greatest Applications of Markov Chains. Proceedings of the Markov Anniversary Meeting.* Proceedings of the Markov Anniversary Meeting. Boson Press, 2006:229-238.

2. (with Andre Berger, Nader Razouk, Greg Angelides, Andy Bartlett, Zhilin Li, Craig Lipkin, Nsoki Mavinga, Elizabeth Perez, Eamonn Tweedy, Erik Wheeler) *Locally Constrained Shortest Paths and an Application in Mission Planning.* Proceedings of the 44th ACM Southeast Conference. ACM, 2006:1-4.

1. (with Carl D. Meyer) *Updating PageRank with Iterative Aggregation.* Proceedings of the Thirteenth World Wide Web Conference. New York: ACM Press, 392-393, 2004.

Technical Reports

2. (with Carl D. Meyer, Russell Albright, James Cox, and David Duling) *Initializations, Algorithms, and Convergence for the Nonnegative Matrix Factorization.* SAS Technical Report, 2007:1-10.

1. (with Norm Curet) *Applying Mathematical Programming Techniques to the Network Diversion Problem.* NSA Unclassified Internal Report. R55-052-98. Sept. 1998.

Other Works

- (with Timothy P. Chartier, Erich Kreutzer and Kathryn Pedings) *Survival of the Fittest: Evolutionary Optimization and Ranking.*

- (with Timothy P. Chartier, Erich Kreutzer, Daniel A. Martin and Kathryn Pedings) *Accounting for Ties when Ranking Items.*

Keynote Talks to Politicians

4. *Ranking and Clustering: from webpages and teams to people and products.* College of Charleston, Board of Trustees Meeting. Charleston, SC. March 20, 2014.

3. *The Nonnegative Matrix Factorization in Data Mining..* The National Security Agency. Fort Meade, MD. Nov. 17, 2006.

2. *The Necessity of Mathematics: From Google to Counterterrorism to Sudoku.* AMS Talk on Capitol Hill. Washington, DC. Nov. 16, 2006.

1. *Information Retrieval and Computing: The Big Picture.* Dept. of Energy Computational Science Graduate Fellows Conference. Capitol Hill, DC. June 22, 2005.

Invited Research Presentations for Industry

14. *Google's PageRank and Beyond.* Webmaster's Forum, University of Illinois at Urbana-Champaign. Jan. 25, 2007.

13. *Mathematical Models in Counterterrorism.* Semandex Networks, Inc. Capitol Hill, DC. Sept. 25-26, 2006.

12. *Search Engine Optimization.* Fortune Interactive. Raleigh, NC. Sept. 22, 2006.

11. *Data Visualization Tools.* SAS Institute, Inc. Cary, NC. Sept. 21, 2006.

10. *The Nonnegative Matrix Factorization in Data Mining.* The Boeing Company. Seattle, WA. May 18, 2006.

9. *The Nonnegative Matrix Factorization in Data Mining.* Yahoo! Research, San Francisco, CA. Oct. 18, 2005.

8. *Alternating Linear Programming for the NMF.* SAS Institute, Inc. Cary, NC. Sept. 20, 2005.

7. *Alternating Least Squares Algorithms for the NMF.* SAS Institute, Inc. Cary, NC. June 9, 2005.

6. *Algorithms for the NMF in Text Mining.* SAS Institute, Inc. Cary, NC. Apr. 22, 2005.

5. *Experiments with the NMF and Reuters10 Dataset.* SAS Institute, Inc. Cary, NC. Feb. 9, 2005.

4. *Scalability and Robustness of the NMF for Text Mining.* SAS Institute, Inc. Cary, NC. Dec. 20, 2004.

3. *The Nonnegative Matrix Factorization for Text Mining.* SAS Institute, Inc. Cary, NC. Nov. 18, 2004.

2. *Linked Data and a MFPT Alternative to LSI.* SAS Institute, Inc. Cary, NC. Oct. 29, 2003.

1. *Markov Chains and Information Retrieval.* The Boeing Company. Seattle, WA. Jan. 23, 2003.

Invited and Keynote Research Presentations

32. *Rankability of Graphs.* AMS Sectional Meeting, Charleston, SC, Mar. 10, 2017.

31. *Rankability and Machine Learning.* Machine Learning Conference, Atlanta, GA, Sept. 23, 2016.

30. *4 Consulting Projects.* Machine Learning Conference, Atlanta, GA, Sept. 19, 2014.

29. *CageRank and De-sparsification of Graphs.* Carolina Sports Analytics Meeting, Furman University, SC. Basketball Analytics Summit, April 12, 2014.

28. Keynote: *Sports Analytics.* Carolina Sports Analytics Meeting, Furman University, SC. Basketball Analytics Summit, April 13, 2013.

27. *2012 Consulting Projects and Clustering by Optimization.* College of Charleston, Sabbatical Presentation. Sept. 14, 2012.

26. Keynote: *Ranking with Optimization.* Neural Info. Processing Conference, Lake Tahoe, NV, Social Choice Workshop. Invited Keynote. Dec. 8, 2012.

25. *PageRank from 1998 to Now.* AIM Mathematics of Ranking Conference, Stanford, CA, Aug. 18, 2010.

24. *Ranking by Optimization Methods.* SIAM Southeastern Sectional Meeting, Raleigh, NC, Mar. 21, 2010.

23. Keynote: *The Science of Rating Items: from webpages to teams to movies.* MAA Southeastern State Dinner, Charleston, SC, Mar. 30, 2009.

22. *Mathematics Everywhere: from Google to Sudoku to NCAA to Netflix.* Tsukuba University, PhilOpt Seminar. Tokyo, Japan, Jan. 30, 2009.

21. *Rank and Rating Aggregation.* SEAMS Cha Cha Days. Chapel Hill, NC, Nov. 2, 2008.

20. Keynote: *Rank and Rating Aggregation.* Hamilton Institute Workshop on Nonnegative Matrices. Maynooth, Ireland, Aug. 6, 2008.

19. *Google's PageRank and Beyond: The Science of Search Engine Rankings.* Southern Methodist University, Mathematics Seminar. Dallas, Texas, Nov. 14, 2007.

18. *Clustering with the SVD.* Numerical Linear Algebra, Internet, and Large Applications. Monopoli, Italy, Sep. 11, 2007.

17. Keynote: *Google's PageRank and Beyond: The Science of Search Engine Rankings.* ILAS International Meeting. Shanghai, China, Jul. 16, 2007.

16. *The Nonnegative Matrix Factorization: a tutorial.* NISS Workshop on the NMF. Raleigh, NC, Feb. 23, 2007.

15. *Clustering with the SVD and the NMF.* Algorithms for Modern Massive Datasets. Stanford, CA, June 21-24, 2006.

14. Keynote: *The Five Greatest Applications of Markov Chains.* Markov Anniversary Meeting. Charleston, SC, June 12-14, 2006.

13. *The Nonnegative Matrix Factorization in Data Mining.* INFORMS Annual Meeting. San Francisco, CA, November 14, 2005.

12. *Introduction to Eigenvector Methods in Information Retrieval.* SIAM Annual Meeting. New Orleans, LA, July 11-15, 2005.

11. *Text Mining using the Nonnegative Matrix Factorization.* SIAM Southeastern Section Annual Meeting. Charleston, SC, March 25-26, 2005.

10. *Information Retrieval and Web Search.* MAA Southeastern Section 84th Annual Meeting. Raleigh, NC, March 11-12, 2005.

9. *Updating the Stationary Vector of an Irreducible Markov Chain.* SIAM Computational Science and Engineering Conference. Orlando, FL, Feb. 11-15, 2005.

8. *Updating PageRank.* SIAM Annual Meeting. Portland, Oregon. July 12-16, 2004.

7. *Updating and Reordering for the PageRank Problem.* The Mathematics of Web Search and Meta-Search. Bertinoro, Italy, June 19-26, 2004.

6. *Solution Methods for the PageRank Problem.* College of Charleston, Mathematics Seminar. Charleston, SC, Feb. 27, 2004.

5. *Updating Large-Scale Markov Chains.* Emory University, Computational Mathematics Seminar. Atlanta, GA, Jan. 30, 2004.

4. *Updating PageRank.* Stanford University, Computational Math Seminar. Palo Alto, CA, Nov. 17, 2003.

3. Keynote: *The Life and Work of A. A. Markov.* Fourth International Conference on the Numerical Solution of Markov Chains. University of Illinois at Urbana-Champaign. September 3-5, 2003.

2. *Search Engines, Markov Chains and Clustering.* SIAM Conference on Applied Linear Algebra, College of William and Mary, July 15-19, 2 003.

1. *Preconditioning for Stochastic Automata Networks.* Preconditioning Techniques for Large Sparse Matrices, Tahoe City, CA, Apr. 29, 2001.

Research Presentations

11. *The Calculus Deconstruction Series.* Stanford University, Palo Alto, CA, June 3, 2017.

10. *The Humility Project: Text analysis for characteristic linguistic patterns.* SIAM Annual Meeting, Boston, MA, July 12, 2016. (presented by Tyler Perini)

9. *Analyzing the 2016 Presidential Campaign with Text Mining.* CofC Graduate Student Research, Charleston, SC, Feb. 19, 2016. (presented by C. Grimes, E. Hausmann)

8. *The Humility Project: Text analysis for characteristic linguistic patterns.* INFORMS Annual Meeting, Philadelphia, PA, Nov. 1, 2015. (presented by Tyler Perini)

7. *Stable Matching Problem: a survey including a new variant.* INFORMS Annual Meeting, Philadelphia, PA, Nov. 1, 2015. (presented by Tyler Perini)

6. *Analyzing Injuries in the NBA.* Kenan-Flagler Business School, UNC, Chapel Hill. Basketball Analytics Summit, April 15, 2015. (presented by L. Valentino)

5. *Ranking Coaches to help predict March Madness.* Carolina Sports Analytics Meeting, Furman University, SC. Basketball Analytics Summit, April 11, 2015. (presented by S. Gorman)

4. *Combine, Drafts, and Running Backs.* Carolina Sports Analytics Meeting, Furman University, SC. Basketball Analytics Summit, April 11, 2015. (presented by T. Sulek)

3. *Predictability of Upsets in March Madness.* Carolina Sports Analytics Meeting, Furman University, SC. Basketball Analytics Summit, April 11, 2015. (presented by A. Passarello)

2. *Predicting Head-to-Head Matchups in NCAA Basketball.* INFORMS Annual Meeting, Minneapolis, MN, Oct. 8, 2013. (presented by Tyler Perini)

1. *Updating PageRank with Iterative Aggregation.* World Wide Web Conference. New York, NY, May 19-21, 2004.

Educational and Outreach Presentations to General or Undergraduate Audience

25. Faculty Lecture Series: *Information Retrieval on the Web, Facebook, Twitter, and Libraries: what's math got to do with it?* Honors College and Friends of the Library. College of Charleston, Jan. 25, 2017.

24. Graduation Speaker: *7 Lessons for Graduates.* N.C. State University, Physical and Mathematical Sciences. Raleigh, NC. Dec. 15, 2016.

23. SCAMP Speaker Series: *What can I do with a math major?* SCAMP (SC Alliance for Minority Participation) Meeting, Charleston, SC. Feb. 8, 2016.

22. Keynote Speaker: *What can I do with a math major?* College of Charleston Math C-MAP Camp, Charleston, SC. June 12, 2015.

21. Keynote Speaker: *My Life as a Mathematical Consultant.* Mercer University Undergraduate Research in Mathematics Conference, Macon, GA. Feb. 21, 2015.

20. Keynote Speaker: *Random Search, Ordered Results.* Mercer University Undergraduate Research in Mathematics Conference, Macon, GA. Feb. 21, 2015.

19. Speaker: *Implementing Hawkes in a fast-track Calculus course.* Hawkes Software RTIME Conference, Charleston, SC. March 1, 2014.

18. Keynote Speaker: *Random Search, Ordered Results: How search engines use mathematics to organize the Web.* MAA State Dinner, Coastal Carolina University, SC. Oct. 26, 2013.

17. Infinite Horizons Speaker: *Random Search, Ordered Results: How search engines use mathematics to organize the Web.* Kennesaw State University, Atlanta, GA. Sept. 13, 2013.

16. Infinite Horizons Speaker: *My Life as a Mathematical Consultant.* Kennesaw State University, Atlanta, GA. Sept. 13, 2013.

15. Grand Opening Speaker: *Random Search, Ordered Results: How search engines use mathematics to organize the Web..* National Museum of Mathematics, New York, NY. Jan. 2, 2013.

14. IEEE Podcast Interview: *Football Rankings versus Google?s PageRank.* IEEE Spectrum Podcast with Steven Cherry, June 22, 2011.

13. Martin Lecture Speaker: *Google-opoly.* Mt. Olive College, NC. Mar. 4, 2011.

12. NPR Radio Interview: *Who's #1?: The Science of Rating and Ranking.* Tech Talk with Michael Kastler, Chicago WRLR 98.3FM, Apr. 21, 2012.

11. Keynote Speaker: *Google-opoly.* College of Charleston, SC, Math Meet. Feb. 20, 2010.

10. Keynote Speaker: *Applications of Nonnegative Matrices: Ranking and Clustering.* Hamilton Institute, Maynooth, Ireland. Aug. 8, 2008.

9. Graduation Speaker: *5 Lessons for Graduates.* N.C. State University, Physical and Mathematical Sciences. Raleigh, NC. May 10, 2008.

8. ACM Student Seminar Speaker: *Google's PageRank and Beyond.* College of Charleston, SC. Oct. 23, 2007.

7. Mathematics Seminar Speaker: *Google's PageRank and Beyond.* The Citadel, Charleston, SC. Oct. 16, 2007.

6. Women in Computer Science Seminar Speaker: *An Intro. to the Use of Link Analysis by Web Search Engines.* University of Illinois at Urbana-Champaign. Jan. 24, 2007.

5. NPR Radio Interview: *The Science of Search Engine Rankings.* AirTalk, Southern California KPCC 89.3FM, Nov. 28, 2006.

4. Mathematics Seminar Speaker: *Google's PageRank and Beyond.* Davidson College, Davidson, NC. Feb. 16, 2006.

3. SIAM Student Chapter Seminar Speaker: *An Intro. to the Use of Link Analysis by Web Search Engines.* University of Delaware, Newark, DE. May 5, 2005.

2. SIAM Student Chapter Seminar Speaker: *An Intro. to the Use of Link Analysis by Web Search Engines.* Columbia University, NY. Nov. 23, 2004.

1. Math. and Comp.Science Seminar Speaker: *An Intro. to the Use of Link Analysis by Web Search Engines.* Mt. St. Mary's College, Emmitsburg, MD. Apr. 19, 2004.

Research Grants

Pending Grants

- NSF, *CISE-CCF-AF: Rankability and Graph Analytics* (co-PI). Requested amount: $500,000.

Awarded Grants

- NSF Award, PI, ($399,128). *CISE-CCF-AF-RUI-1116963. Lagrangian Relaxations for Ranking and Clustering Integer Programs.* 2011–2016.

- MAYS Major Academic Year Support, ($4,000). College of Charleston, 2015.

- MAYS Major Academic Year Support, ($4,000). College of Charleston, 2014.

- NSF Supplement, PI, ($10,000) (PI) *REU/ REG research, CISE-CCF-AF: Lagrangian Relaxations for Ranking and Clustering Integer Programs.* 2012–2013.

- NSF CAREER Award, PI, ($400,360). *CAREER-CCF-0546622. Updating Problems in Information Retrieval and a Device Dissection Lab.* 2006–2010.

- NSF Supplement, PI, ($10,000) (PI) *REU/ REG research, Video: PageRank as a Random Surfer.* 2009.

- SURF Summer Undergraduate Research, ($4,000). College of Charleston, 2006.

Workshop Grants

- NSF Award, PI ($11,841). *DMS: Workshop of Southeastern Clustering and Ranking Group*, 2009.

Service

College of Charleston Department of Mathematics

- *Research with students:* I have advised 26 independent studies, 14 theses (4 B.S., 5 M.S., 5 Ph.D. at other institutions), 8 summer REUs (some 4 NSF-funded at NCSU, 2 NSF-funded at Davidson, 2 CofC SURF). Collectively, my students have given presentations or poster sessions at over 55 regional and international conferences and workshops, ranging from the SIAM and INFORMS Annual Meetings to local sectional meetings.

- I collaborated on a proposal to create a new interdisciplinary graduate program in Data Science, that is on track for completing institutional approval by Spring 2018.

- I serve on several departmental committees including the MATH 105 committee and the Research and Development committee. I also help committees such as the recruiting committee and graduate program committees.

- I am collaborating with the Graduate Program Directors to create new tracks, concentrations, and courses. We are submitting a workforce proposal to the National Science Foundation in November 2017.

Service to the College of Charleston

- *Self-Defense Program*, 2013-present: I am the co-creator and volunteer instructor of the two-credit class PEAC 120 Women's Self-Defense. We have expanded the course and paired it with WGS 120 Feminist Jiu-jitsu and run one section of an FYE Learning Community each semester. We recently just made another learning community for the College's Quality Enhancement Plan, that pairs PEAC 120 Women's Self-Defense with WGS 320 Special Topics in Women's and Gender Studies. As the leader of the program, I brought two guest lecturers to campus in 2015 and 2016. I also created a FYE non-credit program for students to learn self-defense on campus. I have worked with the Gender and Sexuality Equity Center, giving multiple campus-wide demonstrations of the techniques.

- Recruitment for Honors College, 2016-2017

- Advisor, Women in STEM Club, 2016-2017

- Member, Teacher-Scholar Committee, 2013-2017

- Member, SSM Sabbatical Review Committee, 2012

- Sponsor, Bike Share Project, 2011-2012

- Student Affairs and Athletics Committee Member, 2006-2007

- Faculty Advisor, Charity Anywhere student club, 2005-2009: Each year I led student service trips to Dominican Republic, May 2006, Hurricane Katrina relief, Spring Break 2007, displaced Ugandans event DC, May 2007, Habitat for Humanity days in Charleston, 2006-2008, Alliance for Planet Earth Charleston Clean-ups, 2007-2008, Sponsor of Eco Week at CofC, 2008, advisor for CofC?s Trash audit, recycling awareness 2008, 2009, advisor for CofC?s Focus the Nation program, global warming awareness, 2008, Alliance for Planet Earth, advisor 2009-2010.

Service to the Profession and Conference Organization

- *Referee* for: ACM Experimental Algorithmics (1), 2010, ACM Transactions on Information Systems (1), 2006, Applied Mathematics and Computation (1), 2012, Applied Mathematics Letters (1), 2007, Asia-Pacific Journal of Operational Research (1), 2009, BIT (3), 2004, 2005, 2007, Columbian Journal of Statistics (1), 2012, Complex Networks (6), 2013, 2014, 2015, 2016, Computational and Applied Mathematics (1), 2009, Computational Intelligence and Neuroscience (1), 2007, Computational Optimization in Economics and Finance (1), 2010, Computational Statistics and Data Mining (1), 2008, Data Mining and Knowledge Discovery (1), 2009, Electronic Linear Algebra (1), 2004, Electronic Transactions on Numerical Analysis (1), 2007, European Performance Evaluation (1), 2005, Experimental Algorithmics (1), 2010, International Conference on Machine Learning (1), 2006, IEEE Transactions on Neural Networks (1), 2006, IEEE Transactions on Signal Processing (2), 2008, 2011, ILAS Proceedings (1), 2007, Image Processing (1), 2009, INFORMS Journal on Computing (1), 2007, Internet Mathematics (1), 2012, Linear Algebra and its Applications (4), 2003, 2005, 2006, 2012, Link Analysis book (1), 2007, Matrix Computations book by Van Loan (1), 2012, Numerical Linear Algebra (1), 2006, Numerical Solution of Markov Chains Proceedings (4), 2010, Performance Evaluation (3), 2003, 2005, 2006, Princeton University Press (6 books), 2008-present, SIAM Review (2), 2006, SIAM Journal on Matrix Analysis and its Applications (3), 2006, 2006, 2007, SIAM Journal on Scientific Computing (3), 2003, 2005, 2006, Signal Processing (1), 2008, Statistical Analysis and Data Mining (1), 2008, Stochastic Models (1), 2005, Theoretical Computer Science (1), 2012, Web Algorithms Workshop (3), 2012, Web Analysis Textbook Chapter

for Bing Lui, colleague at Urbana-Champaign, 2007, World Wide Web Conference 2008 (5), World Wide Web Conference 2009 (4), World Wide Web Conference 2012 (3)

- *Panel Reviewer* for National Science Foundation (Algorithmic, Statistical, and Mathematical Foundations of Data Science, 2016, Expeditions in Training, Research, and Development for Math and Stats, 2013, Data Mining, 2010, Foundations of Data Analysis and Visualization, 2008, Course, Curriculum, and Laboratory Improvement, 2007, Numerical Computing, 2007).

- *Reviewer* for Math Reviews. (1996-2002, 2007).

- *Editor* for *SIAM News*, liaison to SIAG/LA (Linear Algebra), 2014-present and *Complex Networks*, 2013-present

- *Education Outreach Chair* of the *Statistical and Applied Mathematical Sciences Institute*, SAMSI, 2006-2012

- *Director*, Math. Device Dissection Lab (see NSF CAREER proposal), 2005-2012

- *Committee Member* for SIAM Polya Prize, 206-2017, MAA Math Awareness Month, 2015-2016 and Committee of Women in Mathematics for the ACM, SIAM, MAA, and AAS, 2009-2011,

- *Seminar Leader*, Educational Philosophies, College of Charleston, 2010-2011

- *Program Committee Member*, World Wide Web Conference, 2008, World Wide Web Conference, 2009, World Wide Web Conference, 2010, Numerical Solution of Markov Chains, 2010

- *Director*, SIAM WhydoMath? PageRank project, 2008-2010

- *Organizer* of the *Southeastern Ranking and Clustering Workshop*, College of Charleston, June, 2009.

- *Mini-symposium organizer*, SIAM, MAA, AMS, 2004, 2005, 2006, 2007, 2008

- *Faculty advisor*, Industrial Math. And Stat. Modeling Workshops, Raleigh, NC, 2005, 2006, 2007

- *Organizer* of the *Markov Anniversary Conference*, College of Charleston, June 12-14, 2006.

- *Co-organizer* of the *Meyer 60 Celebration*, Raleigh, NC May 2005.

- *Seminar Leader*, Link Analysis, N.C. State University, 2004-2005

Service to the Community

- Women's Self-Defense Instructor, Gracie Academy, 2013-present

- Folly Beach Trash Sweeps, 2015, 2016

- Sponsor of Jenkins Orphanage Music Program, 2007-2010

- Habitat for Humanity Volunteer, 2005-2009

- Board Member, Chad K. Haynes Memorial Foundation, 2005-2008