

DAVID PHILLIPS

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EDUCATION

Ph.D. **Columbia University**. New York, NY. February 2007. *Operations Research*.
“Approximation algorithms and techniques in theory and practice”

Advisors: Garud Iyengar and Clifford Stein

M.S. **Columbia University**. New York, NY. February 2003. *Operations Research*.

B.A. with Honors **Oberlin College**. Oberlin, OH. May 1997. *Mathematics*.

ACADEMIC POSITIONS

Assistant Professor. Mathematics Department. College of William & Mary. August 2006-present.
on leave from August 2007-June 2008.

Visiting Assistant Professor. Industrial Engineering and Operations Research Department,
Columbia University. August 2007-June 2008.

GRANTS AND FELLOWSHIPS

NASA/VSGC New Investigator (PI). Summer 2009-Summer 2010. \$20,000.

NSF CSUMS Core faculty. Fall 2007-Summer 2010. \$484,711.

NSF GK12 Fellowship. Fall 2001-Spring 2004.

REFEREED PUBLICATIONS

“Models of malicious behavior in sponsored search,” joint work with G. Iyengar and C. Stein.
Proceedings of the 2007 Spring Simulation Multiconference (3). 2007: 143–151. (Acceptance rate unknown).

“Approximation algorithms for semidefinite packing problems with applications to MAXCUT and graph coloring,” joint work with G. Iyengar and C. Stein. *Lecture Notes in Computer Science (3509): Proceedings of the 11th Conference on Integer Programming and Combinatorial Optimization (IPCO XI)*. 2005: 152–166. Acceptance rate: 28.6% (34 of 119 accepted).

“Scheduling an Industrial Production Facility,” joint work with E. Asgeirsson, J. Berry, C. A. Phillips, C. Stein, and J. Wein. *Lecture Notes in Computer Science (3064): Proceedings of the 10th Conference on Integer Programming and Combinatorial Optimization (IPCO X)*. 2004: 116–131. Acceptance rate: 29.4% (32 of 109 accepted).

“Closed on-line bin packing,” joint work with E. Asgeirsson, U. Ayesta, E. Coffman, J. Etra, P. Momčilović, V. Vokshoori, Z. Wang, and J. Wolfe. *Acta Cybernetica 15* (2002), no. 3. 361–367.

UNREFEREED/SUBMITTED PAPERS

“Minimizing flight delay,” joint work with T. Dey and P. Steele. Proceedings of the 2009 Joint Statistical Meetings. 3404–3413. Invited submission to the *Journal of Computational and Graphical Statistics*.

“Approximating semidefinite packing problems,” joint work with G. Iyengar and C Stein. Journal version (100% longer, 60% new material) of IPCO XI paper. Submitted to *SIAM Journal on Optimization*.

“Feasible and accurate algorithms for covering semidefinite programs,” joint work with G. Iyengar and C. Stein. Submitted to the *14th Conference on Integer Programming and Combinatorial Optimization*.

WORKING PAPERS

“Rank constrained heuristics for the MAXCUT problem.” joint work with R. M. Lewis, A. Powell and R. Taylor. In preparation. To be submitted before 2010.

“Highly uncorrelated, orthogonal algorithms for Sparse PCA.” joint work with R. Iaci. In preparation. To be submitted before 2010.

“Resource planning in Magnetic Resonance Imaging,” joint work with A. Carpenter, L. Leemis and G. Phillips. In preparation. To be submitted before 2010.

“Scheduling and planning in an Industrial Production Facility,” joint work with E. Asgeirsson, C. A. Phillips, C. Stein, and J. Wein. Journal version (currently 30% longer, 20% new material) of IPCO X paper. In preparation. To be submitted before 2010.

“Experiments in computing solutions to semidefinite packing problems.” joint work with G. Iyengar and A. Mills. In preparation.

COURSES TAUGHT

Introduction to Operations Research, Fall 2006, Fall 2007

Linear Programming, Fall 2006, Fall 2008, Fall 2009

Nonlinear Programming, Spring 2007

Network Optimization, Spring 2007, Spring 2009

Scheduling, Spring 2008

Integer Programming, Spring 2008

Calculus I, Fall 2008

Foundations of Mathematics, Spring 2009, Fall 2009

Research students

Alan Papir, B. S. (Columbia University, '09). Current student in William & Mary's Computational Operations Research master's program.

Austin Powell. Current undergraduate at William & Mary.

Rachel Taylor. Current undergraduate at William & Mary.

Patrick Steele. Current undergraduate at William & Mary.

Adam Carpenter, B. S., (William & Mary, '08). Current student in the Computational Operations Research master's program.

Craig Kalick, B. A., (William & Mary, '08). Current student in the Computational Operations Research master's program.

Erik Vargo, B. S. (Lebanon Valley College, '07), M.S., (William & Mary, '09). Currently at the University of Virginia for Ph.D. in Systems and Information Engineering.

Alex Mills, B.S., (William & Mary '07). Currently at University of North Carolina, Chapel Hill for a Ph.D. in Operations Research.

Matthew Hanson, B.A., (William & Mary '07). Currently working at the National Bureau of Economic Research.

PROFESSIONAL ACTIVITIES

Co-organizer for the Summer CSUMS Research Experience for Undergraduates, 2008 & 2009.

Co-organizer for the *GMU-WM Workshop on Undergraduate Research in Computational Mathematics, William & Mary*, March 2009.

Mathematics Department Committees: Computational Operations Research (2006-2009), Undergraduate Curriculum (2008-2009), Computers & Technology (2009-2010).

Freshman and Major advising (16 students), Fall 2008 - current.

Referee for Mathematical Programming, Mathematics of Operations Research, ACM Transactions on Algorithm, ACM-SIAM Symposium on Discrete Algorithms, MPS Conference on Integer Programming and Combinatorial Optimization, INFORMS Journal on Computing, Journal of Algorithms and Naval Research Logistics.

Member of INFORMS, SIAM and ACM.

Member of Computational Optimization Research Center (CORC), Columbia University

SELECTED PRESENTATIONS

“Solving the Sparse PCA SDP Relaxation, ”, INFORMS Annual Meeting. San Diego, CA. October 2009.

“Data Expo 2009: Minimizing the probability of experiencing a flight delay, ”, Joint Statistics Meeting. Poster presentation. Awarded Honorable Distinction. Washington, DC. August 2009

“Managing magnetic resonance imaging machines: optimal purchases and schedules.” Ninth Workshop on Models and Algorithms for Planning and Scheduling Problems. Abbey Rolduc, The Netherlands. July 2009.

“Rounding time-indexed project scheduling integer programs to determine resource planning,” INFORMS Computing Society Annual Meeting. Charleston, SC. January 2009.

“Scheduling Patients in a Radiology Department,” INFORMS Annual Meeting. Washington, DC. October 2008.

“Graph optimization in medicine and mining,” CSUMS, The College of William & Mary. Williamsburg, VA. March 2008.

“Semidefinite packing problems,” Discrete Math Seminar, Columbia University. November 2007. New York, NY.

“Models of malicious behavior in sponsored search,” Spring Sim 2007, Norfolk, VA. March 2007.

“Distribution-free strategies for budget-constrained bidders in sequential auctions,” Workshop on Alternative Solution Concepts for Mechanism Design, EC 2006. University of Michigan, Ann Arbor. June, 2006.

“Google Keywords auctions,” Cowles Foundation Conference on Optimization. Yale University. New Haven, NH. February, 2006.

“Experimental Behavior of Algorithms for Semidefinite Relaxations,” INFORMS Annual meeting. New Orleans, LA. November 2005.

“Semidefinite packing, a lower bound,” INFORMS Annual meeting. New Orleans, LA. November 2005.

“Approximating semidefinite packing problems,” IPCO XI. TU-Berlin, Berlin, Germany. June 2005.

“Approximating semidefinite packing problems,” IBM, Yorktown Heights, NY. March 2005.

“Scheduling an industrial facility,” INFORMS Annual meeting. Atlanta, GA. November 2003.

CONFERENCES AND WORKSHOPS

20th International Symposium on Mathematical Programming. Chicago, IL. August 2009

Joint Statistics Meeting. Washington, DC. August 2009

Ninth Workshop on Models and Algorithms for Planning and Scheduling Problems. Abbey Rolduc, The Netherlands. July 2009.

INFORMS Computing Society Annual meeting. Charleston, SC. January 2009.

INFORMS Annual meeting. Washington, DC. November 2008.

Icelandic Workshop on Resource Planning and Scheduling. Reykjavik, Iceland. July 2008.

INFORMS Annual meeting. Seattle, WA. November 2007.

Integer Programming & Combinatorial Optimization (IPCO XII). Ithaca, NY. June 2007.

Spring Simulation Multiconference 2007 (Spring Sim). Norfolk, VA. March 2007.

18th ACM-SIAM Symposium on Discrete Algorithms (SODA). Baltimore, MD. January 2007.

7th ACM Conference on Electronic Commerce (EC). Ann Arbor, MI. June 2006.

Cowles Foundation Conference on Optimization. New Haven, CT. February 2006.

INFORMS Annual meeting. San Francisco, CA. November 2005.

Integer Programming & Combinatorial Optimization (IPCO XI). Berlin, Germany. June 2005

Integer Programming & Combinatorial Optimization (IPCO X). New York, NY. June 2004.

INFORMS Annual meeting. Atlanta, GA. November 2003.

14th ACM-SIAM Symposium on Discrete Algorithms (SODA). Baltimore, MD. January 2003.

PROFESSIONAL EXPERIENCE

PA Consulting

February 1999 - June 2000. Analyst. Implemented and documented statistical and operations research models using programming languages and applications including C/C++, Fortran,

Visual Basic, SAS, MatLab, and Excel. Some projects include:

- **Lead programmer on Project Spreader**, an energy plant valuation model incorporating Monte Carlo simulation, dynamic programming, linear programming, and finance spread option modeling techniques.
- **Lead programmer for the Generation Reliability model**, which determines the Loss-of-Load Expectation (LOLE) of a given set of power plants subject to planned outage constraints. Program uses a greedy algorithm to schedule planned outages and convolves forced outage probabilities to calculate LOLE.

The Lewin Group

August 1997 - February 1999. Research Assistant. Analyzed several data sets and implemented microsimulation, regression analysis, and operations research models using programming languages and applications including Fortran, Visual Basic, SAS, and Excel. Some projects include:

- Wrote and modified Fortran code implementing a microsimulation which forecasts health care expenditures among Medicare recipients using the Medicare Current Beneficiary Survey data-set. Wrote SAS code used to estimate coefficients used in the simulation.
- Implemented microsimulation in SAS analyzing impact of the 1997 Balanced Budget Amendment upon Home-care agencies.
- Developed a software guideline in Visual Basic language to assist doctors in diagnosing and treating community-acquired pneumonia.

COMPUTER SKILLS

Languages/Scripting/Technical Software

Python, C/C++, Fortran, Gurobi, CPLEX, AMPL, SAS, L^AT_EX, bash scripting, Visual Basic, Pascal, Matlab, Mathematica, Excel, @Risk.

Operating Systems

Linux (various), Unix (various), Mac OS X and 9, Windows (XP, 2000, NT, '98)

REFERENCES

Professor Garud Iyengar, IEOR Department, Columbia University, S.W. Mudd Bldg. 313, 500 W. 120th St., New York, NY 10027, GARUD@IEOR.COLUMBIA.EDU, 212.854.4594

Professor Rex Kincaid, Mathematics Department, The College of William & Mary, Jones Hall 114, 200 Campus Dr., Williamsburg, VA 23185 RRKINC@MATH.WM.EDU, 757.221.2038

Dr. Cynthia A. Phillips, Sandia National Laboratories, Mail Stop 1110, P.O. Box 5800, Albuquerque, NM 87185-1110, CAPHILL@SANDIA.GOV, 505.845.7296

Professor Clifford M. Stein, IEOR Department, Columbia University, S.W. Mudd Bldg. 313, 500 W. 120th St., New York, NY 10027, CLIFF@IEOR.COLUMBIA.EDU, 212.854.5238