

David J. Rader, Jr.

CONTACT INFORMATION Department of Mathematics (812) 877-8361
Rose-Hulman Institute of Technology rader@rose-hulman.edu
5500 Wabash Ave. http://www.rose-hulman.edu/~rader
Terre Haute, IN 47803, USA

EDUCATION **Rutgers, The State University of New Jersey**

Ph.D. , Operations Research, May 1997

- Specialization: Nonlinear 0-1 Optimization, Computational Integer Programming
- Thesis: The Structure and Solution of Various Quadratic Pseudo-Boolean Optimization Problems.
- Advisor: Peter L. Hammer, Rutgers Center for Operations Research (RUTCOR)
- Honors: Rutgers University Excellence Fellowship 1991-1993

University of Richmond

B.S. in Mathematics, May 1991

- Graduate Magna Cum Laude
- Honors: Pi Mu Epsilon National Mathematics Honor Society, Phi Beta Kappa, Outstanding Mathematics Student, 1990-1991.
- Minor in computer science

PROFESSIONAL EXPERIENCE **Rose-Hulman Institute of Technology**

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|------------------------------------|----------------|
| Head of Department of Mathematics | 2014 - present |
| Professor of Mathematics | 2011 - present |
| Associate Professor of Mathematics | 2003 - 2011 |
| Assistant Professor of Mathematics | 1997 - 2003 |

CLASSES TAUGHT

- | | |
|---|--|
| <ul style="list-style-type: none">• Calculus I, II, III• Differential Equations I, II• Engineering Statistics I• Discrete and Combinatorial Algebra I• Introduction to Probability• Introduction to Statistics with Probability• Deterministic Models in OR | <ul style="list-style-type: none">• Stochastic Models in OR• Combinatorial Optimization• Project Course in OR• Discrete Math Models• Management Science• Design and Analysis of Algorithms• Mathematical Statistics• Intro to Math Modeling |
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SENIOR THESIS STUDENTS

- Stephen Young (2002)
- Amanda Rohde (2007)
- Jason Saupe (2009)
- Maisey Tucker (2014)

MASTERS THESIS COMMITTEES

- | | |
|---|---|
| <ul style="list-style-type: none">• Seth McElhinney (2001 - EE)• Scott Ohlmiller (2003 - EE)• Michael Seifert (2003 - EMGT)• Anthony Welch (2005 - EMGT) | <ul style="list-style-type: none">• Rimas Guzulaitis (2005 - EMGT)• Barbara Schenk (2007 - EMGT)• Arvind Chandrasekaran (2008 - ME)• Markus Koch (2008 - EMGT) |
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PUBLICATIONS

“Efficient methods for solving quadratic 0-1 knapsack problems”; Joint work with Peter L. Hammer; *INFOR*, V. 35(1997), no. 3, pp. 170-182. <http://dx.doi.org/10.1080/03155986.1997.11732327>

“Optimal cell flipping to minimize channel density in VLSI design and a class of PseudoBoolean optimization problems”; Joint work with E. Boros, P.L. Hammer, and M. Minoux; *Discrete Applied Mathematics*, V. 90(1999), pp. 69-88. [https://doi.org/10.1016/S0166-218X\(98\)00114-0](https://doi.org/10.1016/S0166-218X(98)00114-0)

“Maximally disjoint solutions to the set covering problem”; Joint work with Peter L. Hammer. *Journal of Heuristics*, V. 7 (2001), pp. 131-144. <http://doi.org/10.1023/A:1009687403254>

“Maximizing the product of two linear 0-1 functions”; Joint work with Peter L. Hammer, Pierre Hansen and Panos Pardalos. *Optimization*, V. 51 (2002), pp. 511-537. <http://dx.doi.org/10.1080/02331930290009847>

“The quadratic 0-1 knapsack problem with series-parallel support”; Joint work with Gerhard J. Woeginger. *Operations Research Letters*, V. 30 (2002), no. 3, pp. 159-166. [https://doi.org/10.1016/S0167-6377\(02\)00122-0](https://doi.org/10.1016/S0167-6377(02)00122-0)

“Automated Supply Chain Management in the U.S. Steel Industry”; Joint work with Seifert, Michael, William A. Kline, and Thomas W. Mason. *Peer Reviewed Proceedings of the 2004 National Conference of the American Society of Engineering Management*, October 20-23, 2004, Alexandria, VA, pp. 443-452.

“A heuristic algorithm for a chance constrained stochastic program”; Joint work with Concetta A. DePaolo. *European Journal of Operational Research*, V. 176 (2007), pp. 27-45. <https://doi.org/10.1016/j.ejor.2005.08.008>

“Recommendations for an Undergraduate Curriculum at the Interface of Operations Research and Computer Science”; Joint work with J. Hardin, C. Beck, , K. Furman, A. Hanna, A. Holder, C. Rego, *INFORMS Trans. Ed.*, V. 12 (2012), issue 3, pp. 117-123. <https://doi.org/10.1287/ited.1110.0080>

BOOKS

Deterministic Operations Research: Models and Methods in Linear Optimization, John Wiley & Sons, Inc. (2010). Currently in third printing.

PRESENTATIONS

“Quadratic knapsack problems”, XV Mathematical Programming Society Symposium, Ann Arbor, MI, (August 1994).

“Quadratic knapsack problems”, University of Richmond, Richmond, VA, invited seminar (October 1994).

“Solving quadratic 0-1 knapsack problems”, RUTCOR department seminar, New Brunswick, NJ (April 1996).

“Solving quadratic 0-1 knapsack problems”, GERAD, Universite de Montreal, Montreal, Quebec, CA invited seminar (May 1996).

“Lifting results for the quadratic knapsack polytope”, Project NExT/Young Mathematician’s Network Poster Session, AMS/MAA Joint Meetings, San Diego, CA.

(January, 1997).

“Maximizing the Product of Two Linear Functions in 0-1 Variables”, Joint Rose-Hulman, Indiana State, and St. Mary’s of the Woods Mathematics Seminar, Terre Haute, IN. (October 1997).

“Maximizing the Product of Two Linear Functions in 0-1 Variables”, INFORMS Fall 1997 Invited Talk, Dallas, TX (October 1997).

“Lifting results for the quadratic 0-1 knapsack polytope”, INFORMS Fall 1997 Invited Talk, Dallas, TX (October 1997).

“Maximally disjoint solutions to the set covering problem”, INFORMS Spring 1998 Invited Talk, Montreal, Quebec (April 1998).

“Complexity results for facets of the quadratic 0-1 knapsack polytope”, INFORMS Spring 1999 Contributed Talk, Cincinnati, OH (May 1999).

“Complexity results for facets of the quadratic 0-1 knapsack polytope”, Discrete Optimization '99, Rutgers University, Piscataway, NJ (July 1999).

“Pseudopolynomial and fully polynomial approximation algorithms for a class of quadratic 0-1 knapsack problems”, INFORMS Fall 1999 Invited Talk, Philadelphia, PA (November 1999).

“Optimal cell flipping to minimize channel density in VLSI design”, Colloquium Talk, Valparaiso University, IN (March 2000).

“Exact methods for finding maximally disjoint solutions of the set covering problem”, 17th International Symposium on Mathematical Programming, Atlanta, GA (August 2000).

“Optimal cell flipping to minimize channel density in VLSI design”, Colloquium Talk, Trinity University, TX (November 2000).

“Optimal cell flipping to minimize channel density in VLSI design”, Colloquium Talk, University of Richmond, VA (November 2000).

“Operations Research Applications in Computer Engineering”, Colloquium Talk, Kalamazoo College, MI (October 2001).

“Operations Research Applications in Computer Engineering”, Colloquium Talk, Hope College, MI (October 2001).

“Teaching Operations Research to Math/CS Students”, INFORMS Fall 2001 Contributed Talk, Miami, FL (November 2001).

“Using Technology to Enhance the Teaching of LP and IP Algorithms”, INFORMS Fall 2004 Invited Talk, Denver, CO (November 2004).

“What can you do with an NP-hard optimization problem?”, Rose-Hulman Math Seminar, April 2007.

“How should we introduce OR to undergraduate students?,” INFORMS Fall 2007

Invited Talk, Seattle, WA (November 2007).

“How should we introduce OR to undergraduate students?,” Ball State University Mathematics Colloquium, April 2009.

“Really, how hard is it to schedule final exams?,” Rose-Hulman Math Seminar, May 2011.

“Teaching a First Statistics Course to Engineering and Mathematics Students From an OR Perspective,” INFORMS 2011 Annual Meeting, Charlotte, NC (November 2011).

“How should we introduce OR to undergraduate students at the OR-CS interface?,” EURO-INFORMS Summer 2013 Invited Talk, Rome, Italy (July 2013).

“Publishing Undergraduate Research”, Indiana Project NEXt Panel discussion, Indiana MAA Fall 2013 meeting, Evansville, IN (October 2013).

CONSULTING

Rose-Hulman Institute of Technology

- Redesigned algorithm for final exam scheduling, 2013-present. Produced schedules for final exams since Spring 2013 term.

McGraw-Hill Companies, Inc.

- Produced videos of solutions to various problems for enhanced e-book versions of 9 Schaum’s Outline books, 2010-2013.

Tredegar Film Products

- Devised alternative production schedules, 2002.

SCAC Athletic Conference

- Devised alternative schedules for basketball leagues, 1998-1999.
- Devised alternative schedules for volleyball tournament, 2000.

PROFESSIONAL SERVICE

INFORMS Professional Society

- Session Chair, INFORMS Spring 1999 meeting, Cincinnati, OH (May 1999).
- Session Chair, INFORMS Fall 2001 meeting, Miami, FL (November 2001).
- Cluster Chair, INFORMS Denver 2004 meeting (November 2004).
- INFORMS Computing Society Education Committee, 2007-2009.
- INFORMS Forum on Education VP for Programs, 2007-2009.
- INFORMS Forum on Education President, 2009-2011.

Indiana Section of MAA

- Public Information Officer, 2000-2008.
- Project NEXt - Indiana, mentor, 2001-2002.

Rose-Hulman Undergraduate Mathematics Journal

- Assistant Editor, 2000-2010.
- Editor, 2010 - 2014.

INSTITUTE SERVICE Laptop Orientation Instructor, 1997- 2001, 2005.

Rose-Hulman Institute of Technology High School Mathematics Contest: 1997, 1998, 1999, 2001.

Commission on Assessment of Student Outcomes, 1998-2002.

Rose-Hulman Undergraduate Mathematics Conference - co-coordinator, 1999, 2006.

Honors and Awards Committee

- Secretary, 1999-2000.
- Chair, 2000-2001, 2002-2003.

Jump Start Program - Coordinator, Summer 1999-2001.

Mathematics Department Curriculum Committee, 1999-2001, 2003-2004, 2004-2005, 2012-2013.

- Chair, 2003-2004, 2004-2005.

Mathematics Department Modeling Competition Advisor, 1999-2007.

Mathematics Student Advisor, 1999-2003.

Laptop Committee, 2001-2008, 2010-2011.

- Chair, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008.

Academic Technology Committee, 2005-2006.

Academic Computing Environment Review Commission, 2006-2008 (Chair).

Tablet PC Feasibility Study Group, 2007-2008 (chair).

Faculty Affairs Committee, 2011-2013

- Chair, 2012-2013
- Ad-hoc Tenure Review committee, 2012.

Curriculum Committee, 2014-present

Ad-hoc committee on Fixed Term Department Heads, 2012-2013.

Freshman Advisor, 2013-2014.

AFFILIATIONS Institute for Operations Research and the Management Sciences (INFORMS)

Mathematical Association of America (MAA)

RESEARCH INTERESTS Nonlinear 0-1 Optimization, Computational Integer Programming, Mathematical Modeling, Timetabling. AMS Classification: 90C09, 90C10, 90C27, 90B90