

Illya V. Hicks

Computational and Applied
Mathematics

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Current as of 7-20-2012

PERSONAL DATA

- Born in Waco, TX.
- Married: wife Casmin, one child

EDUCATION

Degree	Field	Institution	Date
Ph.D	Computational and Applied Mathematics	Rice University	2000
M.A.	Computational and Applied Mathematics	Rice University	2000
B.S.	Mathematics	Texas State University	1995

RESEARCH AREA

- branch decomposition techniques
- combinatorial optimization
- graph theory
- integer programming
- network design
- cancer treatment
- social networks
- logistics

EXPERIENCE

- **Rice University**, Associate Professor of Computational and Applied Mathematics (Spring 2007-Present)
- **Texas A&M University**, Associate Professor of Industrial and Systems Engineering (Fall 2006)
- **Texas A&M University**, Assistant Professor of Industrial and Systems Engineering (Fall 2000-Spring 2006)
- **University of Houston-Main Campus**, Instructor (Fall 1999 - Spring 2000)
Instructed undergraduate students in college algebra (Fall 1999) and pre-calculus (Spring 2000).
- **Rice University**, AGEP Program (Summers 1999, 1998, 1995)
Conducted ongoing research relevant to thesis while mentoring undergraduates and high school students.
- **Bell Labs (Lucent Technologies)**, Summer Intern (Summer 1997)
Implemented traveling salesman problem solver using the Held-Karp algorithm.
- **AT&T Labs**, Summer Intern (Summer 1996)
Worked on a min-cost network flow solver.

HONORS

- 2010 Forum Moving Spirit Award, INFORMS
- 2005 Optimization Prize for Young Researchers, Optimization Society, INFORMS
- AT&T Labs Graduate Fellowship (formerly known as CRFP fellowship)

PUBLICATIONS

Published and Accepted Journal Articles (* denotes graduate student or post-doc advised)

1. Margulies*, S., J. Ma, I. V. Hicks, E. Goins, “**Branch Decomposition Heuristics for Linear Matroids**”, Discrete Optimization (to appear) (partially supported by CMMI-0926618)
2. Margulies*, S. J. Ma, I. V. Hicks, “**The Cunningham-Geelen Method in Practice: Branch Decompositions and Integer Programming**”, INFORMS Journal on Computing (to appear) (partially supported by CMMI-0926618)

3. Margulies*, S., I. V. Hicks, “**An Algebraic Exploration of Dominating Sets and Vizing’s Conjecture**”, *Electronic Journal of Combinatorics* 19(2), 2012, P1 (partially supported by CMMI-0926618)
4. Smith, J.C., E. Ulusal*, I. V. Hicks, “**A Combinatorial Optimization Algorithms for Solving the Branchwidth Problem**”, *Computational Optimization and Applications* 51(3), 2012, 1211-1229 (partially supported by CMMI-0926618)
5. McClosky*, B., I. V. Hicks, “**Combinatorial Algorithms for the Maximum k -plex Problem**”, *Journal of Combinatorial Optimization* 23(1), 2012, 29-49, (partially supported by DMS-0926618)
6. McClosky*, B., A. Simms, I. V. Hicks, “**Co-2-plex Polynomials**”, *Journal of Combinatorial Optimization* 22(4), 2011, 640-650 (partially supported by DMS-0729251)
7. Balasundaram, B., S. Butenko, I. V. Hicks, “**Clique Relaxations in Social Network Analysis: The Maximum k -Plex Problem**”, *Operations Research* 59(1), 2011, 133-142 (partially supported by CMMI-0521209)
8. Kahruman, S., E. Ulusal*, S. Butenko, I. V. Hicks, K. Diehl, “**Scheduling the Adjuvant Endocrine Therapy for Early Stage Breast Cancer**”, *Annals of Operations Research* 196(1), 2012, 683-705 (partially supported by CMMI-0521209)
9. McClosky*, B., I. V. Hicks, “**The Co-2-plex Polytope and Integral Systems**”, *SIAM Journal on Discrete Mathematics* 23, 2009, 1135-1148 (partially supported by DMS-0729251)
10. McClosky*, B., I. V. Hicks, “**Composition of Stable Set Polyhedra**”, *Operations Research Letters* 36, 2008, 615-617 (partially supported by DMI-0217265 and DMI-0521209)
11. Hicks, I. V., “**New Facets for the Planar Subgraph Polytope**”, *Networks* 51(2), 2008, 120-132 (partially supported by DMI-0217265 and DMI-0521209)
12. Kahruman, S., E. Kolotoğlu*, S. Butenko, I. V. Hicks, “**On Greedy Construction Heuristics for MAX CUT problem**”, *International Journal on Computational Science and Engineering* 3(3), 2007, 211-218 (partially supported by DMI-0217265)
13. Hicks, I. V., N. McMurray, “**The Branchwidth of Graphs and their Cycle Matroids**”, *Journal of Combinatorial Theory Series B* 97(5), 2007, 681-692 (partially supported by DMI-0217265 and DMI-0521209)

14. Arámbula*, I., I. V. Hicks, "**Restricted b -factors in Bipartite Graphs and t -designs**", *Journal of Combinatorial Designs* 14(3), 2006, 169-182 (partially supported by DMI-0217265)
15. Hicks, I.V., "**Planar Branch Decompositions I: The Ratcatcher**", *INFORMS Journal on Computing* 17(4), 2005, 402-412 (partially supported by DMI-0217265)
16. Hicks, I. V., "**Planar Branch Decompositions II: The Cycle Method**", *INFORMS Journal on Computing* 17(4), 2005, 413-421 (partially supported by DMI-0217265)
17. Hicks, I. V., "**Graphs, Branchwidth, and Tangles! Oh My!**", *Networks* 45(2), 2005, 55-60 (partially supported by DMI-0217265)
18. Warrior, D., W. Wilhelm, J. Warren*, I. V. Hicks, "**A Branch-and-Price Approach for the Maximum Weight Independent Set Problem**", *Networks* 46 (14), 2005, 198-209 (partially supported by DMI-0217265)
19. Hicks, I. V., "**Branch Decompositions and Minor Containment**", *Networks* 43(1), 2004, 1-9
20. Butler-Purry, K. L., N. D. R. Sarma, I. V. Hicks, "**Service Restoration in Shipboard Electric Power Systems**" *IEE Proceedings-Generation, Transmission and Distribution* (an international EE journal) 15(1), 2004, 95-102
21. Bonyet, M., A. Garcia-Diaz, I. V. Hicks, "**Optimization Procedures for simultaneous Road Rehabilitation and Bridge Replacement Decisions in Highway Networks**", *Engineering Optimization* 34(5), 2002, 445-459
22. Hicks, I. V., "**Branchwidth Heuristics**", *Congressus Numerantium* 159, 2002, 31-50

Book Chapters and Technical Reports (* denotes graduate student)

1. Hicks, I.V., "**Branch Decompositions and their Applications**", Tech Report TR00-17, Computational and Applied Mathematics department, Rice University, 2000
2. Hicks, I. V., E. Kolotoğlu*, A. M. C. A. Koster, "**Branch and Tree Decomposition Techniques for Discrete Optimization**", *Tutorials in Operations Research: Emerging Theory, Methods, and Applications*, J. Cole Smith (ed), INFORMS, Hanover, MD, 2005
3. Warren, J.*, I. V. Hicks, "**Combinatorial branch-and-bound for the maximum weight independent set problem**", Tech Report, Industrial and Systems Engineering, Texas A&M University, 2006.

4. Hicks, I.V., **“Branchwidth and Branch Decompositions”**, *Encyclopedia of Optimization*, C. Floudas and P. Pardalos (eds.), Springer, New York, 2009
5. Oum, S., I. V. Hicks, **“Branch-width and Tangles”**, *Wiley Encyclopedia of OR/MS*, J. Cochran et al. (eds.), Wiley, New York, 2011
6. Garcia-Diaz, A., I. V. Hicks, **“Graph and Network Theory: Basic Concepts and Applications”**, *Wiley Encyclopedia of OR/MS*, J. Cochran et al. (eds.), Wiley, New York, 2011

RESEARCH GRANTS

1. **“A New Decomposition Approach for a Class of NP-hard Graph Problems”**, PIs: W. Wilhelm and I. V. Hicks, NSF (DMI-0217265), \$175K, 9-1-02 to 8-31-05, REU grant (24K)
2. **“SGER: Branch Decomposition Techniques for Independence Systems”**, PI: I. V. Hicks, NSF (DMI-0521209), \$80K, 8-1-05 to 7-31-06, developed from 2005 CAREER proposal (only one CAREER award given in OR program for 2005)
3. **“Innovative Techniques for Constructing Branch Decompositions”**, PI: I. V. Hicks, NSF (DMS-0729251, formerly DMS-0611723). \$185K, 8-15-06 to 8-31-09
4. **“Branch Decomposition Techniques for Submodular Optimization”**, PI: I. V. Hicks, NSF (CMMI-0926618), \$250K, 8-1-09 to 7-31-13

OTHER GRANTS

1. **“Travel Support for Minority Students to attend INFORMS Annual Meeting; October 24-27, 2004; Denver, CO”**, PI: I. V. Hicks, NSF (DMI-0440785), \$4.75K, 9-1-04 to 8-31-05
2. **“Pathways to the Doctorate Research Assistantship Award”**, PI: I.V. Hicks, Texas A&M University, \$25K, 9-1-05 to 8-31-07
3. **“Travel Support for Minority Students to attend INFORMS Annual Meeting; November 13-16, 2005; New Orleans, LA”**, PI: I. V. Hicks, NSF (DMI-0537840), \$5K, 9-1-05 to 8-31-06
4. **“GAAN: Fellowships for Research in Industrial and Systems Engineering,”** PIs: G.-A. Klutke, S. Cetinkaya, and I. V. Hicks, DoEd, \$380K, 9-1-06 to 8-31-09

5. **“BPC-DP: Academic Mentoring Workshops for Underrepresented Participants”**, PIs: V. Taylor, I. V. Hicks, and B. York, NSF (CNS-0634272), 388K, 3-1-07 to 2-28-10
6. **“Travel Support for Minority Students Attending INFORMS Annual Meetings”**, PI: I. V. Hicks, NSF (CMMI-0739996), \$18.9K, 8-1-07 to 7-31-11
7. **“Travel Support for Minority Students Attending INFORMS Annual Meetings”**, PI: I. V. Hicks, NSF (CMMI-1130507), \$18.9K, 7-20-11 to 7-19-14

SELECTED TECHNICAL PRESENTATIONS

1. **“Optimization and Social Networks”**, Center of Applied Mathematics, Cornell University, April 2012 (invited speaker)
2. **“Optimization and Social Networks”**, Tapia Celebration of Diversity in Computing Conference, San Francisco, April 2011 (invited plenary speaker)
3. **“Are You Ready For Some Football: How Football Can Help Diversify Math”**, Harvey Mudd Mathematics Conference on Broadening Participation in the Mathematical Sciences, Harvey Mudd College, February 2011 (invited)
4. **“Computing Matroidal Branchwidth”**, SIAM Minisymposium on Combinatorial Optimization, Joint Mathematics Meeting, New Orleans, January 2011 (invited)
5. **“Optimization Techniques for Scheduling Adjuvant Endocrine Therapy for Early Stage Breast Cancer”**, Blackwell-Tapia Conference 2010, MBI, Ohio State University, November 2010 (invited)
6. **“Detecting Cohesiveness in Social Networks”**, Infinite Possibilities Conference, IPAM, UCLA, March 2010 (invited)
7. **“Integer Programming Techniques for General Branchwidth”**, Workshop on Algorithmic Graph Theory, Centre for Discrete Mathematics and its Applications, University of Warwick (U.K.), March 2009 (invited)
8. **“Degree Based Generalizations of Cliques and Stable Sets”**, Operations Research Program Seminar, Mechanical Engineering, University of Texas, April 2009 (invited)
9. **“Detecting Cohesive Subgroups in Social Networks”**, Conference for African-American Researchers in the Mathematical Sciences (CAARMS), Georgia Tech, Atlanta, GA, July 2008 (invited)

10. **“Degree Based Generalizations of Cliques and Stable Sets”**, Industrial and Systems Engineering Departmental Seminar, University of Florida, September 2007 (invited)
11. **“Branch Decomposition Techniques for Discrete Optimization”**, Blackwell-Tapia Conference, IMA, University of Minnesota, November 2006 (invited)
12. **“Branchwidth via Integer Programming”**, Mixed-Integer Programming Workshop, University of Miami, June 2006 (invited)
13. **“3-Separations and the Stable Set Polytope”**, INFORMS Annual Meeting, San Francisco, CA, November 2005
14. **“Tutorials: Branch and Tree Decomposition Techniques for Discrete Optimization”**, INFORMS Annual Meeting, San Francisco, CA, November 2005 (with A. M. C. A. Koster) (invited)
15. **“The Branchwidth of Graphs and Cycle Matroids”**, Mathematics Department, Texas A&M University, September 2004, (invited)
16. **“Branchwidth, Parallel Graph Algorithms, and Social Networks”**, Sandia National Labs, Livermore, CA, June 2004 (invited)
17. **“Operations Research Techniques for Radiation Therapy”**, University of Texas Health Science Center at San Antonio Medical School, San Antonio, TX, May 2004 (invited)
18. **“Theoretical and Practical Applications of Branch Decompositions”**, CombinaTexas Conference, College Station, TX, April 2004 (invited plenary speaker)
19. **“Graphs, Branchwidth and Tangles! Oh My!!”**, Conference for African-American Researchers in the Mathematical Sciences (CAARMS), Duke University, Durham, NC, June 2001 (invited)
20. **“Graph Minors and Branch Decompositions”**, NAM Granville-Brown Session, Joint Mathematics Meeting, New Orleans, LA, January 2001 (invited)
21. **“Got Minor?”**, Blackwell-Tapia Distinguished Lecture Series Conference, Cornell University, May 2000 (invited)

PROFESSIONAL AFFILIATION

- Institute for Operations Research and the Management Science (INFORMS)
- Mathematical Optimization Society (MPS)
- National Association of Mathematicians (NAM)
- Society for Industrial and Applied Mathematics (SIAM)

- Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)

GRADUATE ADVISOR

- William J. Cook, Georgia Tech