

## Karthekeyan Chandrasekaran

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CONTACT INFORMATION	301 Transportation Building 104 S. Mathews Ave Urbana, IL 61801 <i>Phone:</i> 217-300-1160 <i>Email:</i> karthe@illinois.edu <i>URL:</i> <a href="http://karthik.ise.illinois.edu">http://karthik.ise.illinois.edu</a>	
RESEARCH INTERESTS	Optimization, Integer Programming, Probabilistic Methods and Analysis, Randomization	
EDUCATION	<b>Ph.D., Algorithms, Combinatorics, and Optimization</b> Georgia Institute of Technology, Atlanta	Aug, 2012
	<b>B.Tech., Computer Science and Engineering</b> Indian Institute of Technology, Madras	Jun, 2007
APPOINTMENTS	<b>Assistant Professor</b> University of Illinois at Urbana-Champaign, IL Department of Industrial and Enterprise Systems Engineering	Sep, 2014-present
	<b>Affiliate Assistant Professor</b> University of Illinois at Urbana-Champaign, IL Department of Computer Science	Sep, 2014-present
	<b>Simons Postdoctoral Research Fellow</b> Harvard University, Cambridge, MA School of Engineering and Applied Sciences Host: Salil Vadhan	Sep, 2012-Aug, 2014
	<b>Visiting Researcher</b> International Computer Science Institute (ICSI), Berkeley, CA Algorithms Group Host: Richard Karp	Jul-Oct, 2011
	<b>Research Intern</b> Microsoft Research, Bangalore, India Algorithms Research Group Host: Navin Goyal Host: Amit Deshpande	May-Jul, 2009 May-Jul, 2008
	Applied Mathematics Group Host: Satya V. Lokam	May-Jul, 2007
	Microsoft Research, Redmond, WA Algorithms Group Host: Ramarathnam Venkatesan	Jun-Aug, 2006

- TEACHING      **Operations Research & Lab**, IE 310, IE 311 (Undergraduate), Fall 2017  
**Integer Programming**, IE 511 (Graduate), Spring 2017  
**Operations Research & Lab**, IE 310, IE 311 (Undergraduate), Fall 2016  
**Operations Research & Lab**, IE 310, IE 311 (Undergraduate), Spring 2016  
**Combinatorial Optimization**, IE 598 (Graduate), Fall 2015  
**Integer Programming**, IE 511 (Graduate), Spring 2015  
- University of Illinois, Urbana-Champaign
- STUDENTS      PhD Advisees: Chao Xu, UIUC (2016–present, joint with Prof. Chandra Chekuri)  
Undergrad advisees: Jingwen Jiang, UIUC (2015–16, currently PhD student at Univ. of Chicago)
- PUBLICATIONS      **Hypergraph  $k$ -Cut in Randomized Polynomial Time**  
(with C. Xu, X. Yu)  
- (To appear in) ACM-SIAM Symposium on Discrete Algorithms (SODA 2018), Jan 2018
- A tight  $\sqrt{2}$ -approximation for Linear 3-Cut**  
(with K. Bérczi, T. Király, V. Madan)  
- (To appear in) ACM-SIAM Symposium on Discrete Algorithms (SODA 2018), Jan 2018
- Graph Stabilization: A Survey**  
- Combinatorial Optimization and Graph Algorithms: Communications of NII Shonan Meetings, 2017
- Odd Multiway Cut in Directed Acyclic Graphs**  
(with S. Mozaffari)  
- International Symposium on Parameterized and Exact Computation (IPEC'17), Sep 2017
- Global and fixed-terminal cuts in digraphs**  
(with K. Bérczi, T. Király, E. Lee, C. Xu)  
- International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX'17), Aug 2017
- On the Expansion of Group-Based Lifts**  
(with N. Agarwal, A. Kolla, V. Madan)  
- International Workshop on Randomization and Computation (RANDOM'17), Aug 2017
- Shift Lifts Preserving Ramanujan Property**  
(with A. Velingker)  
- Linear Algebra and its Applications, Vol. 529, 2017
- Local Testing for Membership in Lattices**  
(with M. Cheraghchi, V. Gandikota, E. Grigorescu)  
- Foundations of Software Technology and Theoretical Computer Science (FSTTCS'16), Dec 2016
- Deciding Orthogonality in Construction-A Lattices**  
(with V. Gandikota, E. Grigorescu)  
- SIAM Journal on Discrete Mathematics, Vol. 31, Issue 1, 2017  
- Prelim. version in Foundations of Software Technology and Theoretical Computer Science (FSTTCS'15), Dec 2015
- Finding Small Stabilizers for Unstable Graphs**  
(with A. Bock, J. Könnemann, B. Peis, L. Sanità)  
- Mathematical Programming, Vol. 154, Issue 1, 2015

- Prelim. version in Integer Programming and Combinatorial Optimization (IPCO'14), Jun 2014

**Finding a Most Biased Coin with Fewest Flips**

(with R. Karp)

- Conference on Learning Theory (COLT'14), Jun 2014

**Faster Private Release of Marginals on Small Databases**

(with J. Thaler, J. Ullman, A. Wan)

- Innovations in Theoretical Computer Science (ITCS'14), Jan 2014

**Integer Feasibility of Random Polytopes**

(with S. Vempala)

- Innovations in Theoretical Computer Science (ITCS'14), Jan 2014

**The Cutting Plane Algorithm is Polynomial for Perfect Matchings**

(with L. Végh, S. Vempala)

- Mathematics of Operations Research, Vol 41, No. 1, 2016

- Prelim. version in IEEE Symposium on Foundations of Computer Science (FOCS'12), Oct 2012

**Algorithms for Implicit Hitting Set Problems**

(with R. Karp, E. Moreno-Centeno, S. Vempala)

- ACM-SIAM Symposium on Discrete Algorithms (SODA'11), Jan 2011

**Deterministic Algorithms for the Lovász Local Lemma**

(with N. Goyal, B. Haeupler)

- SIAM Journal on Computing, Vol. 42, Issue 6, 2013

- Prelim. version in ACM-SIAM Symposium on Discrete Algorithms (SODA'10), Jan 2010

**Thin Partitions: Isoperimetric Inequalities and Sampling Algorithms for some Non-convex Families**

(with D. Dadush, S. Vempala)

- ACM-SIAM Symposium on Discrete Algorithms (SODA'10), Jan 2010

**Sampling s-Concave Functions**

(with A. Deshpande, S. Vempala)

- International Workshop on Randomization and Computation (RANDOM'09), Aug 2009

**An Observation about Variations of the Diffie-Hellman Assumption**

(with R. Bhaskar, S. V. Lokam, P. L. Montgomery, R. Venkatesan, Y. Yacobi)

- Serdica Journal of Computing, Vol. 3, No. 3, 2009

**Vulnerabilities in Anonymous Credential Systems**

(with R. Bhaskar, S. V. Lokam, P. L. Montgomery, R. Venkatesan, Y. Yacobi)

- Electronic Notes in Theoretical Computer Science, Vol. 197, No. 2, 2008

IN REVIEW

**Beating the 2-approximation factor for Global Bicut**

(with K. Bérczi, T. Király, E. Lee, C. Xu)

**Largest Eigenvalue and Invertibility of Symmetric Matrix Signings**

(with C. Carlson, H-C. Chang, A. Kolla)

**Additive Stabilizers for Unstable Graphs**

(with C. Gottschalk, J. Könnemann, B. Peis, D. Schmand, A. Wierz)

## TALKS

<b>Global and fixed-terminal cuts in digraphs</b>	
Midwest Theory Day, Indiana University, Bloomington	Apr, 2017
ACO25, Georgia Institute of Technology, Atlanta	Jan, 2017
<b>Lattice Optimization</b>	
University of Illinois, Urbana-Champaign	Apr, 2016
<b>Stabilizers for Unstable Graphs</b>	
INFORMS '16, Nashville	Nov, 2016
Workshop in Current Trends in Combinatorial Optimization, Shonan, Japan	Apr, 2016
ISMP '15, Pittsburgh	Jul, 2015
<b>Local Testing for Membership in Lattices</b>	
Hausdorff Institute for Mathematics, Bonn, Germany	Nov, 2015
University of Illinois, Urbana-Champaign	Sep, 2015
<b>Finding Small Stabilizers for Unstable Graphs</b>	
INFORMS '14, San Francisco	Nov, 2014
Purdue University, West Lafayette	Oct, 2014
University of Illinois, Urbana-Champaign	Sep, 2014
Flexible Network Design Workshop, Lugano, Switzerland	Aug, 2014
<b>Finding a Most Biased with Fewest Flips</b>	
EPFL, Lausanne, Switzerland	Jul, 2014
RWTH Aachen University, Aachen, Germany	Jun, 2014
Conference on Learning Theory 2014, Barcelona, Spain	Jun, 2014
<b>Integer Feasibility of Random Polytopes</b>	
Microsoft Research, Redmond	Mar, 2014
Massachusetts Institute of Technology, Cambridge	Mar, 2014
Innovations in Theoretical Computer Science 2014, Princeton	Jan, 2014
<b>Faster Private Release of Marginals on Small Databases</b>	
University of Waterloo, Ontario, Canada	Oct, 2013
Purdue University, West Lafayette	Sep, 2013
<b>A Polynomial-time Cutting Plane Algorithm for Perfect Matchings</b>	
Northeastern University, Boston	Dec, 2013
Brown University, Providence	Oct, 2013
Flexible Network Design Workshop, Toronto, Canada	Aug, 2013
Bellairs Workshop on Combinatorial Optimization, Barbados	Apr, 2013
Carnegie Mellon University, Pittsburgh	Jan, 2013
IEEE Symposium on Foundations of Computer Science 2012, New Brunswick	Oct, 2012
Harvard University, Cambridge	Oct, 2012
Toyota Technological Institute, Chicago	Jun, 2012
<b>A Discrepancy based Approach to Integer Programming</b>	
Toyota Technological Institute, Chicago	Jun, 2012
SIAM Conference on Discrete Mathematics, Halifax, Canada	Jun, 2012
Workshop on Computation and Phase Transitions, Atlanta	Jun, 2012
Discrete Optimization Seminar, Georgia Institute of Technology, Atlanta	Jan, 2012
INFORMS '11, Charlotte	Nov, 2011
Microsoft Research, Silicon Valley	Nov, 2011
IBM Research, Almaden	Sep, 2011

University of California, Berkeley Aug, 2011

**Algorithms for Implicit Hitting Set Problems**

Random Structures and Algorithms, Atlanta May, 2011

ACM-SIAM Symposium on Discrete Algorithms 2011, San Francisco Jan, 2011

Microsoft Research, Bangalore, India Dec, 2010

Indian Institute of Technology, Madras, India Dec, 2010

ACO Student Seminar, Georgia Institute of Technology, Atlanta Apr, 2010

**Algorithms for the Lovász Local Lemma**

Indian Institute of Technology, Madras Dec, 2010

Combinatorics Seminar, Georgia Institute of Technology, Atlanta Sep, 2009

**Sampling Star-shaped Bodies**

Microsoft Research, Bangalore, India Jul, 2009

**Sampling s-Concave Functions**

INFORMS '09, San Diego Oct, 2009

RANDOM-APPROX 2009, Berkeley Aug, 2009

Microsoft Research, Bangalore, India Jun, 2009

AWARDS AND  
HONORS

**Best Ph.D. Thesis Award**

Sigma Xi Chapter, Georgia Institute of Technology, 2013

**College of Computing Dissertation Prize**

Georgia Institute of Technology, 2012

**Algorithms and Randomness Center (ARC) Fellowship**

Georgia Institute of Technology, Fall 2010, Spring 2012

PROFESSIONAL  
SERVICE

**Reviewer for conferences**

– FOCS (2017, 2016, 2015, 2013, 2010), APPROX (2017), STOC (2017, 2016, 2015, 2011), SODA (2017, 2016, 2015), COLT (2016, 2014), IPCO (2016), PODS (2015), CCC (2014), FSTTCS (2013), LATIN (2012), RANDOM (2012), ALT (2012), NIPS (2010)

**Reviewer for journals**

– *SIAM Journal on Computing* (SICOMP), *Journal of Computer and System Sciences* (JCSS), *Mathematics of Operations Research*, *SIAM Journal on Discrete Mathematics* (SIDMA), *Transactions on Knowledge and Data Engineering*, *Mathematical Programming*, *Discrete Optimization*

**Session Organizer**

“Algorithmic Learning Theory”, The INFORMS Annual Meeting (2012), Phoenix

SERVICE

**College of Engineering, UIUC**

- College of Engineering Committee (2015–2016): Evaluated the revised CS curriculum and new CS courses
- Library committee (2014–2015)

**Department of Industrial and Enterprise Systems Engineering, UIUC**

- Graduate Committee (2016–2017)
- Advisory Committee (2016–2017)
- Seminars Committee (2015–2016)

- Grainger Engineering Breakthrough Initiative (GEBI) Hiring Committee (2015–2016)
- ISE-CS Liaison (2014–2015)
- Courses and Curriculum Committee (2014–2015)
- Space Committee (2014–2015)

**PhD Defense Committee**

- Venkata Gandikota, Computer Science, Purdue, Spring 2017

**PhD Preliminary Exam Committee**

- Hee Youn Kwon, Industrial Engineering, UIUC, Fall 2017
- Chao Xu, Computer Science, UIUC, Spring 2017
- Shalmoli Gupta, Computer Science, UIUC, Spring 2017
- Vivek Madan, Computer Science, UIUC, Spring 2017
- Siyang Xie, Civil Engineering, UIUC, Spring 2017
- Mayank Baranwal, Mechanical Science and Engineering, UIUC, Fall 2016
- Venkata Gandikota, Computer Science, Purdue, Fall 2015

**PhD Qualifiers Committee**

- Reza Yousefi Maragheh, ISE, UIUC, Spring 2017
- Runqi Hu, ISE, UIUC, Fall 2015
- Shuanglong Wang, ISE, UIUC, Spring 2015

**Other**

- Illinois Council of Teachers of Mathematics (ICTM) Math Contest Oral Judge, 2016, 2017

REFERENCES

Available upon request