

David Pritchard

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Positions Held

Lecturer, Princeton U., Computer Science, Sept. 2012–June 2014: COS 126 (Intro C.S. w/Java)

- Preceptor, Fall 2012. Co-lead preceptor, Spring 2013. Lead preceptor, Fall 2013 & Spring 2014.
- Revised/created activities, assignments, exams, web pages, grading tools, rubrics for 12–20 staff and 300–400 students. Taught 45 students per term in two precepts, graded weekly assignments.
- Created Java Visualizer and Websheets online open-source Java learning tools for course.
http://www.cs.princeton.edu/~cos126/java_visualize/
<http://cscircles.cemc.uwaterloo.ca/websheets/bytopic.php>
- Dept. liaison w/head lab TA. Supervised junior projects, senior theses, Open Academy students.
- Worked with department and campus committees to rewrite plagiarism policy and report cases.

U. Waterloo (online), Centre for Education in Mathematics & Computing, July–October 2012:

- Created course notes for Math 600 (Intro. Math. Software/L^AT_EX, Maple, GeoGebra), for online Master of Mathematics for Teachers program. Joint w/Stephen Tosh. Taught first offering.
<http://cemclinux1.math.uwaterloo.ca/~math600>

U. Waterloo, Centre for Education in Mathematics & Computing, January–June 2012:

- Created *Computer Science Circles* technology and content, <http://cscircles.ca>. Teaches Python for beginners, high schools, self-learners. 10000 users, 300000 exercises completed. Has 30 lessons, 100 interactive programming exercises, visualizations. Translated to French, German.
- Published in SIGCSE 2013. Received \$5000 SIGCSE Special Projects award in summer of 2013 to open-source the site. Helped install a clone of the site in an Ontario jail.
- Helped w/outreach and enrichment in Waterloo. Ongoing involvement as CS Circles Assistant.

NSERC Post-Doctoral Fellow, January 2010–January 2012:

- École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, January 2010–August 2011: Discrete Optimization group of Friedrich Eisenbrand
- Visitor in Fall 2011: MIT (Thomas Rothvoß), Georgia Tech (Santosh Vempala), UC San Diego (Christina Boucher), Sandia National Labs (Ojas Parekh)

Education

PhD: University of Waterloo, Department of Combinatorics and Optimization, Sept. 2005–Jan. 2010
Thesis: *Linear Programming Tools & Approximation Algorithms for Combinatorial Optimization*
Advisor: Jochen Köneemann

Certificate in University Teaching (CUT): pedagogy, observations, project on math group learning

M. Eng: MIT, Computer Science, September 2004–August 2005

Thesis: *Robust Network Computation*

Advisor: Santosh Vempala

B.S.: MIT, Mathematics & Computer Science double, September 2000–August 2005. GPA: 4.8/5

Teaching

For clickable links to course materials, visit <http://ints.io/daveagp/cm/>

Princeton U., COS 126 (Intro. C.S. w/Java): Preceptor F'12, Co-lead S'13, Lead F'13 & S'14

Co-instructor, U. Waterloo (online), Math 600 (Intro. Math. Software for Teachers), Fall 2012

Instructor, EPFL, Game Theory & Algorithms, graduate course, Spring 2011

Instructor, U. Waterloo, Intro. to Game Theory, undergraduate course, Fall 2008 and Fall 2007

Head TA, MIT: Structure & Interpretation of Computer Programs (in Scheme), Spring 2005

Awards and Fellowships

SIGCSE Special Projects Grant for CS Circles (\$5000), Summer 2013

NSERC Post-doctoral Fellowship (\$40000/year for 2 years), January 2010–January 2012

President's Circle Award for Leadership, University of Waterloo, 2009

Outstanding TA Award, Combinatorics & Optimization, University of Waterloo, Winter 2007

NSERC Post-graduate Doctoral Scholarship (\$21000/year for 3 years), May 2007–April 2009

Best Poster, ACM Symposium on Principles of Distributed Computing, 2006

Outreach and Enrichment

Canadian Computing Competition: house parent, contest committee, 2006–present

Euclid contest committee (Canadian Grade 12 national math contest), 2012–present

Lyons Invited Lecturer, Auckland Invitational Mathematics Workshop, June 2012

Volunteered 7 times as Woburn C.I. supervisor/tutor at American Computer Science League finals

Taught 15 2-hour math circles for local high school students in Kitchener-Waterloo, 2006–2012

Leadership and Service

UW Graduate Studies Endowment Fund: Board of directors and long-range planning, 2008–present

Ontario Combinatorics Workshop: Program committee/local arrangements, 2009

UW Graduate Student Association: Director 2007–2009; Vice-President 2008–2009

MIT Undergraduate Math Association: Co-founder, talk organizer, speaker; President 2004–2005

MIT Theta Xi Fraternity: House Manager Fall 2002; President 2003

Computer Science Circles — Talks

- SIGCSE, March 2013, [PV13]
- Talk, CS Teachers' Association CS & IT Conference, Irvine, USA, July 2012
- Talk, MAA-AMS Joint Mathematics Meetings, Boston, USA, January 2012
- Invited talk, Association for Computer Studies Educators, Toronto, Canada, November 2011

Algorithms and Discrete Mathematics — Invited Talks

- Columbia University, Discrete Math Seminar, [BPRS11], December 2013
- Princeton University, Discrete Math Seminar, [BPRS11], December 2012
- Georgia Tech, Algorithms & Randomness Centre Colloquium, [PT11; BPRS11], October 2011
- MIT, Mittagsseminar at Sloan, [FKPP13], October 2011
- Grenoble, France, G-SCOP Séminaire de Mathématiques Discrètes, [FKPP13], December 2010
- Carnegie-Mellon University, School of Computer Science Theory Lunch, [Pri10a], Dec. 2009
- EPFL, Discrete Optimization Seminar, [CKP10a], September 2009
- McGill University, Discrete Mathematics and Optimization Seminar, [Pri09], May 2009
- MIT, Theory of Distributed Systems Group, [PV06], July 2006

Algorithms and Discrete Mathematics — Workshop Talks

- MAA-AMS Joint Mathematics Meetings, Boston, USA, [MP13], January 2012
- 9th Joint Operations Research Days, U. Berne, Switzerland, [BPRS11], May 2011
- Discrete & Computational Geometry Culminating Workshop, EPFL, [BPRS11], December 2010
- Colloquium on Combinatorics, Max Planck Institute for Informatics, [BPRS11], November 2010
- Operations Research Workshop of Swiss Universities, Zinal, Switzerland, [Pri10a], January 2010
- International Symposium for Mathematical Programming, Chicago, [CKP10a], August 2009
- Discrete & Algorithmic Mathematics Conference (CANADAM), Montréal, [KPP08], May 2009
- Graduate Student Research Conference, University of Waterloo, [Pri08], April 2007

Refereeing

2014: ACM Trans. Alg. 2013: ACM Trans. Alg., CPM, Discrete Math., J. Graph Theory. 2012: Math Programming A, Siam J. Comput, SWAT. 2011: Theory of Comput., FSTTCS, ESA, IPCO. 2010: Math Programming A, WAOA, IPCO, FOCS, J. Comb. Math. Comb. Comput., Discrete Applied Math. 2009: LAGOS. 2008: WAOA, SWAT, LATIN.

Book reviews: 2015, *Combinatorics: Ancient and Modern*, Robin Wilson & John Watkins, for the Mathematical Intelligencer. 2010, *Decisions and Elections: Explaining the Unexpected*, Donald G. Saari, for ACM SIGACT News.

Contests

Medals at International Olympiad in Informatics (2nd place in '00, silver medals in '99 and '98) and International Math Olympiad (silver '00, bronze '99). Top-25 results in Putnam contest, ACM International Collegiate Programming Contest, Google Code Jam, TopCoder Open.

References

Donna Gabai — main collaborator in teaching COS 126 at Princeton
Lecturer
Department of Computer Science, Princeton University
Princeton, New Jersey, USA
`dgabai@cs.princeton.edu`
(609) 258-1978

Robert Sedgewick — professor for COS 126, supervisor of lecturers
William O. Baker Professor
Department of Computer Science, Princeton University
Princeton, New Jersey, USA
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(609) 258-4345

Jochen Könemann — PhD supervisor
Professor
Department of Combinatorics and Optimization, University of Waterloo
Waterloo, Ontario, Canada
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Troy Vasiga — collaborator and supervisor for outreach activities
Associate Director, Centre for Education in Mathematics and Computing
Lecturer, David R. Cheriton School of Computer Science
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Thomas Liebling — attended my Algorithms & Game Theory course
Professor Emeritus and Teaching Staff Member
Discrete Optimization Group, École Polytechnique Fédérale de Lausanne (EPFL)
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Publication List

Electronic copies and slides: <http://ints.io/daveagp/research/>

Journals: Regular Articles

- [SPS15] Marco Di Summa, David Pritchard, and Laura Sanità, “Finding the closest ultrametric,” *Discrete Applied Mathematics*, vol. 180, pp. 70–80, 2015.
- [FKPP14] András Frank, Tamás Király, Júlia Pap, and David Pritchard, “Characterizing and recognizing generalized polymatroids,” *Mathematical Programming*, vol. 146, no. 1-2, pp. 245–273, 2014.
- [BPRS13] Béla Bollobás, David Pritchard, Thomas Rothvoß, and Alex D. Scott, “Cover-decomposition and polychromatic numbers,” *SIAM Journal on Discrete Mathematics*, vol. 27, no. 1, pp. 240–256, 2013. Extended version of [BPRS11].
- [BLLPW13] Christina Boucher, Gad M. Landau, Avivit Levy, David Pritchard, and Oren Weimann, “On approximating string selection problems with outliers,” *Theoretical Computer Science*, vol. 498, pp. 107–114, 2013. Extended version of [BLLPW12].
- [CKP13] Deeparnab Chakrabarty, Jochen Könemann, and David Pritchard, “Hypergraphic LP relaxations for Steiner trees,” *SIAM Journal on Discrete Mathematics*, vol. 27, no. 1, pp. 507–533, 2013. Extended version of [CKP10a].
- [KPP12] Jochen Könemann, Ojas Parekh, and David Pritchard, “Multicommodity flow in trees: packing via covering and iterated relaxation,” *Algorithmica*, vol. 68, no. 3, pp. 1–29, 2012. Extended version of [KPP08].
- [FMP11] Radoslav Fulek, Filip Morić, and David Pritchard, “Diameter bounds for planar graphs,” *Discrete Mathematics*, vol. 311, no. 5, pp. 327–335, 2011.
- [KPT11] Jochen Könemann, David Pritchard, and Kunlun Tan, “A partition-based relaxation for Steiner trees,” *Mathematical Programming*, vol. 127, no. 2, pp. 345–370, 2011.
- [PT11] David Pritchard and Ramakrishna Thurimella, “Fast computation of small cuts via cycle space sampling,” *ACM Trans. Algorithms*, vol. 7, no. 4, 46:1–46:30, Sep. 2011. Extended version of [Pri08].
- [CKP10b] Deeparnab Chakrabarty, Jochen Könemann, and David Pritchard, “Integrality gap of the hypergraphic relaxation of Steiner trees: a short proof of a 1.55 upper bound,” *Operations Research Letters*, vol. 38, no. 6, pp. 567–570, 2010.

Journals: Conference Special Issues

- [PC11] David Pritchard and Deeparnab Chakrabarty, “Approximability of sparse integer programs,” *Algorithmica*, vol. 61, no. 1, pp. 75–93, 2011. Extended version of [Pri09].
- [Pri10c] David A. G. Pritchard, “Efficient divide-and-conquer implementations of symmetric FSAs,” *J. Cellular Automata*, vol. 5, no. 6, pp. 481–490, 2010. Special issue for AUTOMATA 2007.

Conferences

The *presenting author* for conferences is in italics.

- [PP14] *Ojas Parekh* and David Pritchard, “Generalized hypergraph matching via iterated packing and local ratio,” in *Proc. 12th WAOA (Workshop on Approximation & Online Algorithms)*, 2014.
- [PV13] *David Pritchard* and Troy Vasiga, “CS Circles: an in-browser Python course for beginners,” in *Proc. 44th SIGCSE (Comp. Sci. Ed.)*, pp. 591–596, 2013.
- [BLLPW12] Christina Boucher, Gad M. Landau, Avivit Levy, David Pritchard, and *Oren Weimann*, “On approximating string selection problems with outliers,” in *Proc. 23rd CPM (Comb. Patt. Matching)*, pp. 427–438, 2012. Preliminary version of [BLLPW13].
- [BPRS11] Béla Bollobás, *David Pritchard*, Thomas Rothvoß, and Alex D. Scott, “Cover-decomposition and polychromatic numbers,” in *Proc. 19th ESA (European Symp. Algorithms)*, pp. 799–810, 2011. Preliminary version of [BPRS13].
- [MP11] Filip Morić and *David Pritchard*, “Counting large distances in convex polygons: a computational approach,” in *Proc. 6th EUROCOMB*, ser. Electronic Notes in Discrete Mathematics, vol. 38, pp. 731–736, 2011. Preliminary version of [MP13].
- [CKP10a] Deeparnab Chakrabarty, Jochen Könemann, and *David Pritchard*, “Hypergraphic LP relaxations for Steiner trees,” in *Proc. 14th IPCO (Conf. Integer Programming & Combinatorial Optimization)*, pp. 383–396, 2010. Preliminary version of [CKP13].
- [Pri10a] *David Pritchard*, “ k -edge-connectivity: approximation and LP relaxation,” in *Proc. 8th WAOA (Workshop on Approximation & Online Algorithms)*, pp. 225–236, 2010.
- [Pri09] *David Pritchard*, “Approximability of sparse integer programs,” pp. 83–94, 2009. Preliminary version of [PC11].
- [KPP08] Jochen Könemann, Ojas Parekh, and *David Pritchard*, “Max-weight integral multicommodity flow in spiders and high-capacity trees,” in *Proc. 6th WAOA (Workshop on Approximation & Online Algorithms)*, pp. 1–14, 2008. Preliminary version of [KPP12].
- [Pri08] *David Pritchard*, “Fast distributed computation of cuts via random circulations,” in *Proc. 35th ICALP (International Colloq. Automata, Languages & Programming)*, pp. 145–160, 2008. Preliminary version of [PT11].
- [PV06] *David Pritchard* and Santosh Vempala, “Symmetric network computation,” in *Proc. 18th SPAA (Symp. Parallelism in Algorithms and Architectures)*, pp. 261–270, 2006.

Book Chapters

- [MP13] Filip Morić and David Pritchard, “Counting large distances in convex polygons: a computational approach,” in *Thirty Essays on Geometric Graph Theory*, János Pach, Ed. Springer New York, 2013, pp. 415–428. Extended version of [MP11].

Course Notes

- [PT12] David Pritchard and Stephen Tosh, *Introduction to Mathematical Software for Teachers (L^AT_EX, Maple, GeoGebra)*, <http://cemclinux1.math.uwaterloo.ca/~math600>, 2012.

Theses

- [Pri10b] David Pritchard, “Linear programming tools & approximation algorithms for combinatorial optimization,” PhD thesis, University of Waterloo, 2010.
- [Pri05] David Pritchard, “Robust network computation,” Master’s thesis, MIT, 2005.