

Erin Wolf Chambers

Curriculum Vitæ

Department of Math and Computer Science
Saint Louis University
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St. Louis, MO 63103, USA

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RESEARCH INTERESTS

Computational topology and geometry, graph theory, combinatorics and combinatorial algorithms, recruitment and retention in computer science.

EDUCATION

Ph.D. in Computer Science (August 2008)
University of Illinois at Urbana-Champaign
Advisor: Jeff Erickson

M.S. in Mathematics (May 2006)
University of Illinois at Urbana-Champaign

B.S. in Computer Science (May 2002)
Minor in Mathematics
University of Illinois at Urbana-Champaign

PROFESSIONAL EXPERIENCE

Associate Professor (with tenure) **Fall 2013–present**
Department of Mathematics and Computer Science, Saint Louis University *St. Louis, MO*

Assistant Professor **Fall 2008–Spring 2013**
Department of Mathematics and Computer Science, Saint Louis University *St. Louis, MO*

Visiting Research Professor **Summer 2011**
Informatics Department, Saarland University *Saarbrücken, Germany*

Research Assistant **Summer 2006, August 2007–August 2008**
Department of Computer Science, University of Illinois *Urbana, IL*

Teaching Assistant <i>CS Department, University of Illinois</i>	Fall 2005, Spring 2006 <i>Urbana, IL</i>
CS273 Visiting Lecturer <i>CS Department, University of Illinois</i>	Summer 2003 and 2004 <i>Urbana, IL</i>
Research Experience for Undergraduates (REU) Participant <i>Math Department, University of Illinois</i> Supervisor: Dr. A. J. Hildebrand	Summer 2002 <i>Urbana, IL</i>
Co-op <i>CIRAS Program Office, Central Intelligence Agency</i>	January 2001 - August 2001 <i>Washington D.C.</i>
Intern <i>Network Public Access Group, John Deere</i>	Summer 2000 <i>Moline, IL</i>

AWARDS AND HONORARIES

Research and Academic Honors

- Simons Visiting Professorship (at Oberwolfach), 2015
 - National Science Foundation CAREER Award, 2011-2016
 - NSF Graduate Research Fellowship 2002-2007
 - SURGE (Support for Under-Represented Groups in Engineering) Fellowship, 2002-2007
 - Chancellor's Scholar and James Scholar at UIUC, 1998-2002
 - Lockheed Martin Scholarship, 2001
 - Spyglass Scholarship, 1999
 - National Merit Scholar and Illinois State Scholar, 1998
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PUBLICATIONS

Journal Articles

- [1] Erosion Thickness on Medial Axes of 3D Shapes, by Yajie Yan, Kyle Sykes, Erin Chambers, David Letscher, and Tao Ju. In *ACM Transactions on Graphics (Proc. ACM Siggraph 2016)*, 35(4): Article No. 38, 2016.

- [2] The Zipper Foldings of the Diamond. Joint with Di Fang, Kyle Sykes, Philip Trettenero, and Cynthia Traub. In *INVOLVE*, Vol. 8, No. 3, pages 521–534, 2015.
Preliminary version appeared in the *Fall Workshop on Computational Geometry*, 2013.
NOTE: The paper published in *Involve* is considered by the authors to be the final version of this paper. An earlier draft of this paper appears in the journal *Geombinatorics* and was published without the knowledge of the authors.
- [3] Computing minimum area homologies. Joint with Mikael Vejdemo-Johansson. *Computer Graphics Forum*, Volume 34, Issue 6, pages 13–21, 2015.
- [4] Covering apex, surface-embedded graphs with a fixed number of balls, by Glencora Borradaile and Erin Chambers. In *Discrete and Computational Geometry*, Volume 51, Issue 4, pages 979–996, June 2014.
- [5] Multiple Source Shortest Paths in Embedded Graphs. Joint with Sergio Cabello and Jeff Erickson. In *SIAM Journal on Computing* 42(4), 15421571, 2013.
Preliminary version (joint with Sergio Cabello) appeared *Symposium on Discrete Algorithms*, pages 89–97, 2007.
- [6] Flows in One-Crossing-Minor-Free Graphs. Joint with David Eppstein. In *Journal of Graph Algorithms and Applications* 17 (3): 201-220, 2013.
Preliminary version appears in the International Symposium on Algorithms and Computation (ISAAC), pages 241–252, 2010.
- [7] Homology Flows, Cohomology Cuts. Joint with Jeff Erickson, and Amir Nayyeri. In *SIAM Journal on Computing*, volume 41, number 6, pages 1605–1634, special issue of invited papers from 41st Annual ACM Symposium on Theory of Computing, 2012.
Preliminary version appeared in the *Symposium on Theory of Computing*, 2009.
- [8] Extended Grassfire Transform on Medial Axes of 2D Shapes. Joint with Lu Liu, David Letscher, and Tao Ju. In *Computer Aided Design (proceedings of SPM 2011)*, volume 43, issue 11, pages 1496–1505.
- [9] A Simple and Robust Thinning Algorithm on Cell Complexes. Joint with Lu Liu, David Letscher, and Tao Ju. In *Computer Graphics Forum (proceedings of Pacific Graphics)*, volume 29, issue 7, pages 2253–2260, 2010.
- [10] Drawing Graphs in the Plane with a Prescribed Outer Face and Polynomial Area. Joint with David Eppstein, Michael Goodrich, and Maarten Löffler. In *Journal of Graph Algorithms and Applications*, volume 16, number 2, pages 243–259, 2012.
Preliminary version appeared in *Graph Drawing*, 2010.
- [11] Homotopic Fréchet Distance, or Walking Your Dog in the Woods in Polynomial Time. Joint with Éric Colin de Verdière, Jeff Erickson, Sylvain Lazard, Francis Lazarus, and Shripad Thite. In *Computational Geometry, Theory and Applications*, volume 43, issue 3, pages 295–311, 2010, special issue of invited papers from the 24th Annual Symposium on Computational Geometry.
Preliminary version appeared in *Symposium on Computational Geometry 2008* and the *Fall Workshop in Computational Geometry 2007*.

- [12] Vietoris-Rips Complexes of Planar Point Sets. Joint with Vin de Silva, Jeff Erickson, and Robert Ghrist. In *Discrete and Computational Geometry*, volume 44, issue 1, pages 75–90, 2010.
- [13] Extremal Problems for Roman Domination. Joint with Bill Kinnersley, Noah Prince, and Douglas West. In *SIAM Journal on Discrete Mathematics*, volume 23, pages 1575–1586, 2009.
- [14] Splitting (Complicated) Surfaces is Hard. Joint with Éric Colin de Verdière, Jeff Erickson, Francis Lazarus, and Kim Whittlesey. In *Computational Geometry Theory and Applications*, volume 41, issues 1–2, pages 94–110, 2008.
Preliminary version appeared in Symposium on Computational Geometry 2006.
- [15] Pebbling and Optimal Pebbling in Graphs. Joint with David Bunde, Dan Cranston, Kevin Milans, and Douglas West. In *Journal of Graph Theory*, volume 57, issue 3, pages 215–238, 2008.

Book Chapters

- [16] Integrating and Sampling Cuts in Bounded Treewidth Graphs. Joint with Ivona Bezádová and Kyle Fox. To appear in the AWM-Springer Special Issue from the AWM Research Symposium in 2015.
- [17] Global Minimum Cuts in Surface-Embedded Graphs. Joint with Jeff Erickson, Kyle Fox and Amir Nayyeri. In *Encyclopedia of Algorithms*, Ming-Yang Kao (ed.), Springer, 2014.
- [18] Skeleton-based recognition of shapes in images via the longest path. Joint with Gulce Bal, Julia Diebold, Ellen Gasparovic, Ruizhen Hu, Kathryn Leonhard, Matineh Shaker, and Carola Wenk. In *Research in Shape Analysis*, K. Leonard, S. Tari (eds.), Springer, 2014.

Refereed Conference Papers (without a corresponding journal publication)

- [19] Homotopy Measures for Representative Trajectories. Joint with Irina Kostitsyna, Maarten Löffler, and Frank Staals. In *European Symposium on Algorithms*, 2016.
Preliminary version appeared in *EuroCG*, 2015.
- [20] Minimum cycle and homology bases of surface embedded graphs. Joint with Glencora Borradaile, Kyle Fox, and Amir Nayyeri. In *Symposium on Computational Geometry*, 2016.
Invited to the special issue of JoCG from SoCG 2016.
- [21] The Medial Axis and Cut Locus of a Piecewise Linear Surface. Joint with David Letscher and Tao Ju. In *Canadian Conference on Computational Geometry*, 2013.
- [22] Privacy by Fake Data: a Geometric Approach. Joint with Victor Alvarez and László Kozma. In *Canadian Conference on Computational Geometry*, 2013.
- [23] Counting and Sampling Minimum Cuts in Genus g graphs. Joint with Kyle Fox and Amir Nayyeri. In *Symposium on Computational Geometry*, 2013. Full version invited to the special issue of *Discrete and Computational Geometry* (currently under review).

- [24] Measuring Similarity Between Curves on 2-Manifolds via Homotopy Area. Joint with Yusu Wang. In *Symposium on Computational Geometry*, 2013.
- [25] Unfolding Clean-Faced Orthostacks. Joint with Kyle Sykes and Cindy Traub. In *Canadian Conference on Computational Geometry*, 2012.
- [26] Isotopic Fréchet Distance. Joint with David Letscher, Liu Lu, and Tao Ju. In *Canadian Conference on Computational Geometry*, 2011.
- [27] Connecting a Set of Circles with Minimum Sum of Radii. Joint with Sándor P. Fekete, Hella-Franziska Hoffmann, Dimitri Marinakis, Joseph S.B. Mitchell, Venkatesh Srinivasan, Ulrike Stege, and Sue Whitesides. In the Algorithms and Data Structures Symposium, pages 183–194, 2011.
- [28] Connectivity Graphs of Uncertainty Regions. Joint with Al Erickson, Sandor Fekete, Jon Lenchner, Jeff Sember, Venkatesh Srinivasan, Ulrike Stege, Svetlana Stolpner, Christophe Weibel, and Sue Whitesides. In the International Symposium on Algorithms and Computation, pages 434–445, 2010.
- [29] On the Height of a Homotopy. Joint with David Letscher. In *Canadian Conference on Computational Geometry*, 2009.
- [30] Minimum Cuts and Shortest Homologous Cycles. Joint with Jeff Erickson, and Amir Nayyeri. In *Symposium on Computational Geometry*, pages 377–385, 2009.
- [31] Testing Contractibility in Planar Rips Complexes. Joint with Jeff Erickson, and Pratik Worah. In *Symposium on Computational Geometry*, pages 251–259, 2008.

Technical Reports and preprints

- [32] The PolyLink Package, by Christopher Conlon, Richard Pham, and Kyle Sykes, and Erin Chambers. Preprint, 2013.
- [33] Thesis: Computing Interesting Topological Features. Technical report UIUCDCS-R-2008-3036.
- [34] Recruitment, Preparation, Retention: A case study of computing culture at the University of Illinois at Urbana-Champaign. Joint with Tanya Crenshaw, Heather Metcalf, and Umesh Thakkar. Technical report UIUCDCS-R-2007-2811.

COURSES TAUGHT

At Saint Louis University

Numbers in the right margin are student evaluations of the instructor overall, with ratings from 1–5 (where 1 is the best possible score).

Spring 2016	CSCI 2100: Data Structures	
	CSCI 3200: Programming Languages	
Spring 2015	CSCI 281/Phil 341: Computer Ethics (co-instructor)	1.23
	CSCI 443: Computer Security	1.04
Spring 2014	CSCI 281/Phil 341: Computer Ethics (co-instructor)	1.65
	CSCI 344: Programming Languages	1.10
Fall 2013	CSCI 180: Data Structures	1.45
	CSCI 314: Algorithms	1.11
Spring 2013	CSCI 443: Computer Security	1.1
	CSCI 281/Phil 341: Computer Ethics (co-instructor)	1.5
Fall 2012	Math 135: Discrete Mathematics	1.36
	CSCI 180: Data Structures	1.09
Spring 2012	CSCI 150: Intro to Object Oriented Programming	1.5
	CSCI 344: Programming Languages	1.47
Fall 2011	CSCI 140: Introduction to Computer Science	1.6
	CSCI 180: Data Structures	1.11
Spring 2011	CSCI 180: Data Structures	1.26
	CSCI 493: Computer Security	1.33
Fall 2010	Math 135: Discrete Mathematics	1.36
	CSCI 180: Data Structures	1.7
Spring 2010	Math 135: Discrete Mathematics	1.85
	CSCI 314: Algorithms	1.25
Fall 2009	CSCI 145: Scientific Programming	1.57
	CSCI 180: Data Structures	1.22
Spring 2009	CSCI 150: Intro to Object Oriented Programming	1.28
	CSCI 314: Algorithms	1.18
Fall 2008	CSCI 140: Introduction to Computer Science	(unavailable)
	CSCI 150: Intro to Object Oriented Programming	(unavailable)

At University of Illinois

Spring 2008	CS 173: Discrete Mathematics
Summer 2004	CS 273: Introduction to Combinatorial Algorithms
Summer 2003	CS 273: Introduction to Combinatorial Algorithms

FUNDING

- NSF AF: Small: Extending algorithms for topological notions of similarity (CCF-1614562). Sole Principle Investigator. 2016-2019 [\$297,021].
- NSF DMS: Workshop for Women in Computational Topology (DMS-1619908). Co-principle Investigator, with Lori Ziegelmeier (PI) and Brittany Fasy (co-PI), 2016 [\$30,000].
- NSF DMS: Workshop for Women in Shape Analysis (DMS-1619759). Principle Investigator with co-PI Kathryn Leonard, 2016 [\$9,000].

- UIUC: 10 Years Later: Exploring the climate of the UIUC Computer Science Department in 2016, joint with Heather Metcalf, Tanya Crenshaw, and Cinda Hereen, awarded by the UIUC CS department. [\$10,000]
 - Simons Visiting Professorship, funded by Simons Foundation through Oberwolfach [about \$2000 total]
 - NSF HCC: CGV: Small: Collaborative Research: Theories, algorithms, and applications of medial forms for shape analysis. Principle investigator along with Tao Ju (PI) and David Letscher (co-PI). [\$127,123]
 - NSF REU Supplemental Award (to grant CCR-1054779), Summer 2012 and Summer 2014 [\$12,000 each]
 - NSF CAREER: Generalizing Planar Algorithm (CCR-1054779). Sole Principle Investigator. 2011-2016 [\$402,000]
 - VOICES Faculty Fellowship to participate in Ethics Across the Curriculum Program, 2010 [\$2,500]
 - SLU Summer Research Award, 2009 [\$5,000]
 - NSF Graduate Research Fellowship 2002-2007
 - SURGE (Support for Under-Represented Groups in Engineering) Fellowship, 2002-2007
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MENTORSHIP AND ADVISING

Former PhD students

- Kyle Sykes, PhD 2016. *Burn Time: Computation and Properties*
- Data scientist at the National Geospatial Intelligence Agency
- RA supervisor for Katherine Paullin, PhD in Mathematics (advised by David Letscher)
- Lecturer at the University of Kentucky

External Dissertation Committees

- Member of dissertation committee for Liu Lu, Ph.D. in Computer Science from Washington University, 2011.
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SERVICE

National Level Committees

- Member of the Computational Geometry Steering Committee, 2016 to present
- Member of the AWM ADVANCE Research Collaboration Conferences for Women Committee, 2015 to present

Program Committees and Workshops

- Co-organizer for the Women in Computational Topology workshop at the IMA in August 2016
- Co-organizer for the Second Women in Shape workshop at the Nesin Mathematics Village in Turkey, Summer 2015; Team leader and co-organizer for the Women in Shape (WiSH) Workshop at the Institute for Pure and Applied Mathematics (co-sponsored by the Association for Women in Mathematics), Summer 2013; and member of the Women in Shape Steering committee.
- Co-organizer for a special session at the AWM Research Symposium in April 2015, and co-editor for the resulting special issue Springer journal.
- Co-organizer for AWM Poster Session and Speaker session at the 2014 Joint Math Meetings.
- PC Member for: Canadian Conference on Computational Geometry, 2016; Young Researchers Forum at Symposium on Computational Geometry, 2013, 2016 (chair); European Workshop on Computational Geometry, 2013; Symposium on Computational Geometry, 2010 and 2014; Graph Drawing, 2009 and 2014.

University Committees

- Member of the SLU Arts and Science Faculty Council Executive Committee, 2014-2016
- Member of Faculty Senate Committee on Shared Governance, 2013-2015
- Chair of Department Search Committee, 2014-2015 and 2015-2016
- Member of the Search Committee for SLU Chief Information Officer, Spring 2013
- SLU College of Arts and Sciences Technology Committee, Chair for 2014-2016, Member for 2011-2013
- SLU College of Arts and Sciences Undergraduate Curriculum Committee, 2011-2012
- SLU Computer Science Committee, 2009-present
- UIUC CS Department Graduate Admissions Committee member, 2004-2005
- UIUC JETT (Java Engagement for Teacher Training) conference planning committee member, 2004
- UIUC Undergraduate Education Study Committee, 2003-2004
- UIUC Computer Science Student Advisory Committee, 2002-2003
- UIUC Women in CS; President, 2001-2002; Grad VP, 2004-2008
- UIUC Campus Library Advisory Committee, 2001-2002
- Northern Virginia Co-op Education Association; Vice President, Summer 2001

Reviewing and Refereeing

- Member of NSF review panel for the Algorithmic Foundations, 2012, 2015.
- Referee for ACM Transactions on Algorithms; Algorithmica; Computational Geometry: Theory and Applications; Computers and Graphics; Discrete and Computational Geometry; International Journal of Computational Geometry and Applications; Mathematical Reviews; Journal of Graphs Algorithms and Applications; SIAM Journal of Discrete Mathematics; SIAM Journal on Computing; Transactions on Sensor Networks
- External reviewer for ACM-SIAM Symposium on Discrete Algorithms (SODA) 2008, 2009, 2010, 2012, 2013, 2014; European Symposium on Algorithms (ESA) 2008, 2013; International Symposium on Algorithms and Computation 2008, 2010; Latin American Theoretical Informatics Symposium (LATIN) 2010; Foundations of Computer Science (FOCS) 2012; Symposium on Computational Geometry (SOCG) 2009, 2011, 2013, 2015; Symposium on the Theory of Computing (STOC) 2010; Symposium on Theoretical Aspects of Computer Science (STACS) 2009; WADS 2013

SELECTED TALKS

- 2015 Oberwolfach, Germany; Eindhoven Technical University
- 2014 Computational Geometry Special Session at the Joint Math Meetings in Baltimore; ICERM Workshop on Network Science and Graph Algorithms
- 2013 Datstuhl Workshop on Algorithms for Optimization Problems in Planar Graphs; University of Missouri at St. Louis; University of Illinois at Urbana-Champaign (Math Department); Oregon State University; Notre Dame
- 2012 Computational Geometry Special Session at the Joint Math Meetings in Boston; Washington University (Math department); Ohio State University; Workshop on Computational Topology at SoCG 2012; Southern Illinois University at Edwardsville
- 2011 Dagstuhl Workshop on Computational Geometry; Saarland University
- 2010 University of California at Irvine; Washington University
- 2009 University of Illinois at Champaign-Urbana; University of Victoria
- 2008 McGill University; Saint Louis University
- 2007 Knox College; Midwest Theory Day