

Curriculum Vitæ – William J. Lenhart
(last revised: May 2024)

Contact Information

Department of Computer Science
47 Lab Campus Drive
Williams College
Williamstown, MA 01267

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Research Interests

Graph Algorithms, Graph Drawing, Computational Geometry, Computer Graphics

Education

Ph.D., *Department of Mathematics*, Dartmouth College, Hanover, NH, 1983,
Dissertation: *Automorphism Groups of Block Designs*

A.M., *Department of Mathematics*, Dartmouth College, Hanover, NH, 1979

B.S., *Department of Mathematics*, St. Joseph's College, Philadelphia, PA, 1977

Professional Experience

A. Barton Hepburn Professor Emeritus of Computer Science, Williams College, July 2021–present.

A. Barton Hepburn Professor of Computer Science, Williams College, July 2002–June 2021.

Interim Chief Technology Officer, Williams College, January–June 2015.

Provost & Treasurer, Williams College, July 2006–June 2011.

Professor of Computer Science and Mathematics, Williams College, 1995–2002

Acting Dean of the Faculty, Williams College, July 2003–December 2004.

Chair of Department of Computer Science, Williams College, 2001-03, 1998-00, and 1990-92

Associate Professor of Computer Science and Mathematics, Williams College, 1989-1995

Visiting Scholar, School of Computer Science, McGill University, 1992-93.

Visiting Scholar, Dept. of Computer Science, University of Newcastle, New South Wales, Fall 1992.

Visiting Scholar, School of Computer Science, McGill University, 1985-86.

Assistant Professor of Mathematical Sciences, Williams College, 1982-1989

Honors, Awards and Grants

Awarded Named Chair: A. Barton Hepburn Professor of Computer Science, Williams College, 2002.

Co-investigator for NSF REU grant to support student research in Mathematics and Computer Science 1988, 1989.

Williams College Class of 1941 Fellowship for Assistant Professor leave, 1985.

Sloan grant through Williams College to design and teach a one week intensive course for faculty on applications of computers to research and teaching, summers of 1983, 1984.

Sloan grant through Williams College to redesign introductory Computer Science courses and create new Discrete Mathematics course, summers of 1983, 1984.

Publications

C. Binucci, E. Di Giacomo, W.J. Lenhart, G. Liotta, F. Montecchiani, M. Nienburg, A. Symvonis, On the Complexity of the Storyplan Problem, *Journal of Computer and System Sciences*, Volume 139, Issue C, Feb 2024.

William Lenhart, Giuseppe Liotta, Mutual Witness Gabriel Drawings of Complete Bipartite Graphs, *Theoretical Computer Science*, Vol. 974, Issue C, Sep 2023.

Lenhart, W., Liotta, G., Mondal, D. Rahnema Islam Nishat, "Drawing Partial 2-Trees with Few Slopes", *Algorithmica*, 2022. <https://doi.org/10.1007/s00453-022-01065-0>

E. Di Giacomo, W.J. Lenhart, G. Liotta, T. Randolph, A. Tappini, (k,p)-Planarity: A Relaxation of Hybrid Planarity, *Theoretical Computer Science*, Vol. 896, Pages 19–30 2021.

F. De Luca, E. Di Giacomo, S-H Hong, S. Kobourov, W. Lenhart, G. Liotta, H. Meijer, A. Tappini, S. Wismath, "Packing Trees into 1-Planar Graphs", *Journal of Graph Algorithms and Applications, Special Issue on Selected Papers from the 14th International Conference and Workshops on Algorithms and Computation, WALCOM 2020*, Vol. 25, Pages 605–624, 2021.

O. Devillers, S. Lazard, and W. Lenhart, "Rounding Meshes in 3D", *Discrete Comput Geom*, Vol. 64, Pages 37-62, April 2020.

S. Lazard, W. Lenhart, and G. Liotta, "On the Edge-length Ratio of Outerplanar Graphs", *Theoretical Computer Science*, Vol. 770, Pages 88-94, May 2019.

W. Lenhart, G. Liotta, and F. Montecchiani, "On partitioning the edges of 1-plane graphs", *Theoretical Computer Science*, Vol. 662, February 2017.

W. Evans, M. Kaufmann, W. Lenhart, T. Mchedlidze, and S. Wismath, "Bar 1-Visibility Graphs and their relation to other Nearly Planar Graphs", *Journal of Graph Algorithms and Applications*, Vol. 18, no. 5, 2014.

V. Dujmovic, W. Evans, S. Lazard, W. Lenhart, G. Liotta, D. Rappaport, and S. Wismath, "On Point-sets that Support Planar Graphs", *Computational Geometry: Theory and Applications*, Vol. 46, Issue 1, January 2013.

H. Everett, S. Lazard, W. Lenhart, and L. Zhang, "On the Degree of Standard Geometric Predicates for Line Transversals in 3D", *Computational Geometry, Theory and Applications*, Vol. 42, Issue 5, July 2009.

W. Lenhart, and R. Hayward, "Bichromatic P_4 Composition Schemes for Perfect Orderability", *Discrete Applied Mathematics* Vol. 141, Issues 1-3, May 2004.

W. Lenhart, and G. Liotta, "The Drawability Problem for Minimum Weight Triangulations", *Theoretical Computer Science*, Vol. 270, Issue 1-2, 2002.

W. Lenhart, and G. Liotta "Drawing OuterPlanar Minimum Weight Triangulations", *Information Processing Letters*, Vol. 57, no. 5, 1996.

P. Bose, W. Lenhart, and G. Liotta, "Characterizing Proximity Trees", *Algorithmica*, Vol. 16, no. 1, 1996.

W. Lenhart and S. Whitesides, "Reconfiguring Closed Polygonal Chains in Euclidean d -Space", *Discrete and Computational Geometry*, Vol. 13, no. 1, 1995.

G. Jennings and W. Lenhart, “An Art Gallery Theorem for Line Segments in the Plane”, *Pattern Recognition Letters*, Vol. 14, Sep. 1993.

V. Chvatal, W. Lenhart and N. Shihi “Two-Colorings that Decompose Perfect Graphs”, *Journal of Combinatorial Theory, Series B*, Vol. 49, No. 1, Jun. 1990.

R. Hayward and W. Lenhart, “On the P4-Structure of Perfect Graphs IV: Partner Graphs”, *Journal of Combinatorial Theory, Series B*, Vol. 48, No. 1, Feb. 1990.

W. Lenhart, R. Pollack, J. Sack, R. Seidel, M. Sharir, S. Suri, G. Toussaint, S. Whitesides and C. Yap, “Computing the Link Center of a Simple Polygon”, *Discrete and Computational Geometry*, Vol. 3, 1988.

Refereed Conference Papers

Carolina Haase, Philipp KIndermann, William Lenhart, Giuseppe Liotta, ”Mutual Witness Proximity Drawings of Isomorphic Trees”, *Proceedings of the 31st International Symposium on Graph Drawing and Network Visualization, Palermo, Italy, September 2023*.

William Lenhart, Giuseppe Liotta, Mutual Witness Gabriel Drawings of Complete Bipartite Graphs, *Proceedings of the 30th International Symposium on Graph Drawing and Network Visualization, Tokyo, Japan, September 2022*.

C. Binucci, E. Di Giacomo, W.J. Lenhart, G. Liotta, F. Montecchiani, M. Nl- lenburg, A. Symvonis, On the Complexity of the Storyplan Problem, *Proceedings of the 30th International Symposium on Graph Drawing and Network Visualization, Tokyo, Japan, September 2022* .

Felice De Luca, Emilio Di Giacomo, Seok-Hee Hong, Stephen Kobourov, William Lenhart, Giuseppe Liotta, Henk Meijer, Alessandra Tappini, Stephen Wismath, “Packing Trees into 1-planar Graphs”, *WALCOM 2020: The 14th International Conference and Workshops on Algorithms and Computation, National University of Singapore, Singapore, March 31st-April 2, 2020*.

Emilio Di Giacomo, William Lenhart, Giuseppe Liotta, Timothy Randolph and Alessandra Tappini, “(k,p)-Planarity: A Relaxation of Hybrid Planarity”, *WALCOM 2019: The 13th International Conference and Workshops on Algorithms and Computation, Indian Institute of Technology Guwahati, India, February 27-March 2, 2019*.

Olivier Devillers, Sylvain Lazard, William J. Lenhart, “3D Snap Rounding”, *SoCG18: The 34th International Symposium on Computational Geometry, Budapest, Hungary, June 11-14, 2018*.

S. Lazard, W. Lenhart, and G. Liotta, “On the Edge-length Ratio of Outerplanar Graphs”, *Proceedings of the 25th International Symposium on Graph Drawing & Network Visualization, Northeastern University, Boston, MA, September 2017*.

William Lenhart, Giuseppe Liotta, Debajyoti Mondal, and Rahnuma Islam Nishat, “Planar and Plane Slope Number of Partial 2-Trees”, *Twenty-First International Symposium on Graph Drawing, Bordeaux, France, September 2013*.

F. Frati, M. Glisse, W. Lenhart, G. Liotta, T. Mchedlidze, and R. Islam Nishat, “Point-set Embeddability of 2-Colored Trees”, *Twentieth International Symposium on Graph Drawing, Redmond, Washington, September 2012*.

D. Bremner, W. Evans, F. Frati, L. Heyer, S. Kobourov, W. Lenhart, G. Liotta, D. Rappaport, and S. Whitesides, “On Representing Graphs by Touching Cuboids”, *Twentieth International Symposium on Graph Drawing, Redmond, Washington, September 2012*.

V. Dujmovic, W. Evans, S. Lazard, W. Lenhart, G. Liotta, D. Rappaport, and S. Wismath, “On Point-sets that Support Planar Graphs” (accepted), *Nineteenth International Symposium on Graph Drawing, Technische Universitait Eindhoven, September 2011*.

- H. Everett, S Lazard, W. Lenhart, J. Redburn, and L. Zhang, “Predicates for Line Transversals in 3D”, *18th Canadian Conference on Computational Geometry, Kingston, Canada, 2006*.
- R. Hayward and W. Lenhart, “Perfectly Orderable P_4 Composition”, *Brazilian Symposium on Graphs, Algorithms and Combinatorics, 2001*, Electronic Notes in Discrete Mathematics, Vol. 7, Elsevier, 2001.
- W. Lenhart and G. Liotta, “Minimum Weight Drawings of Maximal Triangulations”, *Graph Drawing 2000, Eighth International Symposium, Colonial Williamsburg.*, Lecture Notes in Computer Science, Vpl. 1984, Springer, Berlin, 2001.
- W. Lenhart and G. Liotta, “Drawable and Forbidden Minimum Weight Triangulations”, *Graph Drawing '97, Fifth International Symposium, Rome, 1997.*, Lecture Notes in Computer Science, Vpl. 1353, Springer, Berlin, 1998.
- C. Umans and W. Lenhart, “Hamiltonian Cycles in Solid Grid Graphs”, *FOCS '97, 38th IEEE Conference on Foundations of Computer Science, Miami, 1997*.
- W. Lenhart and G. Liotta, “Proximity Drawings of Outerplanar Graphs”, *Graph Drawing '96, Symposium on Graph Drawing, Berkeley, 1996.*, Lecture Notes in Computer Science, Vol. 1190, Springer, Berlin, 1997.
- W. Lenhart and G. Liotta, “How to Draw Outerplanar Minimum Weight Triangulations”, *Graph Drawing '95, International Workshop on Graph Drawing, Passau, 1995.*, Lecture Notes in Computer Science, Vol. 1027, Springer, Berlin, 1996.
- G. Di Battista, W. Lenhart and G. Liotta, “Proximity Drawability: a Survey”, *Graph Drawing '94, DIMACS International Workshop on Graph Drawing, Princeton, 1994.*, Lecture Notes in Computer Science, Vol. 894, Springer, Berlin, 1995.
- P. Bose, G. Di Battista, W. Lenhart and G. Liotta, “Proximity Constraints and Representable Trees”, *Graph Drawing '94, DIMACS International Workshop on Graph Drawing, Princeton, 1994.* Lecture Notes in Computer Science, Vol. 894, Springer, Berlin, 1995.
- P. Eades, H. El Gindy, M. Houle, W. Lenhart, M. Miller, D. Rappaport and S. Whitesides, “Dominance Drawings of Bipartite Graphs”, *Graph Drawing '93, The ALCOM International Workshop on Graph Drawing, Paris, 1993*.
- P. Bose, W. Lenhart and G. Liotta, “Recognizing Proximity Graphs”, *Graph Drawing '93, The ALCOM International Workshop on Graph Drawing, Paris, 1993*.
- W. Lenhart and S. Whitesides, “Reconfiguration with Line Tracking Motions”, *Fourth Canadian Conference on Computational Geometry, St. John's, Newfoundland 1992*.
- H. Everett, W. Lenhart, M. Overmars, T. Shermer and J. Urrutia, “Strictly Convex Quadrilateralizations of Polygons”, *Fourth Canadian Conference on Computational Geometry, St. John's, Newfoundland 1992*.
- W. Lenhart and S. Whitesides, “Turning a Polygon Inside-Out”, *Third Canadian Conference on Computational Geometry, Vancouver, British Columbia 1991*.
- W. Lenhart, R. Pollack, J. Sack, R. Seidel, M. Sharir, S. Suri, G. Toussaint, S. Whitesides and C. Yap, “Computing the Link Center of a Simple Polygon”, *Proceedings of Third A.C.M. Conference on Computational Geometry. Waterloo, Ontario, 1987*.

Limited-Referee Conference Papers

- Alexander Dobler, Stephen Kobourov, William Lenhart, Tamara Mchedlidze, Martin Nllenburg and Antonios Symvonis, ”Representing Hypergraphs by Point-Line Incidences”, *EuroCG2024 - 40th European Workshop on Computational Geometry, University of Ioannina, Greece, March 2024* .

Workshops and Program Committees

“Graph Drawing 2013”, Bordeaux, France, September 2013, Program Committee

“Graph Drawing ’99”, Prague, Czech Republic, September 1999, Program Committee

“Graph Drawing, Geometric Graph Theory, and Proximity Drawability” one of four day-long workshops for computer science faculty given as part of “Integrating Recent Research Results, an NSF-CISE Educational Infrastructure Workshop” at The Evergreen State College, Olympia, WA, July 1997.

Research Lectures

“Colorful Point Set Embeddings of Trees”,
University of New Brunswick, Saint John, Department of Computer Science, March 2017.

“An Efficient Algorithm for Finding Hamiltonian Cycles in Solid Grid Graphs”,
Università degli Studi di Roma Tre, Dipartimento di Informatica e Automazione, January 2000,
Università degli Studi di Perugia, Dipartimento di Ingegneria Elettronica e dell’Informazione, January 2000,
McGill University, School of Computer Science, March 1997.

“Drawing OuterPlanar Minimum Weight Triangulations”,
Université de Quebec à Montréal, School of Computer Science, March 1997.
University of Rome, *La Sapienza*, Dept. of Computer Science, December 1996.
Brown University, Dept. of Computer Science, April 1996.

“How to Draw OuterPlanar Minimum Weight Triangulations”,
Fifth MSI-Stony Brook Workshop on Computational Geometry, SUNY Stony Brook, October 1995.

“Recognizing Proximity Graphs”
University of Quebec at Montreal, Dept. of Mathematics and Computer Science, Nov. 1993.

“Quadrilateralizing Simple Polygons”
University of Newcastle, Australia, Dept. of Computer Science, Nov. 1992.

“Hamiltonian Cycles in Grid Graphs”
McGill University, School of Computer Science, Mar. 1992.

“Turning a Polygon Inside-Out”
University of Quebec at Montreal, Dept. of Mathematics and Computer Science, Mar. 1992.

“Reconfiguring Simple Polygons”
McGill University, School of Computer Science, Mar. 1991.

“An Introduction to Visibility Problems”
Colgate University, Science Lecture Series, Oct. 1988.

“An Introduction to the Theory of Perfect Graphs”
University of Colorado, Denver, Dept. of Mathematics, Mar. 1988.

“Metrics in Polygons”
Rutgers University, Dept. of Computer Science, Dec. 1987.

“Two-Colorings that decompose Perfect Graphs”
Bellairs Research Institute of McGill U., Workshop on Perfect Graphs, Feb. 1986.

“Some Generalizations of Difference Sets”
University of Montreal, Nov. 1985

Technical Reports (Partial List)

P. Bose, W. Lenhart and G. Liotta
 Recognizing Proximity Graphs,
 McGill University Tech. Report SOCS-94.1, Jan, 1994.

W. Lenhart
 Some Generalizations of Difference Sets,
 McGill University Tech. Report SOCS-86.10, March, 1986.

Professional Service

Referee journal and conference articles in Graph Drawing, Computational Geometry, Graph Theory and Combinatorial Algorithms.

External reader for Masters and Ph.D. Theses.

External evaluator for tenure and promotion decisions.

Undergraduate Research Advising

Jeremy Redburn '03, Honors Thesis: *Robust Computation of the Non-Obstructed Line Segments Tangent to Four Amongst n Triangles.*

Reed Townsend '00, Honors Thesis: *Co-Circular Point Sets and the Minimum Weight Triangulation.*

Davina Kunvipusilkul '99, Honors Thesis: *Bend Minimumization for Hexagonal Graph Drawing.*

Marc Blackstein '99, Honors Thesis: *Minimum Weight Triangulations and an Improved LMT Algorithm.*

Christopher Umans '96, Honors Thesis: *An Algorithm for Finding Hamiltonian Cycles in Grid Graphs Without Holes.*

Michael Pelsmajer '95, Honors Thesis: *Bumper Drawings: A New Type of Proximity Drawing.*

Stina Bridgeman '95, Honors Thesis: *Finding Hamiltonian Cycles in Grid Graphs Without Holes.*

Douglas Briggs '94, Honors Thesis: *Hamiltonian Cycles in Grid Graphs.*

Victor Kravets '91, Honors Thesis: *Recognizing Perfectly Orderable Graphs.*

George Jennings '90, Honors Thesis: *Line Segment Visibility: Necessity, Sufficiency and Complexity.*

Elizabeth Borowsky '90, Honors Thesis: *Some Questions on Perfectly Orderable and Minimally Non-Perfectly Orderable Graphs.*

SMALL Geometry Group Summer 1989: More work on art gallery problems in the plane. Jessica Baraka, Elizabeth Borowsky, Baird Jarman and Mark Knell.

SMALL Geometry Group Summer 1988: Working on an 'Art Gallery' problems concerning line segments in the plane. Rob Allen, Janet Wiener, Ken Hodges, Josh Smith and George Jennings

George Tolley '88, Honors Thesis. *Two-Color P_3 Decomposition Theorems for Perfect Graphs.*

Kenneth April '88, Honors Thesis. *An Introduction to Several Classes of Perfect Graphs.*

Michael McDougall '88, Independent Study. Porting and rewriting large parts of a software tool (GED) for geometers and graph theorists.

Davide Cervone '84, Honors Thesis. *How Many Colors in a Box of Crayola Crayons? Graph Coloring and Short Cycles on the Torus.*

Courses Taught

Computer Science Computer Literacy, Introduction to Computer Science (CS1), Data Structures (CS2), Algorithm Design, Computer Graphics, Theory of Computation,

Mathematics Discrete Mathematics, Calculus, Linear Algebra, Combinatorics, Graph Theory, Real Analysis, Abstract Algebra

College Service

Interim Chief Technology Officer, January–June 2015

Chair, Information Technology Committee 2014-16

Information Technology Committee 2013-14

Provost & Treasurer, July 2006-June 2011

Acting Dean of the Faculty, July 2003-December 2004

Chair, Dept. of Computer Science, 2001-03

Committee on Appointments and Promotions, 2002-03

Science Executive Committee, 2001-03

Faculty Steering Committee, 2001-02

Presidential Search Committee, 1999-00

Committee on Appointments and Promotions, 1999-00

Chair, Dept. of Computer Science, 1998-00

Science Executive Committee, 1998-00

Faculty Steering Committee, 1998-99

Committee on Educational Policy, 1997-99

Faculty Compensation Committee, 1995-96

Committee on Educational Policy, 1993-95

Science Executive Committee, 1990-92

Chair, Dept. of Computer Science, 1990-92

Ad Hoc Committee on Teaching Evaluation, 1990-92

Hiring Committee for Director of Academic Computing, 1990-91

Pine Cobble Building Covenants Committee, 1989-90

Chair of the Faculty Compensation Committee, 1987-88

Faculty Steering and Compensation Committee, 1986-88

Division III Planning Committee, 1984-85

Committee on Educational Policy, 1984-85

Committee on Priorities and Resources, 1983-85

Misc. ad hoc College and Science Division committees