

Craig Eric Larson—Curriculum Vitae—May 2014

CONTACT INFORMATION

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RESEARCH INTERESTS

Graph Theory, Chemical Graph Theory, Graph Algorithms, Automated Conjecture-making

EDUCATION

Ghent University, Ghent, Belgium

Fulbright Research Scholar

January 2013–June 2013

- Advisor: Gunnar Brinkmann, Professor of Applied Mathematics & Computer Science

Texas A&M University (TAMUG), Galveston, TX USA

Welch Foundation Postdoctoral Fellow

January 2012–June 2012

- Advisor: Douglas J. Klein, Professor of Chemical Physics

University of Houston, Houston, TX USA

Ph.D., Mathematics, August 2008

- Advisors: Ermelinda DeLaVina, Klaus Kaiser, Professors of Mathematics
- Dissertation: Graph Theoretic Independence and Critical Independent Sets

M.S., Mathematics, August 2000

- Advisor: Siemion Fajtlowicz, Professor of Mathematics

M.A., Philosophy, August 2000

- Advisor: Justin Leiber, Professor of Philosophy

B.A., Mathematics, May 1993

B.A., Philosophy, May 1990, graduated with Membership in the Honors Program

PROFESSIONAL EXPERIENCE

Virginia Commonwealth University (VCU), Richmond, VA USA

Assistant Professor, Department of Mathematics

August 2008–present

- Courses taught: Mathematical Programming, Linear Algebra, Intro to Abstract Algebra, Graph Theory, Intro to Combinatorics, Number Theory, Precalculus, Mathematical Structures, Think Like a Mathematician, Contemporary Mathematics, Intro to Analysis.

University of Houston, Houston, TX USA

Lecturer, Department of Mathematics

August 2000–May 2008

- Courses taught: Logic I, Graph Theory, Discrete Mathematics, Elements of Calculus, Probability & Statistics, Finite Mathematics, College Algebra, Geometry, Precalculus.

HONORS AND
AWARDS

1. VCU College of Humanities and Sciences Distinguished Teaching Award winner, 2013.
2. Mathematics Association of America Project NExT Fellow, 2009–2010.
3. University of Houston Teaching Excellence Award winner, 2006.
4. National Merit Corporate Scholar, Rockwell International, 1986.

GRANTS

1. NSF, “Computers in Scientific Discovery 7 (CSD7)” conference proposal (\$25,000).
2. VCU Department of Mathematics, Improving VCU Precalculus, with C. Mason, 2012 (\$5,000).
3. Association for Inquiry-Based Learning (AIBL), course development grant, 2011 (\$2500).
4. VCU Honors Summer Undergraduate Research Program, “Extending the GrInvIn Open Source Graph Theory Exploration Program”, Summer 2010 (student support for B. Glass).
5. VCU Center for Teaching Excellence (CTE), New Approaches to Teaching Linear Algebra, 2008 (\$2000).
6. IMA Summer Program, Combinatorics and its Applications, Georgia Institute of Technology, 2003.
7. NATO Travel Grant, European Summer School, Euler Institute, St Petersburg, Russia, 2001.

REFEREED
PUBLICATIONS

1. C. E. Larson, L. Mitchell, B. Lins, Graphs of Unitary Matrices and Positive Definite Zero Forcing, *Reports on Mathematical Physics* 72 (3), December 2013, 311–320.
2. R. Gera, C. E. Larson, R. Pepper, and C. Rasmussen, Independence in Function Graphs, to appear in *Journal of Combinatorial Mathematics and Combinatorial Computing*.
3. G. Brinkmann, C. E. Larson, J. Souffriau, N. Van Cleemput, Construction of Planar 4-connected Triangulations, to appear in *Ars Mathematica Contemporanea*.
4. C. E. Larson and R. Pepper, Three Bounds on the Independence Number of a Graph, to appear in *Bulletin of the Institute of Combinatorics and its Applications*.
5. C. E. Larson and N. Van Cleemput, Forcing Independence, *Croatica Chemica Acta* 86(4), Dec. 2013, 469–475.
6. D. J. Klein and C. E. Larson, Eigenvalues of Saturated Hydrocarbons, *Journal of Mathematical Chemistry* 51(6) 2013, 1608–1618.
7. E. DeLaVina and C. E. Larson, A Parallel Algorithm for Computing the Critical Independence Number and Related Sets, *Ars Mathematica Contemporanea* 6(2) 2013, 237–245.
8. L. Eroh, R. Gera, C. Kang, C. E. Larson, and E. Yi, Domination in Functigraphs, *Discussiones Mathematica Graph Theory* 32(2), 2012, 299–320.
9. E. DeLaVina, C. E. Larson, R. Pepper, and B. Waller, A Characterization of Graphs where the Independence Number Equals the Radius, *Graphs and Combinatorics* 28(5), 2012, 315–332.
10. C. E. Larson and R. Pepper, Graphs with Equal Independence and Annihilation Numbers, *Electronic Journal of Combinatorics*, P180 18(1), 2011.
11. C. E. Larson, The Critical Independence Number and an Independence Decomposition, *European Journal of Combinatorics* 32(2), 2011, 294–300.
12. G. Abay-Asmeron, R. Hammack, C. E. Larson, D. T. Taylor, Notes on the independence number in the Cartesian product of graphs, *Discussiones Mathematica Graph Theory* 31(1), 2011, 25–35.
13. E. DeLaVina, C. E. Larson, R. Pepper and B. Waller, On total domination and support vertices of a tree, *AKCE International Journal of Graphs and Combinatorics*, 7 (1), 2010, 85–95.
14. E. DeLaVina, C. E. Larson, R. Pepper, and B. Waller, Graffiti.pc on the 2-domination number of a graph, *Congressus Numerantium* 203, 2010, 15–32.

15. G. Abay-Asmerom, R. Hammack, C. E. Larson, and D. Taylor, Direct Product Factorization of Bipartite Graphs with Bipartite-Switching Involutions, *SIAM Journal on Discrete Mathematics* 20(4), 2010, 2042–2052.
16. E. DeLaVina, C. E. Larson, R. Pepper, and B. Waller, Graffiti.pc on the total domination number of a tree, *Congressus Numerantium* 195, 2009, 5–18.
17. C. E. Larson, A Note on Critical Independence Reductions, *Bulletin of the Institute of Combinatorics and its Applications* 5, 2007, 34–46.
18. C. E. Larson, A Survey of Research in Automated Mathematical Conjecture-making, in *Graphs and Discovery*, ed. by S. Fajtlowicz, P. W. Fowler, P. Hansen, M. F. Janowitz and F. S. Roberts, DIMACS, 2005, 297–318.
19. S. Fajtlowicz and C. E. Larson, Graph-theoretic Independence as a Predictor of Fullerene Stability, *Chemical-Physics Letters*, 377/5-6, 2003, 485–490.
20. C. E. Larson, Intelligent Machinery and Mathematical Discovery, *Graph Theory Notes of the New York Academy of Science* XLII, 2002, 8–17.

OTHER
PUBLICATIONS

C. E. Larson, Technology, Education and the Single-Salary Schedule, *Notices of the American Mathematical Society*, May 2006, 525.

INVITED
CONFERENCE
PRESENTATIONS

1. “A Conjecture-making Program for Graph Theorists”, Special Session on Graph Theory, AMS Southeastern Spring Sectional meeting, University of Tennessee, Knoxville, March 21-23, 2014.
2. “Eigenvalues of Saturated Hydrocarbons”, Special Session on Graph Theory, Joint Mathematics Meetings, Baltimore, MD, January 18, 2014.
3. “Eigenvalues of Saturated Hydrocarbons”, Special Session on Chemical Graph Theory, CanaDAM, St Johns, Canada, June 2013.
4. “The Independence Number Project”, Special Session on Independence Number: Theory, Algorithms and Applications, CanaDAM, St Johns, Canada, June 2013.
5. “A Difficult Graph for Independence Number Theory,” University of Mons, Belgium, Graph Day, March 5, 2013.
6. “Fractional Independence Number and König-Egerváry Graphs”, Special Session on König-Egerváry Graphs, SIAM Discrete, Halifax, Canada, June 2012.
7. “Towards Vizing’s Independence Number Conjecture”, Joint Mathematics Meetings, Special Session on Graph Theory, Joint Mathematics Meetings, Boston, MA, January 6, 2012.
8. “Conjecturing with GrInvIn”, 3rd biennial Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM), Special Session on Applications of Graph Theory to Chemistry, University of Victoria, Victoria, Canada, May 31–June 3, 2011.
9. “Applications of the Independence Decomposition Theorem”, 35th SIAM Southeastern Atlantic Section Conference, Special Session on Graph Theory, University of North Carolina, Charlotte, NC, March 26–27, 2011.
10. “The Independence and Annihilation Numbers”, Joint Mathematics Meetings, Special Session on New Topics in Graph Theory, New Orleans, LA, January 8, 2011.
11. “Critical Independent Sets,” CombinaTexas, Texas Southern University, Houston, TX, February 25, 2006.
12. “On Progress in Automated Conjecture-Making”, DIMACS Conjectures in Graph Theory and Chemistry, DIMACS, Rutgers, New Jersey, November 14, 2001.

INVITED
COLLOQUIUM &
SEMINAR
PRESENTATIONS

1. “Automated Conjecture-Making and the Independence Number of a Graph”, Brigham Young University Colloquium, Provo, UT, Mar. 27, 2014.
2. “A Graph Theoretic Model to Explain the Stability of Alkanes”, Middle Tennessee State University (MTSU) Discrete Mathematics Seminar, Nashville, TN, November 14, 2013 (expenses paid).
3. “Problems and Results Related to the Efficient Computation of the Independence Number”, Ghent University, Belgium, February 22, 2013.
4. “The Independence Number Project”, Howard University, Washington DC, September 14, 2012.
5. “The Independence Number of a Graph”, Sam Houston State University, Huntsville, TX, Colloquium, April 18, 2012 (expenses paid).
6. “Degree Sequence Bounds for the Independence Number of a Graph”, University of Houston—Downtown, Colloquium, April 4, 2012.
7. “Automated Mathematical Conjecture-making”, Coastal Carolina University Colloquium, September 16, 2011.
8. “Automated Mathematical Conjecture-making”, Hood College Mathematics Colloquium, Hood, MD, April 11, 2011.
9. “Automated Mathematical Conjecture-making”, Christopher Newport University Mathematics Colloquium, Newport News, VA, April 6, 2011.
10. “New Results on Graph Theoretic Independence”, Texas A&M University, Galveston, TX, December 3, 2010.
11. “New Results on Graph Theoretic Independence”, George Mason University, Fairfax, VA, December 10, 2010.
12. “The Traveling Salesman, Graph-theoretic Independence, Fullerenes and Automated Conjecture-Making”, Longwood University Mathematics Colloquium, November 17, 2009.
13. “Graph Theoretic Independence and Critical Independent Sets”, Virginia Commonwealth University, February 29, 2008.
14. “Graph Theoretic Independence and Critical Independent Sets”, Sam Houston State University, Huntsville, TX, March 5, 2008.

OTHER
PRESENTATIONS

1. “A Conjecture-making Program for Graph Theorists”, 14th Haifa Workshop on Interdisciplinary Applications of Graph Theory, Combinatorics and Algorithms, Haifa, Israel, June 2014.
2. “Live your Mathematical Dreams”, Brigham Young University Department of Mathematics Senior Banquet, Provo, UT, Mar. 27, 2014.
3. “A graph theoretic model to explain ‘what every chemist knows’”, VCU Discrete Mathematics Seminar, Dec. 3, 2013.
4. “Automated Conjecture-making, Machine Intelligence, and Robot Consciousness”, VCU Honors College Berglund Series, Oct. 24, 2013.
5. “The Independence Number Project”, VCU Discrete Mathematics Seminar, September 18, 2012.
6. “Applications of the Independence Decomposition Theorem”, 25th Cumberland Conference, Johnson City, TN, May 11, 2012.
7. “Fractional Independence Number and König-Egerváry Graphs”, CombinaTexas 2012, Georgetown, TX, April 21, 2012.
8. “Degree Sequence Bounds for the Independence Number of a Graph”, VCU Discrete Mathematics Seminar, December 1, 2010.

9. “The Graph Induced by all Vertices in Some Critical Independent Set”, SIAM Discrete Mathematics, Austin, TX, June 15, 2010.
10. “The Traveling Salesman, Graph-theoretic Independence, Fullerenes and Automated Conjecture-Making”, VCU Honors College Berglund Series, April 15, 2010.
11. “The Traveling Salesman, Graph-theoretic Independence, Fullerenes and Automated Conjecture-Making”, VCU Graduate Student Seminar, January 29, 2010.
12. “A Parallel Algorithm for Finding Maximum Critical Independent Sets”, Joint Mathematical Meetings, San Francisco, January 14, 2010.
13. “Automated Conjecture-Making and an Idea for Proving that $P=NP$ ”, VCU Math Club, April 30, 2010.
14. “Teaching with GrInvIn”, VCU Discrete Mathematics Seminar, November 19, 2009.
15. “A New Characterization of König-Egerváry Graphs”, 2nd biennial Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM), May 27, 2009.
16. “Radius & Independence”, VCU Discrete Mathematics Seminar, February 12, 2009.
17. “The Critical Independence Number and an Independence Decomposition,” Joint Mathematics Meetings, Washington, D.C., January 8, 2009.
18. “Critical Independent Sets and Applications” I, II & III, VCU Discrete Mathematics Seminar, November 5, 12, 19, 2008.
19. “Graph-theoretic Independence”, Graduate Student Seminar, University of Houston, November 16, 2007.

CONFERENCE
ORGANIZATION

1. 2015 INFORMS Computing Society Conference, Jan., 2015, Richmond, VA, program committee member, plenary speaker chair (with Paul Brooks, VCU, general chair). Speakers: David Applegate, Vasek Chvatal, Richard Stallman.
2. Computers in Scientific Discovery (CSD7) conference, Aug., 2015, Virginia Commonwealth University, Richmond, VA, local organizer, Scientific Committee: G. Brinkmann, P. Fowler, FRS, K. Kutnar, C. E. Larson, W. Myrvold.
3. 14th Haifa Workshop on Interdisciplinary Applications of Graph Theory, Combinatorics and Algorithms, Haifa, Israel, Satellite of Joint International Meeting of the AMS and the Israel Mathematical Union, program committee member (organized by M. Golumbic, E. Scheinerman, M. Stern and O. Weimann), June 11-13 (resp., June 16-19).
4. “My Favorite Graph Theory Conjectures III” (with R. Gera, Naval Postgraduate School), Joint Mathematics Meetings session, Baltimore, MD, January 2014, Speakers: A. Bonato, G. Exoo, J. Gimbel, C. Godsil, J. Gross, R. Haas, J. Hutchinson, W. Imrich, M. Kayll, H. Martin Mulder, W. Pulleyblank, S. Radziszowski, F. Roberts, L. Szekely, D. Sumner, T. Tucker, D. West, C. Q. Zhang, P. Zhang.
5. “Independence Number: Theory, Algorithms and Applications” (with E. DeLaVina, U. of Houston–Downtown), CanaDAM, St Johns, Newfoundland, June 2013. Speakers: E. Delavina, A. Finbow, J. Harant, B. Hartnell, C. Larson, M. Plummer, D. Rall, B. Staton, D. Tankus.
6. “My Favorite Graph Theory Conjectures II” (with R. Gera, Naval Postgraduate School), SIAM Discrete Mathematics session, Halifax, Canada, June 2012. Speakers: L. Beineke, G. Caporossi, F. Chung, V. Chvatal, E. DeLaVina, J. Edmonds, R. Faudree, R. Graham, J. Graver, B. Mohar, M. Plummer, A. Rosa, E. Scheinerman.
7. “König-Egerváry Graphs” (with M. Kayll, University of Montana), SIAM Discrete Mathematics session, Halifax, Canada, June 2012. Speakers: J. Edmonds, M. Kayll, L., C. Larson, V. Levit.

8. “My Favorite Graph Theory Conjectures” (with R. Gera, Naval Postgraduate School), Joint Mathematics Meetings session, Boston, MA, January, 2012. Speakers: N. Dean, W. Goddard, R. Gould, J. Griggs, T. Haynes, S. Hedetneimi, D. Kleitman, L. Lesniak, N. Robertson, A. Schwenk, P. Slater, R. Stanley, W. Trotter, P. Zhang.
9. VCU Discrete Mathematics Seminar (with D. Cranston), Fall 2010–present, Speakers: H. Abeledo, L. Abrams, G. Agnarsson, C. Barnes, A. Burstein, S. Cioaba, J. Davis, J. Dunham, J. Griggs, G. Hurlbert, M. Jacobson, C. Johnson, D. Lamar, X. Lu, C. Manon, R. Martin, K. Mellinger, K. Milans, W. Morris, N. Robertson, J. Rosenhouse, E. Scheinerman, K. Saoub, R. Stanley, A. Streib, N. Streib, P. Stockmeyer, B. Sutton, D. Ullman, A. Van Zuylen, G. Yu.
10. “Open Source Textbooks and Software” session (with B. Lins, Hampden-Sydney College), Fall MD-DC-VA MAA Section Meeting, Goucher College, Baltimore, MD, November 13, 2009. Speakers: D. Joyner, B. Lins, L. Mitchell.

MENTORSHIP

Masters Theses Supervised

1. Michelle Grigsby, M.S., “Independence and Horizontal Edges”, December 2011.
2. Andrew Bristow, M.S., “Independence Number is NP-Complete”, August 2011.
3. William Willis, M.S., “Bounds for the Independence Number of a Graph”, August 2011.
4. Taylor Short, M.S., “KE Theory and the Number of Vertices Belonging to all Maximum Independent Sets of a Graph”, February 2011.
5. Nisreen Bukhary, M.S., “Domination in Benzenoids”, May 2010.

VCU COMMITTEES

1. Colloquium Committee, Department of Mathematics, member, 2011–2013, chair, 2013–present.
2. VCU Discrete Mathematics Seminar co-chair (with D. Cranston), 2010–present.
3. Math 151, Department of Mathematics, chair, 2010–present.
4. Diversity, Department of Mathematics, member, 2010–present.
5. Discrete Mathematics, Department of Mathematics, member, 2008–present.
6. Curriculum, Department of Mathematics, member, 2008–present.
7. Credentials, Department of Mathematics, member, 2008–2010.
8. VCU CHS Faculty Council, 2014–2016.

ORGANIZATIONS

- Phi Mu Epsilon, 2013–present
- Mathematics Association of America (MAA), 2008–present.
- DIMACS Working Group on Computer-Generated Conjectures from Graph Theoretic and Chemical Databases, 2001–2005.
- Institute for Combinatorics and its Applications (ICA), member, 1996–present; Fellow, 2013–present.
- American Mathematical Society (AMS), Member, 1994–present.

VCU COURSES

Semester	Course Name	Course Number	Section	Number of Students	Instructor Evaluation	Course Evaluation
Spring 2014	Combinatorics	MATH 525	901	32	4.85	4.45
	Mathematical Programming	MATH 255	001	27	4.77	4.69
Fall 2013	Abstract Algebra	MATH 501	001	25	4.50	4.00
	Mathematical Programming	MATH 255	001	20	4.85	4.23
Fall 2012	Number Theory	MATH 305	001	22	4.91	4.81
	Precalculus	MATH 151	907	97	4.73	4.30
	Think Like a Mathematician	HONR 399	702	16	4.91	4.64
Fall 2011	Linear Algebra	MATH 310	001	35	4.81	4.71
	Linear Algebra	MATH 310	002	36	4.63	4.54
	Precalculus	MATH 151	012	35	4.58	4.15
	Think Like a Mathematician	HONR 399	702	20	4.67	4.67
	Graph Theory (team-taught)	MATH 591	001	4	N/A	N/A
Spring 2011	Combinatorics	MATH 525	001	15	4.45	3.91
	Linear Algebra	MATH 310	003	40	4.79	4.29
	Graph Theory (team-taught)	MATH 591	001	15	N/A	N/A
Fall 2010	Analysis	MATH 507	001	14	4.75	4.25
	Linear Algebra	MATH 310	003	37	4.96	4.39
	Graph Theory (team-taught)	MATH 591	001	13	N/A	N/A
Spring 2010	Mathematical Structures	MATH 211	001	38	4.73	4.12
	Linear Algebra	MATH 310	901	39	4.64	4.04
Fall 2009	Abstract Algebra	MATH 501	901	23	4.6	3.8
	Linear Algebra	MATH 310	001	23	4.6	4.2
Spring 2009	Mathematical Structures	MATH 211	002	35	4.8	4.1
	Precalculus	MATH 151	012/013	81	4.8	3.9
Fall 2008	Linear Algebra	MATH 310	002	35	4.7	4.4
	Contemporary Mathematics	MATH 131	028	16	3.8	3.4

Table 1: VCU Instructor & Course Evaluations, Scale is 1–5.