ILEANA STREINU

Charles N. Clark Professor of Computer Science and Mathematics

http://cs.smith.edu/~streinu
istreinu@smith.edu,streinu@cs.smith.edu,streinu@cs.umass.edu

Research group site (LinkageLab):
http://linkage.cs.umass.edu

Department of Computer Science
Department of Mathematics
Smith College
Northampton, MA 01063

Office: Ford Hall 253
Phone: (413) 585-3827
Home: (413) 586-8545
Fax: (413) 585-4534

Education

Ph.D., Computer Science, 1994
Rutgers University, New Brunswick, NJ.

Doctorate, Mathematics/Computer Science, 1994
University of Bucharest, Romania.

Diploma (B.Sc.), Specialization (M.Sc.) Mathematics/Computer Science
University of Bucharest, Romania.

Awards

2010. The **2010 David P. Robbins Prize** from the American Mathematical Society.

2006. The **2004 Grigore Moisil Award** in Theoretical Computer Science from the Romanian Academy.

Research Interests

Theoretical Computer Science: Computational Geometry and Graph Algorithms.

Mathematics: Discrete and Combinatorial Geometry, Graph Theory and (Oriented) Matroids, Kinematics and Rigidity Theory, Polytopes and Convex Geometry, Mathematical Crystallography.

Interdisciplinary and Applied Computer Science:

Computational Biology: bio-geometry (structure, flexibility and folding) of biopolymers (proteins, DNA, RNA)

Computational Materials Science: crystalline matter, zeolites, nano-structures

Robotics: robot manipulators, computational origami, sensor networks (localization).

Other geometric applications: in computer graphics, graph drawing, data visualization and statistics.

Software applications: rigidity and flexibility analysis of macromolecules (proteins, DNA, crystalline matter, viruses) and geometric constraint systems (CAD), including motion simulation, folding and reconfiguration; workspace analysis and motion planning of robotic manipulators.

Academic Appointments

Computer Science Department, Smith College, MA.

2009 - present. Charles N. Clark Professor of Computer Science and Mathematics.

2003 - present. Professor

2000 - 2003. Associate Professor

1994 - 2000. Assistant Professor

Mathematics Department, Smith College, MA.

2005 - present. Professor of Mathematics.

Computer Science Department, University of Massachusetts Amherst, MA.

2002 - present. Adjunct Professor of Computer Science

Visiting Positions

2008. June - July: Research visitor, Euler Institute, StPetersburg, Russia.

2006. Summer and Fall: Visiting Professor, Department of Mathematics, Technische Universität Berlin, Germany.

2005. Summer: (June) Exchange Visitor, Mathematics/Informatics Departments, Hamburg University, Germany. (July) Visiting Scholar, Kyoto University of Engineering and Architecture, Japan.

2002 - 2003. Fall: Computer Science Department, Stanford University, CA, Sabbatical Visiting Scholar. DIMACS Center, Rutgers University, Visitor. Spring: École Normale Superieure, Paris, Professeur Visiteur. Université Nancy and LORIA, France, Professeur Visiteur.

Spring 2001. Visiting scholar, Rutgers University Center for Operations Research (RUTCOR).

Fall 1998. Sabbatical Visiting Scholar, Department of Applied Mathematics, Universitat Politecnica de Catalunya, Barcelona, Spain.

Administrative Positions

Smith College, MA.

2000 - 2002. Chair of the Computer Science Department

2011 - 2012. Inaugural Director, Four Colleges Biomathematics Consortium.

2011 – Co-Director, Biomathematical Sciences concentration

Honors

2012. Fellow of the *American Mathematical Society*, inaugural class.

Since 2009. Charles N. Clark endowed chair, Smith College.

2008-2011. Five Colleges 40th Anniversary Professor (University of Massachusetts Amherst and Smith College).

2010. Notable alumna, `http://www.cs.rutgers.edu/information/alumni/notable.whtml`, Computer Science department, Rutgers University, New Jersey.

2010. Plenary speaker. Conference on *Formal Power Series and Applied Combinatorics*, Aug. 2 - 6, 2006, San Francisco State University, California.

2006. Gastprofessorin (Full Visiting Professor), Department of Mathematics, Technische Universität Berlin, Germany (Sponsor: Günter Ziegler).

2006. Plenary speaker. *Geometric and Topological Combinatorics*, a satellite event to the *International Congress of Mathematicians*, Aug. 31 - Sept. 5, 2006, Alcala de Henares, Spain.

2006. Plenary speaker. Anniversary conference on *Discrete and Computational Geometry: 20 years after*, June 18-26, 2006, Snowbird, Utah.

2004. Plenary speaker. Meeting of the *Northeastern Section of the Mathematical Association of America,* Worcester Polytechnic Institute, MA, Nov. 20, 2004.

2004. Plenary speaker, *Workshop on Automated Deduction in Geometry* (ADG 2004), Univ. of Florida at Gainesville, Sept. 15-18, 2004

2002. Invited speaker. *Discrete and Combinatorial Geometry*, a satellite event to the *International Congress of Mathematicians*, August 2002, Beijing, China.

2002. Invited speaker. *Robot Arm Manipulation: Geometric Challenges* (under Science Innovation: Physical Science and Engineering), at the *American Association for the Advancement of Science* annual meeting in Boston, Feb. 14-19, 2002.

2000. Plenary speaker. Fall Workshop on Discrete and Computational Geometry, SUNY at Stony Brook, Oct. 28-29, 2000.

2000. Plenary speaker. Annual Meeting of the New Jersey Chapter of the Mathematical Association of America, Georgian Court College, NJ, April 8, 2000.

DIMACS Fellowship, Rutgers University, 1992, 1993, 1994.

Rutgers Graduate Scholars Award, 1990, 1991.

Diploma "de merit" (highest distinction, 1st in class, GPA 10/10), University of Bucharest, Romania.

Research Papers

[1] (with Ciprian Borcea) "Singularity locus for the endpoint map of serial manipulators with revolute joints." To appear in *Computational Kinematics*, Barcelona, May 2013.

[2] (with John C. Bowers) "Computing Origami Universal Molecules with Cyclic Tournament Forests." Submitted, 2013.

[3] (with Naomi Fox) "Redundant and Critical Interactions in Protein Rigid Cluster Analysis." Submitted, Oct. 2012.

[4] (with Filip Jagodzinski) "Towards biophysical validation of constraint modeling for rigidity analysis of proteins." In *Proc. ACM Conference on Bioinformatics, Computational Biology and Biomedicine (ACM-BCB'12)*, October 2012.

[5] (with Ciprian Borcea) "Flexible crystal frameworks", Proc. Canadian Conf. on Computational Geometry, Charlottestwon, Prince Edward Island, Canada, Aug. 2012.

[5a] (with Ciprian Borcea) "Deformations of crystal frameworks", arxiv:1110.4661, 2011. Preliminary version of [5].

[6] (with Naomi Fox) "Towards accurate modeling of noncovalent interactions for protein rigidity analysis." BMC-Bioinformatics. Accepted, 2012.

[6a] (with Naomi Fox) "Towards accurate modeling for protein rigidity analysis." In *2nd IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS'12). Feb. 23-25*, February 2012. Preliminary version of [6].

[7] (with Filip Jagodzinski, Pamela Clark, Tiffany Liu, Jessica Grant and Samantha Monastra) "Rigidity analysis of periodic crystal structures and protein biological assemblies." BMC-Bioinformatics. Accepted, 2012.

[7a] (with Pamela Clark, Jessica Grant, Samantha Monastra and Filip Jagodzinski) "Periodic rigidity of protein crystal structures", In *2nd IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS'12). Feb. 23-25*, February 2012. Preliminary version of [7].

[8] (with Ciprian S. Borcea) "Realizations of volume frameworks." In *Proc. Automated Deduction in Geometry (ADG'12)*, September 2012.

[9] (with John C. Bowers) "Rigid origami designs with Lang's universal molecule algorithm." In *Proc. Automated deduction in Geometry (ADG'12)*, September 2012.

[10] (with Ciprian S. Borcea) "Positional workspace boundary for serial manipulators with revolute joints." In J. Lenarcic and M. L. Husty, editors, *Latest Advances in Robot Kinematics (ARK'12)*, pages 325–332. Springer Verlag, 2012.

[11] (with Ciprian Borcea and Shin-ichi Tanigawa) "Periodic body-and-bar frameworks", submitted, 2012.

[11a] (with Ciprian Borcea and Shin-ichi Tanigawa) "Periodic body-and-bar frameworks", in Proc. 28th Symp. Computational Geometry (SoCG'12), Chapel Hill, NC, pp. 347–356, 2012. Also on arxiv:1110.4660, 2011. Preliminary version of [11].

[12] (with John C. Bowers) "Lang's universal molecule algorithm" (video). In Proc. 28th Symp. Computational Geometry (SoCG'12), pages 419-420, 2012.

[13] (with Naomi Fox and Filip Jagodzinski) "Kinari-lib: a C library for pebble game rigidity analysis of mechanical models." In *Minisymposium on Publicly Available Geometric/Topological Software, Chapel Hill, NC, USA, Jun. 17-19*, 2012.

[14] (with John C. Bowers) "Lang's universal molecules", manuscript, 2012.

[15] (with Filip Jagodzinski and Jeanne Hardy) "Using rigidity analysis to probe mutation-induced structural changes in proteins". In *Journal of Bioinformatics and Computational Biology*, 10(3), 2012.

[15a] (with Filip Jagodzinski and Jeanne Hardy) "Using rigidity analysis to probe mutation-induced structural changes in proteins". In Proc. *Workshop on Computational Structural Bioinformatics*, IEEE Int. Conf. on Bioinformatics and Biomedicine (BIBM'11), Atlanta, GA, 12-15 Nov. 2011. Preliminary version of [15].

[16] (with Ciprian Borcea) "Frameworks with crystallographic symmetry", *Philosophical Transactions of the Royal Society of London Series A: Mathematical, Physical and Engineering Sciences*, to appear. 2013. arXiv:1110.4662, 2011.

[17] (with Gaiane Panina) "Virtual polytopes: a survey", manuscript, May 2011.

[18] (with Kirk Haller, Audrey Lee-St. John, Meera Sitharam and Neil White) "Body-and-cad geometric constraint systems", *Computational Geometry: Theory and Applications,* special issue for GDR'09, 45(8):385–405, 2012. `http://arxiv.org/abs/1006.1126`.

[18a] (with Kirk Haller, Audrey Lee-St. John, Meera Sitharam and Neil White) "Body-and-cad geometric constraint systems", in: Proc. *24th Annual ACM Symposium on Applied Computing*, technical track on *Geometric Constraints and Reasoning GCR'09,* Honolulu, HI, March 2009. Preliminary version of [18].

[19] (with Md. Ashraful Alam and Igor Rivin) "Outerplanar graphs and Delaunay triangulations". In Dineen, Michael and Khoussainov, Bakhadyr and Nies, Andre (eds.), *Computation, Physics and Beyond , Internat. Workshop in Theoretical Computer Science WTCS 2012*, Lecture Notes in Computer Science, vol. 7160, pp. 320–329, Springer, 2011. `doi:10.1007/978-3-642-27654-5_25`

[19a] (with Md. Ashraful Alam and Igor Rivin) "Outerplanar graphs and Delaunay triangulations", Proc. *Canadian Conf. Computational Geometry (CCCG'11)*, Univ. of Toronto, Aug. 10-12, 2011. Preliminary version of [19].

[20] (with Ciprian Borcea) "Extremal Reaches in Polynomial Time", Proc. 27th *ACM Symp. on Computational Geometry (SoCG'11),* Paris, June 13-15, pp. 472–480, 2011. `10.1145/1998196.1998273`.

[21] (with Ciprian Borcea) "Exact Workspace Boundary by Extremal Reaches", Proc. 27th *ACM Symp. on Computational Geometry (SoCG'11),* Paris, June 13-15, pp. 481–490, 2011. `10.1145/1998196.1998274`.

[22] (with Ciprian Borcea) "Minimally rigid periodic graphs", *Bulletin of the London Mathematical Society,* 43:10931103, 2011. `doi:10.1112/blms/bdr044`.

[23] (with Naomi Fox, Filip Jagodzinski and Yang Li) "KINARI-Web: a server for protein rigidity analysis", *Nucleic Acids Research,* 39 (web-server issue), 2011, `doi:10.1093/nar/gkr482`.

[24] (with Naomi Fox) "Redundant Interactions in Protein Rigid Cluster Analysis", in Proc. 1st *IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS'11).* Feb. 3-5, 2011, Orlando, Florida, 2011. `10.1109/ICCABS.2011.5729952`.

[25] (with Louis Theran) "Natural realizations of sparsity matroids", *Ars Mathematica Contemporanea,* 4(1), 2011.

[26] "Paneled and Molecular Polyhedra: How Stable are they?". In M. Senechal (eds.), *Shaping space*, 2nd ed., pp. 201–209, Springer Verlag, 2013.

[27] (with Ciprian Borcea) "Periodic Frameworks and Flexibility". *Proceedings of the Royal Society* A 8, 466(2121), 26332649, 2010. doi:10.1098/rspa.2009.0676.

[28] (with Louis Theran) "Slider-pinning Rigidity: a Maxwell-Laman-type Theorem". *Discrete and Computational Geometry,* 44(4), 812-837. DOI:10.1007/s00454-010-9283-y, arxiv.org/abs/0712.0031. 2010.

[28a] (with Louis Theran) "Combinatorial Genericity and Minimal Rigidity", in Proc. 24th *ACM Symp. on Computational Geometry (SoCG'08)*, College Park, Maryland, pp. 365-374, June 2008. Preliminary version of [28].

[29] (with Ciprian Borcea) "How far can you reach?". In Proc. *AMC-SIAM Symp. on Discrete Algorithms* (SODA'10), pp. 928–937. Austin, Texas, Jan. 2010.

[30] (with Ciprian Borcea) "Extremal Configurations of Manipulators with Revolute Joints", in: *Reconfigurable Mechanisms and Robots*, Proc. ASME/IFToMM International Conference (ReMAR'09), Jian S. Dai, Matteo Zoppi and Xianwen Kong (eds.), King's College, London, UK, pages 279–284, KC Edizioni, Genova, 2009.
[30a] (with Ciprian Borcea) "Extremal Configurations of Revolute-Jointed Robot Arms", in Oberwolfach Report, *Discrete Differential Geometry,* 2009. Preliminary version of [29] and [30].

[31] (with Gaiane Panina) "Single-vertex origami: the non-expansive case", in *Computational Geometry: Theory and Applications*, 46(8), 678687, 2010. Special issue, selected papers from SoCG'09.

[31a] (with Gaiane Panina) "Single-vertex origami: the non-expansive case", in Proc. 25th *ACM Symposium on Computational geometry (SoCG'09)*, Aarhus University, Denmark, pp. 316-323, June 2009. Preliminary version of [31].

[32] (with Audrey Lee-St. John) "Angular rigidity in 3D: combinatorial characterizations and algorithms", in: Proc. 21st *Canadian Conference on Computational Geometry (CCCG'09)*, Univ. of British Columbia, Vancouver, Canada, Aug. 2009.

[33] (with Jialong Cheng and Meera Sitharam) "Nucleation-free 3D rigidity". Manuscript, June 2011.

[33a] (with Jialong Cheng and Meera Sitharam), "Nucleation-free 3D rigidity", in: Proc. 21st *Canadian Conference on Computational Geometry (CCCG'09)*, Univ. of British Columbia, Vancouver, Canada, Aug. 2009. Preliminary version of [33].

[34] (with Louis Theran) "Sparsity certifying graph decompositions", in *Graphs and Combinatorics*, vol. 25, pp. 219-238, 2009. arxiv.org/abs/0704.0002.

[35] (with Louis Theran) "Sparse Hypergraphs and Pebble Game Algorithms", in *European Journal of Combinatorics*, special issue for the Proceedings of *Oriented Matroids (OM'05)*, 30(8), pp. 19441964, (2009). arxiv.org/abs/math/0703921.

[36] (with Makoto Ohsaki, Naoki Katoh, T. Kinoshita, Shin-ichi Tanigawa and David Avis) "Enumeration of Optimal Pin-Jointed Bistable Compliant Mechanisms", in *Structural and Multidisciplinary Optimization*, 37(6), pp. 645-651, 2009.

[36a] (with Makoto Ohsaki, Naoki Katoh, T. Kinoshita, Shin-ichi Tanigawa and David Avis) "Enumeration of Optimal Pin-Jointed Bistable Compliant Mechanisms". In 7th *World Congress on Structural and Multidisciplinary Optimization*, May 21-25, 2007, Seoul, Korea. Preliminary version of [36].

[36b] (with Makoto Ohsaki, Naoki Katoh, T. Kinoshita, Shin-ichi Tanigawa and David Avis) "Enumeration of Optimal Pin-Jointed Bistable Compliant Mechanisms". In *4th China - Japan - Korea Joint Symposium on Optimization of Structural and Mechanical Systems*, Kunming, Nov. 6 - 9, 2006, China. Preliminary version of [36a].

[37] (with David Avis, Naoki Katoh, Makoto Ohsaki and Shin-ichi Tanigawa) "Enumerating Constrained Non-crossing Minimally Rigid Frameworks", in *Discrete and Computational Geometry*, vol. 40, nr. 1, pp. 31-46, July 2008.

[37a] (with David Avis, Naoki Katoh, Makoto Ohsaki and Shin-ichi Tanigawa) "Enumerating constrained non-crossing minimally rigid frameworks". In 9th *Japan-Korea Joint Workshop on Algorithms and Computation (WAAC'06)*, July 4-5, 2006, Hokkaido University, Sapporo, Japan. Preliminary version of [37].

[38] (with Audrey Lee and Louis Theran) "Analyzing Rigidity with Pebble Games", in Proc. 24th *ACM Symposium on Computational Geometry (SoCG'08)*, College Park, Maryland, pp. 226-227, June 2008.

[38a] (with Audrey Lee and Louis Theran) "Rigidity and Pebble Games", Companion Web Site to [29], `http://linkage.cs.umass.edu/pg/`, June 2008.

[39] (with Audrey Lee) "Pebble Game Algorithms and Sparse graphs", *Discrete Mathematics,* vol. 308, nr. 8, pp. 1425-1437, April 2008.

[39a] (with Audrey Lee) "Pebble Game Algorithms and (k, l)-sparse graphs". In Proc. of the *European Conference on Combinatorics (EuroComb'05)*, Berlin, Germany, 4-9 Sept. 2005. Preliminary version of [39].

[40] (with Günter Rote and Francisco Santos) "Pseudo-triangulations: a survey", in *Surveys on Discrete and Computational Geometry - Twenty Years later*, J.E. Goodman, J. Pach and R. Pollack, eds., Series *Contemporary Mathematics*, vol. 453, pp. 343-410, American Mathematical Society, 2008. `http://arxiv.org/abs/math/0612672`.

[41] (with Greg Aloupis, Erik Demaine, Stefan Langerman, Pat Morin, Joseph O'Rourke and Godfried Toussaint), "Edge-unfolding nested polyhedral bands", in *Computational Geometry: Theory and Applications*, vol. 39, nr. 1, pp. 30-41, 2008.

[41a] (with Greg Aloupis, Erik Demaine, Stefan Langerman, Pat Morin, Joseph O'Rourke and Godfried Toussaint) "Unfolding Polyhedral Bands", Proc. 16th *Canadian Conference on Computational Geometry* (CCCG'04), Concordia University, Montreal, August 9-11, 2004. Preliminary version of [41].

[42] (with Audrey Lee and Louis Theran) " Graded sparse graphs and matroids", in *Journal of Universal Computer Science*, 13:11, pp. 1671-1679, 2007. `arxiv.org/abs/0711.2838`.

[43] (with Audrey Lee and Louis Theran) "The slider-pinning Problem", Proc. *Canadian Conference on Computational Geometry (CCCG'07)*, Aug. 2007.

[44] (with Makoto Ohsaki, Naoki Katoh, T. Kinoshita, Shin-ichi Tanigawa and David Avis) "Enumerating non-crossing minimally rigid frameworks", in *Graphs and Combinatorics*, 23:1, pp. 117-134, 2007.

[44a] (with David Avis, Naoki Katoh, Makoto Ohsaki and Shin-ichi Tanigawa) "Enumerating Planar Minimally Rigid Graphs". In *Proc. 12th Annual International Computing and Combinatorics Conference (COCOON'06)*, Taipei, Taiwan, 15-18 Aug. 2006. Preliminary version of [44].

[45] (with Ruth Haas, Audrey Lee and Louis Theran) "Characterizing Sparse Graphs by Map Decompositions", in *Journal of Combinatorial Mathematics and Combinatorial Computing*, vol. 62, pp. 3-11, 2007. `arxiv.org/abs/0704.3843`.

[46] "Parallel Redrawing Mechanisms, Pseudo-Triangulations and Kinetic Planar Graphs", in Patrick Healy, Nikola S. Nikolov (editors) Proc. *Graph Drawing'05*, Limerick, Ireland, 12-14 Sept. 2005. Springer LNCS, Volume 3843, pp. 421 - 433, 2006.

[47] (with Ciprian Borcea) "Singularities of Hinge Structures", *Conf. on Efficient Methods in Algebraic Geometry* (MEGA'05), Porto Conte, Sardinia, Italy, May 2005. `arxiv.org/abs/0812.1373`.

[48] (with Audrey Lee and Louis Theran) "Finding and Maintaining Rigid Components". In Proc. *Canadian Conference on Computational Geometry (CCCG'05)*, Univ. of Windsor, Canada, Aug. 10-12, 2005.

[49] (with Jack Snoeyink) "Computing Rigid Components of Pseudo-Triangulation Mechanisms in Linear Time". In Proc. *Canadian Conference on Computational Geometry (CCCG'05)*, Univ. of Windsor, Canada, Aug. 10-12, 2005.

[50] (with Audrey Lee and Oliver Brock) "A Methodology for Efficiently Sampling the Conformation Space of Molecular Structures". In *Physical Biology* 2, Special focus: Flexibility in biomolecules, Nov. 2005, S108-S115, `DOI:10.1088/1478-3975/2/4/S05`

[51] "Pseudo-Triangulations, Rigidity and Motion Planning", *Discrete and Computational Geometry*, 34(4), pp. 587-635, Dec. 2005.

[52] (with Walter Whiteley) "Single-Vertex Origami and Spherical Expansive Motions", *Proc. Japan Conf. Discrete and Computational Geometry* (JCDCG), Tokai University, Tokyo, October 8-11, 2004. Lecture Notes in Computer Science 3742, pp. 161-173, Springer 2005.

[53] (with Ruth Hass, David Orden, Günter Rote, Francisco Santos, Brigitte Servatius, Herman Servatius, Diane Souvaine and Walter Whiteley) "Planar Minimally Rigid Graphs and Pseudo-triangulations", in *Comp. Geom. Theory and Applications*, vol. 31, issue 1-2, pp. 31-61, May 2005.

[53a] (with Ruth Hass, David Orden, Günter Rote, Francisco Santos, Brigitte Servatius, Herman Servatius, Diane Souvaine and Walter Whiteley) "Planar Minimally Rigid Graphs and Pseudo-triangulations", in Proc. *ACM Symp. Comput. Geometry (SoCG'03)*, San Diego, June 2003, pp. 154-163. Preliminary version of [53].

[54] (with Jürgen Bokowski, Simon King and Susanne Mock) "A Topological Representation Theorem for Oriented Matroids", in *Discrete and Computational Geometry*, 33(4), pp. 645-668, April 2005.

[55] "Non-Stretchable Pseudo-Visibility Graphs", in *Computational Geometry: Theory and Applications* 31, pp. 195-206, 2005.

[55a] "Non-Stretchable Pseudo-Visibility Graphs", Proc. 11th *Canadian Conf. on Computational Geometry (CCCG'99)*, Vancouver, August 1999, pp. 22-25. Preliminary version of [55].

[56] (with Harry A. Schmitt, Don E. Waagen and George Barbastathis), "Computational origami for sensor configuration and control", in *Conference Record of the Thirty-Eighth Asilomar Conference on Signals*, Systems and Computers , 7-10 Nov. 2004, pp. 811-815 Vol.1.

[57] (with Harry A. Schmitt, D.L. Barker, N.N. Shah, R. D. Rosenwald, D. E. Waagen, George Barbastathis, S.M. Jurga. C.H. Hidrovo-Chavez and T. Buchner), "Cognitive micro-systems: geometry of computation and sensing", in *Fifth Asian Control Conference*, 20-23 July 2004, Melbourne, Australia.

[58] (with Sue Whitesides) "Rectangle Visibility Graphs: Characterization, Construction and Compaction", Proc. *Symp. Theoretical Aspects of Computer Science (STACS'03)*, Berlin, Feb. 2003, pp. 26-37.

[59] (with Oswin Aichholzer, Günter Rote and Bettina Speckmann) "The Zigzag Path of a Pseudo-triangulation", Proc. *Workshop on Algorithms and Data Structures (WADS'03)*, Ottawa, Canada, pp. 377-388, Lecture Notes in Computer Science 2748, Springer Verlag, 2003.

[60] (with Ciprian Borcea) "On the Number of Embeddings of Minimally Rigid Graphs", in *Discrete and Computational Geometry*, 31, pp. 287-303, Feb. 2003.

[60a] (with Ciprian Borcea) "On the Number of Embeddings of Minimally Rigid Graphs", Proc. *ACM Symp. Computational Geometry (SoCG'02)*, Barcelona, June 5-7, 2002. Preliminary version of [60].

[61] "Combinatorial Roadmaps in Configuration Spaces of Simple Planar Polygons", in Saugata Basu and Laureano Gonzalez-Vega (eds.), Proc. *DIMACS Workshop on on Algorithmic and Quantitative Aspects of Real Algebraic Geometry in Mathematics and Computer Science,* pp. 181-206, 2003.

[62] (with Günter Rote and Francisco Santos) "Expansive Motions and the Polytope of Pointed Pseudo-Triangulations", in Boris Aronov, Saugata Basu, János Pach and Micha Sharir (eds.), *Discrete and Computational Geometry – The Goodman-Pollack Festschrift*, in the series: Algorithms and Combinatorics, Springer Verlag, Berlin, 2003.

[63] (with Elif Tosun) "Camera Position Reconstruction and Tight Direction Networks", in Michael Goodrich and Stephen Kobourov (eds.), Proc. *Graph Drawing'02*, Aug. 26-28, 2002, Irvine, CA, Lecture Notes in Computer Science, Springer Verlag 2003.

[64] (with Greg Aloupis, Erik Demaine, Vida Dujmovic, Jeff Erickson, Stefan Langerman, Henk Meijer, Joseph O'Rourke, Mark Overmars, Michael Soss and Godfried Toussaint) "Flat state Connectivity of Linkages under Dihedral Motions", Proc. 13th *Internat. Symp. Algorithms and Computation (ISAAC'02)*, Vancouver, Nov. 20–23, 2002.

[65] (with Greg Aloupis, Erik Demaine, Henk Meijer, Joseph O'Rourke and Godfried Toussaint) "Flat state connectedness of Fixed Angle Chains: Special Acute Chains", Proc. 14th *Canadian Conference on Computational Geometry (CCCG'02)*, Univ. of Lethbridge, Alberta, Canada, Aug. 12–14, 2002.

[66] (with Eynat Rafalin and Diane Souvaine) "Topological Sweep for Degenerate Point Sets", in D. Mount and C. Stein (eds), Proc. 4th Workshop on *Algorithm Engineering and Experiments (ALENEX'02),* San Francisco, Jan. 4-5, 2002, *Lecture Notes in Computer Science,* 2409, pp. 155-165, Springer Verlag, 2002.

[67] (with Kim Miller, Suneeta Ramaswami, Peter Rousseeuw, Diane Souvaine, Toni Sellares and Anja Struyf) "Efficient computation of location depth contours by methods of computational geometry", *Statistics and Computing*, 2002.

[67a] (with Kim Miller, Suneeta Ramaswami, Peter Rousseeuw, Diane Souvaine, Toni Sellares and Anja Struyf) "Fast Implementation of Depth Contours using Topological Sweep", in Proc. 11th *SIAM-ACM Symp. on Discrete Algorithms (SODA'01),* Washington, DC, Jan. 7-9, 2001, pp. 690-699. Preliminary version of [67].

[68] (with Jürgen Bokowski and Susanne Mock) "The Folkman-Lawrence Topological Representation Theorem for Oriented Matroids - an elementary proof in rank 3", *European Journal of Combinatorics,* 22(5), pp. 601-615, July 2001.

[69] "A Combinatorial Approach to Planar Non-Colliding Robot Arm Motion Planning", Proc. 41st *ACM Annual Symposium on Foundations of Computer Science (FOCS'00),* Redondo Beach, CA, Nov. 12-14, 2000, pp. 443-453. Preliminary version of [51].

[70] (with Stefan Felsner, Ferran Hurtado and Marc Noy) "Hamiltonicity and Colorings of Arrangement Graphs", in *Discrete Applied Mathematics*, 154(17), pp. 2470-2483, Nov. 2006.

[70a] (with Stefan Felsner, Ferran Hurtado and Marc Noy) "Hamiltonicity and Colorings of Arrangement Graphs", in Proc. 11th *ACM-SIAM Symposium on Discrete Algorithms (SODA'00)*, San Francisco, Jan. 9-11 2000, pp. 155-164. Preliminary version of [70].

[71] "Stretchability of Star-like Pseudo-Visibility Graphs", Proc. *ACM Symposium on Computational Geometry (SoCG'99),* Miami Beach, June 1999, pp. 274-280.

[72] (with T. Biedl, E. Demaine, M. Demaine, S. Lazard, A. Lubiw, J. O'Rourke, M. Overmars, S. Robbins, G. Toussaint and S. Whitesides) "Locked and Unlocked Polygonal Chains in Three Dimensions", *Discrete and Computational Geometry*, 26, pp. 269-281, 2001.

[72a] (with T. Biedl, E. Demaine, M. Demaine, S. Lazard, A. Lubiw, J. O'Rourke, M. Overmars, S. Robbins, G. Toussaint and S. Whitesides) "Locked and Unlocked Polygonal Chains in Three Dimensions", in Proc. 10th *ACM-SIAM Symposium on Discrete Algorithms (SODA'99)*, Jan. 1999, pp. S866-7. Preliminary version of [72].

[73] (with T. Biedl, E. Demaine, M. Demaine, S. Lazard, A. Lubiw, J. O'Rourke, S. Robbins, G. Toussaint and S. Whitesides) "On Reconfiguring Tree Linkages: Trees can Lock", *Discrete Applied Math.* 117 (2002) pp. 293–297.

[73a] (with T. Biedl, E. Demaine, M. Demaine, S. Lazard, A. Lubiw, J. O'Rourke, S. Robbins, G. Toussaint and S. Whitesides) "On Reconfiguring Tree Linkages: Trees can Lock", in Proc. 10th *Canadian Conference on Computational Geometry (CCCG'98),* Montreal, Aug. 1998. abs:4-5. Preliminary version of [73].

[74] (with W. Steiger) "Illumination by Floodlights", *Computational Geometry: Theory and Applications* 10, pp. 57-70, 1998.

[74a] (with W. Steiger) " Positive and Negative Results on the Floodlight Problem", Proc. 6th *Canadian Conference on Computational Geometry (CCCG'94),* Saskatoon, Aug. 1994, pp. 87-96. Preliminary version of [74].

[75] (with J. O'Rourke) "The vertex-edge visibility graph of a polygon", *Computational Geometry: Theory and Applications* 10, pp. 105-120, 1998.

[76] (with J. O'Rourke) "Pseudo-Visibility Vertex-Edge Visibility Graphs: Characterization and Recognition", Proc. *ACM Symposium on Computational Geometry (SoCG'97)*, Nice, France, June 1997, pp. 119-128.

[77] "Clusters of Stars", Proc. ACM *Symposium on Computational Geometry (SoCG'97),* Nice, France, June 1997, pp. 439-441.

[78] (with J. O'Rourke and T. Shermer) "Illuminating convex polygons with vertex floodlights", Proc. 7th *Canadian Conference on Computational Geometry (CCCG'95),* Quebec City, Aug. 1995, pp. 151-156.

[79] (with W. Steiger) "A pseudo-algorithmic separation of lines and pseudo-lines", *Inf. Proc. Letters* 53, pp. 295-299, 1995.

[79a] (with W. Steiger) "A pseudo-algorithmic separation of lines and pseudo-lines", in Proc. 6th *Canadian Conference on Computational Geometry (CCCG'94),* Saskatoon, Aug. 1994, pp. 7-11. Preliminary version of [79].

[80] "A Gödel-like Independent Sentence in a Theory of Pure LISP Programs", *Recursive Function Theory Newsletter*, no.33, June 1985.

[81] "Grammar Directed Gödel Numberings", *Internat. Jour. Computer Mathematics*, vol.19, no.3-4, 1983, pp.223-237.

[82] "Learning by Grammatical Inference", *Revue Roumaine de Linguistique*, tome XXVI, no.5, 1981, pp.435-454.

[83] " Darboux Property for the Hierarchy of LL(k) languages" (in Romanian), in *Studii si Cercetari Matematice*, Bucharest, tome 30, no.5,1978, pp.579-593.

[84] " LL(k) Languages are closed under union with finite ones", in Proc. 4th *Int. Conf. Automata, Languages and Programming (ICALP'77),* Turku, Finland, Springer LNCS 53, 1977, pp.504-508.

Books and chapters

[85] "Arrangements of geometric objects", in Kenneth H. Rosen (ed. in chief), "Handbook of Discrete and Combinatorial Mathematics", CRC Press, 1999.

[86] "LISP - the AI Programming Language" (in Romanian), *Scientific and Encyclopedic Publishing House*, Bucharest, Romania, 1986, 262 pages.

Invited Lectures and Talks

[1] "Sparsity matroids in periodic rigidity." Combinatorics Seminar (H. Cohn and J. Fox, orgs.), MIT, Feb. 6, 2013.

[2] "Algebraic Equations with real roots arising in Origami Design." Workshop on *Algebraic Geometry and Geometric Modeling*, (Ron Goldman, Jörg Peters and Frank Sottile, orgs.), Banff Intern. Research Station (BIRS), Canada, Jan. 28, 2013.

[3] "Rigidity and origami." Discrete Mathematics Day, Middlebury College, Sept. 15, 2012.

[4] "Periodic rigidity of protein crystal structures", Special Session on Mathematical Biology, 29th International Conference on Group Theoretical Methods in Physics (GROUP'29), Chern Institute of Mathematics, Nankai University, Tianjin, China, Aug. 20-25, 2012.

[5] "Rigidity and origami". Workshop on *Rigidity Theory: Progress, Applications and Key Open Problems*, Banff International Research Station (BIRS), Banff, Canada, July 16-20, 2012.

[6] "Periodic rigidity of protein crystal structures", Computer Science Department Colloquium, University of Connecticut at Storrs, (org. Ion Mandoiu), March 30, 2012.

[7] "How far can you reach?", Computer Science Department Colloquium, City College of New York, (org. Peter Brass), April 2, 2012.

[8] "Periodic rigidity of protein crystal structures", Special Session on Computational Biology, American Mathematical Society Regional Meeting, Tampa, FL. March 9-10, 2012.

[9] "Rigidity and origami." Mathematics Department Colloquium (org. Herman Gluck), University of Pennsylvania, Philadelphia, 20 Feb. 2012.

[10] "Origami configuration spaces", Topology Seminar (org. W. Browder and A. Bahri), Princeton University, Feb. 17, 2012.

[11] "Flexing and folding: mathematical models of protein structures", invited 1 hr talk, *One Hundred Years of X-Ray Crystallography*, A Science Colloquium at Rider University (C. Borcea, org.), New Jersey, 27-28 Oct. 2011.

[12] "Periodic body-and-bar frameworks", invited 1 hr talk, conference on *Rigidity and Symmetry*, Fields Institute of Mathematics, Toronto, Canada, Oct. 17-21, 2011.

[13] "How far can you reach?", invited 1hr talk, *Convexity, Topology, Combinatorics and beyond*, a workshop in the honor of Luis Montejano's 60th birthday, Puerto Vallarta, Mexico, Oct. 3-7, 2011

[14] "Folding carpenters rules, robot arms, proteins", Bellairs Research Institute of McGill University, 2011 Research festival, Holetown, Barbados, May 28-30, 2011

[15] "Folding carpenters rules, robot arms, proteins", invited lecture, Mathematics Colloquium, National Security Agency, Fort Meade, Maryland, April 4, 2011.

[16] "Periodic rigidity", invited 1h talk, *Workshop on Computational Geometry*, (org. Pankaj Agarwal, Kurt Mehlhorn and Monique Theillaud) Leibnitz Centrum für Informatik, Schloss Dagstuhl, Germany, March 14-18, 2011.

[17] "How far can you reach?", invited talk, Discrete Geometry Seminar, Courant Institute of Mathematics, New York University, 5 Oct. 2010. Org. R.Pollack.

[18] "Folding Carpenter's rules, robot arms, proteins", invited 1hr talk, Workshop on "Recent Topics in Applied Mathematics", Institute of Mathematics of the Romanian Academy, Bucharest, Romania, 23 Sept. 2010.

[19] "Folding Carpenter's rules, robot arms, proteins", invited lecture, Colloquium, Department of Mathematics, University of Connecticut at Storrs, 16 Sept. 2010. Org. Milena Herring.

[20] (with Ciprian Borcea) "Minimally rigid periodic graphs", invited talk, conference on "Rigidity Theory and Applications", Org. S. Power and W. Jackson, University of Lancaster, United Kingdom, July 19-21, 2010.

[21] "How far can you reach?", invited talk, conference on *Protein Folding Pathways*, org. B. Ozkan and M. Thorpe, Tempe, Arizona, May 9-13, 2010.

[22] "How far can you reach?", invited presentation, DARPA STOMP Meeting, Austin, Texas, Feb. 15-17, 2010.

[23] "Rigid Origami", invited talk, Joint Annual Mathematical Meetings, MAA Special Section on *Mathematics of Origami*, org. Tom Hull and Tamara Veenstra, San Francisco, Jan. 16, 2010.

[24] "How far can you reach? A tale of geometry, robot arms and proteins", Charles N. Clark Chaired Professor Inaugural Lecture, Smith College, Dec. 7, 2009.

[25] "Single-vertex Origami: the non-expansive case", invited talk, AMS Regional Meeting, Special Section on *Rigidity Theory*, org. Egon Schulte and Brigitte Servatius, 25 April 2009.

[26] "Folding Carpenter's Rules, Robot Arms, Proteins: from Geometry to Combinatorics", invited talk, Temple University, Mathematics Department Colloquium, org. Igor Rivin, 13 April 2009.

[27] "How far can you reach?", invited talk, *Workshop on Computational Geometry*, (org. Pankaj Agarwal, Helmut Alt and Monique Theillaud) Leibnitz Centrum für Informatik, Schloss Dagstuhl, Germany, March 9-13, 2009.

[28] "How far can you reach? A tale of geometry, robot arms and proteins", Computer Science Department Colloquium, Five Colleges 40th Anniversary Professor Public Lecture, University of Massachusetts Amherst, March 3, 2009.

[29] "Extremal Configurations of Revolute-jointed Robot Arms", invited talk, Workshop on *Discrete Differential Geometry*, org. A. Bobenko, R. Kenyon, J. Sullivan and G. Ziegler. Oberwolfach Mathematical Research Institute, Jan. 11-16, 2009.

[30] "Folding Carpenter's Rules, Robot Arms, Proteins: from Geometry to Combinatorics", invited talk, Central Connecticut University, Mathematics Department Colloquium, org. Ivan Gotchev, 27 Sept. 2008.

[31] "Folding Carpenter's Rules, Robot Arms, Proteins: from Geometry to Combinatorics", invited talk, Institute for Informatics and Automation, StPetersburg, Russia. Org. Gaiane Panina. 6 June 2008.

[32] "Recent results in Combinatorial Rigidity Theory", invited talk, Steklov Institute, Combinatorics Seminar, StPetersburg, Russia. Org. Sergey Duzhin. 4 July 2008.

[33] "Recent Results in Combinatorial Rigidity", invited talk, Internat. Conf. "Differential Equations and Topology", dedicated to Centennial Anniversary of L. Pontryagin, Moscow, June 17-22, 2008. Special Section on "Discrete and Combinatorial Geometry". Org. Nikolay Dolbilin and Peter Gruber. 19 June 2008.

[34] "Folding Carpenter's Rules, Robot Arms, Proteins: from Geometry to Combinatorics", invited lecture, Computer Science Department Colloquium, Williams College, Williamstown, Massachusetts. Org. Brent Heeringa. 4 April 2008.

[35] "Folding Carpenter's Rules, Robot Arms, Proteins: from Geometry to Combinatorics", invited talk, Undergraduate Colloquium, Department of Mathematics, UMass Amherst. Org. Peter Norman. 5 Feb. 2008.

[36] "Geometric simulation of protein flexibility ", invited lecture, IMA Tutorial "Mathematics of Proteins". Institute of Mathematics and Applications (IMA), Univ. of Minnessota, Minneapolis. Org. Michael Levitt and Patrice Koehl. 11 Jan. 2008.

[37] "Combinatorial Rigidity", invited talk, Workshop on "Rigidity and polyhedral combinatorics", 3-7 Dec. 2007, American Institute of Mathematics, Palo Alto, California. Org. Robert Connelly, Ezra Miller and Igor Pak. 5 Dec. 2007.

[38] "Rigidity, Flexibility and Motion", invited lecture, *Valley Geometry Seminar*, University of Massachusetts Amherst. Org. Jenia Tevelev and Jessica Sidman, 5 Oct. 2007.

[39] "Pseudo-triangulations, Rigidity and Polygon Reconfiguration", seminar talk, org. Helmuth Stachel, Technical University, Vienna, Austria, 2 Aug. 2007

[40] "The slider pinning problem", invited talk, Workshop on "Tensegrity", La Vaquerie, France, July 2007. Org. Henri Crapo, Brigitte Servatius and Herman Servatius.

[41] "Geometric representation of Rigidity-related matroids", invited talk, Workshop on "Non-linear Computational Geometry", org. Frank Sottile and Thorsten Theobald, May 29 - Jun 2, 2007, Institute of Mathematics and Applications (IMA), University of Minnesota, Minneapolis.

[42] "Flexing, Moving, Folding: from robot arms to protein chains", invited lecture, Computer Science Department Colloquium, org. Afra Zomorodian, Dartmouth, May 7, 2007.

[43] "Flexibility", invited one hour talk, Workshop on "Discrete geometry and topology in low dimensions", org. K. Bezdek, R. Connelly and H. Edelsbrunner, Banff International Research Station, Banff, Canada, April 1-6, 2007.

[44] "Enumerating Planar Minimally Rigid Graphs", seminar talk, Combinatorics Seminar, Mathematics Department, org. R. Connelly, Cornell University, Nov. 29, 2006.

[45] "Pebble games, Matroids and Rigidity", invited one hour talk, Workshop on *Topology and Combinatorics*, a satellite conference to the Madrid International Congress of Mathematicians, Alcalá de Henares, org. C. Athanasiadis, I. Barany, A. Björner, J. de Loera, G. Rote, F. Santos, E. Welzl, 31 Aug. - 2 Sep. 2006.

[46] "Sparse graphs, Pebble games, Arboricity and other treats in combinatorial rigidity", invited talk, Workshop on *Structural Topology*, org. H. Crapo, D. Schattschneider and M. Senechal, La Vaquerie, France, July 2-6, 2006.

[47] "Some problems in Algorithmic Rigidity", invited one hour talk, *Discrete and Computational Geometry - 20 years after*, org. J.E. Goodman, J. Pach and R. Pollack, June 18-26, 2006, Snowbird, Utah.

[48] "Algorithmic update: rigidity analysis, kinematics and dynamics", Workshop on *Flexibility in macro-molecules*, org. M. Thorpe, Tempe, Arizona, May 13-15 2006

[49] "Motions, Constraints and Collisions", Seminar talk, org. M. Thorpe, Dept. of Physics, Arizona State University, Tempe, May 11, 2006.

[50] "A methodology for efficiently sampling the conformation space of molecular structures" (with Audrey Lee), Flexweb NetSeminar, org. M. Thorpe, Center for Biological Physics, Arizona State University, 17 Nov. 2005.

[51] "Orienting the Rigidity Matroid", Workshop on Matroids and Oriented Matroids (OM'05), org. R. Cordovil, J. Ramirez-Alfonsin and M. Las Vergnas, CIRM Center at Luminy, France, 7-11 Oct. 2005.

[52] "Flexibility of Cut and Subdivided Polyhedra", seminar talk, Dept. of Mathematics, org. G. Ziegler, Technical University Berlin, Germany, June 23, 2005.

[53] "Folding Carpenter's Rules, Robot Arms, Proteins and Origami", seminar talk, org. B. Page, Computer Science Dept. Hamburg University, Germany, June 13, 2005.

[54] "Pebble Game algorithms and (k,l)-sparse graphs", seminar talk, org. R. Diestel, Dept. of Mathematics, Hamburg University, Germany, June 7, 2005.

[55] "Exploring and Generating Protein Conformations" (with L. Guibas), NSF-DARPA CARGO annual meeting, Santa Fe, May 10-11, 2005.

[56] "Folding Robot Arms, Origami, Proteins: what is the computational challenge?", seminar talk, org. M. Malita, St Anselm College, New Hampshire, April 29, 2005.

[57] "Rigid Components: combinatorial and geometric", 1hr invited talk, Oberwolfach Mathematical Research Institute, Workshop on Discrete and Comb. Geometry, org. J. Sullivan, E. Welzl and G. Ziegler, Oberwolfach, Germany, April 11-15, 2005

[58] "Pseudo-triangulations, Rigidity and Motion Planning", seminar talk, org. Brigitte Servatius, Worcester Politechnic Institute, Worcester, March 22, 2005.

[59] "Pebble Game Algorithms for Graph Arboricity", Experimental Mathematics Seminar, org. Doron Zeilberger, Rutgers University Math Department, 31 March 2005.

[60] "Pebble Game Algorithms for Graph Arboricity", Discrete Geometry Seminar, org. W. Whiteley, York University, Toronto, Canada, March 3, 2005.

[61] "Pebble Game Algorithms for Graph Arboricity", plenary speaker, Discrete Math Day, org. K. Collins, Wesleyan Univ., CT, Feb. 26, 2005.

[62] "Pebble Game Algorithms for Body-and-Bar Rigidity", seminar talk, IBM T.J. Watson Research Center, org. J. Lenchner, Jan. 6, 2005

[63] "Pebble Game Algorithms for Body-and-Bar Rigidity", Canadian Mathematical Society Annual Meeting, special session on Discrete Geometry, org. K. Bezdek and W. Whiteley, Montreal, Canada, Dec. 11-12, 2004.

[64] "Folding Robot Arms, Origami, Proteins: a combinatorial approach", plenary lecture, Mathematical Assoc. of America regional meeting, Worcester Politechnic Institute, Worcester, Nov. 20, 2004.

[65] "Folding Carpenter's Rules, Robot Arms, Proteins", featured speaker at the *Workshop on Automated Deduction in Geometry* (ADG 2004), Univ. of Florida at Gainesville, Sept. 15-18, 2004.

[66] "Sampling Protein Conformations and Pathways", seminar talk, org. W. DeGrado, Univ. of Pennsylvania, Structural Biology, Aug 2004

[67] "Pseudo-Triangulations and Rigidity: a Survey", invited talk at the *Workshop on Rigidity and Applications*, org. W. Whiteley, University of Calgary, Alberta, Canada, July 23-24, 2004.

[68] "Folding Robot Arms, Proteins, Origamis", colloquium talk, org. O. Daescu, Computer Science Department, University of Texas at Dallas, April 2, 2004.

[69] "Folding Robot Arms, Proteins, Origamis", Discrete Mathematics Seminar, org. Gil Kalai, Computer Science Department, Yale University, March 22, 2004.

[70] "Pseudo-lines, pseudo-triangles and other pseudo's", Geometry Seminar, org. R. Pollack, New York University, Courant Inst. Of Math., March 2004

71] "Points in Motion", MSRI Workshop on Combinatorial and Discrete Geometry, org. J. de Loera, J. Pach, R. Pollack and G. Ziegler, Berkeley, CA, Nov. 17-21, 2003.

[72] "Points in Motion", Department Seminar, org. Diane Souvaine, Computer Science Department, Tufts University, Medford, MA, 29 Oct. 2003.

[73] "Singularities of Hinge Structures", AMS Regional Meeting 991, Special Session on Mathematical Molecular Biology, Oct. 24-25, 2003, Chapel Hill, NC.

[74] "Points in Motion", Theory Seminar, Computer Science Department, org. N. Immermann and D. Mix Barrington, University of Massachusetts at Amherst, 21 Oct. 2003.

[75] "Orienting the Rigidity Matroid", Combinatorics, Geometry and Computation Graduierten Kolleg Seminar, org. G. Rote, Freie Universität Berlin, July 14, 2003.

[76] "Graph Realizations with partial Oriented Matroid constraints", RSME-AMS First Joint Meeting, special session 14 (Discrete and Computational Geometry), org. F. Hurtado and W. Steiger, Seville, Spain, June 18-21, 2003.

[77] "Graph Realizations with partial Oriented Matroid constraints", Seminaire ALGO, org. H. Everett and S. Lazard, LORIA, Nancy, France, June 12, 2003.

[78] "Folding and Unfolding Processes for Polygonal Linkages, with Applications to Structural Biology", NSF-DARPA CARGO Meeting, Santa Rosa, CA, May 12-14, 2003.

[79] "Graph Realizations with partial Oriented Matroid constraints", Seminaire GeCoAl, org. M. Pocchiola, Ecole Normale Superieure Paris, May 2, 2003.

[80] "Oriented Matroids and Rigidity", Seminaire Combinatoire algebrique et geometrique, org. M. Las Vergnas, at Université Paris 6, Feb. 20, 2003.

[81] "Graph Realizations with partial Oriented Matroid constraints", Symposium in honor of Prof. Jürgen Bokowski's 60th birthday, Darmstadt University, Darmstadt, Germany, Feb. 2-4, 2003.

[82] "A Crash Course in Rigidity Theory", Computer Science Department, Stanford University, Jan.10 and 17, 2003.

[83] "Degrees of Freedom", Seminar talk, Graphics group, Computer Science Department, Stanford University, Dec. 12, 2002.

[84] "Towards a mathematical and algorithmic theory for the Protein Folding problem", Seminar talk, org. Lila Gierasch, Department of Molecular Biology, University of Massachusetts at Amherst, Nov. 22, 2002.

[85] "Towards a mathematical and algorithmic theory for the Protein Folding problem", Seminar talk, Computational Biology group, org. S. Batzoglu, Computer Science Department, Stanford University, Nov. 2, 2002.

[86] "A Combinatorial Approach to the Protein Folding Problem", DARPA strategic meeting on the Protein Folding Problem, Arlington, VA, Oct 28-29, 2002.

[87] "Towards a mathematical and algorithmic theory for the Protein Folding problem", Seminar talk, org. M. Levitt, Department of Structural Biology, Stanford University, Oct. 18, 2002.

[88] "Combinatorial Roadmaps in Configuration Spaces of Simple Planar Polygons", Nov. 18-20, 2002. Invited Speaker, DIMACS Workshop on "Algorithmic Issues of Modelling Motion", org. P. Agarwal and L. Guibas. DIMACS/Rugers University, NJ.

[89] "On the number of embeddings of minimally rigid graphs", Geometry Seminar, org. R. Pollack, Courant Institute of Mathematics, New York University, NY.Oct. 15, 2002.

[90] "High degree curves generated by mechanisms, with applications in Rigidity", AMS Regional Meeting, special session on "Optimal Geometry of Curves and Surfaces", org. J. Cantarella and J. Sullivan, Madison, WI. Oct. 12-13, 2002.

[91] "Pseudo-triangulations and Rigidity: a survey and recent results", plenary talk at "Discrete, Combinatorial and Computational Geometry" (R. Pollack, J.E. Goodman, C. Zhong, organizers), a satellite conference to the *International Congress of Mathematicians,* Beijing University, Beijing, August 13-17, 2002.

[92] "Folding Carpenter's Rules, Robot Arms, Proteins: a Combinatorial Approach", org. S. Istrail, Celera Genomics, Rockville, MD. Aug. 6, 2002.

[93] "Folding and Unfolding of Polygonal Linkages", NSF-DARPA CARGO Program kick-off meeting, Newport, RI. May 20-22, 2002.

[94] "On the Number of Embeddings of Minimally Rigid Graphs", Discrete Geometry and Graph Theory Seminar, org. R. Connelly, Mathematics Department, Cornell University. April 26, 2002.

[95] "Folding Carpenter's Rules, Robot Arms, Proteins: a Combinatorial Approach", Mathematics Department Seminar, org. J. Cantarella, University of Georgia, Athens, GA. March 8, 2002.

[96] "Opening Arms: a Combinatorial Approach", Special session on *Robot Arm Manipulation: Geometric Challenges* (under Science Innovation: Physical Science and Engineering), at the *American Association for the Advancement of Science* meeting in Boston, org. R. Connelly and G. Rote, Feb. 14-19, 2002

[97] "Expansive Motions and the Polytope of Pointed Pseudo-Triangulations", Geometry Seminar, org. J. Pach and R. Pollack, Courant Institute of Mathematics, New York University. November 20, 2001.

[98] "New and old results on Pseudo-triangulations", Theory/Operations Research Seminar, org. L. Fleischer, Carnegie-Mellon University. November 16, 2001.

[99] "Folding Carpenter's Rules, Robot Arms, Proteins: a Combinatorial Approach", Valley Discrete Math Day, org. F. Sottile, University of Massachusetts at Amherst. Oct. 12, 2001.

[100] "Pseudo-Triangulations, Rigidity Theory and Efficiently Planning Non-Colliding Robot Arm Motions", Graduate Seminar, org. G. Rote, Fachbereich Informatik, Freie Universität Berlin, Germany. May 28, 2001.

[101] "Pseudo-Triangulations, Rigidity Theory and Efficiently Planning Non-Colliding Robot Arm Motions", Univ. of Massachusetts at Amherst, Theory Seminar, org. N. Immermann and D. Mix Barrington. May 1, 2001.

[102] "Combinatorial Roadmaps in Configuration Spaces of Simple Planar Polygons", DIMACS Workshop on Algorithmic and Quantitative Aspects of Real Algebraic Geometry, Discrete Mathematics and Computer Science Center (DIMACS), org. M. Sharir and R. Pollack, Rutgers University, NJ. March 12-16, 2001.

[103] "A Combinatorial Approach to Planar Non-Colliding Robot Arm Motion Planning", Rutgers Operations Research Center (RUTCOR) seminar, org. P. Hammer. March 2, 2001.

[104] "A Rigidity Theoretic Approach to Planar Non-Colliding Planar Robot Arm Motion Planning", Geometry Seminar, org. R. Pollack, Courant Institute of Mathematics, New York University. Feb. 6, 2001.

[105] "Folding Carpenter Rulers, Robot Arms, Proteins: a Rigidity Theoretical Approach", plenary speaker at the Stony Brook Workshop on Discrete and Computational Geometry, SUNY at Stony Brook. Oct. 28-29, 2000.

[106] "Rigidity of Pseudo-Triangulations", American Mathematical Society (AMS) Regional Meeting, org. A. Ivic-Weiss and W. Whiteley, University of Toronto, Toronto, Canada, Sept. 23-24, 2000.

[107] "The Folkman-Lawrence Topological Representation Theorem for Oriented Matroids - an Elementary Proof in Rank 3", Special Session on Oriented Matroids and Polyhedra, International Conference on Mathematical Programming, Atlanta, Aug. 7-11, 2000.

[108] "Moving Simple Polygons Rigidly", invited plenary lecture at the Annual Meeting of the New Jersey Chapter of Mathematical Association of America, Georgian Court College, NJ. April 8, 2000

[109] "Polygonal Oriented Matroids", special session on Discrete and Combinatorial Geometry, org. R. Connelly, M. Senechal and W. Whiteley, American Mathematical Society (AMS) Regional Meeting, Univ. of Massachusetts at Lowell, MA, April 1-2, 2000.

[110] "The Flexibility Oriented Matroid", 4th Geometry Festival, an International Workshop on Discrete Geometry and Rigidity, org. A. and K. Bezdek, K. Böroczy, Eötvös University, Budapest, Hungary, Nov. 29 - Dec. 2, 1999.

[111] "Stretchability Questions for Pseudo-Visibility Graphs", Workshop on Oriented Matroids, org. M. Las Vergnas, Luminy, France, Oct. 4-8, 1999.

[112] "Research Problems on Visibility", one week of lectures at *Reconnect '99*, an NSF-funded program, Discrete Mathematics and Computer Science Center (DIMACS), Rutgers University, NJ. July 19-23, 1999

[113] "Pseudo-visibility graphs", seminar talk, org. P. Ramos and M. Abellanas, Universidad de Madrid, Alcala de Henares, Spain. Jan. 14, 1999

[114] "Pseudo-visibility in pseudo-polygons", seminar talk, org. F. Santos, Universidad de Cantabria, Santander, Spain. Dec. 10, 1998

[115] "A Crash Course on Oriented Matroids", Departament of Applied Mathematics II, Universitat Politecnica de Catalunya, Barcelona. Nov. - Dec. 1998

[116] "Pseudo-visibility graphs and oriented matroids", seminar talk, org. J. Bokowski, Technische Universitaet Darmstadt, Germany. Nov. 4, 1998

[117] "The complexity of visibility graph recognition", Theory Seminar, org. F. Hurtado, Computer Science Department and Departament of Applied Mathematics II, Universitat Politecnica de Catalunya, Barcelona. Oct. 1998

[118] *Computational Geometry*, short course at Transylvania University of Brasov, Romania. Funded from a European TEMPUS grant. Jan. 6-10 1997

[119] (with J. O'Rourke) "Pseudo-visibility graphs in Pseudo-polygons", 26th Computational Geometry Day, Courant Institute, org. J.E. Goodman and R. Pollack, New York University. Apr. 26, 1996

[120] "Pseudo vertex-edge visibility graphs", Geometry Seminar, org. S. Whitesides, McGill University, Montreal. Mar. 19, 1996

[121] "Pseudo vertex-edge visibility graphs", Courant Institute of Mathematics, Geometry Seminar, org. J.E. Goodman and R. Pollack, New York University. Mar. 22, 1996

[122] "Pseudo-visibility graphs and oriented matroids", 17th Combinatorics and Graph Theory Day (CONE), Smith College. Nov. 11, 1995

[123] "A pseudo-algorithmic separation of lines and pseudo-lines", 14th Combinatorics and Graph Theory Day (CONE), Smith College. Sep. 24, 1994

Conference Talks and Tutorials

[124] (with Ciprian Borcea) "Rigidity of volume frameworks", Automated Deduction in Geometry (ADG'12), Sept. 19-21, 2012, Edinburgh, UK.

[125] "Rigidity of Universal Molecules", Automated Deduction in Geometry (ADG'12), Sept. 19-21, 2012, Edinburgh, UK.

[126] "Flexible crystal frameworks", Canadian Conference in Computational Geometry, Charlottestown, Prince Edward Island, Canada, Aug. 8-10, 2012.

[127] (with Ciprian Borcea) "Positional workspace of revolute jointed manipulators", Advances in Robot Kinematics, Innsbruck, Austria, July 24-29, 2012.

[128] "Periodic body-bar frameworks", ACM Symposium on Computational Geometry, Chapel Hill, North Carolina, June 17-20, 2012.

[129] (with Naomi Fox) "KINARI-Lib: a library for rigidity analysis", Minisymposium on Publicly available software, ACM Symposium on Computational Geometry, Chapel Hill, North Carolina, June 17-20, 2012.

[130] (with Naomi Fox and Filip Jagodzinski) "Analyzing Protein Flexibility Introduction to Combinatorial Rigidity methods and their applications", 3hr tutorial, IEEE Intern. Conf. on Bio-Informatics and Bio-medicine (BIBM'11), Atlanta, GA, Nov. 12-15, 2011.

[131] (with Ciprian Borcea) "Extremal Reaches in Polynomial Time", 27th ACM *Symp. on Computational Geometry* (SoCG'11), Paris, June 13-15, 2011

[132] (with Ciprian Borcea) "Workspace Boundary by Extremal Reaches", 27th ACM *Symp. on Computational Geometry* (SoCG'11), Paris, June 13-15, 2011

[133] "Natural realizations of sparsity matroids". Conference on *Zero-One Matrices and their Applications*, University of Coimbra, Portugal, June 17-20, 2010.

[134] "Computational geometry algorithms for robotic manipulators, with applications". Tutorial, International IEEE Confererence on Robotics and Automation (ICRA'10), Anchorage, Alaska, May 7, 2010.

[135] "How far can you reach?", ACM-SIAM Symp. on Discrete Algorithms (SODA'10), Austin, Texas, Jan. 17-19, 2010.

[136] "Nucleation-free 3D Rigidity", 21st Canadian Conf. Computational Geometry (CCCG'09), Univ. British Columbia, Vancouver, Canada, Aug. 17-19, 2009.

[137] "Single-vertex Origami: the non-expansive case", ACM Symp. Computational Geometry (SoCG'09), Aarhus University, Denmark, June 7-10, 2009.

[138] "Enumerating Planar Minimally Rigid Graphs", 15th Fall Workshop on Computational Geometry and Visualization, 18-19 Nov. 2005, Univ. of Pennsylvania.

[139] "Parallel Redrawing Mechanisms, Pseudo-Triangulations and Kinetic Planar Graphs", Graph Drawing'05 conference, Limerick, Ireland, Sept. 12-14, 2005.

[140] "Computing rigid components of pseudo-triangulation mechanisms in linear time", Canadian Conf. Comput. Geometry (CCCG'05), Univ.of Windsor, Canada, Aug. 10-12, 2005

[141] "Single-vertex Origami and Spherical Expansive Motions", Japan Conf. Discrete and Computational Geometry (JDCG'04), Tokai University, Tokyo, Oct. 8-11, 2004.

[142] (with Ciprian Borcea) "On the Number of Embeddings of Minimally Rigid Graphs", ACM Symp. Comput. Geometry (SoCG'02), Barcelona, June 5-7, 2002.

[143] "Expansive Motions and The Polytope of Pointed Pseudo-Triangulations", The 11th Annual Fall Workshop on Computational Geometry Brooklyn Polytechnic, Brooklyn, NY, Nov. 2-3, 2001.

[144] "The Spherical Carpenter's Rule Problem and Conical Origami Folds", The 11th Annual Fall Workshop on Computational Geometry Brooklyn Polytechnic, Brooklyn, NY, Nov. 2-3, 2001.

[145] "Fast Implementation of Depth Contours using Topological Sweep", 11th SIAM-ACM Symp. on Discrete Algorithms (SODA'01) 2001, Washington, DC, Jan. 7-9, 2001.

[146] "A Combinatorial Approach to Planar Non-Colliding Robot Arm Motion Planning", 41st ACM Annual Symposium on Foundations of Computer Science (FOCS'00), Redondo Beach, CA, Nov. 12-14, 2000.

[147] "Hamiltonicity and Colorings of Arrangement Graphs", 11th ACM-SIAM Symposium on Discrete Algorithms (SODA'00), San Francisco, Jan 9-11, 2000.

[148] "Non-Stretchable Pseudo-Visibility Graphs", 11th Canadian Conf. on Computational Geometry (CCCG'00), Vancouver, British Columbia, CA, Aug. 12-16, 2000.

[149] "Stretchability of Star-like Pseudo-Visibility Graphs", ACM Symposium on Computational Geometry (SoCG'99), Miami Beach, June 1999, pp. 274-280.

[150] "Pseudo-Visibility Vertex-Edge Visibility Graphs: Characterization and Recognition", ACM Symposium on Computational Geometry (SoCG'97), Nice, France, June 4-6, 1997.

[151] "Clusters of Stars", Fall Workshop on Computational Geometry, Johns Hopkins University, Oct. 11-12, 1996.

[152] " Positive and Negative Results on the Floodlight Problem", 6th Canadian Conference on Computational Geometry (CCCG'94), Saskatoon, Canada, Aug. 1994.

[153] "A pseudo-algorithmic separation of lines and pseudo-lines", 6th Canadian Conference on Computational Geometry (CCCG'94), Saskatoon, Canada, Aug. 1994.

Posters and Demos

[1] (with Emily Flynn and Filip Jagodzinski) "Towards Sequence-Based DNA Flexibility Analysis", ACM International Conf. on Bioinformatics and Computational Biology (ACM-BCB'12), Orlando, Florida, Oct. 8-10, 2012.

[2] (with Ciprian Borcea) "Pharmacosiderite and ultrarigidity", Colloquium on *Rigidity of periodic and symmetric structures in nature and engineering*, (Simon Guest, Patrick Fowler and Stephen Power, organizers). Kavli Center of the Royal Society, Buckinghamshire, United Kingdom, Feb. 23-24, 2012.

[3] (with Ciprian Borcea) "Mixed periodic plate-and-bar frameworks and metal-organic frameworks", Colloquium on *Rigidity of periodic and symmetric structures in nature and engineering*, (Simon Guest, Patrick Fowler and Stephen Power, organizers). Kavli Center of the Royal Society, Buckinghamshire, United Kingdom, Feb. 23-24, 2012.

[4] (with Naomi Fox) "Towards accurate modeling of hydrogen bonds for protein rigidity analysis", *Workshop on Computational Structural Bioinformatics*, IEEE Int. Conf. on Bioinformatics and Biomedicine (BIBM11), Atlanta, GA, Nov. 12-15, 2011.

[5] (with Filip Jagodzinski, Naomi Fox and Diana Jaunzeikare) "A Software Tool for Surveying the Rigidity Properties of Protein Families", in: Biotechnology and Bioinformatics Symposium (BIOT'09). October 9-10, 2009 Lincoln, Nebraska, 2009.

[6] (with Naomi Fox, Filip Jagodzinski and Yang Li) "A Web-Based Tool for Rigidity Analysis of Proteins", in: Biotechnology and Bioinformatics Symposium (BIOT'09), Lincoln, Nebraska, 2009.

[7] (with Naomi Fox, Filip Jagodzinski and Jeanne Hardy) "How Hydrogen Bonds Affect Protein Rigidity"", in: 23rd Symposium of the Protein Society, Proteins in Motion. July 25-29, 2009 Boston Marriott Copley Place, Boston, Massachusetts, 2009.

[8] (with Audrey Lee and Louis Theran) "Analyzing Rigidity with Pebble Games", video presentation, 24th ACM Symposium on Computational geometry (SoCG'08), Univ. Maryland College Park, June 2008.

[9] "New Results in Rigidity Theory", Workshop on *Geometric Simulation of Macromolecular Flexibility*, Tempe, Arizona, May 9-11, 2008.

[10] (with Audrey Lee and Aaron StJohn) "2D Motion Simulation under Constraints", Workshop on *Flexibility in Macromolecules*, Tempe, Arizona, May 13-15, 2006.

[11] (with Audrey Lee and Oliver Brook) "A methodology for efficiently sampling conformation spaces of molecular structures", Workshop on *Flexibility in Macromolecules*, Tempe, Arizona, May 15-18, 2005.

[12] (with Audrey Lee and Oliver Brook) "A methodology for efficiently sampling conformation spaces of molecular structures", NSF-DARPA CARGO Meeting, Santa Fe, New Mexico, May 10-11, 2005.

[13] (with Audrey Lee and Louis Theran) "Detecting rigid Components in Graphs", NSF-DARPA CARGO Meeting, Santa Fe, New Mexico, May 10-11, 2005.

[14] (with Audrey Lee) "Single Vertex Origami", NSF-DARPA CARGO Meeting, Madison, Wisconsin, May 10-11, 2004.

[15] (with Elif Tosun) "Camera Position Reconstruction and Tight Direction Networks", Graph Drawing'02, University of Irvine, CA, Aug. 26-28, 2002.

[16] "Clusters of Stars", ACM Symposium on Computational Geometry, Nice, France, June 4-6, 1997.

Posters with Undergraduate Students

[17] (with Diana Jaunzeikare) "Protein rigidity analysis on the whole PDB using FIRST", CCSCNE Conference, SUNY Plattsburg, April 23-24, 2009.

[18] (with Yang Li) "Protein flexibility analysis: a friendly interface", CCSCNE Conference, SUNY Plattsburg, April 23-24, 2009.

[19] (with Elif Tosun) "Visualizing an algorithm for robot arm reconfiguration", CCSCNE Conference, Middlebury College, April 19-20, 2001. Won the Best student poster award.

[20] (with Beenish Chaudry, Geetika Tewari and Elif Tosun) "A research tool for Oriented Matroids in Java", CCSCNE Conference, Ramapo College, NJ, April 2000.

[21] (with Lilla Zollei) "Clusters of Stars", CCSCNE Conference, April 1998.

[22] (with Ling Lin) "A Java applet for Rectangle Visibility Graphs", CCSCNE Conference, April 1998.

[23] (with Roxana Cocan) "Knot visualization", CCSCNE Conference, April 1998.

Software

[1] *KINARI-Mutagen:* Software for studying the effect of mutations on protein flexibility. Accessible at `http://kinari.cs.umass.edu`. Work with PhD student Filip Jagodzinski.

[2] *KINARI-Web:* Software for protein flexibility analysis. Accessible at `http://kinari.cs.umass.edu`. Work with PhD students Naomi Fox and Filip Jagodzinski and undergraduate student Yang Li.

[3] Educational and demos:

Rigidity and Origami: video and educational web site, `http://linkage.cs.umass.edu/langOrigami/`. Work with PhD student John Bowers.

Rigidity and Pebble Games: educational site, `http://linkage.cs.umass.edu/pg/`. Work with former PhD students Audrey Lee and Louis Theran.

Motion Simulator for bar-and-joint linkages, `http://minerva.cs.mtholyoke.edu/demos/motionSimulation.php`. Work with PhD student Audrey Lee.

Research Grants

[1] NSF-UBM-Mathematical Biology, *Four College Biomathematics Consortium*, $994,350, 2011-2016. Collaborative undergraduate student research-training grant. Principal investigator. With Smith College colleagues Robert Dorit (Biology), Christopher Gole (Mathematics), and with Tania Leise, Amy Wagaman and Sheila Jaswal (Amherst College), Lee Spector and Sarah Hews (Hampshire College) and Craig Woodard and Martha Hoppes (MtHolyoke College).

[2] NSF-CCF Algorithmic foundations (Theory) research grant, *Motion planning for geometrically constrained structures*, $216,558, 2010-2013. Principal investigator.

[3] DARPA "23 Mathematical Challenges" Research grant, *Combinatorial and Algorithmic Rigidity: beyond two-dimensions*, $853,820, 2008-2012. Principal investigator. With C. Borcea (Rider University).

[4] NSF-DMS NGIMS interdisciplinary collaboration research grant in Biomathematics, *Geometric simulation of molecular flexibility*, $330,000, 2007-2010. Principal investigator. With M. Thorpe (Arizona State University).

[5] NSF-CCF Theory Research grant, *Rigidity, Flexibility, Motion and Stress: Foundations of Reconfiguration Problems in Computational Geometry*, $200,000, 2007-2010. Principal investigator.

[6] NSF SCREMS grant, *High performance computing environment at Smith College*, co-PI on a Smith College Mathematics Department group proposal for a high-end computer cluster, Ruth Haas (PI), 2007.

[7] NSF REU grant supplement, $10,000, 2005-2006. Principal investigator.

[8] NSF international collaboration grant supplement, *Pseudo-triangulations and Convex Geometry*, $11,000, 2006-2007. Principal investigator.

[9] NSF grant, for organizing the *Fall Workshop on Computational Geometry* at Smith College, Nov. 10-11 2006, $10,000, 2006-2007. Principal investigator.

[10] NSF CCF-0430990 Theory research grant, *Oriented Matroid and Rigidity Theory Techniques in Computational Geometry*, $180,000. Principal Investigator, 3 year research grant, 2004-2007.

[11] NSF-DARPA CARGO grant, *Folding and Unfolding Processes for Polygonal Linkages, with Applications in Biology*, Principal Investigator. With L. Guibas, R. James Milgram and M. Levitt (Stanford University), $650,000, 2003-2006.

[12] NSF-DARPA CARGO incubation grant CCR-0138374, *Folding and Unfolding Processes for Polygonal Linkages, with Applications in Robotics and Biology*, Principal Investigator. With L. Guibas, R. James Milgram and M. Levitt (Stanford University). $99,961, 2002-2003.

[13] NSF CCR-0105507 RUI theory research grant, *Oriented Matroid and Rigidity Theory Techniques for Pseudo-Triangulations, Visibility Graphs and other structures in Computational Geometry*, $108,000. Principal Investigator, 2001-2004.

[14] RUI NSF grant CCR-0203224, *Workshops on Topics in Computational Geometry*, $15,000, 2002-04.

[15] NSF grant CCR-0104370, *Workshop on Pseudo-Triangulations*, $6,000.

[16] Supplement to NSF grant CCR-9731804, *Topics in Computational Geometry*, 2000, $10,000

[17] NSF CCR-9731804 RUI Theory research grant, co-PI (with J. O'Rourke) *Topics in Computational Geometry*, 1998-2001, $150,000

[18] Picker Fellowship, Smith College, 1998

[19] NSF CCR-94-21670 RUI Theory research grant , co-PI (with J. O'Rourke) *Visibility, 3d and other topics in Computational Geometry*, 1995-1997, $150,000

Other funded activities

[20] *Research-in-pairs program* at the Oberwolfach Mathematical Research Institute, Jan. 17-31, 2009. With Gaiane Panina.

[21] Software donation from Dessault Systems - SolidWorks. 2008, 2010.

[22] Software donation from MolSoft, 2009.

[23] Gastprofessorin (Full Visiting Professor), Department of Mathematics, Technische Universität Berlin, Germany. Funded by the Leibnitz grant of Prof. Günter Ziegler, May-Oct. 2006.

[24] University of Engineering and Architecture, Kyoto, Japan. Funded short-term visitor. July 2005.

[25] Hamburg University, Germany. Funded short-term exchange visitor. June 2005.

[26] École Normale Superieure, Paris, funded Professeur Visiteur. March-May 2003.

[27] Université Nancy and LORIA, France, funded Professeur Visiteur. June 2003.

[28] Department of Applied Mathematics, Universitat Politecnica de Catalunya, Barcelona. Visiting scholar. Dec. 1998.

Teaching Experience

Undergraduate courses (Smith College and Rutgers University): Modeling in the Sciences, Frontiers in Biomathematics (team-taught), Algorithms, Computational Geometry, Seminar in Robotics, Seminar in Computational Biology, Formal Languages and Automata, Discrete Mathematics, Data Structures and Object-Oriented Programming, Advanced Programming Techniques (C++, Java, Mathematica), Operating Systems, Databases, Computer Literacy and Introduction to Engineering: Designing Intelligent Robots.

Graduate courses and seminars: Computational Geometry and Applications, Advanced Topics in Computational Geometry, Seminar in Rigidity Theory and applications (University of Massachusetts at Amherst), Lectures on Oriented Matroids (RUTCOR/Rutgers University), Rigidity Theory (Technische Universität Berlin).

Other: A Crash Course in Rigidity Theory (Stanford University), A Crash course on Oriented Matroids (Universitat Politecnica de Catalunya, Barcelona), Computational Geometry (Transylvania University, Brasov, Romania), LISP, Programming Languages and Compilers (University of Bucharest and Polytechnic University, Bucharest, Romania).

Curricular Initiatives

2010. Founding co-director of a newly launched *Concentration in Biomathematical Sciences* at Smith College, an interdisciplinary program with a strong undergraduate research component, involving Mathematics, Computer Science, Engineering, Biology, Chemistry, Biochemistry and Neuroscience faculty and students.

2011-12 Director of the *Concentration in Biomathematical Sciences* at Smith College.

2011-2012. Inaugural director of the Four College Biomath Consortium, a joint interdisciplinary research and teaching initiative of four colleges (Smith, Amherst, MtHolyoke and Hampshire) in Western Massachusetts, and Lead Principal Investigator on the NSF grant proposal to will fund its activities.

Post-doctoral Students

[1] André Schultz, 2008-2009. Now on a junior professor position, University of Muenster (Germany).

[2] Anastasia Kurdia, 2010-2011.

PhD Students

[1] Audrey Lee-StJohn, Univ. of Massachusetts Amherst. PhD May 2008. Now on a tenure-track assistant professor position, MtHolyoke College.

[2] Louis Theran, Univ. of Massachusetts Amherst. PhD June 2010. Now on a 3 year post-doctoral position, Freie Universität in Berlin, Germany, following a 2 year visiting assistant professor, Temple University, Philadelphia.

[3] Filip Jagodzinski, Univ. of Massachusetts Amherst. PhD August 2012. Now on a tenure-track position at Central Washington University.

[4] Naomi Fox, Univ. of Massachusetts Amherst. PhD September 2012. Now on a post-doctoral position in Computational Biology at Lawrence Berkeley Lab.

[5] Md. Ashraful Alam, Univ. of Massachusetts Amherst. Since Sept. 2008.

[6] John Bowers, Univ. of Massachusetts Amherst. Since Jan. 2011.

Undergraduate Honors Students

Tiffany Liu. Smith College Honors Thesis, 2011-2012. Since Sept. 2012, PhD candidate in Computer Science at UMass Amherst.

Yang Li. Smith College Honors Thesis, 2010-2011. Since Sept. 2011, PhD candidate in Computer Science at Stanford University.

Diana Jaunzeikare. Smith College Honors Thesis, 2009-2010. Since June 2010, at Google.

Alexandra Booth. Smith College Honors Thesis, 2006-2007. Since June 2007, at Google.

Elif Tosun. Smith College Honors Thesis, 2000-2001. PhD in Computer Science at New York University in 2008. Now at SolidWorks.

Post-bac Research Students

Pamela Clark, Jessica Grant and Samantha Monastra (Fall 2011), Lily Du, Stefanie Wang and Yonit Bousany (Fall 2010), Xiao Ting Zhao (2009-10), Heidi Goodman, Amanda Tapia and Nicole Vitale (Fall 2009).

Undergraduate Research Students

Emily Flynn (SURF, Summer 2012; 4CBC Biomathematics fellowship, Fall 2012, Spring 2013), Sharon Santana (Fall 2012, Biomathematics fellowship Spring 2013), Hiwot Kassaye (AEMES scholar, Fall 2011), Tiffany Liu (2011012), Aigerim Karabekova (2011-12), Helen Quinnen and Sonia Brown (AEMES scholars, 2010-11), Beverly Turner and Claire Ma (STRIDE scholars, 2009-10), Jennifer DiBerardinis (Spring 2010), Diana Jaunzeikare (2008-11), Yang Li (Mellon-Mays scholar 2007-11), Tonje Stolpested (2009), Adina-Elena Draghici (2009), Alexandra Booth (2005-06), Alexander Apostol (2005-06), Cristina Harko (2004-05), Curtiss Taylor (2004-05), Leonid Lastovkin (2006), Marissa Warner-Wu (STRIDE scholar 2004), Katina Tiggas (2002), Beenish Chaudry (1999-2002), Elif Tosun (1999-2001), Veronica Morales (2001), Caroline Moore (2001), Eleanor Farrington (2001), Melody Donoso (STRIDE scholar 2001), Victoria Manfredi (2000), Naomi Fox (2000), Christine Rice (2000), Katherine Sinclair (2000), Rosy Fynn (2000), Allison Baird (2000), Haley Miller (2000), Octavia Petrovici (1999), Shana Negin (1999), Geetika Tewari (1999-2000), Roxana Cocan (1997-98), Ling Lin (1997-98), Andee Browne (STRIDE scholar 1997), Lilla Zollei (1997), Jorjeta Jetcheva (1996), Erika Knepp (STRIDE scholar 1996-97), Renee Landrum (1996), Heather Alef (1995).

Student awards

[1] John C. Bowers, NSF graduate student fellowship, 2011-14.

[2] Yang Li, Sept. 2011. Her work was recognized in Sept. 2011 by the Council of Undergraduate Research, in a section on featured undergraduate research projects.

[3] Audrey Lee, SolidWorks graduate fellowship, Spring 2008.

[4] Audrey Lee and Louis Theran, Best poster award, Fall Workshop on Computational Geometry, Nov. 2007, IBM Research Center.

[5] Louis Theran, NSF East Asia graduate travel fellowship, 2006.

[6] Audrey Lee, NSF graduate student fellowship, 2003-05.

[7] Elif Tosun, Best undergraduate student poster award, Computing at Small Colleges Conference (CCSCNE'01).

Professional Activities

[1] Organizer, annual *Workshops on Topics in Computational Geometry and its Applications*, Bellairs Research Institute of McGill University in Barbados, West Indies, 2000-2011, `http://linkage.cs.umass.edu/workshops.html`.

- [11th] *Computational Theory and Applications*, Jan. 2-9, 2011.
- [10th] *Rigidity Theory and Applications*, Jan. 1-8, 2010.
- [9th] *Geometric constraints with applications in CAD and biology*, Jan. 2-9, 2009.
- [8th] *Enumeration in Rigidity Theory*, Feb. 24 - Mar. 1, 2008.
- [7th] *Dynamics Under Constraints II*, Feb. 9-16, 2007.
- [6th] *Dynamics Under Constraints*, Jan. 13-20, 2006.
- [5th] *Geometry in NMR Protein Structure Determination and NMR Structural Biology*, Jan. 14-21, 2005.
- [4th] *Geometry of Modeling Proteins*, Jan. 16-23, 2004.
- [3rd] *Geometry of Protein Folding*, Jan. 24-31, 2003.
- [2nd] *Rigidity Theory and Scene Analysis*, Jan. 11-18, 2002.
- [1st] *Pseudo-Triangulations*, Jan. 26-Feb.2, 2001.

[2] Co-organizer (with Robert Connelly, Tibor Jordan, Stephen Power and Walter Whiteley), Workshop on *Rigidity Theory: Progress, Applications and Key Open Problems*, Banff International Research Station (BIRS) Center, Banff, Canada, July 20-25, 2012.

[3] Co-organizer (with Robert Connelly, Tibor Jordan and Walter Whiteley), Workshop on *Rigidity Theory*, Fields Institute, Toronto, Oct. 11-14, 2011.

[4] Co-organizer (with Marston Conder, Robert Connelly, Tibor Jordan, Barry Monson, Egon Schulte, Asia Ivic Weiss and Walter Whiteley), Workshop on *Rigidity and Symmetry*, Fields Institute, Toronto, Oct. 17-21, 2011.

[5] Organizer, Special Sessions at American Mathematical Society Regional Meetings.

- (with Jack Snoeyink), Special Session on *Geometry of Molecular Modeling*, Meeting # 997, Rider University, Lawrenceville, NJ, April 17-18, 2004.
- (with W. Steiger), Special Session on *Discrete and Computational Geometry*, Meeting # 914, Rider University, Lawrenceville, NJ, Oct. 5-6, 1996.

[6] Organizer and PC Chair, 16^{th} *Fall Workshop on Computational Geometry*, 10-11 Nov. 2006 and *Rigidity Theory Day*, 12 Nov. 2006, Smith College, MA.

[7] Co-organizer (with Michael Thorpe), Workshop on *Gemetric Simulation of Macromolecular Flexibility*, Tempe, Arizona, 9-11 May 2008.

[8] Co-organizer (with Brigitte Servatius), Special Session on *Tensegrities*, ICIAM'07 (Internat. Congress on Industrial and Applied Mathematics), Zürich, July 16-22, 2007.

[9] Program Committee member.

- ACM Symposium on Computational Geometry (SoCG'13), Rio de Janeiro, 2013.
- Computational Structural Biology Workshop (CSBW'12), BIBM'12, Drexel University, Philadelphia, Oct. 4, 2012.
- International Symposium on Bioinformatics Research and Applications (ISBRA'12), Dallas, TX, May 21-23, 2012.
- IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS'12). Las Vegas, 24-25 Feb. 2012.
- Special Track on *Geometric Constraint Systems* (GCD'09) at the ACM Annual Symp. on Applied Computing (SAC'12), March 2012.
- *European Symposium on Algorithms* (ESA'11), Saarbrücken, Germany, Sept. 2011.
- 4th Annual *International Conference on Combinatorial Optimization and Applications* (COCOA'10), December 18-20, 2010, The Big Island, Hawaii, USA.
- ACM-SIAM *Symposium on Discrete Algorithms* (SODA'11), San Francisco, Jan. 25-28, 2011.
- *Theoretical Computer Science* (TCS'10) track at the *World Computer Congress*, Brisbane, Australia 2010.
- Special Track on *Geometric Constraint Systems* (GCD'10) at the ACM Annual Symp. on Applied Computing (SAC'10), Sierre, Switzerland, March 2010.
- Special Track on *Geometric Constraint Systems* (GCD'09) at the ACM Annual Symp. on Applied Computing (SAC'09), Honolulu, Hawaii, March 2009.
- 18th Fall *Workshop on Computational Geometry*, Rensselaer Polytechnic Institute, Troy, NY, 31 Oct - 1 Nov. 2008.
- 19th *Internat. Symp. on Algorithms and Computation* (ISAAC'2008), Dec. 15-17, Gold Coast, Australia.
- 17th Fall *Workshop on Computational Geometry*, IBM Thomas Watson Research Center, Yorktown Heights, NY, November 9-10, 2007.
- 23rd *Symposium on Computational Geometry* (SoCG'07), Gyeongju, Korea, June 6-8, 2007.
- 8th Workshop on *Algorithm Engineering and Experiments* (ALENEX'06), Miami, Jan. 21, 2006.
- 15th Fall *Workshop on Computational Geometry*, University of Pennsylvania, November 18-19, 2005.
- 14th Fall *Workshop on Computational Geometry*, MIT, November 19-20, 2004.

- 12th DIMACS Fall *Workshop on Computational Geometry*, DIMACS/Rutgers, November 2002.
- ACM Annual *Symposium on Computational Geometry* (SoCG'01), Tufts University, Medford, MA, 2001.

[10] Editorial work.

- Member of Editorial Board, *Discrete and Computational Geometry*, since 2006.
- Member of Editorial Board, *Contributions to Discrete Mathematics*, since 2005.
- Guest editor, special issue of *Computational Geometry, Theory and Applications* devoted to papers from the Fall Workshop on Computational Geometry, Nov. 2000, Stony Brook.

[11] PhD Committee, External Examiner: Queens University (Computational Geometry) 1998, Tufts University (Computational Geometry) 2005, Yale University (BioInformatics) 2008, Freie Universitaet Berlin (Computational Geometry) 2008, UMass Amherst (Mathematics) 2009, UMass Amherst (Computer Science/BioInformatics) 2010.

[12] Funding Agency Research Proposal Reviewer. NSF and NSA (USA), and NSERC (Canada) grant proposal reviewer. Since 1996, about 2-4 panels or proposal requests per year, for NSF CCF, DMS, REU, etc., regular and CAREER proposals. Invited to participate in DARPA workshops (Protein folding, 2004; STOMP meeting, 2010; Math seminar and retirement events for DARPA program manager Ben Mann, 2010) and AFOSR/AFRL (Space Situational Awareness Workshop, 2010).

[13] Reviewed papers submitted to *Discrete and Computational Geometry*, *Computational Geometry: Theory and Applications*, *Discrete Mathematics*, *International Journal of Computational Geometry and Applications*, *SIAM Journal of Computing*, *Transactions of the AMS*, *ACM Symposium on Computational Geometry (SoCG)*, *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, *Symp. on Theory of Computing (STOC)*, *Internat. Symp. on Algorithms and Computation*, *Geometric Constraints and Reasoning* (GCR), *International Journal of Robotics*, *Graphs and Combinatorics*, *Mathematical Intelligencer*, *Journal of Heuristics*, *Entropy*, etc.

[14] *Other professional activities.* External evaluator: tenure committee (8 cases), promotion to full professor (2 cases). External search committee member, Five Colleges Bioinformatics position, 2008 and 2010-11. Reviewer for Grace Hopper conference travel fellowships.

Other educational and Outreach

[1] *Staying current in a generalist environment: Resources for teaching*, invited talk at the CRA-W (Computing Research Association for Women) Mentoring Workshop for advanced PhD students and junior faculty in Computer Science, SIGCSE Conference, Covington, KY, March 7, 2007.

[2] Invited speaker at *Women in Computer Science* group meetings for PhD students: Stanford, 2002 and UMass Amherst 2004.

[3] *Research Problems on Visibility*, one week of lectures at *Reconnect '99*, an NSF-funded program for reconnecting faculty at teaching institutions to research, DIMACS Center, Rutgers University, NJ, July 19-23, 1999.

[4] *Computational Geometry*, short course at Transylvania University of Brasov, Romania, Jan. 6-10 1997. Funded from a European TEMPUS grant.

[5] *Designing Intelligent Robots: an Introduction to Engineering*, Smith College Summer Science Program for high school girls, 1999, 2000, 2001. Featured on Nickelodeon (2002) and local news on Western Massachusetts TV and radio stations and local newspapers (1999).

Press

[1] Interviewed for *Darwin's Extra Sense*, `http://www.math.dartmouth.edu/publicity/general/extrasense`, a documentary film about Biomathematics by Wendy Conquest, Bob Drake and Dan Rockmore, Dartmouth University; appear in a short video about the Mathematics Department at Smith College, shown at the Joint Mathematical Meeting in Boston, Jan. 2012; and in a video distributed on the Smith College web site, featuring research labs in Ford Hall.

[2] Articles in Smith College Alumnae Quarterly: Winter 2013 issue, *Faculty of note*; Winter 2012 issue, interview about the Biomathematics concentration. The Four Colleges Biomathematics Consortium grant was featured in Smith News and the news sites of Amherst, MtHolyoke and Hampshire Colleges; in the local Daily Hampshire Gazette; and in the Smith College student newspaper The Sophian.

[3] Daily Hampshire Gazette, The Sophian and Smith News also reported on the Robbins Prize in 2010, and the Moisil Prize in 2006.

Languages

English
Romanian (first language)
French (fluent)
Spanish, Italian (medium level)
German (dictionary-assisted reading)