

## CURRICULUM VITAE

March 2020

## Carola Wenk

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Department of Computer Science	URL: <a href="http://www.cs.tulane.edu/~carola">http://www.cs.tulane.edu/~carola</a>
School of Science and Engineering	Date & place of birth: 5/17/73, Berlin, Germany
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## BIOGRAPHICAL SKETCH

Carola Wenk is a Professor of Computer Science at Tulane University. She also holds an adjunct appointment in the Mathematics department. Her research area is in computational geometry, with a focus on shape matching algorithms. Her work encompasses theoretical aspects including algorithms and topological data analysis, as well as interdisciplinary applications ranging from geospatial to biomedical data analysis. She is an expert on the Fréchet distance for curves, and her work on map-matching GPS trajectories and road map construction and comparison has laid theoretical foundations for practitioners in the field. Dr. Wenk has won research, teaching, and service awards, including an NSF CAREER award. Her research has been supported by grants from several agencies such as NSF, NIH, and DARPA. Her research interests span a wide range of application areas including geospatial data analysis, intelligent transportation systems, geographic information science, biomedical imaging, and computational biology.

## EDUCATION

Dr. rer. nat. (Ph.D.) 1998–2002, magna cum laude, Computer Science, Freie Universität Berlin. Thesis: “Shape Matching in Higher Dimensions”. Advisor: Helmut Alt

Dipl. Math. (M.S. and B.S.) 1992–1998, Mathematics, Freie Universität Berlin. Thesis: “Algorithmen für das Crossdating in der Dendrochronologie (Algorithms for Crossdating in Dendrochronology)”. Advisor: Helmut Alt

## PROFESSIONAL CAREER

07/2017 – present	Professor, Computer Science, Tulane University
08/2012 – present	Adjunct (Associate) Professor, Mathematics, Tulane University
08/2012 – 06/2017	Associate Professor, Computer Science, Tulane University
09/2008 – 07/2012	Associate Professor, Computer Science, University of Texas at San Antonio (UTSA)
01/2004 – 08/2008	Assistant Professor, Computer Science, UTSA
01/2002 – 12/2003	Assistant researcher, Computer Science, University of Arizona Postdoctoral advisor: Alon Efrat
10/1995 – 12/2001	Research and teaching assistant, Computer Science, Freie Universität Berlin, Germany

## PROFESSIONAL TRAINING

09/2010 – 05/2011 Leadership training through the Leadership UTSA program

## AWARDS AND HONORS

- 2018 Best Paper Award, International Workshop on Interactive and Spatial Computing.
- 2017 Best Paper Award, International Symposium on Spatial and Temporal Databases.
- 2014 Mortar Board Award for Excellence in Tenured Teaching, Tulane.
- 2012 President’s Distinguished Achievement Award for Excellence in University Service, UTSA.
- 2009 Best Paper Award, Algorithms and Data Structures Symposium, Banff, Alberta, Canada.
- 2008 College of Sciences Teaching Excellence Award, UTSA.
- 2008 President’s Distinguished Achievement Award for Teaching Excellence, UTSA.
- 2007 President’s Distinguished Achievement Award for Research Achievement, UTSA.
- 2007 NSF CAREER Award, National Science Foundation.
- 2005 Faculty research award, “Locating GPS Curves in Roadmaps”, UTSA.

## PROFESSIONAL MEMBERSHIPS

- ACM Association for Computing Machinery
- AAUP, American Association of University Professors

## GRANTS

- [G13] 12/29/17–6/28/20 “A Ground-Truth Simulator for Socio-Spatial Alternate Worlds”, Defense Advanced Research Projects Agency; sub-contract from George Mason University; \$370,275. Role: Subcontract-PI. Collaboration with PI Andreas Züfle, and Co-PIs Dieter Pfoser and Andrew Crooks at George Mason University.
- [G12] 8/1/17–7/31/20 “QuBBD: Collaborative Research: Quantifying Morphologic Phenotypes in Prostate Cancer - Developing Topological Descriptors for Machine Learning Algorithms”, National Science Foundation and National Institutes of Health, NSF-DMS 1664848, \$479,293. Role: PI. Collaboration with Co-PIs Quincy Brown (Biomedical Engineering), Andrew Sholl (Pathology), and Brian Summa (Computer Science) at Tulane and with Brit-tany Fasy at Montana State University; \$899,999 total grant amount.
- [G11] 9/1/16–8/31/20 “AitF: Collaborative Research: Modeling Movement on Transportation Networks using Uncertain Data”, National Science Foundation, NSF-CCF 1637576, \$317,681. Role: PI. Collaboration with Dieter Pfoser and Andreas Züfle at George Mason University; \$825,533 total grant amount.

- Supplement: 9/1/16-8/31/17 REU supplement included in initial award.
- [G10] 7/1/16–6/30/19 “AF: Small: Collaborative Research: Geometric and Topological Algorithms for Analyzing Road Network Data”, National Science Foundation, NSF-CCF 1618469, \$158,052. Role: PI. Collaboration with Brittany Fasy at Montana State University and with Yusu Wang at Ohio State University; \$499,975 total grant amount.
- [G9] 7/1/16–6/30/17 “Virtual Reality-Based Visual Field Testing”, Carol Lavin Bernick Faculty Grant Program, Tulane University, \$10,000. Role: PI. Collaboration with PI Ramesh Ayyala (Ophthalmology) at Tulane.
- [G8] 9/15/15–8/31/17 “QuBBD: Collaborative Research: Towards Automated Quantitative Prostate Cancer Diagnosis”, National Science Foundation and National Institutes of Health, NSF-DMS 1557750, \$52,931. Role: PI. Collaboration with Co-PI Quincy Brown (Biomedical Engineering) at Tulane and with Brittany Fasy at Montana State University; \$99,570 total grant amount.
- [G7] 9/1/12–8/31/16 “AF: Small: Geometric Algorithms for Constructing Road Networks from Trajectories”, National Science Foundation, NSF-CCF 1301911, \$303,624. Role: PI.  
Supplement: 12/13/13 – 8/31/16, \$10,001.
- [G6] 10/1/13–9/30/16 “CC-NIE Networking Infrastructure: Dedicated High-Speed Science Network”, National Science Foundation, NSF-ACI 1340454, \$498,655. Role: Co-PI; with PI Charles McMahan and other Co-PIs Lieu D. Tran, Ricardo Cortez, Caroline M. Taylor.
- [G5] 9/15/10–7/31/12 “Computational Systems Biology Core (CSBC)”, National Institutes of Health, NIH-NCRR 5G12RR013646-12, \$1,916,034 for duration 9/15/10 – 6/30/15, Role: PI, with Co-PIs Yufeng Wang and Fidel Santamaria. Part of the Research Centers for Minority Institutions grant “RCMI Center for Interdisciplinary Health Research”.
- [G4] 3/1/07–2/28/13 “CAREER: Application and Theory of Geometric Shape Handling”, National Science Foundation, NSF-CCF 1331009 (previously 0643597), \$400,468. Role: PI.  
Supplements:  
1) 8/1/09–7/31/10, REU (Research Experience for Undergraduates) Supplement, \$8,000.  
2) 3/1/08–2/28/09, REU Supplement, \$12,000.  
3) 8/1/07–7/31/08, REU Supplement, \$12,000.
- [G3] 9/1/06–8/31/07 “Developing New Spot Detection Algorithms for 2-Dimensional Gel Electrophoresis Image Analysis”, seed grant provided by the UTSA Computational Biology Initiative, \$10,000. Role: PI.
- [G2] 6/12/06–6/11/07 “SGER: Map-Matching and Reactive Routing Algorithms for Traffic Estimation and Prediction Systems”, National Science Foundation, NSF-CCF 0628809, \$25,480. Role: PI

- [G1] 2005 “Locating GPS Curves in Roadmaps”, Faculty Research Award, University of Texas at San Antonio, \$4,845.

#### BOOKS AND BOOK CHAPTERS

(The author list in most publications is in alphabetical order. Student co-authors are underlined.)

- [B4] “Comparing Directed and Weighted Road Maps”, (A. Bittner, B.T. Fasy, M. Grudzien, S. Ghosh Hajra, J. Huang, K. Pelatt, C. Thatcher, A. Tumurbaatar, C. Wenk), *AWM-IMA Springer series: Research in Computational Topology*: 57-70, B.T. Fasy, E. Chambers, L. Ziegelmeier (eds.), Springer, 2018.
- [B3] “Map Construction Algorithms”, (M. Ahmed, S. Karagiorgou, D. Pfoser, C. Wenk), Springer, 2015.
- [B2] “Skeleton-based recognition of shapes in images via the longest path”, (G. Bal, J. Diebold, E.W. Chambers, E. Gasparovic, R. Hu, M. Shaker, K. Leonard, C. Wenk), *Research in Shape Modeling*, K. Leonard, S. Tari (eds.), Association for Women in Mathematics Series 1: 81–99, Springer, 2015.
- [B1] “New Algorithmic Approaches to Protein Spot Detection and Pattern Matching in Two-Dimensional Electrophoresis Gel Databases” (K.-P. Pleißner, F. Hoffmann, K. Kriegel, C. Wenk, S. Wegner, A. Sahlströhm, H. Oswald, H. Alt, and E. Fleck), Chapter 22 in *From Genome to Proteome*: 175–185, Wiley, 2007.

#### REFEREED JOURNAL ARTICLES

- [J28] “A Middle Curve Based on Discrete Fréchet Distance”, (H.-K. Ahn, H. Alt, M. Buchin, E. Oh, L. Scharf, C. Wenk), *Computational Geometry: Theory and Applications*: 89, 101621, August 2020.
- [J27] “Map-Matching Using Shortest Paths”, (B.T. Fasy, E.W. Chambers, Y. Wang, C. Wenk), *Transactions on Spatial Algorithms and Systems* 6(1), article 6, February 2020.
- [J26] “Fast Fréchet Distance Between Curves with Long Edges”, (J. Gudmundsson, M. Mirzanezhad, A. Mohades, C. Wenk), *International Journal of Computational Geometry & Applications* 29(2): 161–187, 2019. (arXiv:1710.10521)
- [J25] “Persistent Homology for the Quantitative Evaluation of Architectural Features in Prostate Cancer Histology”, (P. Lawson, A.B. Sholl, J.Q. Brown, B.T. Fasy, and C. Wenk), *Scientific Reports* 9: 1139, 2019.
- [J24] “Computing the Fréchet Distance Between Folded Polygons” (A.F. Cook IV, A. Driemel, J. Sherette, C. Wenk), *Computational Geometry: Theory and Applications* 50: 1–16, 2015. (arXiv:1103.2865)
- [J23] “Path-Based Distance for Street Map Comparison”, (M. Ahmed, B.T. Fasy, K.S. Hickmann, C. Wenk), *ACM Transactions on Spatial Algorithms and Systems (TSAS)* 1(1): article 3, 28 pages, 2015. (arXiv:1309.6131)
- [J22] “Conserved disulfide bond is not essential for the adenosine A2A receptor: extracellular cysteines influence receptor distribution within the cell and ligand-binding recognition”,

- (Andrea N. Naranjo, Amy Chevalier, Gregory D. Cousins, Esther Ayyettey, Emily McCusker, Carola Wenk, Anne S. Robinson), *Biochimica et Biophysica Acta (BBA) - Biomembranes* 1848: 604-614, 2015.
- [J21] “A Comparison and Evaluation of Map Construction Algorithms”, (M. Ahmed, S. Karagiorgou, D. Pfoser, C. Wenk), *Geoinformatica* 19(3): 601–632, 2015. (arXiv:1402.5138)
- [J20] “Shortest Path Problems on a Polyhedral Surface”, (A.F. Cook IV and C. Wenk), *Algorithmica* 69(1): 58–77, 2014.
- [J19] “Median Trajectories”, (K. Buchin, M. Buchin, M. van Kreveld, M. Löffler, R.I. Silveira, C. Wenk, L. Wiratma), *Algorithmica* 66(3): 595–614, 2013.
- [J18] “Microwave & Magnetic ( $M^2$ ) Proteomics of the EAE Animal Model of Multiple Sclerosis”, (I. Raphael, S. Mahesula, K. Kalsaria, V. Kotagiri, A.B. Purkar, M. Anjanappa, D. Shah, V. Pericherla, Y.L.A. Jadhav, M. Vaynberg, D. Noriega, N.H. Grimaldo, C. Wenk, J. Gelfond, T.G. Forsthuber, W.E. Haskins), *Electrophoresis* 33(24): 3810–3819, 2012.
- [J17] “Approximating the Fréchet Distance for Realistic Curves in Near Linear Time”, (A. Driemel, S. Har-Peled, C. Wenk), *Discrete & Computational Geometry* 48(1): 94–127, 2012. (arXiv:1003.0460)
- [J16] “Link Distance and Shortest Path Problems in the Plane”, (A.F. Cook IV and C. Wenk), *Computational Geometry: Theory and Applications*: 44(8): 442–455, 2011.
- [J15] “Geodesic Fréchet Distance Inside a Simple Polygon” (A.F. Cook IV and C. Wenk), *ACM Transactions on Algorithms*: 7(1), 19 pages, 2010. (arXiv:0802.2846)
- [J14] “Computing the Fréchet Distance Between Simple Polygons” (K. Buchin, M. Buchin, and C. Wenk), *Computational Geometry: Theory and Applications (CGTA)* 41: 2–20, Elsevier, 2008.
- [J13] “NeuronMorphometrics: A Tool for Semi-Automated Processing of Cultured Neuronal Cell Images” (M. Narro, F. Yang, R. Kraft, C. Wenk, A. Efrat, L. Restifo), *Brain Research* 1138: 57–75, Elsevier, 2007.
- [J12] “Drawing with Fat Edges” (C.A. Duncan, A. Efrat, S.G. Kobourov, and C. Wenk), *International Journal of Foundations of Computer Science (IJFCS)* 17(5): 1143-1163, World Scientific, 2006.
- [J11] “Matching Polyhedral Terrains Using Overlays of Envelopes” (V. Koltun and C. Wenk), *Algorithmica* 41(3): 159–183, Springer, 2005.
- [J10] “Covering with Ellipses” (A. Efrat, F. Hoffmann, C. Knauer, K. Kriegel, G. Rote, and C. Wenk), *Algorithmica* 38(2): 145–160, Springer, 2004.
- [J9] “Comparison of Distance Measures for Planar Curves” (H. Alt, C. Knauer, and C. Wenk), *Algorithmica* 38(2): 45–58, Springer, 2004.
- [J8] “Matching Planar Maps” (H. Alt, A. Efrat, G. Rote, and C. Wenk), *Journal of Algorithms* 49: 262–283, Elsevier, 2003.
- [J7] “Computing the Hausdorff Distance of Geometric Patterns and Shapes” (H. Alt, P. Braß, M. Godau, C. Knauer, and C. Wenk), *Discrete and Computational Geometry - The Goodman-Pollack-Festschrift*, 65–76, Springer, 2003.

- [J6] “Applying an Edit Distance to the Matching of Tree Ring Sequences in Dendrochronology” (C. Wenk), *Journal of Discrete Algorithms* 1(5–6):367-385, Elsevier, 2003.
- [J5] “Geometric Algorithms for the Analysis of 2D-Electrophoresis Gels” (A. Efrat, F. Hoffmann, K. Kriegel, C. Schultz, and C. Wenk), *Journal of Computational Biology* 9(2): 299–316, Mary Ann Liebert publishers, 2002.
- [J4] “An Alternative Approach to Deal with Geometric Uncertainties in Computer Analysis of Two-Dimensional Electrophoresis Gels” (K. Kriegel, I. Seefeldt, F. Hoffmann, C. Schultz, C. Wenk, V. Regitz-Zagrosek, H. Oswald, and E. Fleck), *Electrophoresis* 21:2637–2640, Wiley, 2000.
- [J3] “On the Number of Cylinders Touching a Ball” (P. Braß and C. Wenk), *Geometriae Dedicata* 81:281–284, Springer, 2000.
- [J2] “New Algorithmic Approaches to Protein Spot Detection and Pattern Matching in Two-Dimensional Electrophoresis Gel Databases” (K.-P. Pleißner, F. Hoffmann, K. Kriegel, C. Wenk, S. Wegner, A. Sahlströhm, H. Oswald, H. Alt, and E. Fleck), *Electrophoresis* 20:755-765, Wiley, 1999.
- [J1] “An Applied Point Pattern Matching Problem: Comparing 2D Patterns of Protein Spots” (F. Hoffmann, K. Kriegel, and C. Wenk), *Discrete Applied Mathematics* 93: 75–88, Elsevier, 1999.

## REFEREED CONFERENCE PUBLICATIONS

- [C36] “Location-Based Social Network Data Generation Based on Patterns of Life” (J.-S. Kim, H. Jin, H. Kavak, O.C. Rouly, A. Crooks, D. Pfoser, C. Wenk, A. Züfle), accepted to *21st IEEE International Conference on Mobile Data Management*, 2020.
- [C35] “Combinatorial Properties of Self-Overlapping Curves and Interior Boundaries”, (P. Evans, B.T. Fasy, C. Wenk), accepted to *36th International Symposium on Computational Geometry (SoCG)*, 2020.
- [C34] “Distance Measures for Embedded Graphs”, (H.A. Akitaya, M. Buchin, B. Kilgus, S. Sijben, C. Wenk), *30th International Symposium on Algorithms and Computation (ISAAC)*: 55:1–55:15, 2019. (arXiv:1812.09095)
- [C33] “Global Curve Simplification” (M. van de Kerkhof, I. Kostitsyna, M. Löffler, M. Mirzanezhad, C. Wenk), *European Symposium on Algorithms (ESA)*: 67:1–67:14, 2019 (arXiv:1809.10269).
- [C32] “Location-Based Social Simulation”, H. Kavak, J.-S. Kim, A.T. Crooks, D. Pfoser, C. Wenk, A. Züfle, vision paper, *16th International Symposium on Spatial and Temporal Databases (SSTD)*: 218-221, 2019.
- [C31] “Assessment of Sampling Adequacy Using Persistent Homology for the Evaluation of Heterogeneity in 3D Histology Acquired Through Inverted Selective Plane Illumination Microscopy (iSPIM)” (P. Lawson, B. Hu, B.T. Fasy, B. Summa, C. Wenk, J.Q. Brown), *Proc. SPIE 11073, Clinical and Preclinical Optical Diagnostics II*: 1107316, (*SPIE European Conferences on Biomedical Optics (ECBO)*), invited paper, 5 pages), 2019.

- [C30] “Clustering Trajectories for Map Construction”, (K. Buchin, M. Buchin, D. Duran, B.T. Fasy, R. Jacobs, V. Sacristan, R. Silveira, F. Staals, C. Wenk), *International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*: article 14 (10 pages), 2017.
- [C29] “A Unified Framework to Predict Movement [Vision Paper]”, (O. Gkountouna, D. Pfoser, C. Wenk, A. Züfle), *15th International Symposium on Spatial and Temporal Databases (SSTD)*: 393–397, 2017. Best paper award. doi:10.1007/978-3-319-64367
- [C28] “A Middle Curve Based on Discrete Fréchet Distance”, (H.-K. Ahn, H. Alt, M. Buchin, E. Oh, L. Scharf, C. Wenk), *12th Latin American Theoretical Informatics Symposium*: 14–26, 2016.
- [C27] “Choosing Thresholds for Density-Based Map Construction Algorithms”, (M. Ahmed, B.T. Fasy, M. Gibson, C. Wenk), *International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, 2015.
- [C26] “High-area-throughput automated gigapixel imaging of whole prostate tumor resection surfaces using structured illumination microscopy”, (J.Q. Brown, M. Wang, H. Kimbrell, D. Tulman, T.S. Schlichenmeyer, C. Wenk, B. Lee), *SPIE Photonics West – BIOS*, paper 9313-15, 2015.
- [C25] “Local Persistent Homology Based Distance Between Maps”, (M. Ahmed, B.T. Fasy, C. Wenk), *International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, 10 pages, 2014.
- [C24] “Autofocus optimization for tracking tissue surface topography in large-area mosaicking structured illumination microscopy”, (T.S. Schlichenmeyer, M. Wang, C. Wenk, J.Q. Brown), *Frontiers in Optics Conference, Optical Society of America Technical Digest*, 3 pages, 2014.
- [C23] “Constructing Street Networks from GPS Trajectories”, (M. Ahmed and C. Wenk), *European Symposium on Algorithms (ESA)*: 60–71, Ljubljana, Slovenia, 2012.
- [C22] “Partial Matching Between Surfaces Using Fréchet Distance” (J. Sherette and C. Wenk), *Scandinavian Symposium and Workshops on Algorithm Theory (SWAT)*: 13–23, Helsinki, Finland, 2012.
- [C21] “Computing the Fréchet Distance Between Folded Polygons” (A.F. Cook IV, A. Driemel, S. Har-Peled, J. Sherette, C. Wenk), *Algorithms and Data Structures Symposium (WADS)*: 267–278, Brooklyn, New York, 2011.
- [C20] “Approximate Map Matching with respect to the Fréchet Distance”, (D. Chen, A. Driemel, L. Guibas, A. Nguyen, C. Wenk), *Proc. Workshop on Algorithm Engineering and Experiments (ALENEX)*: 75-83, San Francisco, California, 2011.
- [C19] “Median Trajectories”, (K. Buchin, M. Buchin, M. van Kreveld, M. Löffler, R.I. Silveira, C. Wenk, L. Wiratma), *Proc. 18th Annual European Symposium on Algorithms (ESA)*: 463-474, Liverpool, UK, 2010.
- [C18] “Approximating the Fréchet Distance for Realistic Curves in Near Linear Time”, (A. Driemel, S. Har-Peled, C. Wenk), *Proc. 20th ACM Symposium on Computational Geometry (SoCG’10)*: 365-374, 2010.

- [C17] “Visiting a Sequence of Points with a Bevel-Tip Needle” (S. Bitner, Y. K. Cheung, A.F. Cook IV, O. Daescu, A. Kurdia, C. Wenk), *Proc. 9th Latin American Theoretical Informatics Symposium*: 492–502, Oaxaca, Mexico, 2010.
- [C16] “A New Perspective on Efficient and Dependable Vehicle Routing”, (D. Pfoser, A. Efentakis, A. Voisard, C. Wenk), *Proceedings of the 17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS)*: 388–391, Seattle, Washington, 2009.
- [C15] “Shortest Path Problems on a Polyhedral Surface”, (A.F. Cook IV, C. Wenk), *Algorithms and Data Structures Symposium (WADS)*: 156–167, Banff, Alberta, Canada, 2009. Best Paper Award.
- [C14] “Link Distance and Shortest Path Problems in the Plane”, (A.F. Cook IV, C. Wenk), *Proc. Algorithmic Aspects in Information and Management (AAIM)*: 140–151, San Francisco, California, 2009.
- [C13] “Geodesic Fréchet Distance Inside a Simple Polygon” (A.F. Cook IV and C. Wenk), *Proc. 25th International Symposium on Theoretical Aspects of Computer Science (STACS)*: 193–204, Bordeaux, France, 2008.
- [C12] “Fréchet Distance for Curves, Revisited” (B. Aronov, S. Har-Peled, C. Knauer, Y. Wang, and C. Wenk), *Proc. 14th Annual European Symposium on Algorithms (ESA)*: 52–63, LNCS 4168, Zurich, Switzerland, 2006. (arXiv:1504.07685)
- [C11] “Addressing the Need for Map-Matching Speed: Localizing Global Curve-Matching Algorithms” (C. Wenk, R. Salas and D. Pfoser), *Proc. 18th International Conference on Scientific and Statistical Database Management (SSDBM)*: 379–388, Vienna, Austria, 2006.
- [C10] “Computing the Fréchet Distance Between Simple Polygons in Polynomial Time” (K. Buchin, M. Buchin, and C. Wenk), *Proc. 22nd ACM Symposium on Computational Geometry (SoCG)*: 80–87, Sedona, Arizona, 2006.
- [C9] “On Map-Matching Vehicle Tracking Data” (S. Brakatsoulas, D. Pfoser, R. Salas, and C. Wenk), *Proc. 31st Conference on Very Large Data Bases (VLDB)*: 853–864, Trondheim, Norway, 2005.
- [C8] “Matching Polyhedral Terrains Using Overlays of Envelopes” (Vladlen Koltun and Carola Wenk), *Proc. 9th Scandinavian Workshop on Algorithm Theory (SWAT)*: 114–126, LNCS 3111, Humlebaek, Denmark, 2004.
- [C7] “Matching Planar Maps” (H. Alt, A. Efrat, G. Rote, and C. Wenk), *Proc. 14th ACM–SIAM Symposium on Discrete Algorithms (SODA)*: 589–598, Baltimore, USA, 2003.
- [C6] “Covering Shapes by Ellipses” (A. Efrat, F. Hoffmann, C. Knauer, K. Kriegel, G. Rote, and C. Wenk), *Proc. 13th ACM–SIAM Symposium on Discrete Algorithms (SODA)*: 453–454, San Francisco, USA, 2002.
- [C5] “Drawing with Fat Edges” (C.A. Duncan, A. Efrat, S.G. Kobourov, and C. Wenk), *Proc. 9th International Symposium on Graph Drawing (GD)*: 162–177, Vienna, Austria, 2001.
- [C4] “Geometric Algorithms for the Analysis of 2D-Electrophoresis Gels” (A. Efrat, F. Hoffmann, K. Kriegel, C. Schultz, and C. Wenk), *Proc. 5th Annual International Confer-*



ence on Research in Computational Molecular Biology (*RECOMB*): 114–123, Montreal, Canada, 2001.

- [C3] “Matching Polygonal Curves with Respect to the Fréchet Distance” (H. Alt, C. Knauer, and C. Wenk), *Proc. 18th International Symposium on Theoretical Aspects of Computer Science (STACS)*: 63–74, Dresden, Germany, 2001.
- [C2] “Applying an Edit Distance to the Matching of Tree Ring Sequences in Dendrochronology” (C. Wenk), *Proc. 10th Annual Symposium on Combinatorial Pattern Matching (CPM)*: 223–242, LNCS 1645, Warwick, UK, 1999.
- [C1] “Matching 2D patterns of protein spots” (F. Hoffmann, K. Kriegel, and C. Wenk), *Proc. 14th Annual ACM Symposium on Computational Geometry (SoCG)*: 231–239, Minneapolis, USA, 1998.

#### WORKSHOP CONTRIBUTIONS AND TECHNICAL REPORTS

- [W38] “Simulating Urban Patterns of Life: A Geo-Social Data Generation Framework (Demo Paper)”, J.-S. Kim, H. Kavak, U. Manzoor, A.T. Crooks, D. Pfoser, C. Wenk, A. Züfle, *27th International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*: 576–579, 2019.
- [W37] “Shortest-Path Diversification through Network Penalization: A Washington DC Area Case Study” (D. Cheng, O. Gkountouna, A. Züfle, D. Pfoser, C. Wenk), *12th ACM SIGSPATIAL International Workshop on Computational Transportation Science (IWCTS)*, 10 pages, 2019.
- [W36] “Simplification of Indoor Space Footprints” (J.-S. Kim and C. Wenk), *1st ACM SIGSPATIAL International Workshop on Spatial Gems (SpatialGems)*, 2019; to be published. (arXiv:2001.05564)
- [W35] “Threshold-Based Graph Reconstruction Using Discrete Morse Theory” (B.T. Fasy, S. Majhi, C. Wenk), *28th Annual Fall Workshop on Computational Geometry*, 4 pages, Queens College, Queens, NY, 2018.
- [W34] “On Optimal Min-# Curve Simplification” (M. van de Kerkhof, I. Kostitsyna, M. Löffler, M. Mirzanezhad, C. Wenk), *28th Annual Fall Workshop on Computational Geometry*, 4 pages, Queens College, Queens, NY, 2018.
- [W33] “Quantifying prostate cancer morphology in 3D using light sheet microscopy and persistent homology (Conference Presentation)”, (P.J. Lawson, B. Hu, B.T. Fasy, C. Wenk, J.Q. Brown), *Proc. SPIE 10472, Diagnosis and Treatment of Diseases in the Breast and Reproductive System IV*: 1047209, (*SPIE BiOS*), 2018. doi: 10.1117/12.2290994.
- [W32] “Fast Fréchet Distance for Curves with Long Edges”, (J. Gudmundsson, M. Mirzanezhad, *3rd International Workshop on Interactive and Spatial Computing*: 52–58, Richardson, TX, 2018. Best paper award.
- [W31] “Map-Matching Using Shortest Paths”, (B.T. Fasy, E.W. Chambers, Y. Wang, C. Wenk), *3rd International Workshop on Interactive and Spatial Computing*: 44–51, Richardson, TX, 2018.

- [W30] “Topological and Geometric Reconstruction of Metric Graphs in  $R^n$ ”, ( B.T. Fasy, R. Komendarczyk, S. Majhi, C. Wenk), *27th Fall Workshop on Computational Geometry*: 78–82, Stony Brook, New York, 2017.
- [W29] “On Minimum Area Homotopies of Normal Curves in the Plane”, (B.T. Fasy, S. Karako, C. Wenk), arXiv:1707.02251, 2017.
- [W28] “Distance Measures for Embedded Graphs”, (M. Buchin, S. Sijben, C. Wenk), *European Workshop on Computational Geometry*: 37–40, 2017.
- [W27] “On Minimum Area Homotopies”, (B.T. Fasy, S. Karakoç, C. Wenk) *Computational Geometry: Young Researchers Forum*, 2 pages, 2016.
- [W26] “A Middle Curve Based on Discrete Fréchet Distance”, (H.-K. Ahn, H. Alt, M. Buchin, E. Oh, L. Scharf, C. Wenk), *18th Korea-Japan Joint Workshop on Algorithms and Computation (WAAC)*, 2015.
- [W25] “A Middle Curve Based on Discrete Fréchet Distance”, (H.-K. Ahn, H. Alt, M. Buchin, L. Scharf, C. Wenk), *31st European Workshop on Computational Geometry (EuroCG)*: 204–207, 2015.
- [W24] “New Techniques for Road Network Comparison”, (M. Ahmed, B.T. Fasy, C. Wenk), Grace Hopper Celebration of Women in Computing, Data Science in Practical Applications track, 2014.
- [W23] “Simple Curve Embedding”, (J. Sherette and C. Wenk), arXiv: 1303.0821, 2013.
- [W22] “Probabilistic Street-Intersection Reconstruction from GPS Trajectories: Approaches and Challenges”, (M. Ahmed and C. Wenk), *ACM SIGSPATIAL International Workshop on Querying and Mining Uncertain Spatio-Temporal Data* (4 pages), Redondo Beach, CA, 2012.
- [W21] “Partial Matching Between Surfaces Using Fréchet Distance” (J. Sherette, C. Wenk), *21st Fall Workshop on Computational Geometry* (2 pages), City College of New York, Manhattan, NY, 2011.
- [W20] “Constructing Street-Maps from GPS Trajectories” (M. Ahmed, C. Wenk), *21st Fall Workshop on Computational Geometry* (2 pages), City College of New York, Manhattan, NY, 2011.
- [W19] “Computing the Fréchet Distance Between Polyhedral Surfaces with Acyclic Dual Graphs” (A.F. Cook IV, J. Sherette, C. Wenk), *19th Fall Workshop on Computational Geometry*: 75–76, Tufts University, Medford, MA, 2009.
- [W18] “Visiting Points with a Bevel-Tip Needle” (S. Bitner, Y. K. Cheung, A.F. Cook IV, O. Daescu, A. Kurdia, C. Wenk), *19th Fall Workshop on Computational Geometry*: 61-62, Tufts University, Medford, MA, 2009.
- [W17] “Shortest Path Problems on a Polyhedral Surface”, (A.F. Cook IV, C. Wenk) *UTSA Technical Report CS-TR-2009-001*, 2009.
- [W16] “Exploiting Road Network Properties in Efficient Shortest-Path Computation” (D. Pfoser, A. Efentakis, A. Voisard, C. Wenk), *ICSI Technical Report TR-09-007*, International Computer Science Institute, UC Berkeley, 2009.

- [W15] “Shortest Path Problems on a Polyhedral Surface” (A.F. Cook IV, C. Wenk), *25th European Workshop on Computational Geometry (EuroCG’09)*: 179–182, Brussels, Belgium, 2009.
- [W14] “Min-Link Shortest Path Maps and Fréchet Distance” (A.F. Cook IV, C. Wenk), *UTSA Technical Report CS-TR-2008-0011*, 2008.
- [W13] “Geodesic Fréchet Distance With Polygonal Obstacles” (A.F. Cook IV, C. Wenk), *UTSA Technical Report CS-TR-2008-0010*, 2008.
- [W12] “Geodesic Fréchet Distance Inside a Simple Polygon” (A.F. Cook IV, C. Wenk), *17th Fall Workshop on Computational Geometry*, IBM Hawthorne, 2007.
- [W11] “Dynamic Routing”, (N. Kalinowski, C. Wenk), *UTSA Technical Report CS-TR-2007-005*, 2007.
- [W10] “Geodesic Fréchet and Hausdorff Distance Inside a Simple Polygon”, (A.F. Cook IV, C. Wenk), *UTSA Technical Report CS-TR-2007-004*, 2007.
- [W9] “How Difficult is it to Walk the Dog?”, (K. Buchin, M. Buchin, C. Knauer, G. Rote, C. Wenk), *23rd European Workshop on Computational Geometry*: 170–173, Graz, Austria, 2007.
- [W8] “Shortest Tour of a Sequence of Disjoint Segments in  $L_\infty$ ” (E. Arkin, A. Efrat, C. Erten, F. Hurtado, J. Mitchell, V. Polishchuk, C. Wenk), *16th Fall Workshop on Computational Geometry*, Smith College, 2006.
- [W7] “Computing the Fréchet Distance Between Simple Polygons in Polynomial Time” (K. Buchin, M. Buchin, and C. Wenk), *22nd European Workshop on Computational Geometry*, Delphi, Greece, 2006.
- [W6] “Fréchet Distance Between Simple Polygons” (K. Buchin, M. Buchin, and C. Wenk), *15th Annual Fall Workshop on Computational Geometry*, Philadelphia, Pennsylvania, 2005.
- [W5] “Matching Planar Maps” (H. Alt, A. Efrat, Günter Rote, and C. Wenk), *12th Annual Fall Workshop on Computational Geometry*, Rutgers, Piscataway, New Jersey, 2002.
- [W4] “Bounding the Fréchet Distance by the Hausdorff Distance” (H. Alt, C. Knauer, and C. Wenk), *Proc. 17th European Workshop on Computational Geometry*: 166–169, Berlin, Germany, 2001.
- [W3] “A Geometric Approach to Protein Identification in 2D Electrophoretic Gel Images” (F. Hoffmann, K. Kriegel, and C. Wenk), *15th European Workshop on Computational Geometry*: 173–174, Antibes, France, 1999.
- [W2] “A Simple and Robust Geometric Algorithm for Landmark Registration in Computer Assisted Neurosurgery” (F. Hoffmann, K. Kriegel, S. Schönherr, and C. Wenk), *Technical Report B 99-21*, Freie Universität Berlin, Fachbereich Mathematik und Informatik, December 1999.
- [W1] “New Algorithmic Tools for comparing 2D Patterns of Protein Spots” (F. Hoffmann, K. Kriegel, and C. Wenk), *14th European Workshop on Computational Geometry*, Barcelona, Spain, 1998.

## POSTERS, VIDEOS, SOFTWARE, WEBSITES

- [P18] “Topological Descriptors for Quantitative Prostate Cancer Morphology Analysis”, poster, (P. Lawson, E. Berry, J.Q. Brown, B.T. Fasy, C. Wenk), *Conference on Digital Pathology, part of SPIE Medical Imaging*, 2017. Poster award (honorable mention).
- [P17] “Homotopy visualizer”, (P. Evans, A. Burns, C. Wenk), Java code to visualize minimum-area homotopies contracting closed curves to a point, 2016.
- [P16] “On Minimum Area Homotopies”, poster, (B.T. Fasy, S. Karakoç, C. Wenk), *Topology, Geometry, and Data Analysis Conference*, Ohio State University, May 2016.
- [P15] “Towards an Automated Quantitative Diagnosis of Prostate Cancer”, poster, (P. Lawson, C. Miller, B.T. Fasy, Q. Brown, C. Wenk), *BD2K All-Hands Grantee Meeting*, NIH, November 2015.
- [P14] Map Construction Portal, [mapconstruction.org](http://mapconstruction.org), (M. Ahmed, S. Karagiorgou, D. Pfoser, C. Wenk), since 2013.
- [P13] Fréchet-based map construction code, 2013. Based on: “Constructing Street Networks from GPS Trajectories”, (M. Ahmed and C. Wenk), *European Symposium on Algorithms (ESA)*: 60–71, Ljubljana, Slovenia, 2012. Available on [mapconstruction.org](http://mapconstruction.org); integrated into Google’s codebase.
- [P12] Path-based distance measure code for map comparison, 2013. Based on: “Path-Based Distance for Street Map Comparison”, (M. Ahmed, B.T. Fasy, K.S. Hickmann, C. Wenk), (arXiv:1309.6131), 2013. Available at [mapconstruction.org](http://mapconstruction.org).
- [P11] “Constructing Street-Maps from GPS Trajectories” (M. Ahmed, C. Wenk), poster, *Grace Hopper Celebration of Women in Computing*, 2011.
- [P10] “An Efficient Computing Infrastructure for Computational Systems Biology at the University of Texas at San Antonio” (Z. Wang, J.M. Bower, K.A. Robbins, F. Santamaria, Y. Wang, C. Wenk), poster, *12th RCFI International Symposium on Health Disparities*, 2010.
- [P9] “Building an institutional base for Computational Neuroscience: the CBI at UTSA / UTHSCSA”, (Z. Wang, K.A. Robbins, Y. Wang, C. Livi, A.D. Coop, F. Santamaria, C. Wenk, J.M. Bower), poster, *19th Annual Computational Neuroscience Meeting: CNS\*2010*, San Antonio, TX; *BMC Neuroscience* 2010, 11(Suppl 1):P67, 20 July 2010.
- [P8] “A New Perspective on Efficient and Dependable Vehicle Routing”, poster, (D. Pfoser, A. Efentakis, A. Voisard, C. Wenk), *17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS)*, Seattle, Washington, 2009.
- [P7] “Models for Teardrop Spots in 2-DE Gels”, (S.M. Pivek, S.T. Weintraub, and C. Wenk), poster, *11th RCFI International Symposium on Health Disparities*, Honolulu, HI, 2008.
- [P6] “NeuronMetrics”, Software for Semi-Automated Processing of Cultured-Neuron Images, 2007. Based on: “NeuronMorphometrics: A Tool for Semi-Automated Processing of Cultured Neuronal Cell Images” (M. Narro, F. Yang, R. Kraft, C. Wenk, A. Efrat, L. Restifo), *Brain Research* 1138: 57–75, Elsevier, 2007.

- [P5] “Finding a Curve in a Map” (C. Wenk, H. Alt, A. Efrat, L. Palaniappan, and G. Rote), video, *19th Annual ACM Symposium on Computational Geometry (SoCG)*, San Diego, USA, 2003.
- [P4] “Drawing Fat Graphs” (A. Efrat, S.G. Kobourov, M. Stepp, and C. Wenk), video, *18th Annual ACM Symposium on Computational Geometry (SoCG)*, Barcelona, Spain, 2002.
- [P3] CAROL - a tool for spot detection in and matching of two-dimensional electrophoresis gels: <http://gelmatching.inf.fu-berlin.de> (K. Kriegel, C. Wenk, C. Schultz, F. Hoffmann, and D. Dimitrov). Software. Integrated into the gel analysis software PDQUEST by BioRad since 2001.
- [P2] “Identification of Proteins by Point Pattern Matching of Two-Dimensional Gel Electrophoresis Databases” (H. Alt, F. Hoffmann, K. Kriegel, C. Wenk, E. Fleck, H. Oswald, K.-P. Pleissner, S. Wegener), poster, *Jahrestagung der Humangenetischen Gesellschaft*, 1998.
- [P1] “CAROL - New Algorithmic Tools for Comparing Two-Dimensional Electrophoretic Gel Images” (H. Alt, F. Hoffmann, K. Kriegel, C. Wenk, and K.-P. Pleissner), poster P21, *Electrophorese Forum*, Strasbourg, 1997.

## INTELLECTUAL PROPERTY

- [I1] “NeuronMetrics”, Software for Semi-Automated Processing of Cultured-Neuron Images, (M. Narro, F. Yang, R. Kraft, C. Wenk, A. Efrat, L. Restifo), Arizona Board of Regents Technology #ua07-056, Trademarked, 2007.

## SUBMITTED AND IN PREPARATION

- [S5] “Computing relevant subtrajectory bundles faster” (E.H. Sereshgi and C. Wenk), in submission.
- [S4] “Approximating Gromov-Hausdorff Distance in Euclidean Space” (S. Majhi, J. Vitter, C. Wenk), in preparation.
- [S3] “Global Curve Simplification” (M. van de Kerkhof, I. Kostitsyna, M. Löffler, M. Mirzanezhad, C. Wenk), journal version, in preparation.
- [S2] “Topological and Geometric Reconstruction of Geodesic Subspaces of  $R^N$  (B.T. Fasy, R. Komendarczyk, S. Majhi, C. Wenk), in preparation.
- [S1] “Combinatorial Properties of Self-Overlapping Curves Through Minimum Homotopy Area”, (P. Evans and C. Wenk), journal version, in submission.

## INVITED TALKS

- 10/2019 “Topological Data Analysis for Prostate Cancer Tissue Analysis and Map Comparison”, Department of Mathematics, Universitat Politècnica de Catalunya, Spain
- 10/2019 “Topological Data Analysis for Prostate Cancer Tissue Analysis and Map Comparison”, ICAR at LIRMM, Université de Montpellier, France

- 9/2019 “Fast Fréchet Distance and Global Curve Simplification”, Fakultät für Mathematik, Ruhr-Universität Bochum, Germany
- 9/2019 “Fast Fréchet Distance and Global Curve Simplification”, Fakultät für Informatik, Technische Universität Dortmund, Germany
- 9/2019 “Topological Data Analysis for Prostate Cancer Tissue Analysis and Map Comparison”, Informatikkolloquium, FernUniversität Hagen, Germany
- 8/2019 “Curves, Distance Measures, and Homotopies”, *Seminar on Computation in Low-Dimensional Geometry and Topology*, Schloss Dagstuhl, Wadern, Germany
- 10/2018 “On Map Construction, Map Comparison, and Trajectory Clustering”, Norm Asbjornson College of Engineering Seminar, Montana State University
- 08/2018 “On Map Construction, Map Comparison, and Trajectory Clustering”; distinguished lecture at the *30th Canadian Conference on Computational Geometry*, University of Manitoba, Canada
- 05/2018 “Applications of Persistent Homology to Low-Dimensional Data”, *TGDA@OSU TRIPODS Center Workshop on "Theory and Foundations of TGDA"*, Ohio State University.
- 03/2018 “Algorithms for Map Construction and Comparison”, lecture series, *10th Winter School on Computational Geometry*, Amirkabir University of Technology, Iran.
- 04/2017 “On Minimum-Area Homotopies of Curves in the Plane”, *Special Session on Applications of Topology and Geometry*, *Association for Women in Mathematics (AWM) Research Symposium*, University of California Los Angeles.
- 03/2017 “Applications of Computational Geometry and Topology in Shape Matching”, *Association of Women in Mathematics (AWM) Student Chapter*, Tulane.
- 03/2015 “Road Map Construction and Comparison”, *Seminar on Computational Geometry*, *Schloss Dagstuhl*, Wadern, Germany
- 09/2014 “Road Map Construction and Comparison”, Department of Mathematics and Computer Science, Eindhoven University of Technology, Netherlands
- 08/2014 “Constructing Road Maps from Trajectories”, Department of Electrical and Computer Engineering, North Carolina State University
- 02/2014 “Geometric Algorithms for Shapes And Trajectories”, Workshop *Morphogenesis, Regeneration and the Analysis of Shape*, Mathematical Biosciences Institute, Ohio State University
- 01/2014 “On Map Construction and Map Comparison”, Association for Women in Mathematics Workshop, Joint Mathematics Meetings, Baltimore
- 10/2013 “Geometric Algorithms for Shapes And Trajectories”, Biomedical Engineering Seminar, Tulane University
- 06/2012 “Shape Analysis and Reconciliation of Geospatial Trajectory Data”, GEOCROWD summer school, Crete, Greece
- 03/2011 “Computing the Fréchet Distance for Folded Polygons”, *Seminar on Computational Geometry*, *Schloss Dagstuhl*, Wadern, Germany
- 04/2009 “The Computational Biology Initiative at the University of Texas at San Antonio”, RTRN Bioinformatics & Comp Bio Working Group Webinar Series, Research Centers in Minority Institutions Translational Research Network (RTRN), [www.rtrn.net](http://www.rtrn.net)

- 03/2009 “Fréchet Distance Variants for Curves and Surfaces”, Texas A&M University, Computer Science and Engineering Department
- 03/2009 “Shortest Path Problems on a Polyhedral Surface”, *Seminar on Computational Geometry, Schloss Dagstuhl*, Wadern, Germany
- 02/2009 “Fréchet Distance Variants for Curves and Surfaces”, University of Texas at Austin, Computer Science Department
- 02/2009 “Towards traffic-aware routing using GPS vehicle trajectories”, University of Texas - Pan American, Computer Science Department
- 10/2007 “Towards traffic-aware routing using GPS vehicle trajectories”, City College New York, Computer Science Department.
- 12/2005 “Imaging and Analysis of 2D-Electrophoresis Gels”, Tools in Genomics and Proteomics Workshop, UT Health Science Center, San Antonio.
- 10/2005 “Applications of Geometric Shape Matching”, City College New York, Computer Science Department.
- 05/2005 “Shape Matching for Curves and Graphs”, *Seminar on Graph Drawing, Schloss Dagstuhl*, Wadern, Germany.
- 07/2004 “Matching and Comparing Curves”, Lancaster University, Computing Department, UK.
- 09/2003 “Geometric Algorithms for Biomedical Applications”, International Workshop on Object Recognition, Taormina, Sicily, Italy.
- 05/2003 “Applications of Geometric Shape Matching”, University of Arizona, Department of Management Information Systems.
- 03/2003 “Finding a Curve in a Map”, video presentation, *Seminar on Computational Geometry, Schloss Dagstuhl*, Wadern, Germany.
- 01/2003 “Two Topics in Shape Matching: Matching Electrophoresis Gels and Finding a Curve in a Map”, Tel Aviv University, Computer Science Department.
- 03/2002 “Geometric Algorithms for Biomedical Applications”, Arizona State University, Department of Bioengineering.
- 04/2001 “Applications of Geometric Shape Matching”, University of Arizona, Computer Science Department.
- 03/2001 “Approximate Matching of Polygonal Curves with Respect to the Fréchet Distance”, *Seminar on Computational Geometry, Schloss Dagstuhl*, Wadern, Germany.
- 11/2000 “Approximate Matching of Polygonal curves with Respect to the Fréchet Distance”, graduate program “Computational Discrete Mathematics”, Freie Universität Berlin.
- 02/2000 “Geometric Pattern Matching with Applications”, *Berliner Algorithmentag (BAT)*, Technische Universität Berlin, Germany

#### PAPER AND POSTER PRESENTATIONS

- 04/2018 “Map-Matching Using Shortest Paths”, (B.T. Fasy, E.W. Chambers, Y. Wang, C. Wenk), *3rd International Workshop on Interactive and Spatial Computing*: 44–51, Richardson, TX

- 11/2017 “Clustering Trajectories for Constructing Maps”, *International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL)*, Redondo Beach, CA.
- 07/2012 “Partial Matching Between Surfaces Using Fréchet Distance”, *Scandinavian Symposium and Workshops on Algorithm Theory (SWAT)*, Helsinki, Finland.
- 12/2008 “Models for Teardrop Spots in 2-DE Gels”, poster, *11th RCMI International Symposium on Health Disparities*, Honolulu, HI.
- 11/2005 “Fréchet Distance Between Simple Polygons”, *15th Annual Fall Workshop on Computational Geometry and Visualization*, Pennsylvania, PA.
- 07/2004 “Matching Polyhedral Terrains Using Overlays of Envelopes”, *9th Scandinavian Workshop on Algorithm Theory (SWAT)*, Humlebaek, Denmark.
- 01/2003 “Matching Planar Maps”, *14th ACM–SIAM Symposium on Discrete Algorithms (SODA)*, Baltimore, USA.
- 11/2002 “Matching Planar Maps”, *DIMACS Workshop on Computational Geometry*, Piscataway, USA.
- 01/2002 “Covering Shapes by Ellipses”, *13th ACM–SIAM Symposium on Discrete Algorithms (SODA)*, San Francisco, USA.
- 09/2001 “Drawing with Fat Edges”, *9th Int. Symp. on Graph Drawing*, Vienna, Austria.
- 03/2001 “Bounding the Fréchet distance by the Hausdorff distance”, *17th European Workshop on Computational Geometry*, Freie Universität Berlin, Germany.
- 07/1999 “Applying an Edit Distance to the Matching of Tree Ring Sequences in Dendrochronology”, *10th Ann. Symposium on Combinatorial Pattern Matching (CPM)*, Warwick, UK.

#### EDITORIAL ACTIVITIES AND STEERING COMMITTEES

- Editorial board member, *Computational Geometry: Theory and Applications*. Since 2019.
- General co-chair, 2nd ACM SIGSPATIAL International Workshop on GeoSpatial Simulation, 2019.
- Editorial board member, *Journal of Spatial Information Science*. Since 2018.
- Steering committee member, *International Workshop on Interactive and Spatial Computing*. Since 2018.
- Co-editor (with Dieter Pfoser) of the *Geoinformatica* special issue on Crowdsourcing Geospatial Information, 2015.
- Co-editor (with Afra Zomorodian) of the *Computational Geometry: Theory and Applications (CGTA)* special issue on SoCG 2009.

#### PROGRAM COMMITTEES

- Spring Simulation Conference (SpringSim), 2020
- 6th International ACM SIGMOD Workshop on Managing and Mining Enriched Geospatial Data (GEORICH), 2020.
- 3rd Iranian Conference on Computational Geometry, 2020
- Workshop on Applications of Topological Data Analysis (ATDA), 2019
- Winter Simulation Conference, Big Data in Simulation track, 2019



- 16th International Symposium on Spatial and Temporal Databases (SSTD), Vienna, Austria, 2019.
- 31st Canadian Conference on Computational Geometry (CCCG), University of Alberta, Canada, 2019.
- 26th International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL), Seattle, WA, 2018.
- 1st ACM SIGSPATIAL International Workshop on GeoSpatial Simulation (GeoSim 2018)
- 5th International ACM SIGMOD Workshop on Managing and Mining Enriched Geo-Spatial Data (GEORICH), 2018.
- Chair of the Workshop Committee for Computational Geometry Week, 2018.
- 26th Annual European Symposium on Algorithms (ESA), Track B (Engineering and Application Track), Helsinki, Finland, 2018.
- 34th European Workshop on Computational Geometry (EuroCG), Berlin, Germany, 2018.
- 25th International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL), Redondo Beach, CA, 2017.
- 15th International Symposium on Spatial and Temporal Databases (SSTD), Arlington, 2017.
- 4th International ACM SIGMOD Workshop on Managing and Mining Enriched Geo-Spatial Data (GEORICH), 2017.
- 33rd European Workshop on Computational Geometry (EuroCG), Malmö, Sweden, 2017.
- Meeting on Algorithms Engineering and Experiments (ALENEX), Barcelona, Spain, 2017.
- 24th International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL), San Francisco, CA, 2016.
- Young Researchers Forum, associated with the International Symposium on Computational Geometry (SoCG), 2016.
- 3rd International ACM SIGMOD Workshop on Managing and Mining Enriched Geo-Spatial Data (GEORICH), 2016.
- 23rd International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL), Seattle, WA, 2015.
- 14th International Symposium on Spatial and Temporal Databases (SSTD), Seoul, South Korea, 2015.
- 14th Algorithms and Data Structures Symposium (WADS), University of Victoria, BC, Canada, 2015.
- 2nd International ACM SIGMOD Workshop on Managing and Mining Enriched Geo-Spatial Data (GEORICH), 2015.
- 6th International Conference on Bioinformatics and Computational Biology (BICoB), Las Vegas, NV, 2014.
- 23rd Annual Fall Workshop on Computational Geometry, City College of New York, 2013.

- 13th International Symposium on Spatial and Temporal Databases (SSTD), Munich, Germany, 2013.
- 5th International Conference on Bioinformatics and Computational Biology (BICoB), Honolulu, Hawaii, 2013.
- 7th International Frontiers of Algorithmics Workshop (FAW) and the 9th International Conference on Algorithmic Aspects of Information and Management (AAIM), Dalian, China, 2013.
- 29th Annual Symposium on Computational Geometry (SoCG), Rio de Janeiro, Brazil, 2013.
- 29th European Workshop on Computational Geometry (EuroCG), Braunschweig, Germany, 2013.
- 6th Annual International Conference on Combinatorial Optimization and Applications (COCOA), Banff, Canada, 2012.
- 20th Annual European Symposium on Algorithms (ESA), Ljubljana, Slovenia, 2012.
- 17th Annual International Computing and Combinatorics Conference (COCOON), Dallas, TX, 2011.
- 12th Symposium on Spatial and Temporal Databases (SSTD), Minneapolis, MN, 2011.
- Program Committee Member for the 25th ACM Annual Symposium on Computational Geometry (SoCG), Aarhus, Denmark, June 8-10, 2009.
- Program Committee Member for the 8th International Conference on Mobile Data Management (MDM), Mannheim, Germany, 2007.

#### GRANT REVIEWS

- NSF Review Panel Member, 2007, 2008, 2013, 2015, 2017–2019.
- Reviewer for NSF, 2016, 2018.
- Reviewer for National Science and Research Council of Canada, 2010, 2015, 2019.
- Reviewer for Netherlands Organisation for Scientific Research, 2010, 2011, 2017.
- Reviewer for Swiss National Science Foundation, 2009.

#### REVIEWER SERVICE

- Journals:

ACM Transactions on Algorithms, Algorithmica, BMC Bioinformatics, Computational Geometry: Theory and Applications, Computer-Aided Geometric Design, Discrete and Computational Geometry, Discrete Mathematics, IEEE Transactions on Computers, IEEE Transactions on Neural Networks, Information Processing Letters, International Journal of Computational Geometry and Applications, International Journal of Geographical Information Science, International Journal of Knowledge Discovery in Bioinformatics, International Journal of Robotics Research, ISPRS Journal of Photogrammetry and Remote Sensing, Journal of Bioinformatics and Computational Biology, Journal of Combinatorial Optimization, Journal of Discrete Algorithms, Journal of Spatial Information Science, Journal for Graph Algorithms and Applications, Nordic Journal of Computing, Pattern Recognition, PLOS One, Sensors, SIAM Journal on Computing, Theoretical Computer Science, Transactions on Spatial Algorithms and Systems

- Conferences:

ACM SIGSPATIAL GIS, ALENEX, CCCG, CIAC, ESA, FOCS, ICALP, ISAAC, MFCS, SAC-DSGC, SEA, SoCG, SODA, STACS, STOC

- Books and other reviewing activities:

Addison-Wesley, MIT Press, Springer, Mathematical Reviews;

Member of the review panel for Grace Hopper Celebration scholarships, 2007–2014.

#### ORGANIZATION OF SCIENTIFIC EVENTS

- Co-organizer (with B. Burton, M. Löffler, E.W. Chambers) of the Dagstuhl seminar “Applications of Topology to the Analysis of 1-Dimensional Objects”, February 12-17, 2017.
- Co-organizer (with Rolf A. de By) of the 3rd ACM SIGSPATIAL International Workshop on Crowdsourced and Volunteered Geographic Information (GEOCROWD), November 4, 2014.
- Co-organizer (with A. Efrat) and treasurer of the 22nd Annual ACM Symposium on Computational Geometry (SoCG), June 5-7 2006, Sedona, Arizona.
- Co-organizer (with H. Alt) of the 17th European Workshop on Computational Geometry, March 26-28 2001, Freie Universität Berlin, Germany.
- Co-organizer (with B. Felsner) of the ALT-FEST, Colloquium on the occasion of the 50th birthday of Prof. Dr. Helmut Alt, with talks, May 9th 2000, Freie Universität Berlin.

#### TEACHING EXPERIENCE

- Classes taught at Tulane University
  - CMPS 1500 “Introduction to Computer Science I”, undergraduate; Fall 2013, Spring 2019
  - CMPS 1600 “Introduction to Computer Science II”, undergraduate; Spring 2014
  - CMPS/MATH 2170 “Introduction to Discrete Mathematics”, undergraduate; Fall 2013, Fall 2014, Fall 2015
  - CMPS 2200 “Introduction to Algorithms”, undergraduate; Fall 2012, Fall 2014, Fall 2015, Fall 2017
  - CMPS 3130/6130 “Introduction to Computational Geometry”, undergraduate with a graduate section; Spring 2013, Spring 2015, Spring 2017, Spring 2020
  - CMPS 6610/4610 “Algorithms”, graduate with an undergraduate section; Fall 2016, Fall 2018
  - CMPS 6640/4040 “Computational Geometry”, graduate with an undergraduate section; Spring 2016
  - CMPS 7010 “Research Seminar”, Fall 2015, Fall 2016, Fall 2017
  - TIDE 1022 “Computational Thinking for Work and Play”, undergraduate; Fall 2014
- Classes taught at University of Texas at San Antonio
  - CS 6463 “Advanced Topics: Computational Geometry”, graduate; Fall 2006, Fall 2010

- CS 5633 “Analysis of Algorithms”, graduate; Spring 2004, Spring 2005, Spring 2006, Spring 2008, Spring 2009, Spring 2010, Spring 2012
- CS 3343 “Analysis of Algorithms”, undergraduate; Spring 2009, Fall 2010, Fall 2011
- CS 3233 “Discrete Mathematical Structures”, undergraduate; Fall 2004, Fall 2009
- CS 1723/2123 “Data Structures”, undergraduate; Fall 2006, Spring 2007, Fall 2007, Spring 2010
- CS 1713 “Introduction to Computer Science”, undergraduate; Fall 2005
- Classes taught at University of Arizona
  - CSc 437/537 “Geometric Algorithms”, mixed undergraduate and graduate; Fall 2002
  - CSc 445 “Algorithms”, undergraduate; Summer 2003
  - CSc 345/346 “Analysis of Discrete Structures”, undergraduate; Spring 2003
  - CSc 344 “Foundations of Computing”, undergraduate; Fall 2002
  - CSc 227 “Program Design and Development”, undergraduate; Summer 2002
- Classes taught at Arizona State University
  - CSE 591 “Computational Geometry”, graduate; Spring 2002
- At Freie Universität Berlin
  - Taught summer block course “Programming in C”
  - Teaching assistant for “Introduction to Algorithms and Data Structures I and II”, “Design and Analysis of Algorithms”, and “Programming in Java”

#### POSTDOCTORAL RESEARCHERS SUPERVISED

- 2019 – present    Ovi Chris Rouly  
2018 – 2019        Umar Manzoor (Now Lecturer at University of Hull)  
2013 – 2015        Brittany Fasy (Now Assistant Professor at Montana State University)

#### EXTERNAL MEMBER ON PHD COMMITTEES

- Samuel Micka, Montana State University, 2017-present
- Amin Gheibi, Carleton University, Canada, 2015.
- Wouter Meulemans, Eindhoven University of Technology, Netherlands, 2014.
- Masoud Omran, Carleton University, Canada, 2014.

#### STUDENTS (TULANE)

- PhD students (5+1)
  - Yu (Demi) Qin, 2nd year, Computer Science, co-advised with Brian Summa; visualization prostate cancer histopathology images with quantitative descriptors.
  - Erfan Hosseini, 2nd year, Computer Science; road map comparison.
  - Majid Mirzanezhad, 4th year, Computer Science; data structures for curves and simplification of curves and graphs.

- Sushovan Majhi, 6th year, Mathematics; topological reconstruction.
- Peter Lawson, 6th year, Bioinnovation, co-advised with J. Quincy Brown; quantitative descriptors for prostate cancer histopathology images.
  
- Andrea N. Naranjo, graduated 2014, Chemical and Biomolecular Engineering; collaborated on research to study trafficking behavior of membrane proteins.
  
- Undergraduate students (23+9)
  - Joseph Allen, 2019 – present, supervising research on tools for labeling prostate cancer histology images
  - Jason Georgis, 2018 – 2019, supervised CS coordinate major research on convergence properties of map construction
  - Amy Grouse, 2018 – 2019, supervised CS coordinate major research on analyzing the shortest path structure of movement trajectories
  - Po-Yu (Timmy) Wu, 2018, (external student), supervised research on an image analysis pipeline for prostate cancer tissue images.
  - Parker Evans, 2016 – 2018, supervised Honors thesis research on self-overlapping curves, interior boundaries, and minimum area homotopies.
  - Emily Dong, 2017, (external student), supervised research on movement models on transportation networks.
  - Ethan Bogart, 2016 – 2017, supervised research on movement models on transportation networks.
  - Myranda Summers, 2016 – 2017, supervised research on movement models on transportation networks.
  - Winona Richey, 2016 – 2017, supervised CS coordinate major research on analyzing laser direct write techniques for cell printing.
  - Xiaoxiao Ma, 2016 – 2017, supervised CS coordinate major research on developing cost-efficient VR-based technology for visual field testing for glaucoma detection.
  - Andrea Burns, 2016, supervised research on computing self-overlapping curves.
  - Gianna Capezio, 2015-2016, supervised CS coordinate major research on analyzing New Orleans community data.
  - Kai Kuroda, 2015-2016, supervised CS coordinate major research on algorithms for map construction using Reeb graphs.
  - Elaine Chang, 2015-2016, supervised CS coordinate major research on developing cost-efficient VR-based technology for visual field testing for glaucoma detection.
  - Benjamin Slavin, 2015, supervised CS coordinate major research on developing cost-efficient VR-based technology for visual field testing for glaucoma detection.
  - Cody Licorish, 2013-2015, supervised research on analyzing, clustering, and detecting movement patterns in trajectory data.
  - Joel Gotthelf, 2015, co-supervised CS coordinate major research (together with Brent Venable) on comparison and classification of shark teeth.
  - Matthew Fortuna, 2014-2015, supervised CS coordinate major research on algorithms to optimize the geometric arrangement of nanoantennas for light spectrum splitting.
  - Tyler Schlichenmeyer, 2013-2014, supervised CS coordinate major research on algorithms to improve structured illumination microscopy for prostate cancer surgery.
  - Greg Cousins, 2013, supervised research on Hausdorff-based image comparison to quantify trafficking behavior of membrane proteins.

- Taylor Huntington, 2013, co-supervised research on trajectory generation.
- Isaac Rodriguez, 2013, supervised research on trajectory extraction from OpenStreetMap.
- Evan Cordell, graduated Spring 2013; supervised Honors thesis research on computing the Fréchet distance for simple polygons.
- Kelly Krawczyk, 2017, supervised CS coordinate major project on directions to avoid potholes in New Orleans
- Theodore Airey, 2016-2017, supervised CS coordinate major project.
- Christopher Miller, 2015-2016, collaborated on research to develop quantitative descriptors for prostate cancer histopathology images.
- Victor Bankston, 2014-2015, supervised Senior Seminar project in Mathematics
- Benjamin Sonin, 2014-2015, co-supervised Senior Design project in Engineering Physics.
- Lee Chedister, 2013-2014, supervised Senior Seminar project in Mathematics.
- Jonathan Kochen, 2013-2014, supervised Senior Seminar project in Mathematics.
- Derek Kiesling, 2012-2013, supervised Senior Seminar project in Mathematics.
- Xinghao Gong, 2013, Honors thesis reader (Mathematics).

## STUDENTS (UTSA)

- PhD students (3+8)

- Mahmuda Ahmed; graduated Summer 2015; supervised research on trajectory analysis and map construction; co-chair of PhD committee (together with Matt Gibson).  
Positions: (current) Software Engineer at Uber Technologies Inc.
- Jessica L. Sherette, graduated Fall 2013; supervised research on distance measures for surfaces; co-chair of PhD committee (together with Kay Robbins).  
Positions: (current) Lecturer in the Department of Computer Science at the University of Texas at San Antonio.
- Atlas F. Cook IV, graduated Fall 2009; supervised research on obstacle-avoiding similarity metrics and shortest path problems; chair of PhD committee.  
Positions: Programmer at the Institute for Computational Engineering and Sciences at the University of Texas at Austin; postdoc with Roland Geraerts in Utrecht, Netherlands; postdoc with Mark de Berg in Eindhoven, Netherlands.
- Jared Bennat, 2011–2012, supervised research on the computation of integral Fréchet distance.
- Dragana Veljkovich, graduated Fall 2010; member of PhD committee.
- Anthonoy Castaldo, graduated Fall 2010; member of PhD committee.
- Keith Harrison, dissertation proposal Fall 2010; member of PhD committee.
- Areej Al-Bataineh, dissertation proposal Spring 2010; member of PhD committee.
- Yijuan Lu, graduated Spring 2008; member of PhD committee.
- Yie (Jerry) Yue, graduated Spring 2007; member of PhD committee.
- Lisa Tate, dissertation proposal Spring 2006; member of PhD committee.

- Masters students (5+10)

- Nazul Grimaldo, graduated Summer 2012; supervised research on protein quantification using LC-MS/MS data for protein biomarker detection; chair of MS committee.

- Jayanthi Nalini, graduated Fall 2012; supervised research on shape matching implementations using the Fréchet distance.
- Justin Leonard, graduated Fall 2010; chair of MS committee.
- Allen Fouty, graduated Spring 2010; supervised research on dynamic travel-time databases, member of MS committee.
- Randall Salas, graduated Fall 2006; supervised research on GPS trajectory analysis for dynamic travel-time databases; chair of MS committee.
  
- Chad Zalkin, graduated Spring 2011; member of MS committee.
- Robert Mireles, graduated Spring 2009; member of MS committee.
- Kevin Do, graduated Spring 2008; member of MS committee.
- Neil Kalinowski, graduated Fall 2007, supervised research on GPS trajectory analysis and reactive routing for dynamic travel-time databases, member of MS committee.
- Anthony Castaldo, graduated Summer 2007; member of MS committee.
- Jason Cochetti, graduated Fall 2006; member of MS committee.
- Mark Robinson, graduated Fall 2006; member of MS committee.
- Rachel Smith, graduated Spring 2006; member of MS committee.
- Stephanie Daecon, graduated Fall 2005 (Applied Mathematics); member of MS committee.
- Jun Pan, graduated Summer 2005; member of MS committee.
  
- Undergraduate students (8+5)
  - Mikey Segura, supervised research on live cell imaging trajectory analysis.
  - Ali Scissons, supervised research on mobile computing and GPS trajectory analysis for dynamic travel-time databases.
  - Jessica Stahley, supervised research on mobile computing and GPS trajectory analysis for dynamic travel-time databases.
  - Matt Moore, supervised MBRS-RISE research rotation.
  - Miriam Winter, supervised research on GPS trajectory analysis for dynamic travel-time databases.
  - Sean Pivek, supervised research on analyzing 2D electrophoresis gels.
  - Bianca Castillo, supervised MBRS-RISE research rotation.
  - Drew Shaw, supervised research on analyzing 2D electrophoresis gels.
  
  - Michael Anzaldua, supervised internship at USAA, Fall 2007.
  - Ashley Price, supervised internahip at Cisco, Summer 2007.
  - Natalya Jeffords, supervised internship at USAA, Summer 2006.
  - Dennis Andrade, supervised internship at Sonatest, Spring 2006.
  - James Packer, graduated Fall 2006; reader for Honors thesis.

#### OTHER TEACHING ACTIVITIES

- Faculty advisor for the Zeta chapter of Upsilon Pi Epsilon at Tulane; 2015–2016.
- Faculty advisor for the Association for Computing Machinery (ACM) student chapter at UTSA; 2007–2012.
- Faculty advisor for the Bangladesh Student Association at UTSA; 2011–2012.

## INSTITUTIONAL SERVICE (TULANE)

- 2016 – present Member of the President’s Faculty Advisory Committee
- 2016 – present Member of the Faculty Handbook Committee
- 2015 – present SSE representative on the University Senate
- 2012 – present Newcomb Fellow
- 2018 – 2019 Chair of the SSE Graduate Studies Committee (member since 2016)
- 2015 – 2019 Graduate coordinator, Department of Computer Science
- 2016 – 2018 Member of the ad hoc senate committee on reform of the University Senate
- 2015 – 2016 Co-organizer (with Bruce Gibb) of the SSE Lunch-time Faculty Research Seminars
- 2013 – 2016 Member of the SSE Curriculum Committee
- 2012 – 2016 Proposal development for the PhD program in Computer Science

## SHARED GOVERNANCE (UT SYSTEM)

- 2009 – 2012 University of Texas System Faculty Advisory Council (UTFAC), member
- 2011 – 2012 Executive Committee (UTFAC), member
- 2011 – 2012 Co-Chair of the Academic Affairs and Faculty Quality Committee (UTFAC)

## SHARED GOVERNANCE (UTSA)

- 2010 – 2012 Chair of the Faculty Senate (vice chair 2009–2010, member 2008–2010)
- 2008 – 2012 Faculty Senate Executive Committee, member (chair since Fall 2010)
- 2009 – 2010 Faculty Senate Handbook of Operating Procedures Committee, member
- 2009 – 2010 Faculty Senate Budget Committee, member

## UNIVERSITY COMMITTEES (UTSA)

- 2011 – 2012 Executive Leadership Council, member
- 2009 – 2012 Strategic Resource Planning Council, member
- 2010 Resource Strategy Team, member
- 2010 – 2012 Committee on the Handbook of Operating Procedures, member
- 2010 – 2012 Facilities and Administration (F&A) Task Force, member

## COLLEGE SERVICE (UTSA)

- 2010 – 2012 Head of the Computational Biology Initiative (CBI; [cbi.utsa.edu](http://cbi.utsa.edu))
- 2005 – 2007 College Policy Committee, member
- 2006 – 2007 Dissertation Awards Committee, member
- 2011 – 2012 College Faculty Review Advisory Council (CFRAC), member
- 2011 – 2012 Cyber Security Council, member



## DEPARTMENTAL SERVICE (UTSA)

2007 – 2012	Chair of the Communications Committee and Communications Director
2004 – 2007	Faculty Search Committee, member
2009 – 2010	Faculty Search Committee, member
2005 – 2007	Secretary of the Department Faculty Forum
2004 – 2012	PhD Exam Committee (Algorithms Portion), member
2006 – 2007	Theory Sub-Committee, member
2005 – 2009	Graduate Studies Committee, member
2009 – 2012	Graduate Recruitment Committee, member
2009	Faculty Mentoring Task Force, member