Donald Sheehy

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Education

B.S.E. Computer Science, Princeton University, *Summa Cum Laude*, 2005.

Ph.D. Computer Science, Carnegie Mellon University, 2011.

Employment

University of Connecticut, Assistant Professor, 2013–present

Geometrica, Inria Saclay, PostDoc, 2011–2013

Carnegie Mellon University, Graduate Student, 2005–2011.

Google (Mountain View, CA), Software Engineering Intern, Summer 2007.

Google (Pittsburgh, PA), Software Engineering Intern, Summer 2008.

Teaching

At UConn:
Objects and Data Structures (python), Spring 2016, Fall 2016, Spring 2017
Data Structures and Intro to Algorithms (Java), Fall 2015
Theory of Computation, Spring 2014, 2015
Computational Geometry, Fall 2013, 2014, 2015, 2016, 2017

At Carnegie Mellon University:
Computational Geometry, Spring 2010

Grants and Funding

NSF. *CRII: AF: Principled Divide-and-Conquer for Topological Algorithms*. Start Date:02/01/2015; Award Amount: $173,034.00.

NSF. *AF: Small: Homological Methods for Big Enough Data*. Start Date:08/01/2015; Award Amount: $340,954.00.

NSF. *CAREER: Algorithmic Challenges and Opportunities in Spatial Data Analysis*. Start Date:02/01/2016; Award Amount: $511,429.

AFRL. *Topological Detection of Geometric Structure*. Start Date: 04/15/2017; Award Amount: $208,500.

Publications

Journal Articles

Efficient and Robust Persistent Homology for Measures
Mickael Buchet, Frederic Chazal, Steve Y. Oudot and Donald R. Sheehy.
Computational Geometry: Theory and Applications. 58: 70-96, 2016

Zigzag Zoology: Rips Zigzags for Homology Inference
Steve Y. Oudot and Donald R. Sheehy.
Foundations of Computational Mathematics, 2015

A new approach to output-sensitive construction of Voronoi diagrams and Delaunay triangulations
Gary L. Miller and Donald R. Sheehy.
Discrete Comput Geom, 52(3): 476-491., 2014

Linear-Size Approximations to the Vietoris-Rips Filtration
Donald R. Sheehy.
Discrete Comput Geom, 49(4): 778-796, 2013

New Bounds on the Size of Optimal Meshes
Donald R. Sheehy.
Computer Graphics Forum, 31:5, 1627-1635, 2012

Approximate Centerpoints with Proofs
Gary L. Miller and Donald R. Sheehy.
Computational Geometry: Theory and Applications, 43(8): 647-654, 2010

Shape Deformation in Continuous Map Generalization
Jeff Danciger, Satyan L. Devadoss, John Mugno, Donald R. Sheehy and Rachel Ward.
GeoInformatica 13: 2, 203-221, 2009

Compatible Triangulations and Point Partitions by Series Triangular Graphs
Jeff Danciger, Satyan L. Devadoss and Donald R. Sheehy.
Computational Geometry: Theory and Applications 34, 195-202, 2006

Proceedings

Frechet-Stable Signature Using Persistent Homology
Marc Khoury and Donald R. Sheehy.
SODA: ACM-SIAM Symposium on Discrete Algorithms, 2018

Supporting Ruled Polygons
Nicholas J. Cavanna, Marc Khoury and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2017

When and Why the Topological Coverage Criterion Works
Nicholas J. Cavanna, Kirk Gardner and Donald R. Sheehy.
SODA: ACM-SIAM Symposium on Discrete Algorithms, 2017

Transforming Hierarchical Trees on Metric Spaces
Mahmoodreza Jahanseir and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2016

kth Nearest Neighbor Sampling in the Plane
Kirk Gardner and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2016

Adaptive Metrics for Adaptive Samples
Nicholas J. Cavanna and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2016

Exploring Circle Packing Algorithms
Kevin Pratt, Connor Riley and Donald R. Sheehy.
SOCG: Symposium on Computational Geometry (Multimedia Session), 2016

Interactive Geometric Algorithm Visualization in a Browser
Lynn Asselin, Kirk Gardner and Donald R. Sheehy.
SOCG: Symposium on Computational Geometry (Multimedia Session), 2016

Persistent Homology and Nested Dissection
Michael Kerber, Donald R. Sheehy and Primoz Skraba.
SODA: ACM-SIAM Symposium on Discrete Algorithms, 2016

An Output-Sensitive Algorithm for Computing Weighted α-Complexes
Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2015

A Geometric Perspective on Sparse Filtrations
Nicholas J. Cavanna, Mahmoodreza Jahanseir and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2015

Approximating Nearest Neighbor Distances
Michael B. Cohen, Brittany Terese Fasy, Gary L. Miller, Amir Nayyeri, Donald R. Sheehy and Ameya Velingker.
WADS: Algorithms and Data Structures Symposium, 2015

Visualizing Sparse Filtrations
Nicholas J. Cavanna, Mahmoodreza Jahanseir and Donald R. Sheehy.
SOCG: Symposium on Computational Geometry (Multimedia Session), 2015

Efficient and Robust Persistent Homology for Measures
Mickael Buchet, Frederic Chazal, Steve Y. Oudot and Donald R. Sheehy.
SODA: Symposium on Discrete Algorithms, 2015

The Persistent Homology of Distance Functions under Random Projection
Donald R. Sheehy.
SOCG: Symposium on Computational Geometry, 2014

Geometric Separators and the Parabolic Lift
Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2013

A New Approach to Output-Sensitive Voronoi Diagrams and Delaunay Triangulations
Gary L. Miller and Donald R. Sheehy.
SOCG: ACM Symposium on Computational Geometry, 2013

A Fast Algorithm for Well-Spaced Points and Approximate Delaunay Graphs
Gary L. Miller, Donald R. Sheehy and Ameya Velingker.
SOCG: ACM Symposium on Computational Geometry, 2013

Zigzag Zoology: Rips Zigzags for Homology Inference
Steve Y. Oudot and Donald R. Sheehy.
SOCG: ACM Symposium on Computational Geometry, 2013

A Multicover Nerve for Geometric Inference
Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2012

Minimax Rates for Homology Inference
Sivaraman Balakrishnan, Alessandro Rinaldo, Aarti Singh, Donald R. Sheehy and Larry Wasserman.
AISTATS: AI and Statistics, 2012

Linear-Size Approximations to the Vietoris-Rips Filtration
Donald R. Sheehy.
SOCG: ACM Symposium on Computational Geometry, 2012

Beating the Spread: Time-Optimal Point Meshing
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
SOCG: ACM Symposium on Computational Geometry, 2011

Topological Inference via Meshing
Benoit Hudson, Gary L. Miller, Steve Y. Oudot and Donald R. Sheehy.
SOCG: ACM Symposium on Computational Geometry, 2010

The Centervertex Theorem for Wedge Depth
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2009

Approximate Center Points with Proofs
Gary L. Miller and Donald R. Sheehy.
SOCG: Proceedings of the 25th ACM Symposium on Computational Geometry, 2009

Size Complexity of Volume Meshes vs. Surface Meshes
Benoit Hudson, Gary L. Miller, Todd Phillips and Donald R. Sheehy.
SODA: ACM-SIAM Symposium on Discrete Algorithms, 2009

Achieving Spatial Adaptivity while Finding Approximate Nearest Neighbors
Jonathan Derryberry, Daniel D. Sleator, Donald R. Sheehy and Maverick Woo.
CCCG: The Canadian Conference in Computational Geometry, 2008

Linear-size meshes
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
CCCG: The Canadian Conference in Computational Geometry, 2008

Size Competitive Meshing without Large Angles
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
ICALP: 34th International Colloquium on Automata, Languages and Programming, 2007

Workshop Papers

Persistent Nerves Revisited
Nicholas J. Cavanna and Donald R. Sheehy.
CG Week: Young Researchers Forum, 2017

Constructing Hierarchical Trees from Locally Greedy Permutations
Mahmoodreza Jahanseir and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2016

Optimal Size kNN Sampling
Kirk Gardner and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2016

Persistent Nerves Revisited
Nicholas J. Cavanna and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2016

Generalized Coverage in Homological Sensor Networks
Nicholas J. Cavanna, Kirk Gardner and Donald R. Sheehy.
CG Week: Young Researchers Forum, 2016

Certified Homology Inference
Nicholas J. Cavanna, Kirk Gardner and Donald R. Sheehy.
CG Week: Young Researchers Forum, 2016

Transforming Hierarchical Trees on Metric Spaces
Mahmoodreza Jahanseir and Donald R. Sheehy.
CG Week: Young Researchers Forum, 2016

Characterizing the Distortion of Some Simple Euclidean Embeddings
Jonathan Lenchner, Krzysztof Onak, Donald R. Sheehy and Liu Yang.
The European Workshop on Computational Geometry, 2016

Approximating the Simplicial Depth in High Dimensions
Peyman Afshani, Donald R. Sheehy and Yannik Stein.
The European Workshop on Computational Geometry, 2016

From Cover Trees to Net-Trees
Mahmoodreza Jahanseir and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2015

Generalized Coverage in Homological Sensor Networks
Nicholas J. Cavanna, Kirk Gardner and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2015

A Geometric Perspective on Sparse Filtrations
Nicholas J. Cavanna, Mahmoodreza Jahanseir and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2015

Persistent Homology and Nested Dissection
Michael Kerber, Donald R. Sheehy and Primoz Skraba.
The Fall Workshop in in Computational Geometry, 2013

A New Approach to Output-Sensitive Voronoi Diagrams and Delaunay Triangulations
Gary L. Miller and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2012

Tighter Bounds on the Size of Optimal Meshes
Donald R. Sheehy.
The European Workshop on Computational Geometry, 2012

Fat Voronoi Diagrams
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2010

(Multi)Filtering Noise in Geometric Persistent Homology
Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2010

Mesh-Enhanced Persistent Homology
Benoit Hudson, Gary L. Miller, Steve Y. Oudot and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2009

Approximating Voronoi Diagrams with Voronoi Diagrams
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2009

Fast sizing calculations for meshing
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2008

Cone Depth and the Center Vertex Theorem
Gary L. Miller, Todd Phillips and Donald R. Sheehy.
The Fall Workshop in in Computational Geometry, 2008

Service

Editorial Board, International Journal of Computational Geometry and Applications

Program Committee, International Symposium on Computational Geometry, 2015

Chair, Program Committee, 24th Annual Fall Workshop on Computational Geometry 2014

Co-Organizer NIPS Workshop on Algebraic Topology in Machine Learning, 2012

Graduate Admissions Committee Carnegie Mellon University

Organized Low-Dimensional Manifolds Reading Group (`http://www.cs.cmu.edu/~manifolds`)

Theory Lunch Organizer, 2007-2008

Immigration Course Student Coordinator, 2006

Selected Talks

Transforming Hierarchical Trees on Metric Spaces
The Canadian Conference on Computational Geometry, Vancouver, Canada, August 4, 2016

Sampling Uncertain Manifolds
CG Week Workshop on Geometric Computing on Uncertain Data, Boston, MA, June 15, 2016

Some Thoughts on Sampling
Topology, Geometry, and Data Analysis Conference at Ohio State University, May 16, 2016

Characterizing the Distortion of Some Simple Euclidean Embeddings
The European Workshop on Computational Geometry, Lugano, Switzerland, March 31, 2016

Persistent Homology and Nested Dissection
The ACM-SIAM Symposium on Discrete Algorithms, Arlington, VA, January 11, 2016

Sensors and Samples: A Homological Approach
Presented at the Institute for Advanced Study in Princeton, NJ. Workshop on Topology: Identifying Order in Complex Systems

The Persistent Homology of Distance Functions under Random Projection
Presented at the Symposium on Computational Geometry, Kyoto Japan, June, 2014.

Persistent Homology and Nested Dissection
Presented at the 23rd Fall Workshop on Computational Geometry, New York City, October 2013.

Geometric and Topological Data Analysis
Presented at the Air Force Research Lab, Rome, New York

Geometric Separators and the Parabolic Lift
Presented at The Canadian Conference on Computational Geometry, Waterloo, Canada, August 2013.

A New Approach to Output-Sensitive Voronoi Diagrams and Delaunay Triangulations
Presented at The Symposium on Computational Geometry 2013, Rio de Janiero, Brazil

Optimal Meshing
Presented at the Workshop on Computational Geometry (Mesh Generation) at SoCG 2013 in Rio de Janiero

Mesh Generation and Topological Data Analysis
Banff Workshop on Topological Data Analysis and Machine Learning Theory 2012

A Multicover Nerve for Geometric Inference
Presented at the Canadian Conference on Computational Geometry 2012, PEI Canada

New Bounds on the Size of Optimal Meshes
Presented at the Symposium on Geometry Processing 2012, Tallinn Estonia

Minimax Rates for Homology Inference
Geometrica Seminar, Inria Saclay

Linear-Size Approximations to the Vietoris-Rips Filtration
Presented at The Symposium on Computational Geometry 2012, University of North Carolina Chapel Hill

Beating the Spread: Time-Optimal Point Meshing
Presented at Symposium on Computational Geometry, 2011, Paris, France

Learning with Nets and Meshes
Computational Geometry Learning Workshop (CGL), Paris, France

Meshes and Nets
Presented at CMU Theory Lunch, April 6, 2011

Ball Packings and Fat Voronoi Diagrams
Presented at CMU Theory Lunch, September 15, 2010

Topological Inference via Meshing
Presented at Symposium on Computational Geometry, 2010, in Snowbird, Utah

**Prospective Students Research Talk:
 Geometry, Topology and All of You Wildest Dreams Will Come True.**
Presented to CMU Prospective Grad Students, Feb 27, 2010

The Centervertex Theorem for Wedge Depth
Presented at the Canadian Conference on Computational Geometry, 2009, in Vancouver

Approximate Centerpoints with Proofs
Presented at the Symposium on Computational Geometry, 2009, in Aarhus, Denmark.

Planar Graphs in 2 1/2 Dimensions
Presented at Theory Lunch, Carnegie Mellon University, March 18, 2009

Linear-size meshes
Presented at the Canadian Conference on Computational Geometry, 2008, in Montreal

Achieving Spatial Adaptivity while Finding Approximate Nearest Neighbors
Presented at the Canadian Conference on Computational Geometry, 2008, in Montreal

Cone Depth and the Center Vertex Theorem
Presented at The Fall Workshop in in Computational Geometry, October 31, 2008

Searching for the Center
Presented at Theory Lunch, Carnegie Mellon University, October 8, 2008

A Competitive Algorithm for No-Large-Angle Triangulation
Presented at Theory Lunch, Carnegie Mellon University, May 2, 2007

Flips in Computational Geometry
Presented at Theory Lunch, Carnegie Mellon University, Nov. 15, 2006

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`http://donsheehy.net/cv.html`