



# Keenan Crane

## Curriculum Vitæ

<http://www.cs.cmu.edu/~kmcrane>  
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(412) 268-3454

## Employment

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*Associate Professor with tenure (2024–)*

Computer Science Department and Robotics Institute  
Department of Electrical and Computer Engineering (courtesy) Carnegie Mellon University

*Associate Professor without tenure (2021–2024)*

*Michael B. Donohue Career Development Professor*  
Computer Science Department and Robotics Institute  
Department of Electrical and Computer Engineering (courtesy) Carnegie Mellon University

*Assistant Professor (2015–2021)*

Computer Science Department and Robotics Institute  
Carnegie Mellon University

*NSF Mathematical Sciences Postdoctoral Fellow (2013–2015)*

Columbia University

## Education

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*PhD, Computer Science*

California Institute of Technology (2010–2013)

*MS, Computer Science*

California Institute of Technology (2007–2010)

*BS, Computer Science*

University of Illinois at Urbana-Champaign (2002–2006)

## Publications

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### BOOKS

1. Keenan Crane (ed.)  
*An Excursion into Discrete Differential Geometry*  
**Proceedings of Symposia in Applied Mathematics (76) 2020**

### JOURNAL ARTICLES

2. Nicole Feng, Mark Gillespie, Keenan Crane  
*Winding Numbers on Discrete Surfaces*  
**ACM Transactions on Graphics (2023)**
3. Rohan Sawhney, Bailey Miller, Ioannis Gkioulekas, Keenan Crane  
*Walk on Stars: A Grid-Free Monte Carlo Method for PDEs with Neumann Boundary Conditions*  
**ACM Transactions on Graphics (2023)**
4. Derek Liu, Benjamin Chislett, Mark Gillespie, Alec Jacobson, Keenan Crane  
*Surface Simplification with Intrinsic Error Metrics*  
**ACM Transactions on Graphics (2023)**

5. Bailey Miller, Rohan Sawhney, Keenan Crane, Ioannis Gkioulekas  
*Boundary Value Caching for Walk on Spheres*  
**ACM Transactions on Graphics (2023)**
6. Rohan Sawhney, Dario Seyb, Wojciech Jarosz, Keenan Crane  
*Grid-Free Monte Carlo for PDEs with Spatially Varying Coefficients*  
**ACM Transactions on Graphics (2022)** [Best Paper, Honorable Mention]
7. Nicholas Sharp, Souhaib Attaiki, Keenan Crane, Maks Ovsjanikov  
*DiffusionNet: Discretization Agnostic Learning on Surfaces*  
**ACM Transactions on Graphics (2022)**
8. Mark Gillespie, Nicholas Sharp, Keenan Crane  
*Integer Coordinates for Intrinsic Geometry Processing*  
**ACM Transactions on Graphics (2021)**
9. Chris Yu, Caleb Brakensiek, Henrik Schumacher, Keenan Crane  
*Repulsive Surfaces*  
**ACM Transactions on Graphics (2021)**
10. Mark Gillespie, Boris Springborn, Keenan Crane  
*Discrete Conformal Equivalence of Polyhedral Surfaces*  
**ACM Transactions on Graphics 40 (4) 2021**
11. Chris Yu, Henrik Schumacher, Keenan Crane  
*Repulsive Curves*  
**ACM Transactions on Graphics 40 (2) 2021**
12. Nicholas Sharp, Keenan Crane  
*You Can Find Geodesic Paths in Triangle Meshes by Just Flipping Edges*  
**ACM Transactions on Graphics 39 (6) 2020**
13. Rohan Sawhney, Keenan Crane  
*Monte Carlo Geometry Processing: A Grid-Free Approach to PDE-Based Methods on Volumetric Domains*  
**ACM Transactions on Graphics 39 (4) 2020**
14. Nicholas Sharp, Keenan Crane  
*A Laplacian for Nonmanifold Triangle Meshes*  
**SGP / Computer Graphics Forum 39 (5) 2020** [Best Paper Award]
15. Katherine Ye, Wode Ni, Max Krieger, Dor Ma'ayan, Jenna Wise, Joshua Sunshine, Jonathan Aldrich, Keenan Crane  
*Penrose: From Mathematical Notation to Beautiful Diagrams*  
**ACM Transactions on Graphics 39 (4) 2020**
16. Nicholas Sharp, Yousuf Soliman, Keenan Crane  
*Navigating Intrinsic Triangulations*  
**ACM Transactions on Graphics 38 (4) 2019**
17. Etienne Corman, Keenan Crane  
*Symmetric Moving Frames*  
**ACM Transactions on Graphics 38 (4) 2019**
18. Nicholas Sharp, Yousuf Soliman, Keenan Crane  
*The Vector Heat Method*  
**ACM Transactions on Graphics 38 (3) 2019**
19. Nicholas Sharp, Keenan Crane  
*Variational Surface Cutting*  
**ACM Transactions on Graphics 37 (4) 2018**
20. Yousuf Soliman, Dejan Slepčev, Keenan Crane  
*Optimal Cone Singularities for Conformal Flattening*  
**ACM Transactions on Graphics 37 (4) 2018**

21. Oded Stein, Eitan Grinspun, Keenan Crane  
*Developability of Triangle Meshes*  
**ACM Transactions on Graphics 37 (4) 2018**
22. Mina Konakovic, Julian Panetta, Keenan Crane, Mark Pauly  
*Rapid Deployment of Curved Surfaces via Programmable Auxetics*  
**ACM Transactions on Graphics 37 (4) 2018**
23. Alex Baden, Keenan Crane, Misha Kazhdan  
*Möbius Registration*  
**SGP / Computer Graphics Forum 37 (5), 2018**
24. Rohan Sawhney, Keenan Crane  
*Boundary First Flattening*  
**ACM Transactions on Graphics 37 (1) 2017**
25. Chris Yu, Keenan Crane, Stelian Coros  
*Computational Design of Telescoping Structures*  
**ACM Transactions on Graphics 36 (4), 2017**
26. Derek Liu, Alec Jacobson, Keenan Crane  
*A Dirac Operator for Extrinsic Shape Analysis*  
**SGP / Computer Graphics Forum 36 (5), 2017**
27. Mina Konakovic, Keenan Crane, Bailin Deng, Sofien Bouaziz, Daniel Piker, Mark Pauly  
*Beyond Developable: Computational Design and Fabrication with Auxetic Materials*  
**ACM Transactions on Graphics 35 (4), 2016**
28. Felix Knöppel, Keenan Crane, Ulrich Pinkall, Peter Schröder  
*Stripe Patterns on Surfaces*  
**ACM Transactions on Graphics 34 (4), 2015**
29. Keenan Crane, Clarisse Weischedel, Max Wardetzky  
*Geodesics in Heat: A New Approach to Computing Distance Based on Heat Flow*  
**ACM Transactions on Graphics 32 (5), 2013**
30. Keenan Crane, Ulrich Pinkall, Peter Schröder  
*Robust Fairing via Conformal Curvature Flow*  
**ACM Transactions on Graphics 32 (4), 2013**
31. Felix Knöppel, Keenan Crane, Ulrich Pinkall, Peter Schröder  
*Globally Optimal Direction Fields*  
**ACM Transactions on Graphics 32 (4), 2013**
32. Keenan Crane, Ulrich Pinkall, Peter Schröder  
*Spin Transformations of Discrete Surfaces*  
**ACM Transactions on Graphics 30 (4), 2011**
33. Keenan Crane, Mathieu Desbrun, Peter Schröder  
*Trivial Connections on Discrete Surfaces*  
**SGP / Computer Graphics Forum 29 (5), 2010 [Best Paper Award]**
34. Patrick Mullen, Keenan Crane, Dmitry Pavlov, Yiying Tong, Mathieu Desbrun  
*Energy-Preserving Integrators for Fluid Animation*  
**ACM Transactions on Graphics 28 (3), 2009**
35. Marin Kobilarov, Keenan Crane, Mathieu Desbrun  
*Lie Group Integrators for Animation and Control of Vehicles*  
**ACM Transactions on Graphics 28 (2), 2009**
36. Ryan White, Keenan Crane, David Forsyth  
*Capturing and Animating Occluded Cloth*  
**ACM Transactions on Graphics 26 (3), 2007**
37. Eliot Young, Richard Binzel, Keenan Crane  
*A Two-color Map of Pluto's Sub-Charon Hemisphere*  
**The Astronomical Journal 121 (1), 2001**

## ***OTHER REFEREED PUBLICATIONS***

38. Nicholas Sharp, Mark Gillespie, Keenan Crane  
*Geometry Processing with Intrinsic Triangulations*  
ACM SIGGRAPH Course Notes, 2021
39. Keenan Crane  
*Conformal Geometry of Simplicial Surfaces*  
Proceedings of Symposia in Applied Mathematics (2020)
40. Wode Ni, Katherine Ye, Joshua Sunshine, Jonathan Aldrich, Keenan Crane  
*SUBSTANCE and STYLE: Domain-Specific Languages for Mathematical Diagrams*  
DSLDI (Domain-Specific Language Design and Implementation) 2017
41. Katherine Ye, Keenan Crane, Jonathan Aldrich, and Joshua Sunshine  
*Designing Extensible, Domain-Specific Languages for Mathematical Diagrams*  
ACM SIGPLAN POPL - Off the Beaten Track 2017
42. Keenan Crane, Fernando de Goes, Mathieu Desbrun, Peter Schröder  
*Digital Geometry Processing with Discrete Exterior Calculus*  
ACM SIGGRAPH Course Notes, 2013
43. Michael Glueck, Keenan Crane, Sean Anderson, Andres Rutnik, Azam Khan  
*Multiscale 3D Reference Visualization*  
Proceedings of the Symposium on Interactive 3D Graphics, 2009
44. Keenan Crane, Ignacio Llamas, Sarah Tariq  
*Real Time Simulation and Rendering of 3D Fluids*  
GPU Gems 3 (Addison-Wesley), 2007
45. Ryan White, Keenan Crane, David Forsyth  
*Data Driven Cloth Animation*  
ACM SIGGRAPH Technical Sketches, 2007
46. Nathan Carr, Jared Hoberock, Keenan Crane, John Hart  
*Rectangular Multi-Chart Geometry Images*  
Proceedings of the Symposium on Geometry Processing, 2006
47. Nathan Carr, Jared Hoberock, Keenan Crane, John Hart  
*Fast GPU Ray Tracing of Dynamic Meshes*  
Proceedings of Graphics Interface, 2006

## ***TECHNICAL REPORTS AND MANUSCRIPTS***

48. Keenan Crane, Marco Livesu, Enrico Puppo, Yipeng Qin  
*A Survey of Algorithms for Geodesic Paths and Distances*  
arXiv:2007.10430, 2020
49. Justin Solomon, Keenan Crane, Adrian Butscher, Chris Wojtan  
*A General Framework for Bilateral and Mean Shift Filtering*  
arXiv:1405.4734, 2014

## ***INVITED PAPERS***

50. Keenan Crane, Max Wardetzky *A Glimpse into Discrete Differential Geometry*  
Notices of the AMS, November 2017
51. Keenan Crane, Clarisse Weischedel, Max Wardetzky  
*The Heat Method for Distance Computation*  
Communications of the ACM (CACM) Research Highlights, November 2017
52. Keenan Crane  
*Conformal Geometry Processing*  
Caltech PhD thesis, 2013

53. Keenan Crane  
*Discrete Connections for Geometry Processing*  
Caltech MS thesis, 2010

## *Professional Activities*

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Technical Papers co-Chair - Symposium on Geometry Processing (2021)  
Associate Editor - ACM Transactions on Graphics (2017–2020)  
Steering Committee - Summer Geometry Initiative (2021–2023)  
Steering Committee - Illustrating Mathematics (2019–)  
Inaugural Committee Member - ACM SIGGRAPH Doctoral Consortium (2018)  
Technical Papers Committee - SIGGRAPH (2015, 2016, 2021, 2024), SIGGRAPH Asia (2014, 2019, 2020)  
Committee Member - AMS Short Course Subcommittee (2019–2022)  
Co-Organizer - ICERM Workshop on Illustrating Geometry & Topology (2019)  
Organizer - AMS Short Course on Discrete Differential Geometry, Joint Mathematics Meeting (2018)  
Program Committee - Symposium on Geometry Processing (SGP 2013, 2014, 2015, 2018, 2019, 2020)  
Program Committee - Conference on Computer Vision & Pattern Recognition (CVPR 2013)  
Program Committee - Tiny Transactions on Computer Science (TinyToCS 2013)  
Program Committee - Midwest Conference on Computer Graphics (MIDGRAPH 2005)  
Chair - ACM SIGGRAPH Student Chapter at UIUC (2005)  
*Reviewer:* SIGGRAPH 2006–2021; SIGGRAPH Asia 2008, 2010, 2013–2021; ACM Transactions on Graphics 2007, 2008, 2012, 2014–2020; Eurographics 2006, 2007, 2011, 2013, 2016, 2017; Pacific Graphics 2013, 2014; IEEE TVCG 2009, 2011, 2012, 2014, 2015; Computers & Graphics 2011, 2012; ECCV 2012; CVPR 2013; GMOD 2013; Graphics Interface 2006; MIDGRAPH 2005; SIAM SIIMS 2011, 2012; Computer Aided Design 2013; Computer Graphics Forum 2013; Origami6 2015.  
Panelist - NSF core programs

CSRankings.org: 7th most productive Computer Graphics researcher in US (of 153) during time at CMU (2015–2023)  
YouTube (<https://www.youtube.com/keenan Crane>) — 1.2 million views as of April 3, 2023.  
Twitter (<https://twitter.com/keenanisalive>) — 23k followers as of April 3, 2023.

## *Press Coverage*

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The Aperiodical, “*–e<sup>i $\pi$</sup>  to Watch: Keenan Crane*” (November 2023)  
New York Times, “*Theyre Taking Jigsaws to Infinity and Beyond*” (December 2022)  
Dartmouth University, “*Shining Light on Hard Math to Recreate Reality*” (August 2022)  
WIRED, “*Computer Scientist Explains Fractals in 5 Levels of Difficulty*” (May 2022)  
Hackaday, “*This Spherical Lamps Pieces Ship Flat, Thanks to Math*” (May 2022)  
SCS News, “*Repulsive Energies Lead CMU Researchers To Rethink Computer Graphics*” (December 2021)  
Tech Xplore, “*Analysis of Complex Geometric Models Made Simple*” (July 2020)  
Popular Mechanics, “*Finally, Software That Turns Confusing Math Equations Into Simple Images*” (June 2020)  
Notices of the AMS, “*Packard Fellowships Awarded*” (February 2019)  
ACM News, “*2018 Packard Fellowships Include 2 Computer Scientists*” (October 2018)  
ZDNet, “*Telescoping Robots Can Shrink to Travel*” (August 2017)  
90.5 WESA, “*CMU Researchers Put A Twist On Telescoping Structures*” (August 2017)  
ACM SIGGRAPH Press Release, “*Making Telescopes that Curve and Twist*” (July 2017)  
WIRED, “*A Freaky Anti-Rubber Is Still Weirder Scientists Out*” (August 2016)  
NSF Science Now, “*Computational Design Tool Transforms Flat Materials into 3-D Shapes*” (August 2016)  
3DPrint.com, “*These 3D Printed Porcelain Coffee Mugs & Donuts are Clever Topology-Related Joke*” (August 2015)  
Scientific American Blog, “*In Love with Geometry*” (September 2013)  
National Public Radio, “*Digital Domain Grapples with Fur, Feathers*” (June 2012)  
Engineering & Science Magazine, “*Conquering Shapes*” (Spring 2012)

## *Awards & Honors*

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### **Packard Fellowship (2018–2023)**

Awarded to 18 faculty/year across all areas of science and engineering; \$875,000 over 5 years.

### **NSF CAREER Award (2020–2025)**

Awarded to ~100 computer science faculty/year; \$519,154 over 5 years.

### **Michael B. Donohue Career Development Professorship (2021–2024)**

Awarded to one junior faculty member in the CMU School of Computer Science every 3 years.

### **NSF Mathematical Sciences Postdoctoral Fellowship (2013–2015; NSF Award #1304254)**

Awarded to top 15% of applicants across all areas of pure & applied mathematics; \$150,000 over 2 years.

### **Google PhD Fellowship (2010–2013)**

Awarded to ~15 students/year across all disciplines of computer science; 3-years tuition & stipend.

### **2021 Early Career Academic Achievement Alumni Award**

Awarded annually by the UIUC Department of Computer Science.

### **2020 Eurographics Junior Fellow**

About 2–4 new fellows elected annually across computer graphics.

### **2022 SIGGRAPH Best Paper Award, Honorable Mention**

### **2020 Symposium on Geometry Processing Best Paper Award**

### **2019 Symposium on Geometry Processing Software Award**

One award per year; € 1000 prize.

### **2013 Heidelberg Laureate Forum**

### **2012 Oberwolfach Graduate Student Fellow**

### **2012 Everhart Distinguished Speaker**

### **2010 Symposium on Geometry Processing Best Paper Award**

### **2011 NSF Junior Oberwolfach Fellow**

## *Industry Experience*

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Autodesk Research, Toronto, Canada

*Research Intern* (Summer 2008)

NVIDIA Corporation, Santa Clara, CA

*Demo Team Intern* (Summer 2006)

NVIDIA Corporation, Santa Clara, CA

*Demo Team Intern* (Summer 2005)

NVIDIA Corporation, Santa Clara, CA

*Architecture Intern* (Summer 2004)

Southwest Research Institute, Department of Space Studies

*Student Researcher* (Spring 2000 - Spring 2002)

## *Invited Talks*

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February 27, 2024

*Shape Spaces for Biomembranes?*

Interpretable Quantitative Cell Representations Summit

Allen Institute for Cell Science

February 23, 2024

*Monte Carlo Geometry Processing*

University of Washington

Seattle, Washington

**September 7, 2023**

*Walk on X: Simulating Nature without Simplifying the Geometry*  
Packard Fellows Meeting  
Colorado Springs, CO

**August 22, 2022**

*Monte Carlo Geometry Processing*  
Oberwolfach Mathematical Research Institute  
Oberwolfach, Germany

**June 16, 2022**

*Repulsive Shape Optimization*  
Mathematical Institute  
University of Oxford

**November 18, 2021**

*Repulsive Shape Optimization*  
Center on Frontiers of Computing Studies  
Peking University

**July 6–9, 2020**

*(Postponed due to COVID)*  
SIAM Conference on Imaging Science  
Toronto, Canada

**March, 2020**

*Symmetric Moving Frames*  
University of Göttingen  
Göttingen, Germany

**September 2, 2019**

*Intrinsic Triangulations [Keynote]*  
International Geometry Workshop  
Strobl, Austria

**October 17, 2018**

*Differential Geometry and Digital Fabrication*  
G. Milton Wing Lectures  
University of Rochester

**October 19, 2018**

*Discrete Conformal Geometry II: Beyond Uniformization*  
G. Milton Wing Lectures  
University of Rochester

**July 10, 2017**

*Extrinsic Conformal Geometry*  
FoCM'17 Computational Topology & Geometry Workshop  
Barcelona, Spain

**November 18, 2016**

*Differential Geometry and Developability [Keynote]*  
Symposium on Geometry & Computational Design  
Vienna, Austria

**June 17, 2016**

*Laplace-Beltrami: The Swiss Army Knife of Geometry Processing*  
EU Regional School  
Aachen, Germany

**July 6, 2023**

*Monte Carlo Geometry Processing [Keynote]*  
International Geometry Summit  
Genoa, Italy

**June 20, 2022**

*Intrinsic Geometry Processing [Plenary]*  
International Conference on Curves & Surfaces  
Arcachon, France

**April 27, 2022**

*Geometry Processing & Differential Geometry*  
Unity, Inc.  
Conversations with Research Pioneers

**May 7–9, 2021**

*Intrinsic Triangulations [Keynote]*  
Center of Mathematics Sciences and Applications  
Harvard University

**June 15–24, 2020**

*(Postponed due to COVID)*  
FoCM'20 Computational Topology & Geometry Workshop  
Vancouver, Canada

**September 5, 2019**

*Discrete Differential Geometry*  
Packard Fellows Meeting  
Monterey, CA

**April 1, 2019**

*Heat Methods in Geometry Processing*  
IPAM Workshop on Geometric Processing  
Los Angeles, CA

**October 18, 2018**

*Discrete Conformal Geometry I: Uniformization*  
G. Milton Wing Lectures  
University of Rochester

**September 21, 2017**

*Boundary First Flattening*  
International Geometry Workshop  
Oberurgl, Austria

**November 16, 2016**

*Boundary First Flattening*  
IST Austria  
Klosterneuburg, Austria

**July 1, 2016**

*Conformal Geometry and Auxetic Linkages*  
Brown University / ICERM  
Providence, RI

**January 28, 2016**

*Linear Conformal Parameterization with Boundary Control*  
Oberwolfach Mathematical Research Institute  
Oberwolfach, Germany

**October 14, 2015**

*Line Bundles in Geometry Processing*  
Oberwolfach Mathematical Research Institute  
Oberwolfach, Germany

**April 27, 2015**

*Illustrating Geometry*  
Princeton University  
Princeton, NJ

**March 10, 2015**

*Spin Transformations and Geometry Processing*  
Technische Universität Berlin  
Berlin, Germany

**April 8, 2014**

*Optimizing Algorithms at the Level of Geometry*  
Carnegie Mellon School of Computer Science  
Pittsburgh, PA

**March 20, 2014**

*Optimizing Algorithms at the Level of Geometry*  
University of Toronto, Department of Computer Science  
Toronto, Canada

**February 27, 2014**

*Optimizing Algorithms at the Level of Geometry*  
Georgia Tech College of Computing  
Atlanta, GA

**December 12, 2013**

*Fast Algorithms for Geometry Processing*  
Blue Sky Studios  
Greenwich, CT

**August 31, 2013**

*Globally Optimal Direction Fields*  
International Geometry Workshop  
Strobl, Austria

**August 31, 2012**

*Optimal Algorithms for Vector Field Design and Editing*  
Rhythm and Hues Studios  
El Segundo, California

**June 18, 2012**

*Manipulating Geometry via Extrinsic Curvature*  
DDG Workshop @ SoCG  
Chapel Hill, North Carolina

**May 9, 2012**

*Helping Machines (and People) Think About Shape*  
Caltech Everhart Lecture Series  
Pasadena, California

**March 27, 2012**

*Robust Fairing using Conformal Surface Flows*  
Hausdorff Research Institute for Mathematics  
Bonn, Germany

**July 10, 2015**

*Developable Surface Flow*  
International Geometry Workshop  
Seggau, Austria

**April 19, 2015**

*Line Bundles in Geometry Processing*  
Columbia University  
New York, NY

**June 27, 2014**

*Optimizing Algorithms at the Level of Geometry*  
Google  
Mountainview, CA

**April 1, 2014**

*Optimizing Algorithms at the Level of Geometry*  
Stanford University, Department of Computer Science  
Stanford, CA

**March 19, 2014**

*Optimizing Algorithms at the Level of Geometry*  
Autodesk Research  
Toronto, Canada

**February 24, 2014**

*Optimizing Algorithms at the Level of Geometry*  
UCSD Department of Computer Science and Engineering  
San Diego, CA

**September 3, 2013**

*Geodesics in Heat*  
Institute of Science and Technology Austria  
Klosterneuburg, Austria

**November 18, 2012**

*Manipulating Geometry via Extrinsic Curvature*  
Johns Hopkins University  
Baltimore, Maryland

**July 11, 2012**

*The Heat Method*  
Oberwolfach Mathematical Research Institute  
Oberwolfach, Germany

**May 19, 2012**

*Helping Machines (and People) Think About Shape*  
Caltech Alumni Association Seminar Day  
Pasadena, California

**April 19, 2012**

*Optimal Algorithms for Vector Field Design and Editing*  
Digital Domain  
Venice, California

**December 13, 2011**

*Helping Machines Think About Shape*  
Johns Hopkins Center for Imaging Science  
Baltimore, Maryland



**July 11, 2011**

*Spin Transformations of Discrete Surfaces*  
École Polytechnique Fédérale de Lausanne (EPFL)  
Lausanne, Switzerland

**June 28, 2011**

*Spin Transformations of Discrete Surfaces*  
Institute of Science and Technology Austria  
Klosterneuburg, Austria

**June 21, 2011**

*Conformal Surface Flows*  
International Geometry Workshop  
Obergurgl, Austria

**June 17, 2011**

*Recent Developments in Discrete Differential Geometry*  
Institute of Science and Technology Austria  
Klosterneuburg, Austria

**May 24, 2011**

*Recent Developments in Discrete Differential Geometry*  
California Institute of Technology  
Pasadena, CA

**April 13, 2011**

*Spin Transformations of Discrete Surfaces*  
Stanford University  
Stanford, CA

**February 2, 2011**

*Spin Transformations of Discrete Surfaces*  
Oberwolfach Mathematical Research Institute  
Oberwolfach, Germany

**September 30, 2010**

*Trivial Connections on Discrete Surfaces*  
Freie Universität Berlin  
Berlin, Germany

**May 20, 2010**

*Trivial Connections on Discrete Surfaces*  
Barrett Memorial Lectures  
Knoxville, TN

**July 7, 2009**

*Lie Group Integrators for Animation and Control of Vehicles*  
Technische Universität Berlin  
Berlin, Germany

## *Teaching and Education*

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**At CMU:**

TERM	COURSE	NUMBER	FCE OVERALL TEACHING	DEPT. AVG.
Fall 2015	Computer Graphics Seminar	15-869J	4.9	4.3
Fall 2015	Computer Graphics	15-462/662	4.8/4.9	4.3
Spring 2016	Discrete Differential Geometry	15-869J	4.8	4.3
Fall 2016	Computer Graphics	15-462/662	4.7/4.9	4.3
Fall 2017	Discrete Differential Geometry	15-458/858	4.1/4.7	4.2
Fall 2017	Computer Graphics	15-462/662	4.7/4.6	4.2
Fall 2018	Computer Graphics	15-462/662	4.9/4.8	4.2
Spring 2019	Discrete Differential Geometry	15-458/858	5.0/4.8	4.2
Spring 2020	Computer Graphics	15-462/662	4.5/4.7	4.4
Spring 2020	Discrete Differential Geometry	15-458/858	4.9/4.5	4.4
Fall 2020	Computer Graphics	15-462/662	4.7/5.0	3.5
Spring 2021	Discrete Differential Geometry	15-458/858	4.2/4.8	4.3
Fall 2021	Computer Graphics	15-462/662	4.1/4.4	4.3
Spring 2022	Discrete Differential Geometry	15-458/858	4.8/4.6	4.3
Spring 2023	Discrete Differential Geometry	15-458/858	4.2/4.9	4.2
Fall 2023	Monte Carlo Methods	15-327/627/860, 21-387		

**At previous institutions:**

*Teaching Assistant* — Caltech CS 177 (Discrete Differential Geometry), 2011, 2012

*Teaching Assistant* — Caltech CS 101.4 (Algorithms in Geometry and Topology), 2009

**External Teaching Activities:**

**August 9, 2021**

*Geometry Processing with Intrinsic Triangulations*  
ACM SIGGRAPH Courses  
Virtual/Online

**June 21, 2021**

*Geometry Processing with Intrinsic Triangulations*  
International Meshing Roundtable  
Virtual/Online

July 7, 2018

*Conformal Geometry Processing*

Symposium on Geometry Processing Grad School  
Paris, France

January 5–6, 2018

*Discrete Conformal Geometry*

Joint Mathematics Meeting  
San Diego, CA

July 1, 2017

*Conformal Geometry Processing*

Symposium on Geometry Processing Grad School  
London, UK

July 6, 2017

*Conformal Geometry Processing*

AICES EU Regional School  
Aachen, Germany

July 11, 2014

*Geometry Processing with Laplace-Beltrami*

Symposium on Geometry Processing Grad School  
Cardiff, Wales

July 22, 2013

*Geometry Processing with Discrete Exterior Calculus*

SIGGRAPH Courses  
Anaheim, CA

July 8, 2013

*Geometry Processing with Discrete Exterior Calculus*

Symposium on Geometry Processing Grad School  
Genova, Italy

July 14, 2012

*Differential Geometry and Discrete Curvature Flows*

Symposium on Geometry Processing Grad School  
Tallinn, Estonia

## *Advising*

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### *CURRENT*

**PhD:** Rohan Sawhney (*CMU CSD 2016–*), Mark Gillespie (*CMU CSD 2018–*), Nicole Feng (*CMU CSD 2020–*), Olga Gutan (*CMU CSD 2022–*), Hossein Baktash (*CMU ECE 2022–*), Zoë Marschner (*CMU CSD 2023–*)

### *PAST*

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