Mark Gillespie
Curriculum Vitae

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MarkGillespie

Academic Appointments

École Polytechnique / INRIA, Palaiseau, France   *Sept. 2024–present*
  Postdoctoral Researcher

Education

Carnegie Mellon University,   *2018–2024*
  PhD in Computer Science | *Advisor: Keenan Crane*

California Institute of Technology,   *2014–2018*
  B.S. in Computer Science and B.S. in Mathematics

Journal Articles

Theo Braune*, **Mark Gillespie***, Yiying Tong, and Mathieu Desbrun. 2025
Discrete Torsion of Connection Forms on Simplicial Meshes
ACM Transactions on Graphics (SIGGRAPH), 44, 4. 2025. DOI: 10.1145/3731197

Mark Gillespie, Denise Yang, Mario Botsch, and Keenan Crane. 2024
Ray Tracing Harmonic Functions [Best Paper, Honorable Mention]
ACM Transactions on Graphics (SIGGRAPH), 43, 4 (99). 2024. DOI: 10.1145/3658201

Yuichi Hirose, **Mark Gillespie**, Angelica M. Bonilla Fominaya, and James McCann. 2024a
Solid Knitting [Best Paper, Honorable Mention]
ACM Transactions on Graphics (SIGGRAPH), 43, 4 (88). 2024. DOI: 10.1145/3658123

Nicole Feng, **Mark Gillespie**, and Keenan Crane. 2023
Winding Numbers on Discrete Surfaces
ACM Transactions on Graphics (SIGGRAPH), 42, 4 (36). 2023. DOI: 10.1145/3592401

Hsueh-Ti Derek Liu, **Mark Gillespie**, Benjamin Chislett, Nicholas Sharp, Alec Jacobson, and Keenan Crane. 2023
Surface Simplification Using Intrinsic Error Metrics
ACM Transactions on Graphics (SIGGRAPH), 42, 4 (118). 2023. DOI: 10.1145/3592403

Mark Gillespie, Nicholas Sharp, and Keenan Crane. 2021
Integer Coordinates for Intrinsic Geometry Processing
ACM Transactions on Graphics (SIGGRAPH ASIA), 40, 6 (252). 2021. DOI: 10.1145/3478513.3480522

Mark Gillespie, Boris Springborn, and Keenan Crane. 2021
Discrete Conformal Equivalence of Polyhedral Surfaces
ACM Transactions on Graphics (SIGGRAPH), 40, 4 (103). 2021. DOI: 10.1145/3450626.3459763

Other Refereed Publications

Mark Gillespie. 2024
Evolving Intrinsic Triangulations
PhD Thesis, Carnegie Mellon University. 2024. DOI: 10.1184/R1/25898782.v1

Yuichi Hirose, **Mark Gillespie**, Angelica M. Bonilla Fominaya, and James McCann. 2024b
Solid Knitting (Abstract)
SCF Adjunct '24 (15). 2024. DOI: 10.1145/3665662.3673257

Nicholas Sharp, **Mark Gillespie**, and Keenan Crane. 2021
Geometry Processing with Intrinsic Triangulations
SIGGRAPH '21 Courses. 2021. DOI: 10.1145/3450508.3464592

Awards & Honors

Two SIGGRAPH Best Paper Award Honorable Mentions   *2024*
   Awarded to 12 papers out of about 840 submissions; ~top 1.5% of papers

NSF Graduate Research Fellowship   *2019-2022*
   Awarded to top 15% of applicants across all areas of science; $147,000 over 3 years

Hertz Fellowship Finalist   *2017*
   Awarded to top 5% of applicants of applicants across applied science, math, and engineering.

Arthur R Adams SURF Fellow   *2016-2017*

SIGGRAPH ACM Turing Award Celebration Grant   *2017*
   Awarded to 10 students in computer graphics from across the country.

Other Research Experience

Technische Universität Berlin, Department of Mathematics   *July 2023*
   Visiting Researcher | *Host: Boris Springborn*

University of California, San Diego, Department of Computer Science and Engineering   *Summer 2022*
   Visiting Graduate | *Host: Albert Chern*

California Institute of Technology, Department of Computing and Mathematical Sciences   *Summer 2017*
   Arthur R. Adams Undergraduate Researcher | *Mentor: Peter Schröder*

California Institute of Technology, Department of Computing and Mathematical Sciences   *Summer 2016*
   Arthur R. Adams Undergraduate Researcher | *Mentor: Mathieu Desbrun*

California Institute of Technology, Department of Computing and Mathematical Sciences   *2016–2017*
   Undergraduate Researcher | *Mentor: Alan Barr*

Selected Talks

Geometry Processing with Intrinsic Triangulations, 49th CGAL Developer Meeting   *Apr. 2025*

Ray Tracing Harmonic Functions, 49th CGAL Developer Meeting   *Apr. 2025*

New Foundations for Robust Geometry Processing, University of Utah   *Feb. 2025*

Ray Tracing Harmonic Functions, Oberwolfach Workshop on Surface Processing   *Feb. 2025*

Solid Knitting & Harmonic Hitting, IST Austria   *Nov. 2024*

Ray Tracing Harmonic Functions, ACM SIGGRAPH 2024   *Aug. 2024*

Intrinsic Triangulations in Geometry Processing, IST Austria   *Sept. 2023*

Intrinsic Triangulations in Geometry Processing, Geometry Workshop in Obergurgl   *Aug. 2023*

Intrinsic Triangulations in Geometry Processing, TU Berlin SFB TRR 109 Colloquium   *Jul. 2023*

Discrete Conformal Equivalence of Polyhedral Surfaces, UCSD Pixel Cafe   *Apr. 2022*

Discrete Conformal Equivalence of Polyhedral Surfaces, Toronto Geometry Colloquium   *Mar. 2022*

Integer Coordinates for Intrinsic Geometry Processing, ACM SIGGRAPH Asia 2021   *Nov. 2021*

Discrete Conformal Equivalence of Polyhedral Surfaces, ACM SIGGRAPH 2021   *Aug. 2021*

Geometry Processing with Intrinsic Triangulations, ACM SIGGRAPH 2021 Courses   *Aug. 2021*

Service

Program Committee

Symposium on Geometry Processing (2025)

Reviewing

SIGGRAPH (2019, 2022–2025), SIGGRAPH Asia (2022–2024), ACM Transactions on Graphics (2024–2025), Symposium on Geometry Processing (2025), Graphics Replicability Stamp Initiative (2025), Eurographics (2024), Computer Graphics Forum (2024), Journal of Computational and Applied Mathematics (2024–2025), Computer-Aided Design (2023), Transactions on Visualization and Computer Graphics (2023–2025), Computers & Graphics (2021)

Departmental

Organizer, Graphics Reading Group (2022–2023); Organizer, Graphics Seminar (2020–2021); Panel Speaker (CSD Visit Day 2020, 2023, CSD Introductory Course 2022); Organizer, PhD mutual mentorship pod (2022–2024)

Mentorship

Summer Geometry Initiative volunteer (2024), Advising Master's student (2022-2023), CMU Summer Undergraduate Research Fellowship (2020)

Teaching Experience

CS 15-466/666: Computer Game Programming, Carnegie Mellon University   *Fall 2022*
Teaching Assistant

CS 15-458/858: Discrete Differential Geometry, Carnegie Mellon University   *Spring 2019*
Teaching Assistant

CS 171: Introduction to Computer Graphics, California Institute of Technology   *Fall 2017, 2018*
Teaching Assistant

CS 38: Introduction to Algorithms, California Institute of Technology   *Spring 2016, 2017*
Teaching Assistant

Press Coverage

Knitting Industry Creative, "Solid Knitting – A New Fabrication Technique"   *Aug. 2024*

Textile Technology Source, "Solid-Knitting Machine Builds Reconfigurable Objects"   *Aug. 2024*

Design Boom, "Carnegie Mellon University's Researchers Develop 'Solid Knitting'"   *Aug. 2024*

Material District, "Solid Knitting: 3D Printing with Yarn"   *Aug. 2024*

Cosmos Magazine, "3D Knitting Could Make Solid But Soft Furniture"   *Jul. 2024*

Interesting Engineering, "Beware IKEA: Solid Knitted 3-Dimensional Furniture Could Be a Reality"   *Jul. 2024*

New Atlas, "Innovative 'Solid Knitting' Machine Builds 100% Reconfigurable Objects"   *Jul. 2024*

ZME Science, "Solid Knitting: A Different Spin on 3D Printing That Can Make Furniture Out of Yarn"   *Jul. 2024*

ACM SIGGRAPH Blog, "Beyond the Threads"   *Jul. 2024*

CMU News, "Robotics Institute Introduces Solid Knitting as New Fabrication Technique"   *Jul. 2024*