Mark Gillespie

Curriculum Vitae

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MarkGillespie

Academic Appointments

École Polytechnique, 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

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

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

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

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

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

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

Other Publications

Mark Gillespie
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
Solid Knitting (Abstract)
SCF Adjunct '24 Article 15. 2024. DOI: 10.1145/3665662.3673257

Nicholas Sharp, **Mark Gillespie**, and Keenan Crane
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

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*

Geometry Processing with Intrinsic Triangulations, SIAM IMR 2021 Courses *June 2021*

Service

Program Committee
Symposium on Geometry Processing (2025)

Reviewing
SIGGRAPH (2019, 2022–2025), SIGGRAPH Asia (2022–2024), ACM Transactions on Graphics (2024, 2025), Eurographics (2024), Computer Graphics Forum (2024), Journal of Computational and Applied Mathematics (2024), Computer-Aided Design (2023), Transactions on Visualization and Computer Graphics (2023–2024), 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" *August 2024*

Textile Technology Source, "Solid-knitting machine builds reconfigurable objects" *August 2024*

Design Boom, "Carnegie Mellon University's researchers develop 'solid knitting'" *August 2024*

Material District, "Solid knitting: 3D printing with yarn" *August 2024*

Cosmos Magazine, "3D knitting could make solid but soft furniture" *July 2024*

Interesting Engineering, "Beware IKEA: Solid knitted three-dimensional furniture could be a reality" *July 2024*

New Atlas, "Innovative 'solid knitting' machine builds 100% reconfigurable objects" *July 2024*

ZME Science, "Solid knitting: a different spin on 3D printing that can make furniture out of yarn" *July 2024*

ACM SIGGRAPH Blog, "Beyond the Threads" *July 2024*

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