

Liane Makatura

Curriculum Vitae

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Education

- 2018–Present **Massachusetts Institute of Technology (MIT), Cambridge, MA.**
Ph.D. in Computer Science, focus on Computational Design & Fabrication and Optimization.
S.M. Thesis (2020): *Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts.*
Advisor: Prof. Wojciech Matusik GPA: 5.0/5.0
- 2013–2017 **Dartmouth College, Hanover, NH.**
Bachelor of Arts in Computer Science (High Honors) and Mathematics; Minor in Digital Arts.
Thesis: *Tools for Physical Graphic Design*, advised by Prof. Emily Whiting
Phi Beta Kappa · Magna Cum Laude · GPA: 3.91/4.00

Honors & Awards

- May 2023 **Morningside Design Fellowship**, MIT Morningside Academy for Design.
- May 2023 **German Studies Excellence Award, Second Prize**, MIT.
- Apr. 2022 **German Studies Excellence Award, Third Prize**, MIT.
- Apr. 2018 **Graduate Research Fellowship (NSF GRFP)**, U.S. National Science Foundation.
- June 2017 **Rufus Choate Scholar**, Dartmouth College (top 5% of students).
- Mar. 2017 **U.S. Fulbright Scholar / Swiss Government Excellence Scholarship.**
- Mar. 2016 **Goldwater Award, Honorable Mention.**
- Mar. 2016 **Women in Technology Scholarship**, Adobe Research.
- Nov. 2015 **Francis L. Town Scientific Prize**, Dartmouth College.
- May 2015 **James O. Freedman Presidential Scholarship**, Dartmouth College.
- Mar. 2015 **Neukom Scholar**, Neukom Institute for Computational Science.
- 2014 – 2017 **Jack and Marion Plummer Gruver Scholarship**, Dartmouth College (awarded annually).

Publications

- Aug. 2023 **Helix-Free Stripes for Knit Graph Design.**
R. Mitra, L. Makatura, E. Whiting, E. Chien · SIGGRAPH 2023 (Conference Paper)
- June 2023 **Procedural Metamaterials: A Unified Procedural Graph for Metamaterial Design.**
L. Makatura, B. Wang*, Y.L. Chen, B. Deng, C. Wojtan, B. Bickel, W. Matusik · TOG, Presented at SIGGRAPH 2023 (Paper)*
- June 2022 **Polygrammar: Grammar for Digital Polymer Representation and Generation.**
M. Guo, W. Shou, L. Makatura, T. Erps, M. Foshey, W. Matusik · Advanced Science 2022 (Paper)
- Jan. 2022 **3D printing of polymer composites: Materials, processes, and applications.**
S. Park, W. Shou, L. Makatura, W. Matusik, K. Fu · Matter 2022 (Paper)
- Aug. 2021 **Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts.**
L. Makatura, M. Guo, A. Schulz, J. Solomon, W. Matusik · SIGGRAPH 2021 (Paper)
- Aug. 2021 **Knit Sketching: from Cut & Sew Patterns to Machine-Knit Garments.**
A. Kaspar, K. Wu, Y. Luo, L. Makatura, and W. Matusik · SIGGRAPH 2021 (Paper)

- Oct. 2019 **Knitting Skeletons: A Computer-Aided Design Tool for Shaping and Patterning of Knitted Garments.**
A. Kaspar, L. Makatura, and W. Matusik · UIST 2019 (Paper)
- June 2019 **Neural Inverse Knitting: From Images to Manufacturing Instructions.**
A. Kaspar, T.H. Oh, L. Makatura, P. Kellnhofer, and W. Matusik · ICML 2019 (Paper)
- May 2017 **Environment-Scale Fabrication: Replicating Outdoor Climbing Experiences.**
E. Whiting, N. Ouf, L. Makatura, C. Mousas, Z. Shu, and L. Kavan · CHI 2017 (Paper)

Professional Service

- 2021-present **Mentor**, *RCDC @ SIGGRAPH Undergraduate Mentorship Program.*
- 2020-present **Executive Team, Founding Member**, *ACM SIGGRAPH Community Group for Women in Graphics Research (WiGRAPH).*
Organize 2-3 annual research panels at major graphics conferences; develop, maintain and generate content for WiGRAPH's website, including digital resources, original articles and a list of opportunities in graphics.
- 2020-present **Executive Team, Founding Member**, *MIT EECS Graduate Application Assistance Program.*
Advisor (present) · Lead of Acceptance, Selection, and Matching (2020-2022) · Created program framework and trainings; facilitated 160+ mentor pairs each year between current MIT graduate students and prospective students from underrepresented and/or under-resourced backgrounds.
- 2020-present **Reviewer**, *SIGGRAPH Asia, Graphical Models.*
- 2019-2022 **Web Chair**, *ACM Symposium on Computational Fabrication.*
- 2019 **Organizer**, *Berthouzoz Women in Research Lunch, ACM SIGGRAPH.*
- 2019 **Student Co-Organizer**, *New England Symposium on Graphics.*
- 2017 **Team Leader for Student Volunteers**, *ACM SIGGRAPH.*
- 2016 **Student Volunteer**, *ACM SIGGRAPH.*

Research Experience

- Sept. 2018 – **Computational Fabrication Group (CFG)**, *MIT, Cambridge, MA.*
Present *Research Assistant, advised by Prof. Wojciech Matusik*
Exploring topics in optimization, computational design, and fabrication. Supported by the NSF GRFP.
- Sept. 2017 – **Computer Graphics and Geometry Laboratory (LGG)**, *EPFL, Lausanne, Switzerland.*
Aug. 2018 *Visiting Researcher, advised by Prof. Mark Pauly*
Conducted research in computational caustic design, exploring the possibility of embedding multiple images in a single, physically realizable caustic generator. Supported by the U.S. Fulbright Research Grant.
- Sept. 2015 – **Visual Computing Lab (VCL)**, *Dartmouth College, Hanover, NH.*
June 2017 *Research Assistant, advised by Prof. Emily Whiting*
Developed a reconstruction and fabrication pipeline to replicate natural rock-climbing routes in an indoor climbing gym. Co-authored a publication presented at CHI 2017.
- June 2014 – **Digital Arts Leadership and Innovation (DALI) Lab**, *Dartmouth College, Hanover, NH.*
June 2017 *Lead Developer · Student Staff · Mentor · Project Manager*
Advised 15-20 project teams of 3-4 students. Ran weekly meetings, open lab hours, member trainings, etc.
- June 2016 – **Creative Technologies Lab (CTL)**, *Adobe Research, Seattle, WA.*
Sept. 2016 *Research Intern, advised by Dr. Danny Kaufman and Dr. Wilmot Li*
Developed a fabrication-aware system for the intuitive design of fabricable Intarsia (wooden mosaic) pieces.

Teaching Experience

- 2020-Present **Department of Electrical Engineering and Computer Science**, *MIT, Cambridge, MA.*
Guest Lecture: Comp. Design & Fabrication September 13, 2022

TA: Intro to Numerical Simulation (MATLAB, Python) Fall 2021
Grader: Intro to Numerical Simulation (MATLAB, Python) Fall 2020

2014 – 2017 **Department of Computer Science, Dartmouth College**, Hanover, NH.
TA: Intro to Programming (Python) Fall 2014, Spring 2015, Fall 2015
TA: Object Oriented Programming (Java) Winter 2015
TA: Computer Animation (Autodesk Maya) Summer 2015
TA: Artificial Intelligence (Java, Python) Fall 2016
Grader: Algorithms Fall 2016

Invited Talks

- 4.27.2022 **Knit Sketching: from Cut & Sew Patterns to Machine-Knit Garments.**
HCI Engineering Group, MIT, Cambridge, MA USA
- 4.25.2022 **Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts.**
Brown Visual Computing Group, Brown University, Providence, RI USA
- 10.29.2021 **Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts.**
IEEEVis, Presentation of Selected SIGGRAPH papers, virtual
- 10.2.2021 **Computational Knitting: Intuitive Tools for Creating Complex Knits.**
Girls' Day 2021: Express Yourself with Science, MIT Museum and LIST Visual Arts Center, Cambridge, MA USA
- 10.1.2021 **Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts.**
Toronto Geometry Colloquium, virtual
- 3.30.2017 **Environment-Scale Fabrication: Replicating Outdoor Climbing Experiences.**
Dynamic Graphics Project, University of Toronto, ON Canada

Work and Leadership

- 2019-present **EECS Graduate Student Association, MIT**, Cambridge, MA.
Advisor (Present) · Co-President (2020) · VP of Visit Days and Orientation (2019)
- 2015 – 2019 **Student Accessibility Services, Dartmouth & MIT.**
Notetaker · Tutor (Termly, as needed)
- 2015 – 2017 **Women in Science Program (WISP) Peer Mentoring, Dartmouth College**, Hanover, NH.
- 2014 – 2017 **Office of Residential Education, Dartmouth College**, Hanover, NH.
Undergraduate Resident Advisor for 34 first-year students annually
- 2014 – 2017 **Office of Undergraduate Admissions, Dartmouth College**, Hanover, NH.
Tour Guide · Tour Guide Trainer · Reception Area Assistant · Visitor Relations Intern

Personal Information

Languages: English (native) · German (intermediate)
Hobbies: Tennis · Knitting · Reading · Woodworking · Ceramics