

CURRICULUM VITAE

JAMES L. MCCANN

EDUCATION

University of Michigan	Ann Arbor	Computer Science, Mathematics	B.S.	2005
Carnegie Mellon University	Pittsburgh	Computer Science	Ph.D.	2010

Thesis: “Image Editing and Creation with Perception-Motivated Local Features”
Thesis Advisor: Nancy Pollard

EMPLOYMENT

Since 2023, Associate Professor, Carnegie Mellon University
2017-2023 Assistant Professor, Carnegie Mellon University
2014-2017, Associate Research Scientist, Disney Research Pittsburgh
Since 2012, Sole Proprietor, TCHOW llc
2010-2012, Research Scientist, Adobe
2000: Contract Web Illustrator, Berrien County Intermediate School District

PUBLICATION LIST

REFEREED JOURNAL PAPERS - PUBLISHED

1. *Polynomial-Time Program Equivalence for Machine Knitting* by N. Hurtig, J. Lin, T. Price, A. Schulz, J. McCann, and G. Bernstein; *Proc. ACM Program. Lang.*, 9(ICFP), 2025.
2. *Computer numerical control knitting of high-resolution mosquito bite blocking textiles* by B. Holt, K. Oswalt, A. England, R. Murphy, I. Owens, M. Finney, N. Wong, S. Adhikari, J. McCann, and J. Beckmann; *Communications Engineering*, 3(1), 2024.
3. *UFO Instruction Graphs are Machine Knittable* by J. Lin, Y. Ikarashi, G. Bernstein, and J. McCann; *ACM Trans. Graph.*, 43(6), 2024.
4. *Solid Knitting* by Y. Hirose, M. Gillespie, A. Bonilla Fominaya, and J. McCann; *ACM Transactions on Graphics*, 43(4), 2024.
★ Best Paper Award Honorable Mention
5. *3D Knitting for Pneumatic Soft Robotics* by V. Sanchez, K. Mahadevan, G. Ohlson, M. Graule, M. Yuen, C. Teeple, J. Weaver, J. McCann, K. Bertoldi, and R. Wood; *Advanced Functional Materials*, 33(26), 2023.
6. *Customizing Textile and Tactile Skins for Interactive Industrial Robots* by B. Su, Z. Wei, J. McCann, W. Yuan, and C. Liu; *ASME Letters in Dynamic Systems and Control*, 3(3), 2023.
7. *Semantics and Scheduling for Machine Knitting Compilers* by J. Lin, V. Narayanan, Y. Ikarashi, J. Ragan-Kelley, G. Bernstein, and J. McCann; *ACM Transactions on Graphics*, 42(4), 2023.
8. *Wearable 3D Machine Knitting: Automatic Generation of Shaped Knit Sheets to Cover Real-World Objects* by K. Wu, M. Tarini, C. Yuksel, J. McCann, and X. Gao; *IEEE Transactions on Visualization & Computer Graphics*, 2021.
9. *Visual Knitting Machine Programming* by V. Narayanan, K. Wu, C. Yuksel, and J. McCann; *ACM Transactions on Graphics*, 38(4), 2019.
10. *Structural Design Using Laplacian Shells* by E. Ulu, J. McCann, and L. Kara; *Computer Graphics Forum*, 38(5), 2019.
11. *Automatic Machine Knitting of 3D Meshes* by V. Narayanan, L. Albaugh, J. Hodgins, S. Coros, and J. McCann; *ACM Transactions on Graphics*, 37(3), 2018.
12. *Lightweight Structure Design under Force Location Uncertainty* by E. Ulu, J. McCann, and L. Kara; *ACM Transactions on Graphics*, 36(4), 2017.
13. *RFID Light Bulb: Enabling Ubiquitous Deployment of Interactive RFID Systems* by J. Gummeson, J. McCann, C. Yang, D. Ranasinghe, S. Hudson, and A. Sample; *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, 1(2), 2017.
★ Best paper [top 5% of papers]

14. *A Compiler for 3D Machine Knitting* by J. McCann, L. Albaugh, V. Narayanan, A. Grow, W. Matusik, J. Mankoff, and J. Hodgins; *ACM Transactions on Graphics*, 35(4), 2016.
15. *Composition-Aware Scene Optimization for Product Images* by T. Liu, J. McCann, W. Li, and T. Funkhouser; *Computer Graphics Forum*, 34(2), 2015.
16. *Physics Storyboards* by S. Ha, J. McCann, C. Liu, and J. Popovic; *Computer Graphics Forum*, 2013.
17. *Soft Stacking* by J. McCann and N. Pollard; *Computer Graphics Forum*, 31(2pt2), 2012.
18. *Local Layering* by J. McCann and N. Pollard; *ACM Transactions on Graphics*, 28(3), 2009.
19. *Real-Time Gradient-Domain Painting* by J. McCann and N. Pollard; *ACM Transactions on Graphics*, 27(3), 2008.
20. *Responsive Characters from Motion Fragments* by J. McCann and N. Pollard; *ACM Transactions on Graphics*, 26(3), 2007.

REFEREED CONFERENCE/WORKSHOP PAPERS

21. *Designing Looms as Kits for Collaborative Assembly* by S. Speer, N. Yankova, J. Huang, C. Rosé, K. Peppler, J. McCann, and M. Orta Martinez; **ACM UIST**, 2025.
22. *Neighbor-Aware Data-Driven Relaxation of Stitch Mesh Models for Knits* by Y. Hwang, J. Lin, J. Hsu, B. Mastropolito, J. McCann, and C. Yuksel; **SIGGRAPH Asia 2025 Conference Papers**.
23. *Co-Dithering for Jacquard Knitting* by Y. Xu and J. McCann; **ACM Symposium on Computational Fabrication**, 2025.
24. *Social Gesture Recognition in spHRI: Leveraging Fabric-Based Tactile Sensing on Humanoid Robots* by D. Crowder, K. Vandyck, X. Sun, J. McCann, and W. Yuan; **IEEE ICRA**, 2025.
25. *Creating Furniture-Scale Deployable Objects with a Computer-Controlled Sewing Machine* by S. Tayal, L. Albaugh, J. McCann, and S. Hudson; **ACM CHI**, 2025.
26. *CoFRIDA: Self-Supervised Fine-Tuning for Human-Robot Co-Painting* by P. Schaldenbrand, G. Parmar, J. Zhu, J. McCann, and J. Oh; **IEEE ICRA**, 2024.
★ Best Paper Award on Human-Robot Interaction
27. *Sketching AI Concepts with Capabilities and Examples: AI Innovation in the Intensive Care Unit* by N. Yildirim, S. Zlotnikov, D. Sayar, J. Kahn, L. Bukowski, S. Amin, K. Riman, B. Davis, J. Minturn, A. King, D. Ricketts, L. Tang, V. Sivaraman, A. Perer, S. Preum, J. McCann, and J. Zimmerman; **ACM CHI**, 2024.
28. *Investigating Why Clinicians Deviate from Standards of Care: Liberating Patients from Mechanical Ventilation in the ICU* by N. Yildirim, S. Zlotnikov, A. Venkat, G. Chawla, J. Kim, L. Bukowski, J. Kahn, J. Mccann, and J. Zimmerman; **ACM CHI**, 2024.

29. *SPEERLoom: An Open-Source Loom Kit for Interdisciplinary Engagement in Math, Engineering, and Textiles* by S. Speer, A. Garcia-Alonzo, J. Huang, N. Yankova, C. Rosé, K. Peppler, J. McCann, and M. Orta Martinez; **ACM UIST**, 2023.
30. *Creating Design Resources to Scaffold the Ideation of AI Concepts* by N. Yildirim, C. Oh, D. Sayar, K. Brand, S. Challa, V. Turri, N. Crosby Walton, A. Wong, J. Forlizzi, J. McCann, and J. Zimmerman; **ACM DIS**, 2023.
★ Honorable mention
31. *Estimating Yarn Length for Machine-Knitted Structures* by G. Ohlson, A. Bonilla Fominaya, K. Puthuveetil, J. Wang, E. Amspoker, and J. McCann; **ACM Symposium on Computational Fabrication**, 2023.
32. *RobotSweater: Scalable, Generalizable, and Customizable Machine-Knitted Tactile Skins for Robots* by Z. Si, T. Yu, K. Morozov, J. McCann, and W. Yuan; **IEEE ICRA**, 2023.
33. *uKnit: A Position-Aware Reconfigurable Machine-Knitted Wearable for Gestural Interaction and Passive Sensing using Electrical Impedance Tomography* by T. Yu, R. Arakawa, J. McCann, and M. Goel; **ACM CHI**, 2023.
34. *FRIDA: A Collaborative Robot Painter with a Differentiable, Real2Sim2Real Planning Environment* by P. Schaldenbrand, J. McCann, and J. Oh; **IEEE ICRA**, 2023.
★ Outstanding Deployed Systems Paper Finalist
35. *How Experienced Designers of Enterprise Applications Engage AI as a Design Material* by N. Yildirim, A. Kass, T. Tung, C. Upton, D. Costello, R. Giusti, S. Lacin, S. Lovic, J. O'Neill, R. Meehan, E. Ó Loideáin, A. Pini, M. Corcoran, J. Hayes, D. Cahalane, G. Shihhare, L. Castoro, G. Caruso, C. Oh, J. McCann, J. Forlizzi, and J. Zimmerman; **ACM CHI**, 2022.
36. *metaSVG: A Portable Exchange Format for Adaptable Laser Cutting Plans* by N. Yildirim, M. Franklin, D. Zeng, J. Zimmerman, and J. McCann; **Graphics Interface**, 2022.
37. *Engineering Multifunctional Spacer Fabrics Through Machine Knitting* by L. Albaugh, J. McCann, S. Hudson, and L. Yao; **ACM CHI**, 2021.
★ Honorable mention [top 5% of papers]
38. *Enabling Personal Computational Handweaving with a Low-Cost Jacquard Loom* by L. Albaugh, J. McCann, L. Yao, and S. Hudson; **ACM CHI**, 2021.
39. *An Artin Braid Group Representation of Knitting Machine State with Applications to Validation and Optimization of Fabrication Plans* by J. Lin and J. McCann; **IEEE ICRA**, 2021.
★ Best Conference Paper Award Finalist
40. *Evaluation and Characterization of Tendon Routing Methods for Soft, Flexible Foam Robots* by E. Moore and J. McCann; **IEEE RoboSoft**, 2021.
41. *Coupling Programs and Visualization for Machine Knitting* by T. Yu and J. McCann; **ACM Symposium on Computational Fabrication**, 2020.

42. *Inverse Design Tool for Asymmetrical Self-Rising Surfaces with Color Texture* by J. Gu, V. Narayanan, G. Wang, D. Luo, H. Jain, K. Lu, F. Qin, S. Wang, J. McCann, and L. Yao; **ACM Symposium on Computational Fabrication**, 2020.
43. *Design Adjectives: A Framework for Interactive Model-Guided Exploration of Parameterized Design Spaces* by E. Shimizu, M. Fisher, S. Paris, J. McCann, and K. Fatahalian; **ACM UIST**, 2020.
44. *Representing Crochet with Stitch Meshes* by R. Guo, J. Lin, V. Narayanan, and J. McCann; **ACM Symposium on Computational Fabrication**, 2020.
45. *Digital Fabrication Tools at Work: Probing Professionals' Current Needs and Desired Futures* by N. Yildirim, J. McCann, and J. Zimmerman; **ACM CHI**, 2020.
46. *Geppetto: Enabling Semantic Design of Expressive Robot Behaviors* by R. Desai, F. Anderson, J. Matejka, S. Coros, J. McCann, G. Fitzmaurice, and T. Grossman; **ACM CHI**, 2019.
47. *Redefining Collaboration for Designing Intelligent Systems* by N. Yildirim, J. McCann, and J. Zimmerman; **ACM CHI Workshop on the Future of Work**, 2019.
48. *A modular mold for embedded tendon and stiffening placement in foam robots* by E. Moore and J. McCann; **IEEE ICRA Workshop on Robot Design and Customization**, 2019.
49. *KnitPicking Textures: Programming and Modifying Complex Knitted Textures for Machine and Hand Knitting* by M. Hofmann, L. Albaugh, T. Sethapakadi, J. Hodgins, S. Hudson, J. McCann, and J. Mankoff; **ACM UIST**, 2019.
50. *Algorithmic Quilting Pattern Generation for Pieced Quilts* by Y. Li, D. Breen, J. McCann, and J. Hodgins; **Graphics Interface**, 2019.
51. *Painting with CATS: Camera-Aided Texture Synthesis* by T. Sethapakdi and J. McCann; **ACM CHI**, 2019.
52. *Assembly-Aware Design of Printable Electromechanical Devices* by R. Desai, J. McCann, and S. Coros; **ACM UIST**, 2018.
53. *Efficient Transfer Planning for Flat Knitting* by J. Lin, V. Narayanan, and J. McCann; **ACM Symposium on Computational Fabrication**, 2018.
54. *Whole-Cloth Quilting Patterns from Photographs* by C. Liu, J. Hodgins, and J. McCann; **Proceedings of the Symposium on Non-Photorealistic Animation and Rendering**.
55. *A 3D Printer for Interactive Electromagnetic Devices* by H. Peng, F. Guimbretière, J. McCann, and S. Hudson; **ACM UIST**, 2016.
56. *RapID: A Framework for Fabricating Low-Latency Interactive Objects with RFID Tags* by A. Spielberg, A. Sample, S. Hudson, J. Mankoff, and J. McCann; **ACM CHI**, 2016.
★ Best paper [top 1% of papers]
57. *Joint 5D Pen Input for Light Field Displays* by J. Tompkin, S. Muff, J. McCann, H. Pfister, J. Kautz, M. Alexa, and W. Matusik; **ACM UIST**, 2015.

58. *A Layered Fabric 3D Printer for Soft Interactive Objects* by H. Peng, J. Mankoff, S. Hudson, and J. McCann; **ACM CHI**, 2015.
★ Honorable mention [top 5% of papers]
59. *Dynamic Sprites* by B. Jones, J. Popovic, J. McCann, W. Li, and A. Bargteil; **ACM Conference on Motion in Games**, 2013.
60. *Mid-Level Smoke Control for 2D Animation* by A. Barnat, Z. Li, J. McCann, and N. Pollard; **Graphics Interface**, 2011.
61. *BoLeRO: A Principled Technique for Including Bone Length Constraints in Motion Capture Occlusion Filling* by L. Li, J. McCann, N. Pollard, and C. Faloutsos; **ACM SIGGRAPH/Eurographics Symposium on Computer Animation**, 2010.
62. *DynaMMo: Mining and Summarization of Coevolving Sequences with Missing Values* by L. Li, J. McCann, N. Pollard, and C. Faloutsos; **ACM SIGKDD**, 2009.
63. *Laziness is a Virtue: Motion Stitching Using Effort Minimization* by L. Li, J. McCann, C. Faloutsos, and N. Pollard; **Eurographics Short Papers**, 2008.
64. *Physics-Based Motion Retiming* by J. McCann, N. Pollard, and S. Srinivasa; **ACM SIGGRAPH/Eurographics Symposium on Computer Animation**, 2006.
65. *Newton: A Library-Based Analytical Synthesis Tool for RF-MEMS Resonators* by M. McCorquodale, J. McCann, and R. Brown; **Asia and South Pacific Design Automation Conference**, 2006.

OTHER PUBLICATIONS

66. *An Infinity Mirror Without Apparent Mirroring* (Poster) by J. McCann; **ACM SIGGRAPH 2025 Posters**.
67. *Solid Knitting* (Poster) by Y. Hirose, M. Gillespie, A. Bonilla Fominaya, and J. McCann; **ACM Symposium on Computational Fabrication**, 2024.
68. *A Parametric Complete-Garment Sweater Pattern with knitout* (Demo) by P. Didwania, T. Gildengers, and J. McCann; **ACM Symposium on Computational Fabrication**, 2023.
69. *Frida: A Narrative Robot Artist with Versatile Styles* (Demo) by P. Schaldenbrand, Z. Liu, J. Xu, H. Sekhr, J. Ding, J. McCann, and J. Oh; **IJCAI-ECAI Robot Exhibitions**, 2022.
70. *Knit.Work* (Web Page) by J. McCann, G. Ohlson, J. Lin, and V. Narayanan; <https://knit.work>, 2021.
71. *Leveraging Temporal Constraints for Simplified Knit Representation* (Abstract) by J. Lin and J. McCann; **APS March Meeting**, 2021.
72. *Victo Ngai Inspired Stylization in Real-Time* (Poster) by Y. He and J. McCann; **ACM SIGGRAPH 2020 Posters**.

73. *Magic Bench: A Multi-User & Multi-Sensory AR/MR Platform* (Demo) by K. McIntosh, J. Mars, J. Krahe, J. McCann, A. Rivera, J. Marsico, A. Israr, S. Lawson, and M. Mahler; **ACM SIGGRAPH VR Village**, 2017.
74. *The “Knitout” (.k) File Format* (Specification) by J. McCann; <https://textiles-lab.github.io/knitout/knitout.html>, 2017.
75. *Threadsteading: Playful Interaction for Textile Fabrication Devices* (Demo) by L. Albaugh, A. Grow, C. Liu, J. McCann, G. Smith, and J. Mankoff; **CHI Interactivity 2016 / Alt.Ctrl.GDC 2016 / IndieCade 2016**.
★ IndieCade “Technology Award” winner
76. *Building a Toolkit for Fabricating Interactive Objects* (Magazine Article) by A. Spielberg, A. Sample, S. Hudson, J. Mankoff, and J. McCann; ACM XRDS, 2016.
77. *Soft Printing with Fabric* (Magazine Article) by H. Peng, S. Hudson, J. Mankoff, and J. McCann; ACM XRDS, 2016.
78. *Challenges Facing a High-Level Language for Machine Knitting* (Talk) by L. Albaugh and J. McCann; **POPL Off The Beaten Track**, 2016.
79. *Interactive Light Field Painting* (Demo) by J. Tompkin, S. Muff, S. Jakushevskij, J. McCann, J. Kautz, M. Alexa, and W. Matusik; **ACM SIGGRAPH Emerging Technologies**, 2012.
80. *Virtual Cane Creation for Glassblowers* (Talk) by A. Winslow, K. Baldauf, B. Lee, J. McCann, E. Demaine, M. Demaine, and P. Houk; **ACM SIGGRAPH Studio Talks**, 2012.
81. *Mid-level Fluid Control with Fluid Motifs* (Poster) by A. Barnat, Z. Li, and J. McCann; **ACM SIGGRAPH/Eurographics Symposium on Computer Animation**, 2009.
82. *Recalling the Single-FFT Direct Poisson Solve* (Poster) by J. McCann; **ACM SIGGRAPH 2008 Posters**.
83. *A Hierarchical Self-Organizing Map for Motion Exploration* (Poster) by R. Slyper, J. McCann, N. Pollard, and J. Hodgins; **ACM SIGGRAPH/Eurographics Symposium on Computer Animation**, 2007.

PATENTS AND INVENTION DISCLOSURES

84. US20240309568A1 (abandoned, unfortunately): *Structures and methods of use of micro-resolution knitted mosquito bite blocking textiles*. J.F. Beckman, B. Holt, J. McCann; 2024.
85. Invention Disclosure: *Knitting method for electrode grids*. T. Yu, J. McCann; 2022.
86. Invention Disclosure: *Canonical braid representations for knit stitch racking*. J. Lin, J. McCann; 2020.

87. Invention Disclosure: *Short-row-only knitting pattern generation from topologically-disc-shaped 3D CAD models with direction control through normalised fields; orthogonal linking guided by virtual courses; and symmetry guaranteed by post-linking assembly*. V. Narayanan, J. McCann; 2020.
88. US20180315243A1: *Multisensory augmented reality*. M. Mahler, J. Mars, J. McCann, A. Israr, S. Lawson, K. McIntosh, J. Bedford; 2017.
89. US10127417B2: *Systems and methods for determining interaction states of wireless tags based on probability distributions*. J. McCann, A. Spielberg, S. Hudson, A. Sample, J. Mankoff; 2016.
90. US10160165B2: *Three-dimensional printer with an inverted cutting surface and a movable platform for creating layered objects*. J. McCann, H. Peng, S. Hudson, J. Mankoff; 2015.
91. US9036909B2: *Pyramid collapse color interpolation*. S. Paris, J. McCann; 2013.

SOFTWARE ARTIFACTS

92. *Knitout Backend for Kniterate* by G. Ohlson and J. McCann; <https://github.com/textiles-lab/knitout-backend-kniterate/>, 2020.
93. *SMOBJ Format and Utilities* by J. McCann and V. Narayanan; <https://github.com/textiles-lab/smobj/>, 2019.
94. *Knitout Live Visualizer* by J. McCann and T. Yu; <https://github.com/textiles-lab/knitout-live-visualizer/>, 2017.

JOKE PAPERS

Far too many to list.

EVIDENCE OF EXTERNAL REPUTATION

INVITED TALKS

- *The Future of Knitting Machine Programming*, ICERM Computational Textiles Working Group, September 2019
- *The Future of 3D Knitting Design at the Carnegie Mellon Textiles Lab*, Wear-It Innovation Summit, June 2019
- *The Future of 3D Knitting Design at the Carnegie Mellon Textiles Lab*, Shima Seiki G3D 5, March 2019
- *The Future of Production* (Panel), World Economic Forum Annual Meeting of New Champions, June 2017

SEMINARS & COLLOQUIA

- *Computational Fabrication, Four Ways, with Examples from Machine Knitting*, RICE University MECH Seminar, March 2025
- *35 Years of Creative Tools: Hits and B-Sides*, University of Tokyo Graphics Seminar, December 2024
- *Short Talk: Humane Vulkan*, SIGGRAPH Asia Pre-Conference Workshop, December 2024
- *Short Motivational Talk: Textiles are a Perfect Fit for Computational Fabrication*, Computational Fabrication Seminar (virtual; <https://computational-fabrication.org/>), March 2022
- *What Do Knitting Machines Make?*, GVU Center Brown Bag, February 2022
- *What Can Knitting Machines Make?*, UPenn Kod*lab Seminar, December 2020
- *On-Demand Machine Knitting for Everyone*, Drexel University Computer Science Seminar, January 2018

OTHER

- *Knitout Workshop*, RICE University TexLab, March 2025
- *Expert in “AI vs Human: The Creativity Experiment” (TV Documentary)*, Australian Broadcasting Company, May 2023
- *Knitout Workshop*, Cornell University Hybrid Body Lab, August 2023

PROFESSIONAL ACTIVITIES

CONFERENCE AND WORKSHOP COMMITTEES

- SIGGRAPH 2026 Technical Papers Committee Member
- CHI 2026 Area Chair (Papers Committee Member)
- ACM SIGPLAN FARM 2025 Program Committee Member
- NII Shonan Meeting Co-Organiser: “Foundations of Computation and Creative Computing” (September 2025)
- SIGGRAPH Asia 2025 Technical Papers Committee Member
- SIGGRAPH 2025 Technical Papers COI Coordinator
- SIGGRAPH 2024 Birds of a Feather Organizer: “Textiles”
- SIGGRAPH 2024 Technical Papers COI Coordinator
- SIGGRAPH 2023 Technical Papers Committee Member
- CHI 2023 Area Chair (Papers Committee Member)
- SIGGRAPH Asia 2022 Technical Papers Committee Member
- SIGGRAPH 2022 Technical Papers COI Coordinator
- SIGGRAPH Asia 2021 Technical Papers COI Coordinator
- SCF 2021 Papers Chair
- SIGGRAPH 2021 Measurable Creativity Workshop co-Organizer
- SIGGRAPH 2021 Technical Papers COI Coordinator
- CVPR 2021 Measurable Creativity Workshop co-Organizer
- SIGGRAPH 2019 Frontiers Textiles Workshop Organizer
- Symposium on Computational Fabrication Steering Committee Member (since 2019)
- Symposium on Computational Fabrication 2019 General Co-Chair

EDITORSHIPS

- Co-guest Editor: Computer-Aided Design: Special Issue on Computational Modeling, Design and Fabrication for Textiles

CONSULTING

- KnitFit advisor (24hrs / year)

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- ACM Member
- Eurographics Member

OTHER

- AdaCAD Advisory Board Member

CONTRIBUTIONS TO EDUCATION

CURRICULUM DESIGN

15-472/672/772: Real-Time Computer Graphics

– *Designed in Spring 2024, refined in Fall 2024.*

An upper-level graphics course, focused on high-performance GPU-accelerated real-time graphics. Uses C++ and the 3rd-generation graphics API Vulkan, which allows for fine-grained synchronization and scheduling control. In response to student feedback about existing tutorials in Spring 2024 I wrote a new Vulkan introduction – nakluV – which focuses on short time-to-first-image and fills in boilerplate later, and deployed this tutorial in Fall 2024.

▷ materials: <https://naak.love/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-472-s26/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-472-f24/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-472-s24/>

15-367/867: Algorithmic Textiles Design

– *Created Spring 2019. Refined Spring 2020, 2021, 2023, 2025.*

A studio course with open-ended projects and group critiques that teaches students how to control modern automated textile production equipment with their own code. Was known as 15-469/869K until 2021.

▷ materials: <https://graphics.cs.cmu.edu/courses/15-867-s25/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-867-s23/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-869K-s21/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-869K-s20/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-869K-s19/>

15-466/666: Game Programming

– *Redesigned in 2009 (as graduate student) and Fall 2017. Refined in Fall 2018 - 2024.*

A project course focused on building computer game runtimes and asset pipelines from scratch in C++ and OpenGL.

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f25/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f24/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f23/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f22/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f21/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f20/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f19/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f18/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f17/>

▷ materials: <https://graphics.cs.cmu.edu/courses/15-466-f09/>

15-362/662: Computer Graphics

– *Overhauled base code in 2022.*

Our introductory graphics course, built collaboratively by the graphics faculty. I contributed an overhaul of the base code to clean up accumulated technical debt, add test cases, and streamline the setup process for students. (Note: was known as 15-462 during the overhaul.)

▷ materials: <http://15462.courses.cs.cmu.edu/fall2022/>

15-236: Saving Humanity with Computational Models

– *Created Spring 2021.*

A course about using html, css, javascript, and English to write persuasive arguments involving interactive models.

▷ materials: <https://graphics.cs.cmu.edu/courses/15-236-s21/>

15-465: Game Engine Programming

– *Created Fall 2015 (as adjunct faculty).*

A lightweight game engine and asset pipeline course targeting single-page HTML5/javascript games. Designed for sophomore-level students in the IDEATE program.

▷ materials: <https://graphics.cs.cmu.edu/courses/16-465-s15/>

OTHER

Knitout Office Hours

– *Created Fall 2018; ongoing.*

A weekly informal gathering to teach knitting machine programming with knitout, open to anyone in the extended CMU community.

UNIVERSITY, COLLEGE, AND DEPARTMENT SERVICE

SCHOOL AND DEPARTMENT SERVICE AND COMMITTEE WORK

- RI Undergrad Curriculum Review Committee (Fall 2024 - present)
- RI Admissions Committee (Fall 2023 - present)
- RI MSR Admissions Committee (Fall 2018 - Fall 2021)
- SCS Student Teaching Awards Committee (Spring 2019 - Spring 2020)
- OurCS workshop co-leader (Fall 2019)

OTHER

- Carnegie Mellon Graphics Colloquium co-organizer (2024-present)
- Graphics web server redesign (2023) and maintenance (ongoing)
- Graphics Lab meeting organizer (??? - 2019)
- Graphics Lab Literature Club (Reading Group) faculty cookie sponsor
- SIGBOVIK emcee (2017, 2018) and shadowy guiding hand (2019-present)

GRADUATE STUDENT ADVISING

CURRENT PHD STUDENTS

Angelica Bonilla [RI]

Entered 2025

Co-creative Robots; Actuated Knitting

Yuichi Hirose [RI]

Entered 2023

Solid Knitting

Gabrielle Ohlson [RI] (co-advised with Andrew Begel)

Entered 2022

Textile Design for Sensorily-Sensitive (e.g., Autistic) Individuals

COMPLETED PHD STUDENTS

Jenny Lin [CSD]

Planning and Semantics for Machine Knitting

Defended Summer 2024, now at University of Utah (Tenure-track Faculty)

Nur Yildirim [HCII] (co-advised with John Zimmerman)

Designing for AI

Defended Summer 2024, now at University of Virginia (Tenure-track Faculty)

Vidya Narayanan [CSD]

Foundations of 3D Machine Knitting

Defended Fall 2021, now at Amazon

Ella Moore [RI]

Soft Robotics, Active Garments

Entered 2020, Left 2021 without degree

Evan Shimizu [CSD] (co-advised with Kayvon Fatahalian)

Improving Parameterized Design with Interactive User-Guided Sampling and Parameter Identification Tools

Defended Spring 2020, now at Adobe

Ruta Desai [RI] (co-advised with Stelian Coros)

Robot Design for Everyone: Computational Tools that Democratize the Design of Robots

Defended Fall 2018, now at Facebook Reality Labs

OTHER THESES AND RESEARCH PROJECTS

Tianhong Yu [MSCS]

Masters Thesis: *Reconfigurable Knit Sensing*, Spring 2022

Ticha Sethapakdi [MSCS]

Masters Thesis: *Painting with CaTS: Camera-aided Texture Synthesis*, Spring 2018

Charlie Ma [ECE MS]

Research Project: *3D Reconstruction of Knitted Objects*, Spring 2019

Sarika Bajaj [ECE MS]

Research Project: *Serial Loom v2*, Spring 2019

MS OR PHD THESIS COMMITTEE SERVICE

Hannah Fechtner [CMU (Department of Philosophy) PhD]

Braids in Lean, prospectus presented Fall 2025

Vivian Shen [RI PhD]

Sensorimotor-Aligned Design for Pareto-Efficient Haptic Immersion in Extended Reality, defended Fall 2025

Peter Schaldenbrand [RI PhD]

Generative Robotics: Self-Supervised Learning for Human-Robot Collaborative Creation, defended Fall 2025

Samantha Speer [RI PhD]

Design Principles for Robotics Systems that Support Human-Human Collaborative Learning, defended Fall 2025

Hannah Twigg-Smith [University of Washington PhD]

Tools for Digital/Physical Creativity, defended Winter 2024

Hannah Fechtner [CMU (Department of Philosophy) MS]

Braids in Lean, defended Spring 2024

Mark Gillespie [CSD PhD]

Evolving Intrinsic Triangulations, defended Spring 2024

Chris Yu [CSD PhD]

Repulsive Energies and their Applications, defended Spring 2021

Qiqin Le [MSCD (Computational Design)]

Physics-based CAD, defended Spring 2021

Yong He [CSD PhD]

Slang – A Shader Compilation System for Extensible, Real-Time Shading, defended Spring 2018

Erva Ulu [ECE PhD]

Enhancing the Structural Performance of Additively Manufactured Objects, defended Spring 2018

STUDENT SERVICE AND TEAM MENTORING

ADVISING OF UNDERGRADUATES

Andy Jiang [CS Undergrad]

Independent Study: *A sub-mesh level-of-detail system inspired by Nanite*, Spring 2025

Matei Budiu [CS Undergrad]

Independent Study: *Accelerating Sound Visualization for Scale-less Composition*, Spring 2024

Pratyay Didwania [CS Undergrad]

Independent Study: *Compression Garment Knitting System*, Spring 2024

Hank Xu [CS Undergrad]

Independent Study: *Game engine for “Noire,” a 3D action/adventure game*, Spring 2024

Daniel Stankiewicz [CS Undergrad]

Independent Study: *Physics engine for “Noire,” a 3D action/adventure game*, Spring 2024

Trey DuBose, Alan Lee, Melody Huang [CS Undergrads]

Research Project: *Experimental Sound Visualizations for Scale-less Composition*, Summer 2023, Fall 2023

Jiayin Feng, Alex Zheng [CS Undergrads]

Research Project: *(Even More) Experimental Sound Visualizations for Scale-less Composition*, Fall 2023

Teadora Gildengers [CS Undergrad]

Independent Study: *Parametric Whole-Garment Knit Sweater Pattern*, Spring 2023

Yixin He [CS Undergrad]

Independent Study: *Implementing Watercolor Stylization for Games*, Spring 2019