Vidya **Narayanan**

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I am interested in improving computational design and fabrication ecosystems by building better techniques, interfaces and design languages.

Research Interests: Computation Textiles, Computational Design, Fabrication & Graphics

Education

Carnegie Mellon University Ph.D. in Computer Science — Pittsburgh, USA

Thesis: Foundations for 3D Machine Knitting. Advisor: James McCann

My PhD thesis looks at how standard knitting machines can be viewed as a soft 3D printers, by separating *what* a user wants to make from *how* the machine executes a pattern program and building computational techniques to navigate between these representations. — 2016 - 2021

Indian Institute of Science Master of Science (Engg) — Bangalore, India

Thesis: Similarity of Scalar Fields. Advisor: Vijay Natarajan — 2012 - 2015

National Institute of Technology Bachelor of Technology, Computer Engineering — Surat, India — 2004 - 2008

Work Experience

Adobe Research Research Intern — San Jose, USA

Mentors: Michal Lukáč, Amanda Ghassaei, Danny Kaufman

I built a system to semi-automatically fold 2D dielines into 3D forms and contributed to the Adobe **Max '18 Sneak Demo *Fantastic Fold***. — May 2018 - Aug 2018

Disney Research Research Associate — Pittsburgh, USA

I worked on a high-level design language and compiler for machine knitting. — Aug 2015 - June 2016

NVIDIA System Software Engineer — Pune, India

I implemented and maintained DirectX graphics drivers for NVIDIA GPUs. — Jan 2011 - Jul 2012

Tata Elxsi Software Developer — Bangalore, India

Developed graphics applications for clients including EA Brightlight's official *Harry Potter and the Deathly Hallows* game. — Nov 2008 - Dec 2010

Publications

[1] Inverse Design Tool for Asymmetrical Self-Rising Surfaces with Color Texture
Jianzhe Gu, **Vidya Narayanan**, Guanyun Wang, Danli Luo, Harshika Jain, Kexin Lu, Fang Qin, Sijia Wang, James McCann, Lining Yao
Symposium on Computational Fabrication, 2020

[2] Representing Crochet with Stitch Meshes
Runbo Guo, Jenny Lin, **Vidya Narayanan**, James McCann
Symposium on Computational Fabrication, 2020

[3] Visual knitting machine programming
Vidya Narayanan, Kui Wu, Cem Yuksel, James McCann
ACM Transactions on Graphics (TOG) SIGGRAPH 2019

[4] Efficient Transfer Planning for Flat Knitting
Jenny Lin, **Vidya Narayanan**, James McCann
Proceedings of the 2nd ACM Symposium on Computational Fabrication, 2018

[5] Automatic Machine Knitting of 3D Meshes
Vidya Narayanan, Lea Albaugh, Jessica Hodgins, Stelian Coros, James McCann
ACM Transactions on Graphics (TOG) 2018

[6] An exploratory framework for cyclone identification and tracking
Akash Anil Valsangkar, Joy Merwin Monteiro, **Vidya Narayanan**, Ingrid Hotz, Vijay Natarajan
IEEE transactions on visualization and computer graphics IEEE, 2018

[7] A Compiler for 3D Machine Knitting
James McCann, Lea Albaugh, **Vidya Narayanan**, April Grow, Wojciech Matusik, Jennifer Mankoff, Jessica Hodgins
ACM Transactions on Graphics (TOG) SIGGRAPH 2016

[8] Distance between extremum graphs
Vidya Narayanan, Dilip Mathew Thomas, Vijay Natarajan
IEEE Pacific Visualization Symposium, 2015

Selected Press

Techcrunch	Knitting machines power up with computer generated patterns for 3D shapes
Gizmodo	Researchers figured out how to turn 3D models into cute knitted toys.
digital trends	Amazing software turns 3D scans into knitted objects.
3ders	New software lets you transform 3D models into stuffed knitted toys.
New Atlas	Software turns knitting machines into 3D printers.
Knitting Industry	Another step towards on-demand machine knitting.

Talks

An Introduction to 3D Machine Knitting Computational Fabrication Seminar	virtual April 2021
Visual Knitting Machine Programming SIGGRAPH	Los Angeles, USA August 2019
Automatic Machine Knitting of 3D Meshes SIGGRAPH	Vancouver, Canada July 2018
Comparing Scalar Functions with Extremum Graphs Pacific Vis	Hangzhou, China April 2015

Skills

Programming Languages	**C/C++**, Javascript, Python
Graphics & Visualization	**OpenGL**, DirectX, Unity, Paraview, VTK
Fabrication	**3D Knitting**, 3D Printing, Laser cutting, CNC Milling

Service

Teaching	TA for 15-462 (CMU) Computer Graphics (taught by Keenan Crane) Fall 2020 TA for 15-300 (CMU) Research & Innovation in CS (taught by Jonathan Aldrich & Bogdan Vasilescu) Fall 2019 Guest Lecture for 15-869 (CMU) Algorithmic Textiles Design: Introduction to Machine Knitting (Spring 2020) and Making 3D shapes with knitting, weaving and folding (Spring 2021) Knitout Office Hours: held weekly for introducing machine-knitting using knitout (with CMU Textiles Lab) 2018 onwards
Mentoring	Michelle Guo (Undergraduate Researcher, CMU) Tile-based visualization and design of crochet patterns (Summer 2020) Aparajita Haldar (Undergraduate Researcher, BITS Pilani Goa) Comparing contour-tree algorithms (IISc, Summer 2015)
Reviewing	SIGGRAPH (2020-21), SIGGRAPH ASIA(2019-21), TEI(2019), SCF(2018,20)
Committees	Posters Chair, Symposium on Computational Fabrication 2019, Pittsburgh, USA Student Member, Doctoral Review Committee (2017-21), Computer Science Department, CMU Student Member, PhD Admissions Committee (2020), Computer Science Department, CMU