

Sarah Kushner, PhD

GEOMETRY · ANIMATRONICS · HUMAN COMPUTER INTERACTION · COMPUTATIONAL FABRICATION

Harold Frank Hall, UC Santa Barbara, California, US

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Education

University of Toronto PHD IN COMPUTER SCIENCE – GEOMETRY, ANIMATION & FABRICATION Advised by Daniel Wigdor and Paul H. Dietz Thesis: <i>Techniques for Physical Storytelling</i>	Toronto, ON, Canada 2017 - 2024
Institut polytechnique de Grenoble (Grenoble INP) MS IN INFORMATICS – GRAPHICS, VISION & ROBOTICS SPECIALTY Advised by Marie-Paule Cani and Rémi Ronfard Thesis: <i>The Sketch-Based Posing and Animation of Multiple Characters: Animation of Dancing Couples</i>	Grenoble, France 2016 - 2017
Drexel University BS IN COMPUTER SCIENCE, MINOR IN DIGITAL MEDIA Magna Cum Laude, Pennoni Honors College	Philadelphia, PA, USA 2012 - 2016

Experience

University of California, Santa Barbara POSTDOCTORAL RESEARCHER IN THE GEOMETRIC INTELLIGENCE LAB Project on visualization and geometric shape analysis of 3D women’s brain data	Santa Barbara, CA, USA 2025 - present
University of California, Santa Barbara VISITING PHD STUDENT IN THE GEOMETRIC INTELLIGENCE LAB Project on interpolating 3D rigged animations on $SO(3)$ using geometric statistics	Santa Barbara, CA, USA October 2022 - March 2023
Inria Grenoble Rhône-Alpes RESEARCH INTERN Project on sketch-based animation techniques and numerical methods to animate multiple characters	Montbonnot-Saint-Martin, France February 2017 - June 2017
Drexel University RESEARCH ASSISTANT Project on designing a course on Knowledge Representation and Reasoning and Privacy	Philadelphia, PA, USA March 2015 - August 2015
Applied Informatics Group RESEARCH SOFTWARE ENGINEER CO-OP Project on building a robust intelligent system to answer cybersecurity queries	Philadelphia, PA, USA September 2014 - March 2015

Publications, Posters & Demos

Interpolation of Animated Characters on Lie groups GEOMETRIC SCIENCE OF INFORMATION (GSI) Sarah Kushner, Vismay Modi, Nina Miolane	Saint-Malo, France October 2025
Paper Animatronics Workshop 2025 SIGGRAPH LABS Paul H. Dietz, Sarah Kushner, Catherine Dietz, Jennifer Ginger Alford, Elliot Mueller	Vancouver, BC, Canada August 2025
Papertronic Puppets: Teaching STEM and Storytelling Through Creative Construction IEEE FRONTIERS IN EDUCATION (FIE) Sarah Kushner, John Kanji, Paul H. Dietz, Daniel Wigdor	Washington D.C., USA October 2024

Interactive 3D Zoetrope with a Strobing Flashlight (Demo)

USER INTERFACE SOFTWARE AND TECHNOLOGY (UIST)

Sarah Kushner, Paul H. Dietz, Alec Jacobson

[Bend, OR, USA](#)

October 2022

Levitating Rigid Objects with Hidden Rods and Wires

EUROGRAPHICS

Sarah Kushner, Risa Ulinski, Karan Singh, David I.W. Levin, Alec Jacobson

[Vienna, Austria \(remote\)](#)

May 2021

Example-Based Print Preview for Laser Cutting (Poster)

GRAPHICS INTERFACE

Sarah Kushner, Alec Jacobson

[Toronto, ON, Canada](#)

May 2018

Ontology-Driven Data Semantics Discovery for Cyber-Security

PRACTICAL ASPECTS OF DECLARATIVE LANGUAGES

Marcello Balduccini, Sarah Kushner, Jacquelin Speck

[Portland, OR, USA](#)

June 2015

Talks

Modelling the Maternal Brain (and its challenges)

GRADUATE SIMULATION SEMINAR SERIES AT UC SANTA BARBARA

[Santa Barbara, CA, USA](#)

August 2025

Review of Linear Statistical Methods

GEOMETRIC INTELLIGENCE LAB AT UC SANTA BARBARA

[Santa Barbara, CA, USA](#)

July 2025

Using shape deformations to predict postpartum depression

GEOMETRIC INTELLIGENCE LAB AT UC SANTA BARBARA

[Santa Barbara, CA, USA](#)

April 2025

Exploring volume changes in the brain during pregnancy

GEOMETRIC INTELLIGENCE WORKSHOP AT INSTITUTO DE MATEMÁTICAS UNAM (UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO)

[Mexico City, Mexico](#)

March 2025

Techniques for Physical Storytelling

GEOMETRIC INTELLIGENCE LAB AT UC SANTA BARBARA

[Santa Barbara, CA, USA](#)

January 2025

Bringing Stories to Life: Animatronics for Education

UNIVERSITY OF TORONTO ARIA (APPLIED RESEARCH IN ACTION) SHOWCASE

[Toronto, ON, Canada](#)

November 2024

Techniques for Physical Storytelling

WIGRAPH RISING STARS RESEARCH PITCH

[Denver, Colorado, USA](#)

July 2024

Blender Tutorial & Interpolation of Animated Characters on Lie groups

GEOMETRIC INTELLIGENCE LAB AT UC SANTA BARBARA

[Santa Barbara, CA, USA](#)

January 2023

Zoetrope Cinematography and the Timing Animation Principles

GEOMETRIC INTELLIGENCE LAB AT UC SANTA BARBARA

[Santa Barbara, CA, USA](#)

October 2022

Fabricating Cinematography Techniques for 3D Printed Movies

EUROGRAPHICS DOCTORAL CONSORTIUM

[Vienna, Austria \(remote\)](#)

May 2021

Levitating Rigid Objects with Hidden Rods and Wires

TORONTO GEOMETRY COLLOQUIUM

[Toronto, ON, Canada](#)

April 2021

Levitating Rigid Objects with Hidden Rods and Wires

UNIVERSITY OF TORONTO GRAPHICS CLUB RAPID FIRE TALKS

[Toronto, ON, Canada](#)

March 2021

Sneakily Staging Structually Sound Supports

MONTREAL TORONTO GRAPHICS WORKSHOP

[Waterloo, ON, Canada](#)

November 2019

Invisible Supports for 3D Zoetrope Movies

MONTREAL TORONTO GRAPHICS WORKSHOP

[Montréal, QC, Canada](#)

November 2018

Realistic Example-Based Print Preview for Laser Cutting

MONTREAL TORONTO GRAPHICS WORKSHOP

[Toronto, ON, Canada](#)

November 2017

Teaching

CSC 490 - Capstone Physical Computing in K-12 Education

TEACHING ASSISTANT

Assist students with weekly assignments and mentor them through their capstone projects

[University of Toronto](#)

Winter 2024

CSC 317/2504 - Computer Graphics

COURSE INSTRUCTOR

Taught the fourth year undergraduate graphics course remotely to ~70 students

[University of Toronto](#)

Summer 2020

CSC 419/2520 - Geometry Processing

TEACHING ASSISTANT

Lead tutorial sessions to assist students with homework assignments, marked assignments and final projects

[University of Toronto](#)

Winter 2020

CSC 2521 - Topics in Computer Graphics: Seminar on Geometry and Animation

TEACHING ASSISTANT, SUBSTITUTE LECTURER

Lead discussions on seminal research papers in graphics, assign marks for participation and quality

[University of Toronto](#)

Fall 2019

CSC 317/2504 - Computer Graphics

TEACHING ASSISTANT, SUBSTITUTE LECTURER

Provided guidance to students working on the assignments, marked assignments and exams

[University of Toronto](#)

Winter 2018 - Winter 2020

CSC 320 - Introduction to Visual Computing

TEACHING ASSISTANT

Created marking schemes, marked assignments and exams

[University of Toronto](#)

Winter 2018

CSC 318 - Interactive Computational Media

TEACHING ASSISTANT

Created marking schemes, marked assignments and exams

[University of Toronto](#)

Fall 2017

Honors and Awards

Postdoctoral Researcher Award

RECEIVED, \$73,500 USD

Ann S. Bowers Women's Brain Health Initiative to apply cutting-edge AI to advance women's brain health

[UC Santa Barbara](#)

2025

WiGRAPH Rising Stars Program

RECEIVED, SIGGRAPH CONFERENCE FEES FOR 2023 AND 2024

Designed to encourage people of underrepresented genders to become research leaders in computer graphics

[WiGRAPH](#)

2023

Mitacs Globalink Research Award

RECEIVED, \$6000 CAD

Supports research collaborations with partner university to conduct a 12- to 24-week research project

[Mitacs](#)

2022

Beatrice Worsley Graduate Scholarship in Computer Science

RECEIVED, \$4000 CAD

Awarded to PhD students who have taken an active role in helping to promote women in the field of computer science

[University of Toronto](#)

2018

Grenoble INP Fondation Bourse d'Excellence Internationale

RECEIVED, €5000 EUR

Attract talented international students with strong academic and professional potential to engineering training at Grenoble INP

[Grenoble INP](#)

2016/2017

Fulbright Study/Research Fellowship

SEMI-FINALIST

Study/research grant to design a project to work on with advisers at foreign universities

[Fulbright U.S. Student Program](#)

2016/2017

James B. Maginnis Award

RECEIVED, \$500 USD

Presented to an upper division student majoring in computer science in recognition of academic excellence

[Drexel University](#)

Winter 2016

SuperNova Undergraduate Research Fellow

RECEIVED

Engaged in progressively demanding undergraduate research experiences, courses and projects

[Drexel University](#)

2016

Franklin Institute Laureate Liaison

RECEIVED

Liaison to visiting scholars (Edmund Clarke) recognized at the Franklin Institute

[Franklin Institute, Drexel University](#)

Fall 2017

STAR Scholar Summer Research Program

RECEIVED, \$4000 USD

Students Tackling Advanced Research Program

[Drexel University](#)

2013

Activities

LEADERSHIP

DCS Women

STUDENT ORGANIZER

Helped organize and run events for graduate students in the Department of Computer Science

[University of Toronto](#)

September 2021 - August 2022

University of Toronto Department of Computer Science

GRADUATE APPLICATION TRIAGER

16 hours of paid work on processing graduate school applications

[University of Toronto](#)

December 2021

Symposium on Geometry Processing Conference

STUDENT VOLUNTEER

Provided Zoom support, created and moderated the Discord server, and ran Trivia Night

[Toronto, ON \(remote\)](#)

July 2021

HER CODE CAMP

DIRECTOR OF MARKETING, DIRECTOR OF MENTORSHIP

Helped organize Python workshops to high school students in the Toronto area who are women or non-binary

[Affiliated with University of Toronto](#)

September 2019 - August 2020

MENTORING UNDERGRADUATES & HIGH SCHOOL STUDENTS

Graduate Application Assistance Program (GAAP)

MENTOR

Advising undergraduate and masters students to improve their CVs and statements for grad school applications

[University of Toronto](#)

October 2021 - October 2022

Nikoleta Grujic

ENGINEERING SCIENCE CAPSTONE MENTOR

Engineering science capstone project on audio in interactive zoetropes

[University of Toronto](#)

September 2023 - June 2024

Evelyn Pan

COMPUTER SCIENCE RESEARCH MENTOR

Computer science capstone project on zoetrope kits for educational purposes

[University of Toronto](#)

September 2023 - December 2023

Anqi Li

SUMMER PROJECT MENTOR

Mechanical engineering of large scale zoetropes

[University of Toronto](#)

April 2021 - August 2021

Cindy Zhu and Kevin Huang

MENTOR

Project on viewing meshes in VR

Cindy is now studying computer science at Carnegie Mellon University

[\(visiting\) Unionville High School](#)

April 2018 - June 2020

Arjun Chhabra

ENGINEERING SCIENCE SUMMER PROGRAM MENTOR

Project on visualization tools for laser cutting

Arjun is now a Mechanical and Aerospace Engineering PhD Student at Princeton University

[University of Toronto](#)

June 2018 - September 2018

Undergraduate Research Leaders

MENTOR

Guided undergraduate students who wanted to be involved in research

[Drexel University](#)

September 2015 - June 2016

REVIEWING

2025

REVIEWER

SIGGRAPH Technical Papers

Conference on Tangible, Embedded and Embodied Interaction (TEI) Work in Progress Papers

2024

REVIEWER

Conference on Human Factors in Computing Systems (CHI)

IEEE Frontiers in Education (FIE) Work in Progress Papers

MEMBERSHIPS

ACM SIGGRAPH, Upsilon Pi Epsilon, University of Toronto DCS Women

[United States Parachute Association](#)

Skills

Programming Languages

Python, C++, Matlab, HTML, CSS, Bash, LaTeX, Javascript, OpenGL, GLSL

Software

3D Software: Blender, Autodesk Maya, Fusion 360, 3D printing slicers

2D Software: Adobe Photoshop, Illustrator, AfterEffects, Google Slides, Apple Keynote, iMovie, Microsoft PowerPoint, Excel, Word

IDEs: Visual Studio, Visual Studio Code, Arduino, MPLAB X, Jupyter notebooks

iPad: ProCreate

Hardware

Machines: 3D printing (Bambu, Prusa, Stratasys, Ultimaker), laser cutting (Versalaser, Trotec), CNC milling, motion capture (Vicon, Noraxon)

Electronics: Arduino, Raspberry Pi, PICkit, M5Stack, basic circuit design (EasyEDA), LEDs, IMUs, stepper motors, IR sensors, photo interrupters, inductive proximity sensors, triggerable cameras, servo motors

Building: Soldering, jigsaw, drill press, aluminum extrusion design and assembly

Art

Painting: watercolour, acrylic, oil painting, silkscreen

Drawing: graphite, pen, charcoal, chalk pastel

Digital: graphic design, iPad drawing, web design