

# DANIEL RITCHIE

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## EDUCATION

### Stanford University

PhD, Computer Science

Dissertation: *Probabilistic Programming for Procedural Modeling and Design*

Advisors: Pat Hanrahan, Noah Goodman

Conferred September 2016

### Stanford University

MS, Computer Science

Conferred April 2013

### University of California Berkeley

BA, Computer Science

Conferred May 2010

## EMPLOYMENT

### Assistant Professor

Brown University Computer Science Department

Providence, RI

2017 – Present

### Postdoctoral Researcher

Stanford University Computer Science Department

Stanford, CA

2016 – 2017

### Research Intern

Adobe Creative Technologies Lab

San Francisco, CA

Summer 2011

### Graduate Research Assistant

Stanford University Computer Science Department

Stanford, CA

2010 – 2016

### Technical Director Intern

Pixar Animation Studios

Emeryville, CA

Summer 2009

### Software Intern

Hewlett-Packard

Roseville, CA

Summer 2008

## REFEREED

## PUBLICATIONS

**Learning Style Compatibility Between Objects in a Real-World 3D Asset Database.** Yifan Liu, Ruolan Tang, Daniel Ritchie. *Pacific Graphics 2019*.

**PlanIT: Planning and Instantiating Indoor Scenes with Relation Graph and Spatial Prior Networks.** Kai Wang, Yu-an Lin, Ben Weissmann, Manolis Savva, Angel X. Chang, Daniel Ritchie. *SIGGRAPH 2019*.

**Fast and Flexible Indoor Scene Synthesis via Deep Convolutional Generative Models.** Daniel Ritchie, Kai Wang, Yu-an Lin. *CVPR 2019*.

**Learning to Describe Scenes with Programs.** Yunchao Liu, Zheng Wu, Daniel Ritchie, William T. Freeman, Joshua B. Tenenbaum, Jiajun Wu. *ICLR 2019*.

**Learning to Infer Graphics Programs from Hand-Drawn Images.** Kevin Ellis, Daniel Ritchie, Armando Solar-Lezama, Joshua B. Tenenbaum. *NeurIPS 2018*.  
SPOTLIGHT PRESENTATION.

**Improving Shape Deformation in Unsupervised Image-to-Image Translation** Aaron Gokaslan, Vivek Ramanujan, Daniel Ritchie, Kwang In Kim, James Tompkin. *ECCV 2018*.

**Deep Convolutional Priors for Indoor Scene Synthesis** Kai Wang, Manolis Savva, Angel X. Chang, Daniel Ritchie. *SIGGRAPH 2018*.

**ScanComplete: Large-Scale Scene Completion and Semantic Segmentation for 3D Scans** Angela Dai, Daniel Ritchie, Martin Bokeloh, Scott Reed, Jürgen Sturm, Matthias Nießner. *CVPR 2018*.

**Example-based Authoring of Procedural Modeling Programs with Structural and Continuous Variability** Daniel Ritchie, Sarah Jobalia, Anna Thomas *Eurographics 2018*.

**An Improved Training Procedure for Neural Autoregressive Data Completion.** Maxime Voisin, Daniel Ritchie. *NIPS 2017 Bayesian Deep Learning Workshop*.

**Neurally-Guided Procedural Models: Amortized Inference for Procedural Graphics Programs using Neural Networks.** Daniel Ritchie, Anna Thomas, Pat Hanrahan, Noah D. Goodman. *NIPS 2016*.

**C3: Lightweight Incrementalized MCMC for Probabilistic Programs using Continuations and Callsite Caching.** Daniel Ritchie, Andreas Stuhlmüller, Noah D. Goodman. *AISTATS 2016*.

**Controlling Procedural Modeling Programs with Stochastically-Ordered Sequential Monte Carlo.** Daniel Ritchie, Ben Mildenhall, Noah D. Goodman, and Pat Hanrahan. *SIGGRAPH 2015*.

**Generating Design Suggestions under Tight Constraints with Gradient-based Probabilistic Programming.** Daniel Ritchie, Sharon Lin, Noah D. Goodman, and Pat Hanrahan. *Eurographics 2015*. BEST PAPER HONORABLE MENTION.

**Quicksand: A Lightweight Embedding of Probabilistic Programming for Procedural Modeling and Design.** Daniel Ritchie. *The 3rd NIPS Workshop on Probabilistic Programming, 2014*.

**First-class Runtime Generation of High-performance Types using Exotypes.** Zach Devito, Daniel Ritchie, Matthew Fisher, Alex Aiken, and Pat Hanrahan. *PLDI 2014*.

**Probabilistic Color-by-Numbers: Suggesting Pattern Colorizations Using Factor Graphs.** Sharon Lin, Daniel Ritchie, Matthew Fisher, and Pat Hanrahan. *SIGGRAPH 2013*.

**Example-based Synthesis of 3D Object Arrangements.** Matthew Fisher, Daniel Ritchie, Manolis Savva, Thomas Funkhouser, and Pat Hanrahan. *SIGGRAPH Asia 2012*.

**d.tour: Style-based Exploration of Design Example Galleries.** Daniel Ritchie, Ankita Arvind Kejriwal, and Scott R. Klemmer. *UIST 2011*.

**Dynamic Local Remeshing for Elastoplastic Simulation.** Martin Wicke, Daniel Ritchie, Bryan M. Klingner, Sebastian Burke, Jonathan R. Shewchuk, and James F. O'Brien. *SIGGRAPH 2010*.

**Interactive Simulation of Surgical Needle Insertion and Steering.** Nuttapong Chentanez, Ron Alterovitz, Daniel Ritchie, Lita Cho, Kris K. Hauser, Ken Goldberg, Jonathan R. Shewchuk, and James F. O'Brien. *SIGGRAPH 2009*.

**TECHNICAL  
REPORTS**

**Deep Amortized Inference for Probabilistic Programs.** Daniel Ritchie, Paul Horsfall, Noah D. Goodman. *arXiv:1610.05735*, 2016.

**INVITED  
TALKS**

**Learning to Generate 3D Structures**  
Brown Department of Biostatistics, *Deep Learning Seminar* February 2020

**Deep Learning for Graph(ic)s**  
Simon Fraser University, *Visual Computing Group* December 2019

**Learning to Generate Visual Structures**  
Carney Institute for Brain Science, *Lunch Seminar* October 2019

**Indoor Scene Synthesis: Past, Present, and Future**  
Shenzhen University, *Visual Computing Summer School* July 2019

**Probabilistic Programming**  
Brown ICERM, *Computer Vision Semester Program* February 2019

**Virtual Indoor Scene Synthesis: Past, Present, and Future**  
MIT, *Graphics Lunch* December 2018

**Toward Style-Aware Generative Models of Virtual Indoor Scenes**  
Wayfair LLC, *Computer Vision / Data Science Team* December 2018

**Visual Program Induction**  
Brown Applied Math, *Pattern Theory Seminar* November 2018

**Probabilistic Programming for Computer Graphics**  
MIT, *PROBPROG 2018* October 2018

**Learning Procedural Modeling Programs from Examples**  
MIT, *New England Symposium on Graphics* April 2018  
Microsoft Research Cambridge, *New England Machine Learning Day* May 2018

**Learning from Large-Scale Synthetic 3D Scene Data**  
Brown University Data Science Initiative, *Datathon* March 2018

**Inferring Graphics Programs**  
University of Washington, *ML+PL Workshop* February 2018

**Learning and Inferring Graphics Programs**  
MIT, *Vision Seminar* September 2017

**Creative AI for Computer Graphics (It's More Than Just Style Transfer)**  
Google Brain, *Magenta Group* January 2017

## Probabilistic Programming for Procedural Modeling and Design

|   |               |
|---|---------------|
| Adobe Systems, <i>Creative Technologies Lab</i>         | March 2016    |
| Brown University, <i>Computer Science Department</i>    | February 2016 |
| Harvey Mudd College, <i>Computer Science Department</i> | February 2016 |
| Yale University, <i>Computer Science Department</i>     | February 2016 |

**PANELIST**      Advances in Software for Approximate Bayesian Inference. *NIPS 2016 Workshop on Advances in Approximate Bayesian Inference.*

**TUTORIALS & WORKSHOPS**      **3D Scene Generation**      June 2019  
Angel Chang, Qixing Huang, Daniel Ritchie, Manolis Savva  
CVPR 2019 Workshop

**Learning Generative Models of 3D Structures**      May 2019  
Siddhartha Chaudhuri, Daniel Ritchie, Kai Xu, Hao Zhang  
Eurographics 2019 Tutorial

**TEACHING**      **Instructor**      Fall 2018 – 2019  
Brown CSCI 1470/2470: Deep Learning

**Instructor**      Spring 2018 – 2020  
Brown CSCI 2240: Interactive Computer Graphics

**Instructor**      Fall 2017  
Brown CSCI 2951-W: Creative Artificial Intelligence for Computer Graphics

**Instructor**      Summer 2016  
DARPA Probabilistic Programming for Advanced Machine Learning Summer School

**Course Assistant**      Spring 2014  
Stanford CS 348b: Image Synthesis Techniques

**Course Assistant**      Fall 2011  
Stanford CS 148: Introduction to Computer Graphics and Imaging

**Graduate Student Instructor**      Fall 2009, Spring 2010  
UC Berkeley CS 184: Foundations of Computer Graphics

**Student Facilitator**      Spring 2009 – Spring 2010  
UC Berkeley Undergraduate Graphics Group

**Tutor**      Fall 2008  
UC Berkeley Self-Paced Center

|                           |                |                              |
|---------------------------|----------------|------------------------------|
| <b>RESEARCH MENTORING</b> | Kai Wang       | Brown CS PhD (current)       |
|                           | Theresa Barton | Brown CS PhD (current)       |
|                           | Russell Jones  | Brown CS PhD (current)       |
|                           | Xianghao Xu    | Brown CS PhD (current)       |
|                           | Siqi Wang      | Brown CS ScM (expected 2020) |

|   |  |
|---|--|
| Loudon Cohen  | Brown CS ScB + ScM (expected 2020)             |
| Purvi Goel  | Brown CS ScB + ScM (expected 2020)             |
| Natalie Lindsay   | Brown CS ScB + ScM (expected 2020)             |
| Leon Lei  | Brown CS ScB + ScM (expected 2020)             |
| Naveen Srinivasan   | Brown CS ScB + ScM (expected 2020)             |
| Michael Cosgrove  | Brown CS ScB (expected 2021)                   |
| Dylan Tian  | Brown CS ScB + Visual Art AB (expected 2021)   |
| Brian Oppenheim   | Brown CS ScB (expected 2020)                   |
| Brad Guesman  | Brown CS AB + Physics AB (expected 2020)       |
| Miles Freeman   | Brown CS + Applied Math ScB (expected 2020)    |
| David Charatan  | Brown Computer Engineering ScB (expected 2022) |
| Hameed Abdul-Rashid<br><i>Home institution: University of Southern Mississippi</i>                | Visiting Researcher Summer 2019                |
| Ellen Jiang<br><i>Next position: Google Brain, Big Picture Group</i>                              | Brown CS ScB 2020                              |
| Ruolan Tang<br><i>Next position: Two Sigma</i>  | Brown CS ScM 2019                              |
| Ben Weissmann<br><i>Next position: Down Dog</i>   | Brown CS ScB 2019                              |
| Mae Heitmann<br><i>Next position: AirBnB</i>  | Brown Math+CS ScB 2019                         |
| Montana Fowler<br><i>Next position: PhD Student, UC Santa Cruz</i>                                | Brown CS AB + Visual Art AB 2019               |
| Yu-An (Andy) Lin<br><i>Next position: Microsoft</i>   | Brown ECE ScM 2018                             |
| Yifan Liu<br><i>Next position: Google</i>   | Brown CS ScM 2018                              |
| Shreya Shankar<br><i>Next position: Machine Learning Engineer, Viaduct</i>                        | Stanford CS BS 2019                            |
| Maxime Voisin<br><i>Next position: Research Assistant, Stanford University</i>                    | Stanford MS&E MS 2018                          |
| Anna Thomas<br><i>Next position: Masters Student, University of Cambridge (Churchill Scholar)</i> | Stanford CS BS 2018                            |

Sarah Jobalia  
*Next position: Microsoft* Stanford CS MS 2018

Ben Mildenhall  
*Next position: PhD Student, UC Berkeley* Stanford CS BS 2015

**FUNDING**      **NSF CHS Small #1907547**      2019  
Learning to Automatically Design Interior Spaces  
Sole PI. \$498,333

**DARPA GAILA HR00111990064**      2019  
Cognitively-Motivated Word Learning in Embodied Virtual Agents  
Co-PIs: Ellie Pavlick, Roman Fieinan, Stefanie Tellex, Carsten Eickhoff. \$954,509

**Brown University OVRP Research Seed Fund Award**      2019  
Building a Large Dataset of Articulated 3D Object Models  
Sole PI. \$42,500

**NSF CRII #1753684**      2018  
Learning Procedural Modeling Programs for Computer Graphics from Examples  
Sole PI. \$175,000

**AWARDS & HONORS**      Eurographics Best Paper Honorable Mention      2015  
Stanford Graduate Fellowship      2010  
UC Berkeley EECS Departmental Citation      2010  
UC Berkeley Computer Science Highest Achievement Award      2010  
CRA Outstanding Undergraduate Researcher Honorable Mention      2010  
UC Berkeley Edward Frank Kraft Scholarship      2007

**SERVICE**      **Program Committee Member / Area Chair**  
SIGGRAPH Asia: 2018, 2019  
NeurIPS: 2019  
Eurographics: 2020

**Conference Proceedings Reviewer**  
SIGGRAPH: 2016, 2017, 2018, 2019  
SIGGRAPH Asia: 2016, 2017, 2018, 2019  
CVPR: 2019, 2020  
UIST: 2016  
NeurIPS: 2016, 2018, 2019  
Eurographics: 2017, 2018, 2019  
Graphics Interface: 2019  
ICCV: 2019  
ICML: 2018  
ICLR: 2018

**Journal Reviewer**  
ACM TOG: 2019  
TVCG: 2016, 2019  
Computer Graphics Forum: 2017  
Pattern Recognition: 2019  
Computer Aided Design: 2016

**Grant Reviewer**

NSF Proposal Reviewer: 2018

**PATENTS**

**Methods and Apparatus for Comic Creation** (US 20130073952 A1)