Benjamin Tod Jones

CONTACT INFORMATION

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EDUCATION

University of Washington, Seattle, WA

PhD in Computer Science and Engineering **June 2024**

University of Washington, Seattle, WA

Masters of Computer Science and Engineering **March 2018**

Harvey Mudd College, Claremont, CA

Bachelor of Science in Computer Science and Mathematics **May 2012**

Bachelor of Science in Physics **May 2012**

TEACHING

University of Washington, Seattle, WA

Predoctoral Instructor **June 2018 - August 2018**

Instructor for CSE 373: Data Structures and Algorithms

University of Washington, Seattle, WA

Teaching Assistant **September 2015 – June 2018**

Lectured, taught sections, graded, and prepared course materials for CSE 373: Data Structures and Algorithms, CSE 421: Algorithms, and CSE 457: Computer Graphics.

The Claremont Colleges, Claremont, CA

Grader and Tutor **August 2009 – December 2011**

Graded and tutored students in computer science and mathematics courses: Graduate Analysis II (Functional Analysis), C++ and Data Structures, Real Analysis I, Introduction to Computer Science, and Real Analysis II.

PUBLICATIONS

Zhu, Amy, Mei, Yuxuan, Jones, Benjamin, Tatlock, Zachary, and Schulz, Adriana. "Computational Illusion Knitting." ACM Transactions on Graphics (TOG) 2024.

Mei, Yuxuan, Jones, Benjamin T., Cascaval, Dan, Mankoff, Jennifer, Vouga, Etienne, and Schulz, Adriana. "FabHacks: Transform Everyday Objects into Home Hacks Leveraging a Solver-aided DSL." ACM Symposium on Computational Fabrication (SCF), 2024.

Jones, Benjamin, Kodnongbua, Milin, Ahmad, Maaz, Kim, Vladimir G., and Schulz, Adriana. "Zero-shot CAD Program Re-Parameterization for Interactive Manipulation." Proceedings of ACM SIGGRAPH Asia, 2023.

Jones, Benjamin, Noeckel, James, Kodnongbua, Milin, Baran, Ilya, and Schulz, Adriana. "B-rep Matching for Collaboration Across CAD Systems." ACM Transactions on Graphics (TOG), 2023.

Jones, Benjamin T., Hu, Michael, Kim, Vladimir G., and Schulz, Adriana. "Self-Supervised Representation Learning for CAD," IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023.

Mei, Yuxuan, Cascaval, Dan, Jones, Benjamin T., Vouga, Etienne, and Schulz, Adriana. "FabHacks: A Domain-specific Language for Functional Fixtures Using Everyday Objects," Proceedings of the 7th Annual ACM Symposium on Computational Fabrication (SCF), 2022.

Noeckel, James, Jones, Benjamin T., Willis, Karl, Curless, Brian, and Schulz, Adriana. "Mates2Motion: Learning How Mechanical CAD Assemblies Work," ICML 2022 Workshop on Machine Learning in Computational Fabrication, 2022.

Jones, Benjamin T., Hildreth, Dalton, Chen, Duowen, Baran, Ilya, Kim, Vladimir G., and Schulz, Adriana. "AutoMate: A Dataset and Learning Approach for Automatic Mating of CAD Assemblies," ACM Transactions on Graphics (TOG), 2021.

Jones, Benjamin T., Mei, Yuxuan, Gotfrid, Taylor, Zhao, Haisen, Mankof, Jennifer, and Schulz,

Adriana. "Computation Design of Knit Templates," ACM Transactions on Graphics (TOG), 2021.

Jones, Benjamin T. "Human-AI Interaction in Symbolic Problem Solving." *Visual Languages and Human-Centric Computing (VL/HCC)*, 2018 IEEE Symposium on. IEEE, 2018.

Jones, Benjamin T., and Tanimoto, Steven L. "Searching Over Search Trees for Human-AI Collaboration in Exploratory Problem Solving: A Case Study in Algebra." *Visual Languages and Human-Centric Computing (VL/HCC)*, 2018 IEEE Symposium on. IEEE, 2018.

B. Jones, A. Adams, A. Nguyen, J.-M. Chang, L. Vese. "Placenta imaging classification: at risk detector (PICARD)," *Technical report*, UCLA Applied Mathematics Summer REU, 2010.

ACM UIST Student Innovation Contest

2nd Place Most Creative **October 2011**

Created software for the Microsoft TouchMouse which allows the mouse to be used as a tilt sensor when turned upside down.

1st Place Most Useful **October 2009**

Created a predictive typing program for a prototype pressure sensitive keyboard which allows users with limited dexterity to type by mashing the keyboard in the general area of the letters they wish to use.

Professional Experience

Adobe, Seattle, WA

Research Intern **June 2023 – December 2023**

Developed a novel CAD programming language for use by large language models in CAD synthesis.

Adobe, San Jose, CA

Research Intern **June 2021 – September 2021**

Developed mathematical machinery to apply gradient descent across changes of parametric domains for use in shape optimization.

PTC, Boston, MA

Research Intern at Onshape **June 2020 – February 2021**

Developed a machine learning tool for assembling parametric CAD models using a graph convolutional network for representation learning of BREP models.

University of Washington, Seattle, WA

Research Assistant in Computational Fabrication **January 2018 – Present**

Conducting research on computational design tools for fabrication, with a focus on design space exploration and optimization, advised by Adriana Schulz.

Amazon, Seattle, WA

Research Intern in Core Machine Learning **June 2016 – December 2016**

Developed graph partitioning algorithms used in solving record matching problems. Built record matching machine learning pipelines using Apache Spark and Scala. Developed a Spark GraphX graph visualization plug-in for Apache Zeppelin using D3.

University of Washington, Seattle, WA

Research Assistant in Mobile Systems **September 2015 – March 2016**

Performed research on applications of mobile-phone based ultrasonic sonar, advised by Shyam Gollakota.

California Institute of Technology Biophotonics Laboratory, Pasadena, CA

Visiting Researcher **October 2014 – May 2015**

Worked to extend Fourier Ptychographic Microscopy (FPM) and automated aberration correction to electron microscopy.

Quantcast, San Francisco, CA

Software Engineer in Product Labs and Inference **July 2012 – March 2014**

Created Machine learning models to infer the demographics of mobile device users.
Developed a web application for cohort analysis using the Play Framework and Apace Cassandra. Modified Cassandra to support co-processor filter predicates. Designed and prototyped new products and features including visualizations, uniques counting, and an interactive querying tool built on Apache Cassandra and Spark.

Microsoft, Bellevue, WA

Software Development Intern in AdCenter **May 2011 – August 2011**

Software development intern in Microsoft's AdCenter delivery engine. Wrote map-reduce code for data mining and developed a prototype website for a new feature in AdCenter using ASP.NET.

UCLA Department of Applied Mathematics, Los Angeles, CA

Student Researcher **June 2010 – August 2010**

Developed image processing techniques for classifying placental images in order to predict future health risks and start preventative treatments.

Project Experience

Restoring Balance in Protein-protein Interaction Datasets **April 2021 – June 2021**
Discovered a systemic imbalance in datasets commonly used to train protein-protein interaction predictors that significantly degrades performance on unseen proteins. Designed a alternative balancing scheme during training that improves ROC AUC on unseen proteins from 0.53 to 0.63.

Draw Me a Print **November 2017 – December 2017**
Built a system which tracks a 3d printing pen through space using a single commercial depth camera (Microsoft Kinect v2) and reconstructs a 3d printable surface based on the pen's traces. Camera audio is used to determine the extrusion state of the pen.

Impact of Interactive Documents on Learning **March 2017 – June 2017**
Designed and executed a pilot study to determine the effects of varying levels of interactivity embedded into documents on the reader's understanding of the document's content.

Cecelia **April 2016 – June 2016**
Built a web-based graphical frontend for GDB that can apply custom graphical properties to data structures, allowing them to be visualized as they would usually be drawn (e.g red-black trees). The front-end was created using D3 and WebCoLa, the backend GDB integration was built in node.js.

PeaCrow **May 2016 – June 2016**
Modified the PeaCoq proof assistant to automatically find completions of proof subgoals and offer them as auto-complete suggestions without impeding the user's natural workflow.

Inverse Kinematics of the Human Hand using Sparse Data **December 2015**
Created an inverse kinematic solver capable of determining the entire configuration of a human hand in real time using only five spatial markers. The hand was rendered in Unity and displayed on an Oculus Rift.

Harvey Mudd College Clinic

Artemis Innovation Management LLC **August 2011 – May 2012**

Currently designing, building, and testing a microwave wireless power transmission system for space-based solar power.

Technical Skills

Computational Optics, Apache Cassandra, Apache Spark, Map Reduce, Data Mining, Image Processing, Classification, Experimental Methods, Mathematical Analysis

Programming

C, C++, C#, Java, Scala, Python, Mathematica, Matlab, Haskell, Prolog, Scheme, LaTeX.

Honors, Awards and Leadership

Wissner-Slivka Endowed Graduate Fellowship in Computer Science and Engineering, 2015-2016
Dean's List, Harvey Mudd College, 2009-2011
National Merit Scholar, 2008
Harvey S. Mudd Merit Award, 2008-2012
Frank W. Anderson Scholarship Award, 2008
Robert C. Byrd Scholar, 2008-2012
Valedictorian, Woodinville High School, 2008
Sontag Dorm President, 2010 - 2011
Eagle Scout, Boy Scouts of America, 2007