Dr. Katherine L. Bouman

Katherine (Katie) L. Bouman is currently a postdoctoral fellow at the Center for Astrophysics | Harvard & Smithsonian. In June 2019 she will be starting as an assistant professor in the Computing and Mathematical Sciences Department at the California Institute of Technology. Her research focus is on using emerging computational methods to push the boundaries of interdisciplinary imaging.

Bouman's primary interests are in computational imaging, computer vision, and computational photography. By collaboratively designing systems that tightly integrate novel sensor and algorithm design, her goal is to develop a new generation of computational cameras that exceed limitations of traditional theory and allow us to observe things previously considered impossible to see and/or measure. As a member of the Event Horizon Telescope (EHT) Collaboration, she has worked on developing innovative ways to combine techniques from both astronomy and computer science to produce the first picture of a black hole using data from the EHT, as well as verify the recovered image structure. She has served as one of the leaders of the imaging team for the Event Horizon Telescope project. She is currently co-leading a study on the future of black hole science and expansions of the EHT project through the Keck Institute for Space Science (KISS). More generally, her work combines ideas from physics, signal processing, and machine learning to find and exploit hidden signals for both scientific discovery and technological innovation. In addition to astronomy, she has worked on computational imaging in a number of domains, including estimating material parameters from imperceptible motions in videos, improving medical imaging analysis, and seeing around corners. She also enjoys connecting her work to industry, having done internships previously at Qualcomm, Lincoln Laboratory, and Microsoft Research.

Bouman received her B.S.E. from The University of Michigan in Ann Arbor in 2011 in electrical engineering. During her time at the University of Michigan, she received the William Harvey Seeley Prize, presented to a student who stands first in the class of electrical engineering in their first year. She also received a Barry M. Goldwater Scholarship for research she had done in low-complexity image processing for sign identification on mobile platforms. Following her B.S.E, she attended graduate school at the Massachusetts Institute of Technology (MIT) in 2011 where she studied electrical engineering and computer science. In particular, she worked in a group that focused on computer vision research in the Computer Science and Artificial Intelligence Laboratory (CSAIL). She was awarded a NSF Graduate Fellowship and an Irwin and Joan Jacobs Presidential Fellowship during her graduate studies. She received her M.S. in 2013, and was awarded the Ernst A. Guillemin Thesis Prize for her master's thesis: "Estimating the Material Properties of Fabric Through the Observation of Motion." She received her Ph.D. in 2017 for her thesis: "Extreme Imaging via Physical Model Inversion: Seeing Around Corners and Imaging Black Holes."

Bouman serves on the IEEE Signal Processing Technical Committee on Computational Imaging, is a co-organizer for the Computational Cameras and Displays (CCD) workshop at CVPR, serves on the Center for Autonomous Systems and Technologies (CAST) advisory board at Caltech, is an area chair for the International Conference on Image Processing (ICIP), and has been awarded outstanding reviewer awards for peer reviews done in CVPR and ECCV. Bouman has participated in numerous outreach events to get youth interested in science and engineering. For example, she has spoken at local high schools and has given talks at local public events, such as TED and the Boston Museum of Science. Her a TED talk on "How to Take a Picture of a Black Hole" has received over 5.1 million views. Through these activities she has been able to share her own excitement in her work and excite a diverse body of students about careers in science, technology, and engineering.