

S. SANDRA BAE

ATLAS Institute
1125 18th ST. 320 UCB
Boulder, CO 80309-0320

sandra.bae@colorado.edu
sandrabaegithub.io

EDUCATION

- 2020 - 2024 **University of Colorado, Boulder**
Ph.D. in Creative Technology & Design
Advisor: Ellen Do & Danielle Szafir | ACME Lab & VisuaLab
- 2018 - 2020 **University of California, Davis**
M.S. in Computer Science
Thesis: A Visual Analytics Approach to Debugging Cooperative, Multi-Robot Systems' Worldviews
Advisor: Kwan-Liu Ma | ViDi Lab
- 2014 - 2018 **University of California, Davis**
B.A. in Human-Computer Interaction
Minor in Education

RESEARCH INTEREST

My research interests lie in the intersection where computers meet the physical world, spanning across human-computer interaction (HCI), tangible user interfaces (TUIs), data visualization, and material science. My goal is to explore how tangible interactions can help people understand complex ideas when analyzing data in its physical form.

Keywords: Human-Computer Interaction, Data Visualization, Tangible Interactions, Material Science

RESEARCH EXPERIENCE

- FALL 2020 - PRESENT **University of Colorado, Boulder | Boulder, CO**
Graduate Research Assistant & Teaching Assistant
Research with Danielle Szafir and Ellen Do.
Teaching assistant for Daniel Leithinger in ATLAS.
- SUMMER 2020 **Stanford University | Palo Alto, CA (Remote)**
HCI Research Intern
Research with James Landay and Elizabeth Murnane.
Identifying and building family-centered, in-car technology to support collaborative learning.
- SUMMER 2019 - SUMMER 2020 **NASA Jet Propulsion Lab | Pasadena, CA**
University Researcher
Research with Federico Rossi, Scott Davidoff, and Joshua Vander Hook.
Working as a NASA JPL Master's Thesis Fellow to expand Summer 2019's project with further iterations and design considerations.
- SUMMER 2019 **NASA Jet Propulsion Lab | Pasadena, CA**
Data Visualization / HCI Research Intern
Research with Hillary Mushkin, Santiago Lambledya, Maggie Hendrie, Scott Davidoff.
Identified JPL roboticists' visualization needs and implemented a system determined by design iterations.
- SUMMER 2019 - SPRING 2020 **University of California, Davis | Davis, CA**
Undergraduate / Graduate Student Research Assistant & Teaching Assistant
Research with Kwan-Liu Ma.

Teaching assistant for Kwan-Liu Ma, Hao-Chuan Wang, and Nina Amenta in Computer Science.

REFEREED PUBLICATIONS

- JOURNAL ARTICLES R. Woollands, F. Rossi, T. S. Vaquero, M. S. Net, S. S. Bae, V. Bickel, and J. V. Hook. “Maximizing Dust Devil Follow-Up Observations on Mars Using Cubesats and On-board Scheduling”. In: *Journal of Astronautical Sciences* (2022).
- CONFERENCE ARTICLES S. S. Bae, C. Zheng, M. E. West, E. Do, S. Huron, and D. Szafir. “Making Data Tangible: A Cross-disciplinary Design Space for Data Physicalization”. In: *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*. New Orleans, Louisiana, 2022.
- S. S. Bae, F. Rossi, J. V. Hook, S. Davidoff, and K.-L. Ma. “A Visual Analytics Approach to Debugging Cooperative, Autonomous Multi-Robot Systems’ Worldviews”. In: *Proceedings of the IEEE Visual Analytics Science and Technology (VAST) 2020*. Salt Lake City, Utah (Virtual), 2020.
- S. S. Bae*, O.-H. Kwon*, S. Chandrasegaran, and K.-L. Ma. “Spinneret: Aiding Creative Ideation through Non-Obvious Concept Associations”. In: *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. Honolulu, Hawaii (Virtual), 2020, 1–13 (*equally contributed).
- POSTERS & DEMOS S. S. Bae* and M. E. West*. “Cyborg Crafts: Second SKIN (Soft Keen INteraction)”. In: *Proceedings of the Fifteenth International Conference on Tangible, Embedded, and Embodied Interaction (TEI ’21)*. Salzburg, Austria (Virtual): Association for Computing Machinery, 2021 (*equally contributed).
- S. S. Bae, R. Yang, P. Gyory, J. Uhr, D. A. Szafir, and E. Y.-L. Do. “Touching Information with DIY Paper Charts & AR Markers”. In: *Interaction Design and Children*. IDC ’21. Athens, Greece (Virtual): Association for Computing Machinery, 2021.
- TECH REPORTS R. Woollands, F. Rossi, T. S. Vaquero, M. S. Net, S. S. Bae, V. Bickel, and J. V. Hook. “Maximizing Dust Devil Follow-Up Observations on Mars Using Cubesats and On-board Scheduling”. In: *Proceedings of the 43rd Annual AAS Guidance & Control Conference*, Breckenridge, CO. 2021.

BOOK CHAPTERS

T. Hopkins, S. S. Bae, J. Uhr, C. Zheng, A. Bani, and E. Y.-L. Do. “User Interfaces in Smart Cities”. In: *Handbook of Smart Cities*. Ed. by J. C. Augusto. Springer International Publishing, 2021.

AWARDS AND DISTINCTION

- 2021 CU Boulder Travel Grant (\$500)
- 2021 Achievement Reward for College Scientists (\$6,500)
- 2021 Korean American Scholarship Foundation (\$2,000)
- 2021 Honorable Mention, IEEE World Haptics Student Design Competition
- 2021 CRA-WP Grad Cohort for Women
- 2021 Ada Lovelace Fellow, Open Hardware Summit
- 2021 Craft Award, ACM TEI Student Design Competition.
- 2019 - 2020 Richard C. and Joy Dorf Engineering Graduate Fellowship (\$1,000)
- 2019 - 2020 NASA JPL Master’s Thesis Educational Fellow (\$30,000)
- 2018 - 2019 NSF’s Preparing Engineering Graduate Students for the 21st Century Fellow (\$10,000).

- 2018 Honorable Mention Visual Storytelling Award, IEEE Pacific Visualization Symposium.
- 2017 Beneath (CONNECT EXPO 2017) - Judge's Honorable Mention.
- 2017 UC Davis Organizational Research Expo.
- 2017 Better Together - AIGA and IDSA.
- 2014 - 2015 Dean's Honor: Fall 2014 (College of Engineering), Spring 2015 (College of Letters and Science).

FUNDING

CONTRIBUTED TO FUNDED GRANTS EAGER: Home-Based DIY Interactive Information Physicalization for Young Children and their Parents
Amount: \$300,000
Agency: National Science Foundation
Principal Investigator: Ellen Do, CU Boulder
Co-Principal Investigator: Danielle Albers Szafir, CU Boulder
Duration: Oct 2020 - Sep 2022

TALKS

- INVITED GUEST LECTURER **The Value of Design: Empowering Humans through Human-Centered Thinking**
 CU Boulder Information Visualization Class, Boulder, CO, 18 March 2021 (hosted by Danielle Szafir).
- The Value of Design: Empowering Humans through Human-Centered Thinking**
 UC Davis Android Development Class, Davis, CA, 14 January 2021 (hosted by Nina Amenta).
- INVITED TALKS **Debugging Multi-Robot Autonomous System Anomalies**
 CU Boulder ATLAS Seminar, Boulder, CO, 6 October 2020 (hosted by Ellen Do).
- Debugging Multi-Robot Autonomous System Anomalies**
 NASA-JPL, Pasadena, CA, 27 August 2020 (hosted by Scott Davidoff).

DESIGN EXHIBITIONS

- 2019 **Sit On Data** | Imagining America's 20th Anniversary National Gathering
 A data-driven parametric-bench where users can feel the data by sitting. Developing using Python, CNC routing, Laser cutting.
- 2017 **BENEATH** | SOFA Chicago 2017
 An immersive installation conveying California's land subsidence. Presented at SOFA Chicago 2017. Built motion graphics and projection using Processing.
- 2017 **OneClimate: Prototyping Climate Change** | Exploratorium Museum (SF)
 A multisensory exhibition conveying the impact of climate change sponsored by the John Muir Institute of the Environment. Featured at the Exploratorium in San Francisco for the OneClimate event, AIGA & ISAD - San Francisco, and IA's 2017 National Gathering. Designed the scientific narrative and constructed the exhibit using woodshop skills.

TEACHING AND MENTORING

Teaching Assistant

- SPRING 2021 **ATLS3300: Object**
 Instructor: Daniel Leithinger
 ATLAS Institute, University of Colorado Boulder.
- SPRING 2020 **ECS162: Web Programming**
 Instructor: Nina Amenta
 Department of Computer Science, University of California, Davis.

WINTER 2019, 2020 **ECS164: Intro To Human-Computer Interaction**
Instructor: Hao-Chuan Wang
Department of Computer Science, University of California, Davis.

SUMMER 2018 **ECS163: Information Visualization**
Instructor: Kwan-Liu Ma
Department of Computer Science, University of California, Davis.

Mentoring

- 2021 **Claire O’Grady**
Undergraduate student in Creative Technology and Design
CU Boulder
Project: Senior Capstone Project (EAGER project)
- 2021 **Skyler Hoeger**
Undergraduate student in Creative Technology and Design
CU Boulder
Project: Senior Capstone Project (EAGER project)
- 2021 **Katie Rudoff**
Undergraduate student in Creative Technology and Design
CU Boulder
Project: Senior Capstone Project (EAGER project)
- 2020 **Vy Thai**
Undergraduate student in Computer Science
Stanford University
Project: Design probes for family-centered, in-car technology
- 2019 **Ashleigh Thompson**
Master student in Computer Science
University of California, Davis (Now Microsoft)
- 2019 **Lovpret Kaur**
Undergraduate student in Computer Science
University of California, Davis (Now Intel)

ACADEMIC SERVICE

- 2021 **Program Committee**
ACM Creativity & Cognition 2021
- 2021- PRESENT **Academic Paper Reviewer**
ACM UIST 2021
ACM DIS 2021
ACM CHI 2021
EG/VGTC EuroVis 2022
- 2021- PRESENT **Institutional Service**
Ph.D. Open House Organizer, ATLAS Institute, CU Boulder
Faculty Candidate Student Host, ATLAS Institute, CU Boulder
Ph.D. Graduate Application Support Program Founder, ATLAS Institute, CU Boulder
- 2016-2018 **Tutoring**
Coding tutor, Women’s Resources and Research Center UC Davis, UC Davis

SELECTED MEDIA COVERAGE

- 2021 **CU Boulder** | Sandra Bae receives ARCS and KASF scholarship
<https://www.colorado.edu/atlas/2021/09/08/sandra-bae-receives-arcs-and-kasf-scholarships>

- 2017 **CONNECT EXPO | SOFA CHICAGO 2017** Exhibition
Printing Press: Chubb (pg. 10-11).
- 2017 **AIGA and IDSA | Better Together Design** Exhibition
Printing Press: AIGA (pg. 8-9).
- 2017 **UC Davis | 'OneClimate' a Call to Arms**
<https://www.ucdavis.edu/news/oneclimate-call-arms>