# Ananya Nandy

Ph.D. Candidate @ UC Berkeley · Decision Making, Human-Centered Computing, & Design

✉ nandy.ananya@gmail.com    🌐 https://ananyan.github.io/    🎓 google scholar

Quantitative researcher passionate about using emerging technologies to enhance decision making in challenging sociotechnical domains. Leveraging expertise in engineering, product design, and design cognition, I excel at prototyping user interfaces that leverage new technologies and conducting behavioral experiments to guide the development of useful and usable interactive systems.

## Experience

**Toyota Research Institute – Human-Centered AI Research Intern**                          May 2023 – Aug 2023
*Future Product Innovation Group - Advised by Shabnam Hakimi and Matthew Klenk*                Los Altos, CA

- Conceptualized and led project to analyze human multi-modal translation (text and 3D) to provide insights into how text-input generative AI models can support design innovation
- Built interface to deploy study to 500 online participants and log outcomes, actions, and perceptions
- Leveraged vision and language transformer models in Python to analyze image and semantic data generated through study
- Developed statistical models in R to analyze experimental manipulations and outcomes, providing actionable insights for AI-driven design support, communicated through conference publication

**UC Berkeley – Graduate Researcher**                                                Aug 2019 – Present
*Cognition and Computation in Design (Co-Design) Lab - Advised by Kosa Goucher-Lambert*              Berkeley, CA

- Led comprehensive quantitative analyses of design decision-making processes using a variety of modalities (text, images, and 3D models) to improve human-machine alignment for design support tools.
- Communicated research findings through 6 conference paper presentations, 4 journal articles, and 2 workshop papers, effectively communicating concepts to multidisciplinary audiences and resulting in a best paper award and best paper nomination

***AI-Assisted Decision Making for Design Tasks***

- Designed and executed a behavioral experiment to explore AI-assisted decision making in multi-objective scenarios, analyzing data using generalized linear mixed models in R
- Created a Unity-based web application to enable 3D visualization and data collection from online participants
- Developed and evaluated real-time human-in-the-loop Bayesian optimization models to efficiently and accurately express subjective qualities in 3D designs
- Programmed custom web application with dynamic 3D rendering to deploy models (using Python, Flask, HTML/CSS/JavaScript, and Bayesian optimization in PyTorch) and conducted online user study to investigate perceptions of optimization process and outcomes
- Presented findings through 2 publications at HCAI and design venues, earning a best paper award

***Spatial Interactions in VR for Design Space Exploration - Collaboration with Berkeley HCI (Advised by Björn Hartmann)***

- Co-developed novel gesture and action-based interactions using Unity and Meta Quest 2 to facilitate intuitive, non-semantic searches across thousands of design alternatives (generated with Rhino3D/Grasshopper software)
- Designed and conducted user study in 3D and VR environments to evaluate interaction usability, analyzing sequential actions and self-reported quantitative data to derive recommendations for system development
- Communicated research outcomes through 2 publications and presentations at prominent HCI and design conferences

## Education

**University of California, Berkeley**                                                    Exp. Aug 2024
*Ph.D. Mechanical Engineering (Minor in Human-Computer Interaction)*
Thesis: Human-Machine Alignment for Early-Stage Design

**Massachusetts Institute of Technology (MIT)**                                                Jun 2019
*B.S. Mechanical Engineering*

## Skills

**Research Methods**: Experimental Design, Interface Development, Statistical Data Analysis, Computational Modeling

**Programming Languages**: Python (Fluent), R (Proficient), HTML/CSS/Javascript (Proficient), C# (Proficient for use with Unity & Rhino/Grasshopper), MATLAB (Familiar)

**Tools, Packages, & Software**: Unity, Flask, Python Data Science Stack (pandas, numpy, scipy, scikit-learn), Bayesian optimization in PyTorch, CAD (Autodesk Fusion 360, SolidWorks, OpenSCAD/JSCAD)

**Relevant Coursework**: Principles and Techniques of Data Science, User Interface Design, Immersive Computing & Virtual Reality, Designing for Emerging Technologies, Bayesian Models of Cognition, Algorithmic Human-Robot Interaction

## Leadership, Teaching, & Mentorship

**Graduate Women in Engineering Board – New Student Committee Chair**  Aug 2023 – Present
Leading a committee to organize outreach, professional development, and mentorship for first-years

**UC Berkeley Master of Engineering Capstone Mentor**  Sept 2023 – May 2024
Trust Measurement for Human-Machine Interaction (A. Baradaran, R. Oberoi, V. Kansal)

**Human-Centered Design Methods – Graduate Student Instructor (GSI)**  Fall 2020, 2022, 2023
Mentored over 50 teams through design process 🏆 **2020 Outstanding GSI Award**

**UC Berkeley Engineering Design Scholar Program Mentor**  Summer 2020, 2021, 2023
Mentored 3 undergraduate students through summer research projects

## Selected Publications

**Peer-Reviewed Journal Articles**

4. Computationally adapting designs to align with semantic attributes: understanding how an interactive optimization method influences outcomes and human perceptions
   **Ananya Nandy**, Kosa Goucher-Lambert. *Journal of Computing and Information Science in Engineering. Under Review.*

3. Adopting "Blackbox" Design Advice: The Influence of Imperfect Suggestions during AI-Assisted Decision Making
   **Ananya Nandy**, David Antonio Herrera, Kosa Goucher-Lambert. *Design Science. Under Review.*

2. Do Human and Computational Evaluations of Similarity Align? An Empirical Study of Product Function
   **Ananya Nandy**, Kosa Goucher-Lambert. *Journal of Mechanical Design. April 2022.*

1. Evaluating Quantitative Measures for Assessing Functional Similarity in Engineering Design
   **Ananya Nandy**, Andy Dong, Kosa Goucher-Lambert. *Journal of Mechanical Design. March 2022.* ⭐ **Featured Article**

**Peer-Reviewed Conference Proceedings (3 of 6)**

3. Semantic properties of word prompts shape design outcomes: understanding the influence of semantic richness and similarity
   **Ananya Nandy**, Monica Van, Jonathan Li, Kosa Goucher-Lambert, Matthew Klenk, Shabnam Hakimi
   *Design Computing and Cognition (DCC'24). Accepted.*

2. VR or Not? Investigating Interface Type and User Strategies for Interactive Design Space Exploration
   **Ananya Nandy**, James Smith, Nicholas Jennings, Michael Kuniavsky, Björn Hartmann, Kosa Goucher-Lambert
   *International Conference on Engineering Design (ICED'23). July 2023.*

1. How does machine advice influence design choice? The effect of error on design decision making
   **Ananya Nandy**, Kosa Goucher-Lambert
   *Design Computing and Cognition (DCC'22). July 2022.* 🏆 **Best Paper in Design Cognition/Neurocognition**

**Extended Abstract & Workshop Papers**

2. GeneratiVR: Spatial Interactions in Virtual Reality to Explore Generative Design Spaces
   Nicholas Jennings, **Ananya Nandy**, Xinyi Zhu, Yuting Wang, Fanping Sui, James Smith, Björn Hartmann
   *ACM Conference on Human Factors in Computing Systems Extended Abstracts (CHI '22 LBW). May 2022.*

1. Considerations for Collaborative Human-AI Decision-Making in Engineering Design
   **Ananya Nandy**, Kosa Goucher-Lambert
   *NeurIPS 2021 Workshop on Human Centered AI. December 2021.*