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 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 from 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 complex 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)

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

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
Committee: Kosa Goucher-Lambert (advisor), Björn Hartmann, Hannah Stuart

University of California, Berkeley Dec 2022
M.S. Mechanical Engineering

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. **Ananya Nandy** & Kosa Goucher-Lambert. Under Review. Computationally adapting designs to align with semantic attributes: understanding how an interactive optimization method influences outcomes and human perceptions. *Journal of Computing and Information Science in Engineering*.
3. **Ananya Nandy**, David Antonio Herrera & Kosa Goucher-Lambert. Under Review. Adopting "Blackbox" Design Advice: The Influence of Imperfect Suggestions during AI-Assisted Decision Making. *Design Science*.
2. **Ananya Nandy** & Kosa Goucher-Lambert. 2022. Do Human and Computational Evaluations of Similarity Align? An Empirical Study of Product Function. *Journal of Mechanical Design*.
1. **Ananya Nandy**, Andy Dong & Kosa Goucher-Lambert. 2022. Evaluating Quantitative Measures for Assessing Functional Similarity in Engineering Design. *Journal of Mechanical Design*. ⭐ **Featured Article**

Peer-Reviewed Conference Proceedings (3 of 6)

3. **Ananya Nandy**, Monica Van, Jonathan Li, Kosa Goucher-Lambert, Matthew Klenk & Shabnam Hakimi. 2024. Semantic properties of word prompts shape design outcomes: understanding the influence of semantic richness and similarity. *Design Computing and Cognition*.
2. **Ananya Nandy**, James Smith, Nicholas Jennings, Michael Kuniavsky, Björn Hartmann & Kosa Goucher-Lambert. 2023. VR or Not? Investigating Interface Type and User Strategies for Interactive Design Space Exploration. *International Conference on Engineering Design*.
1. **Ananya Nandy** & Kosa Goucher-Lambert. 2022. How does machine advice influence design choice? The effect of error on design decision making. *Design Computing and Cognition*. 🏆 **Best Paper in Design Cognition/Neurocognition**

Extended Abstract & Workshop Papers

2. Nicholas Jennings, **Ananya Nandy**, Xinyi Zhu, Yuting Wang, Fanping Sui, James Smith & Björn Hartmann. 2022. GeneratiVR: Spatial Interactions in Virtual Reality to Explore Generative Design Spaces. *ACM Conference on Human Factors in Computing Systems Extended Abstracts*.
1. **Ananya Nandy** & Kosa Goucher-Lambert. 2021. Considerations for Collaborative Human-AI Decision-Making in Engineering Design. *NeurIPS 2021 Workshop on Human Centered AI*.