



Ananya Nandy

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

 <https://ananyan.github.io/>  [google scholar](#)

Education

Ph.D., Mechanical Engineering

Exp. Aug 2024

University of California, Berkeley

Dissertation: Human-Machine Alignment for Early-Stage Design

Committee: Kosa Goucher-Lambert, Björn Hartmann, Hannah Stuart

Minors: Human-Computer Interaction and Computational Modeling of Cognition

M.S., Mechanical Engineering

Dec 2022

University of California, Berkeley

B.S., Mechanical Engineering

Jun 2019

Massachusetts Institute of Technology (MIT)

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-led multi-modal translation (from abstract words to 3D) to provide insights into how text-input generative AI models can support design innovation
- Developed 3D interface (using Unity) to log sequential task actions and survey to capture self-reported information
- Deployed interface as web app to conduct online study with over 500 participants
- Analyzed quantitative data (input experimental manipulations and outcome states) using statistical modeling
- Used machine learning techniques in Python for data processing and classification (analyzing image and text)
- Collaborated with Toyota stakeholders and worked within team of researchers and software engineers

UC Berkeley – Graduate Researcher

Aug 2019 – Present

Cognition and Computation in Design (Co-Design) Lab - Advised by Kosa Goucher-Lambert

Berkeley, CA

- Led quantitative analyses of decision-making to improve human-machine alignment for engineering design tools
- Developed and deployed multiple user interfaces (web-based and virtual reality) to collect behavioral data
- Worked within multi-disciplinary teams including engineers, computer scientists, and cognitive scientists
- Disseminated findings through 6 conference paper presentations, 4 journal articles, and 2 workshop papers, communicating to multidisciplinary audiences and resulting in a best paper award and a best paper nomination

AI-Assisted Decision Making

- Conceptualized and implemented experimental study on the impact of AI-assisted decision making in technical, multi-objective contexts
- Developed user interface (using Unity and deployed as a web app) to collect behavioral and self-reported measures

Human-Machine Alignment

- Applied network modeling to quantify similarity for complex engineering systems and developed low-dimensional embeddings from large-scale survey data to compare human vs. machine similarity representations
- Developed real-time human-in-the-loop models (using Bayesian optimization in PyTorch) to enable personalized optimization during ergonomic design
- Developed web-based interface (using Flask, HTML, CSS, and JavaScript with a Python-language backend) to deploy models in an online study, resulting in personalized outcomes

Spatial Interactions in VR for Design Space Exploration - 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 alternatives
- Designed and conducted a user study in 3D and VR environments
- Analyzed sequential actions and quantitative survey data to develop guidelines for interaction design

MIT Media Lab – Undergraduate Researcher

Sept 2018 – May 2019

Responsive Environments Group

Cambridge, MA

- Manufactured novel electro-mechanically robust connector systems to attach stretchable electronic sensor modules
- Characterized resistance and strain to failure of connected modules during tensile testing

Skills

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

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

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

Prototyping & Fabrication: 3D Printing, Laser Cutter, Machining, Basic Electronics/Arduino/Raspberry Pi

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

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. Submitted. Adopting “blackbox” engineering advice: the influence of imperfect suggestions during AI-assisted decision making with multiple objectives. *Computers in Human Behavior*.
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

6. **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*.
5. **Ananya Nandy** & Kosa Goucher-Lambert. 2023. Adaptive Optimization of Subjective Design Attributes: Characterizing Individual and Aggregate Perceptions. *ASME International Design Engineering Technical Conferences*.
4. **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*.
3. **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**
2. **Ananya Nandy** & Kosa Goucher-Lambert. 2021. Aligning Human and Computational Evaluations of Functional Design Similarity. *ASME International Design Engineering Technical Conferences*. ★ **Nominated for Best Design Theory & Methodology Paper**
1. **Ananya Nandy**, Andy Dong & Kosa Goucher-Lambert. 2020. A Comparison of Vector and Network-Based Measures for Assessing Design Similarity. *ASME International Design Engineering Technical Conferences*.

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*.

Awards & Honors

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|---|--------------------------|
| Mechanical Engineering Department Summer Fellowship (UC Berkeley) | Summer 2024 |
| David A. Dornfeld Graduate Fellowship (UC Berkeley) | Spring 2024 |
| Graduate Division Block Grant Award (UC Berkeley) | Summer 2022, Spring 2023 |
| Best Design Cognition/Neurocognition Paper Prize (DCC'22 Conference) | Summer 2022 |
| Conference Travel Grant (UC Berkeley) | Summer 2022, Summer 2023 |
| Outstanding Graduate Student Instructor Award (UC Berkeley) | Fall 2020 |
| Mechanical Engineering Department First Year Fellowship (UC Berkeley) | Fall 2019 - Summer 2020 |
| Tau Beta Pi & Pi Tau Sigma Honor Society (MIT) | Spring 2019 |

Teaching

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| Human-Centered Design Methods | Fall 2020, 2022, 2023 |
| <i>Graduate Student Instructor</i> | UC Berkeley |
| <ul style="list-style-type: none">Mentored over 50 graduate-level project teams through human-centered design process (user research, concept generation & selection, prototyping)Received Outstanding Graduate Student Instructor Award for Fall 2020 🏆 | |
| Design Methodology | Spring 2022 |
| <i>Graduate Student Instructor</i> | UC Berkeley |
| <ul style="list-style-type: none">Mentored 14 undergraduate-level project teams in introduction to human-centered designGave guest lecture on concept exploration and prototyping | |
| Prototyping and Fabrication | Summer 2021 |
| <i>Graduate Student Instructor</i> | UC Berkeley |
| <ul style="list-style-type: none">Assisted students (UC Berkeley and non-UC Berkeley) from interdisciplinary backgrounds complete projects for remote prototyping class. | |
| Remote Instruction of Design Skills and Methodologies | Summer 2020 |
| <i>Graduate Student Instructor</i> | UC Berkeley |
| <ul style="list-style-type: none">Developed resources for Jacobs Institute of Design Innovation to ensure equity in remote instruction of design classes | |
| Design and Manufacturing II | Spring 2019 |
| <i>Lab Assistant</i> | MIT |
| <ul style="list-style-type: none">Assisted teams on mold design and manufacturing using CAD/CAM during lab sections | |

Service & Mentorship

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| Reviewer | |
| ASME International Design Engineering Technical Conference (IDETC) | Mar 2022 - Present |
| Graduate Women in Engineering - New Student Committee | |
| <i>Chair</i> | Aug 2023 - Present |
| <ul style="list-style-type: none">Leading committee to organize orientation outreach and events for new studentsLeading buddies mentorship program for first-year women in engineering graduate students | |
| <i>Committee Member</i> | Aug 2022 - May 2023 |
| <ul style="list-style-type: none">Helped run buddies mentorship program with first-year and returning studentsOrganized professional development workshops including Grad School 101 series to support new students' transition to graduate school | |
| UC Berkeley MEng Team Capstone Mentor | |
| Arman Baradaran, Rajveer Oberoi, Varin Kansal: Trust Measurement for Human-Machine Interaction | Sept 2023 - May 2024 |
| Berkeley Engineering Design Scholar Program Mentor | |
| Antonio Herrera: Human-AI Interactions in Engineering Design | Jun 2023 - Aug 2023 |
| Resham Khanna: XR as a Design Aid | Jun 2021 - Aug 2021 |
| Amy Jiang: Encouraging Sustainable Behavior through Gaming | Jun 2020 - Aug 2020 |

Other Experience

Busch Vacuum Pumps and Systems - R&D Intern

Jun 2019 – Aug 2019

Pre-development Group

Baden-Württemberg, Germany

- Simulated acoustics of claw compressor for the development of a new pulsation dampener
- Designed and executed experiment to characterize claw compressor acoustics for validation

Sistine Solar - Product Design Intern

Jun 2018 – Aug 2018

Greentown Labs

Somerville, MA

- Developed alpha prototype for device to efficiently apply thin films with custom visuals on solar panels to enable seamless aesthetic blending into surrounding environments

Mitsubishi Electric – R&D Intern

Jun 2017 – Aug 2017

Smart Systems Group

Hyogo, Japan

- Applied machine learning methods in Python to disaggregate appliance level energy consumption data from smart meter data