Ananya Nandy

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EDUCATION

University of California, Berkeley Aug 2024
Ph.D., Mechanical Engineering (GPA: 3.97/4.0)
Focus on Design, Human-Computer Interaction, and Computational Modeling of Cognition

Massachusetts Institute of Technology (MIT) Jun 2019
B.S., Mechanical Engineering (GPA: 4.9/5.0)

EXPERIENCE

National Institute of Standards and Technology (NIST) Nov 2024 – Present
Research Engineer - Life Cycle Engineering Group *Gaithersburg, MD*

- Leading research in NIST's Circular Economy program, aiming to improve practices for circular product design
- Developing methods to enable the practical implementation of circular product design principles to the electronics sector
- Collaborating with industry and academic partners as part of primary drafting team for new ASTM standard for circular product design principles
- Defined a reference model for design within a circular economy, identifying key sources of data from other life cycle stages necessary to inform design decisions
- Published the reference model in an interactive format accessible to industry stakeholders (available at: pages.nist.gov/circular-economy-manufacturing-models) and developed an automated pipeline in Python to enable the publication of future reference models

Toyota Research Institute May 2023 – Aug 2023
Research Intern - Human-Centered AI Division *Los Altos, CA*

- Led end-to-end data collection and analysis pipeline for study on sequential design decision-making with 500 participants
- Developed interactive data logging tools to track user interactions and survey responses
- Applied pre-trained vision/language transformer models to analyze image and semantic data
- Developed statistical models (R, Python) to analyze experimental manipulations and outcomes
- Worked cross-functionally with software engineers, research scientists, and Toyota leadership to align study objectives and outcomes with innovation strategy

UC Berkeley Aug 2019 – Oct 2024
Graduate Researcher - Cognition and Computation in Design Lab *Berkeley, CA*

- Researched design decision making through quantitative behavioral methods and interactive computation
- Developed and deployed multiple 3D user interfaces (web and virtual reality) to collect empirical data
- Analyzed data using Python and R, resulting in quantitative insights for understanding and improving design process and creativity

- Collaborated within multi-disciplinary teams including engineers, computer scientists, and cognitive scientists
- Advised 4 research projects and mentored over 50 design teams comprised of undergraduate and graduate students
- Disseminated findings through 6 conference paper presentations, 3 journal articles, and 3 workshop papers, communicating to multidisciplinary audiences and resulting in 2 best paper awards

Selected Projects

AI-Assisted Design Decision Making

- Designed and executed 2 behavioral experiments with a total of 90 participants to explore AI-assisted decision making and explainable AI in the engineering design domain
- Developed and evaluated real-time human-in-the-loop preference optimization models (via a Flask web app and Bayesian optimization in PyTorch) for computational design

Spatial Interactions in VR for Design Space Exploration

- Developed novel gesture and action-based interactions using Unity and Meta Quest 2 to facilitate intuitive, non-semantic searches across thousands of design alternatives
- Designed and conducted an in-person user study with 30 participants in 3D and VR environments, analyzing sequential actions and quantitative survey data to develop guidelines for interaction design

Busch Vacuum Pumps and Systems Jun 2019 - Aug 2019
Research & Development Intern *Baden-Württemberg, Germany*

- Developed acoustic simulation of claw compressor to inform the development of a new pulsation dampener
- Designed and executed empirical experiments to characterize claw compressor acoustics

Sistine Solar Jun 2018 - Aug 2018
Product Design Intern *Somerville, MA*

- Developed size-adjustable device to efficiently apply high-tech SolarSkin films to solar panels, improving aesthetics and integration into environment
- Reduced SolarSkin application time by 10x and eliminated the need for water usage during application while maintaining accurate alignment
- Independently led project from end-to-end, working in small team in fast-paced startup environment

Mitsubishi Electric Jun 2017 - Aug 2017
Research & Development Intern - Smart Systems Group *Hyogo, Japan*

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

SKILLS

Programming: Python, R, HTML/CSS/Javascript, MATLAB

3D Software: Unity/C#, Autodesk Fusion 360, Grasshopper, Solidworks

Software Tools: Python Data Science/ML (pandas, numpy, scikit-learn, BoTorch/PyTorch, Hugging Face transformers), Flask Web Framework, Github

Quantitative Methods: Statistical Data Analysis, Computational Modeling, Interface Development, Experimental Design, Life Cycle Assessment (familiar with SimaPro)

Relevant Coursework: Data Science, User Interface Design, Algorithmic Human-Robot Interaction, Immersive Computing & Virtual Reality, Bayesian Models of Cognition

LEADERSHIP & MENTORSHIP

Graduate Women in Engineering Committee Chair Aug 2023 – Aug 2024
Led committee to organize outreach, professional development & mentorship

UC Berkeley MEng Capstone Team Mentor Sept 2023 – May 2024
Project: Trust Measurement for Human-Machine Interaction

Human-Centered Design Methods, Graduate Student Instructor Fall 2020, 2022, 2023
Advised 50+ teams through design projects 🏆 **Outstanding GSI Award**

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

PUBLICATIONS

Peer-Reviewed Journal Articles

3. **A. Nandy** et al. 2025. "Adopting "blackbox" engineering advice: the influence of imperfect suggestions during AI-assisted decision making with multiple objectives." *Artificial Intelligence for Engineering Design, Analysis and Manufacturing.*
2. **A. Nandy** & K. Goucher-Lambert. April 2022. "Do Human and Computational Evaluations of Similarity Align? An Empirical Study of Product Function." *Journal of Mechanical Design.*
1. **A. Nandy** et al. March 2022. "Evaluating Quantitative Measures for Assessing Functional Similarity in Engineering Design." *Journal of Mechanical Design.* ★ **Featured Article**

Peer-Reviewed Conference Proceedings

6. **A. Nandy** et al. 2024. "Semantic properties of word prompts shape design outcomes: understanding the influence of semantic richness and similarity." *Design Computing and Cognition.* 🏆 **Best Paper in Design Cognition**
5. **A. Nandy** & K. Goucher-Lambert. 2023. "Adaptive Optimization of Subjective Design Attributes: Characterizing Individual and Aggregate Perceptions." *ASME IDETC-CIE.*
4. **A. Nandy** et al. 2023. "VR or Not? Investigating Interface Type and User Strategies for Interactive Design Space Exploration." *International Conference on Engineering Design.*
3. **A. Nandy** & K. 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**
2. **A. Nandy** & K. Goucher-Lambert. 2021. "Aligning Human and Computational Evaluations of Functional Design Similarity." *ASME IDETC-CIE.* ★ **Nominated for Best Paper**
1. **A. Nandy** et al. 2020. "A Comparison of Vector and Network-Based Measures for Assessing Design Similarity." *ASME IDETC-CIE.*

Extended Abstract & Workshop Papers

3. **A. Nandy***, S. Hakimi* et al. 2025. "Semantic properties of abstract prompts shape sequential decision making in design." *Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM).*
2. N. Jennings, **A. Nandy** et al. 2022. "GeneratiVR: Spatial Interactions in Virtual Reality to Explore Generative Design Spaces." *ACM Conference on Human Factors in Computing Systems Extended Abstracts.*
1. **A. Nandy** & K. Goucher-Lambert. 2021. "Considerations for Collaborative Human-AI Decision-Making in Engineering Design." *NeurIPS 2021 Workshop on Human Centered AI.*