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, Engineering Lab   *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 - Future Product Innovation Group, 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.*