

# Ananya Nandy

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🌐 <https://ananyan.github.io/>

🎓 [google scholar](#)

## EDUCATION

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**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

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**National Institute of Standards and Technology (NIST)**

Nov 2024 – Present

*Research Engineer - Life Cycle Engineering Group*

*Gaithersburg, MD*

- Leading research to develop measurement methods and practical implementation of circular product design principles within the Circular Economy program (focused on the electronics industry sector)
- Collaborating with industry and academic partners in primary drafting team for new ASTM standard for circular product design principles
- Defined a comprehensive reference model for design and manufacturing within a circular economy, identifying key sources of data from other life cycle stages necessary to inform design decisions
- Developed website to publish the reference model in an interactive format accessible to industry stakeholders (available at: [pages.nist.gov/circular-economy-manufacturing-models](https://pages.nist.gov/circular-economy-manufacturing-models))
- 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 to analyze sequential design decision-making (500 study participants) to identify opportunities for AI-assisted design
- Worked cross-functionally with software engineers, research scientists, and Toyota leadership to align study objectives and outcomes with innovation strategy
- 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
- Developed quantitative sequential decision making models to identify behavior patterns
- Published 2 conference publications (received a best paper award) and filed a patent application

**University of California, Berkeley**

Aug 2019 – Oct 2024

*Graduate Researcher - Cognition and Computation in Design Lab*

*Berkeley, CA*

- Investigated design decision making through quantitative behavioral methods and interactive computation, resulting in 7 conference paper presentations (including a best paper award) and 3 journal articles to disseminate results
- Developed and deployed multiple custom 3D user interfaces (web and virtual reality) to collect empirical data

- Analyzed data using Python and R, resulting in quantitative insights to understand and improve design process and creativity
- Collaborated with engineers, designers, computer scientists, and cognitive scientists within multi-disciplinary teams
- Advised 4 research projects (independent and team) and mentored over 50 undergraduate/graduate student teams through product design projects

### Selected Projects

#### *AI-Assisted Design Decision Making*

- Designed and executed 2 online behavioral experiments (90 study 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 (30 study participants) in 3D and VR environments, analyzing sequential actions and quantitative survey data to develop guidelines for interaction design

#### **Busch Vacuum Pumps and Systems**

*Research & Development Intern*

Jun 2019 - Aug 2019

*Baden-Württemberg, Germany*

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

#### **Sistine Solar**

*Product Design Intern*

Jun 2018 - Aug 2018

*Somerville, MA*

- Developed size-adjustable device to efficiently apply high-tech SolarSkin films to solar panels, improving aesthetics and integration into physical 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 in a fast-paced startup context

#### **Mitsubishi Electric**

*Research & Development Intern - Smart Systems Group*

Jun 2017 - Aug 2017

*Hyogo, Japan*

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

## SKILLS

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

**3D and Design 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 (basic familiarity with SimaPro)

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

## LEADERSHIP & MENTORSHIP

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<b>Graduate Women in Engineering Committee Chair</b> Led committee to organize outreach, professional development & mentorship	Aug 2023 – Aug 2024
<b>UC Berkeley MEng Capstone Team Mentor</b> Project: Trust Measurement for Human-Machine Interaction	Sept 2023 – May 2024
<b>Human-Centered Design Methods, Graduate Student Instructor</b> Advised 50+ teams through design projects 🏆 <b>Outstanding GSI Award</b>	Fall 2020, 2022, 2023
<b>UC Berkeley Engineering Design Scholar Program Mentor</b> Mentored 3 undergraduate students through summer research projects	Summer 2020, 2021, 2023

## PUBLICATIONS

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### 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*.