Simantini (Soma) Mitra-Behura

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Education

University of Cambridge   Cambridge, UK

Master of Philosophy in Engineering for Sustainable Development — Distinction   Graduation date: Aug 2021

- **Dissertation**: Towards Sustainable and Equitable Textile Manufacture: Evaluation Frameworks for Poverty-Alleviation Interventions [Live link]
- **Relevant Coursework:** Sustainability Methods and Metrics *(quantitative modeling)*; Innovations in Sustainable Design and Manufacturing *(process optimisation)*; Biomimetics *(structure-property design principles)*

Massachusetts Institute of Technology   Cambridge, MA, USA

B.S. in Materials Science and Engineering, Minor in Mathematics   Graduation date: Jun 2019

- GPA: 4.7/5.0
- **Relevant Coursework:** Computational Science and Engineering; Theory of Computation; Signals and Systems; Electronic, Optical and Magnetic Properties of Materials; Mechanical Behavior of Materials; Microstructural Evolution; Mathematical Methods for Materials Scientists; Probability and Random Variables; Fundamentals of Statistics; Nonlinear Dynamics: The Natural System

Publications, Awards, & Invited Talks

Peer-reviewed

- Xu, L.*, **Mitra-Behura S.*** et al. (2015). Identifying DNA Methylation Variation Patterns to Obtain Potential Breast Cancer Biomarker Genes [Live link]. *Int. J. Biomed. Data Mining*, 4 (1). doi:10.4172/2090-4924.1000115

Technical Whitepapers

- **Mitra-Behura, S.** (2023). *Girl Effect's Artificial Intelligence & Machine Learning Vision for Family Planning Chatbots* [Live link]. Girl Effect, London.
- **Mitra-Behura, S.** et al. (2025). *Building with GenAI: Girl Effect's Journey to Smarter, Safer Health Chatbots* [Live link]. Girl Effect, London.

Awards & Panels

- **Awards:** Siemens Competition Regional Finalist (2014); Marshall and Rhodes Scholarship Nominee (2019)
- **Panels:** Humans in the machine - the impact of AI on workers [Live link to blog post] (Feb 2025); Building an evidence base for AI in SBC [Live link to blog post] (May 2025)

Research & Technical Experience

MIT Center for Bits and Atoms   Cambridge, MA, USA

Undergraduate Researcher   *Sep 2015 - Jun 2019*

Advisors: Dr. Sam Calisch, Dr. Prashant Patil, and Prof. Neil Gershenfeld

Developed Frame3dd and Abaqus Python pipelines for simulating energy absorption of curved crease Miura-Ori folds; these folded functionals were proposed as sustainable and efficient alternatives to vehicle crash panels (Toyota-funded). Simulated applied force vs displacement for various material thicknesses, radii of curvature, and fold angles in Miura-Ori structures; these insights informed the design of crash panels that were then manufactured and physically tested. Designed a MEMS stage actuator that relied on electrostatic comb drives for mechanical motion using SolidWorks; used to manufacture circuit components that were reusable and recyclable due to their reconfigurability. Simulated mechanical deformation, resilience, and electrostatic behavior of MEMS stage using COMSOL Multiphysics; this device was then manufactured and became a part of Dr. Patil's novel array of techniques for designing reconfigurable MEMS devices and electronics.

Girl Effect   London, UK

Data Scientist (Data Analytics & AI Lead)   *Mar 2022 - Present*

Leading AI architecture and evaluation framework development to drive a generative AI conversational agent that proactively guides users towards positive sexual and mental health outcomes using proven social behavior change communication (SBCC) techniques; amounts to $2m investment over two years with over 60K users so far.

Developing various AI systems and related evaluation metrics and datasets, ranging from traditional BERT-based trained classifiers to prompt-engineered and embedding-based guardrails, metrics, classifiers, and generators using Python. Managing 10-person team including software engineers, ML engineers, data scientists, data curators, UX designers, and SBCC experts. Conducted Chi-square statistical analyses of impact of generative AI features and other content on chatbot user behavior. Authored Vision paper (2023) that motivated original investment and updated whitepaper (2025) on our progress (see Publications). Led development of scalable Azure data infrastructure for ingesting and visualizing cross-country, cross-medium impact data.

SELCO Foundation   Bangalore, India
Technology & Design Fellow   *Sep 2019 - Mar 2020*

Developed Rhino+Grasshopper parametric simulation tool that was used to evaluate locally-sourced, sustainable materials as alternatives in rural building construction. Integrated Honeybee to connect to simulation engines like EnergyPlus/OpenStudio for building energy and thermal comfort prediction; Radiance for daylighting simulations; and Ladybug for location-specific weather data. Determined dehumidification level needed in a Gudalur, Tamil Nadu-based storage facility for coffee cherry drying using tool. Recommended better materials and efficient lighting design for two rural healthcare centers in Keba, Arunachal Pradesh and Gumballi, Karnataka using tool. Created simulation workflow template, documentation, and trained Built Environment team for tool usage in future projects.

Texas State University Department of Mathematics   San Marcos, TX, USA
High School Researcher   *Jun 2014 - Mar 2015*

Advisors: Prof. Shuying Sun and Prof. Ziliang Zong

Compared breast cancer cell line epigenetic data to normal cancer cell line data using R-based statistical methods to identify novel gene biomarkers for breast cancer. Calculated degree of variation in CG site methylation between breast cancer cells and normal cells and performed Chi-square analyses to pinpoint large (>100) groups of CG sites associated with high methylation variation. Mapped these to corresponding genes, resulting in 88 novel genes, and generated a genetic pathway diagram of these 88 genes using ConsensusPathDB. Shortlisted and published 26 novel genes as potential breast cancer biomarkers based on this diagram.

Teaching & Mentorship Experience

- **Teaching Assistant – 3.091: Introduction to Solid-State Chemistry**, MIT *(Fall 2017)*. Led weekly recitations and office hours in foundational chemistry material and graded coursework.
- **Mentor – Profusion Data Academy & UC Berkeley Graduate Data Corps** *(Summer 2022; Summer 2023; Spring 2025)*. Designed chatbot-related NLP projects for and mentored two Master's students at University of Essex and Queen Mary University of London and three UC Berkeley Master's in Computational Social Science students in developing multilingual classification NLPs and providing direction for real-world outcomes.

Activities & Leadership

- **MIT Climate Action Advisory Council – Undergraduate Representative** *(Sep 2018-Jun 2019)*. Represented undergraduate interests related to divestment, carbon pricing, climate-oriented programs, and political climate in MIT's pathway to meet goals set by the 2015 MIT Plan for Action on Climate Change
- **MIT Undergraduate Association's Committee on Sustainability – Chair** *(Jan 2016-Jun 2019)*. Led development of MIT community urban farm based on undergraduate survey, organized program (Trash2Treasure) to redirect tons of dorm waste from landfill to on-campus autumn sale while remaining financially sustainable, and ran sustainability awareness campaigns, conferences, and demonstrations.
- **MIT Solar Electric Vehicle Team – Composites Lead** *(Sep 2015-Mar 2017)*. Led manufacture and assembly of the vehicle's composite chassis and aerodynamic shell, independently fabricated chassis composite panels, and managed transportation and final assembly at an off-site warehouse.

Skills

Languages: Python, R, LaTeX

Software: Mathematica, Abaqus, COMSOL Multiphysics, Solidworks, Fusion 360, Frame3dd, Rhino + Grasshopper + Honeybee, Microsoft PowerBI, LangChain/LangSmith