Madhur Atreya

CURRENT RESEARCH AREAS

Printed and solution-processed electronics, naturally derived and biodegradable materials, Internet of things (IoT) and distributed sensing, novel fabrication techniques, user-centered design.

EDUCATION

August 2022	University of Colorado, Boulder *Doctor of Philosophy*, Mechanical Engineering *Thesis:* Design of Additively Fabricated Biodegradable Sensors for Soil Monitoring
August 2011	University of Southern California *Master of Science*, Mechanical Engineering
December 2009	The University of Texas at Austin *Bachelor of Science*, Mechanical Engineering

SKILLS

- Printed electronics
- Arduino-based data acquisition
- Differential scanning calorimetry
- Scanning electron microscopy
- Human-centered design
- Customer discovery
- Project management
- Project-based learning
- GD&T
- Design for manufacturability
- Windchill PDMLink
- PTC CREO and Solidworks

RESEARCH EXPERIENCE

Aug 22 – July 24	*Postdoctoral Researcher, Boulder Experimental Electronics and Manufacturing Lab* Dr. Gregory Whiting, University of Colorado, Boulder
Sep 17 – Aug 22	*Graduate Research Assistant, Boulder Experimental Electronics and Manufacturing Lab* Dr. Gregory Whiting, University of Colorado, Boulder
Aug 16 – Sep 17	*Research Assistant, Interactive Robotics and Novel Technologies Lab* Dr. Daniel Szafir, University of Colorado, Boulder

TEACHING EXPERIENCE

Aug 25 – present	*Assistant Teaching Professor, Integrated Design Engineering (IDE) Program* University of Colorado Boulder
Aug 24 – May 25	*Lecturer, Mechanical Engineering Design Track, Full Time* University of Colorado, Boulder
Aug 23 – Dec 23	*Lecturer, First Year Engineering Projects* University of Colorado, Boulder
Aug 18 – May 19	*Graduate Teaching Assistant, Component Design Course* Drs. Derek Reamon and Janet Tsai, University of Colorado, Boulder

PEER-REVIEWED PUBLICATIONS & CONFERENCE PAPERS

1. T.J. Sharpe, **M. Atreya**, S. Liu, M. Gong, N. Luna, N. Smock, J. Davies, J.N. Quinton, R.D. Bardgett, J.C. Neff, R. Killick, G. L. Whiting, *In-situ Decomposition Sensor Output Correlates with Soil Health Indicators.* ***Computers and Electronics in Agriculture.*** Accepted January 7, 2026.

2. C.A. Crichton, L. Lahann, J.P. Cisneros Barba, T. Yuan, E.J. Strand, N. Bruno, P.J. Goodrich, C.L. Baumbauer, **M. Atreya**, E. Bihar, W.L. Silver, K.S.J. Pister, A.C. Arias, G.L. Whiting. 2025. *Two-Electrode Screen-Printed pH Sensors for Monitoring Soil and Other Growing Media.* ***IEEE Sensors Journal***.

3. C.L. Baumbauer, A. Gopalakrishnan, **M. Atreya**, G.L. Whiting, A.C. Arias. 2024. *Polycaprolactone-based Zinc Ink for High Conductivity Transient Printed Electronics and Antennas.* ***Advanced Electronic Materials***.

4. E. Bihar, E. J. Strand, C. A. Crichton, M. N. Renny, I. Bonter, T. Tran, **M. Atreya**, A. Gestos, J. Haseloff, R. R. McLeod, G. L. Whiting. 2023. *Self-healable printed electronic cryogels for bioelectronics and plant monitoring.* ***NPJ Flexible Electronics***.

5. **M. Atreya**, S. DeSousa, J. B. Kauzya, E. Williams, A. Hayes, K. V. Dikshit, J. Nielson, A. Palmgren, S. Khorchidian, S. Liu, A. Gopalakrishnan, E. Bihar, C. J. Bruns, R. Bardgett, J. N. Quinton, J. Davies, J. C. Neff, G. L. Whiting. 2023. *A Transient Printed Soil Decomposition Sensor based on a Biopolymer Composite Conductor.* ***Advanced Science***.

6. **M. Atreya**, G. Marinick, C. Baumbauer; K.V. Dikshit, S. Liu, C. Bellerjeau, J. Nielson, S. Khorchidian, A. Palmgren, Y. Sui, R. Bardgett, D. Baumbauer, C.J. Bruns, J.C. Neff, A.C. Arias, G.L. Whiting. 2022. *Wax Blends as Tunable Encapsulants for Soil-Degradable Electronics.* ***ACS Applied Electronic Materials.***

7. Y. Sui, **M. Atreya**, S. Dahal, A. Gopalakrishnan, R. Khosla, G.L. Whiting. 2021. *Controlled Biodegradation of an Additively Fabricated Capacitive Soil Moisture Sensor*, ***ACS Sustainable Chemistry & Engineering.***

8. **M. Atreya**, K.V. Dikshit, G. Marinick, J. Nielson, C. Bruns, G.L. Whiting. 2020. *Poly (lactic acid)-based ink for biodegradable printed electronics with conductivity enhanced through solvent aging*, ***ACS Applied Materials & Interfaces.***

9. S. Dahal, W. Yilma, Y. Sui, **M. Atreya**, S. Bryan, V. Davis, G.L. Whiting, R. Khosla. 2020. *Degradability of biodegradable soil moisture sensor components and their effect on maize (Zea mays L.) growth*. ***Sensors.***

10. A. Muehlbradt, **M. Atreya**, D. Guinness, S.K. Kane. 2018. *Exploring the Design of Audio-Kinetic Graphics for Education*. ***Proceedings of the 2018 on International Conference on Multimodal Interaction (ICMI).***

11. C. Brooks, **M. Atreya**, D. Szafir. 2018. *Proactive Robot Assistants for Freeform Collaborative Tasks Through Multimodal Recognition of Generic Subtasks.* ***2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).***

CONFERENCE PRESENTATIONS, NON-ARCHIVAL CONFERENCE PAPERS, & BOOK CHAPTERS

1. D. Mandal, W. Yilma, **M. Atreya**, J.B. Kauzya, N. Smock, R. Khosla, G.L. Whiting. 2024. *Evaluation of Hybrid Biodegradable Sensor Node for Monitoring Soil Moisture.* Book chapter in ***Harnessing Data Science for Sustainable Agriculture and Natural Resource Management.***

2. **M. Atreya,** T. Sharpe, S. Liu, R. Killick, M. Gong, K. Verhaalen, A. Gopalakrishnan, N. Smock, I. Sarralde, M. Bean, J. Davies, J. Quinton, R. Bardgett, J. Neff, E. Thomas, G. Whiting. *Novel Soil Decomposition Sensor: Field Studies and Design Improvements.* EGU General Assembly 2024, Vienna, Austria, (virtual).

3. **M. Atreya**, J. B. Kauzya ,S. DeSousa, E. Williams, A. Hayes, K. V. Dikshit, J. Nielson, A. Palmgren, S. Khorchidian, S. Liu, A. Gopalakrishnan, E. Bihar, C. J. Bruns, R. Bardgett, J. N. Quinton, J. Davies, J. C. Neff, G. L. Whiting. *Novel Printed Soil Decomposition Sensors Based on Biodegradation*, EGU General Assembly 2023, Vienna, Austria, (virtual).

4. **M. Atreya**, G. Marinick, K. Dikshit, C. Bellerjeau, Y. Sui, C. Bruns, G.L. Whiting. *Blends of Beeswax and Soy Wax as Encapsulating Materials for Soil-Biodegradable Electronics*. 2021 MRS Spring Meeting, (virtual).

5. **M. Atreya**, K. Dikshit, G. Marinick, J. Nielson, C. Bruns, G.L. Whiting. *The Design of Biodegradable Soil Sensors for Precision Agriculture*. 2019 MRS Spring Meeting, Boston, MA.

6. **M. Atreya**, G. Marinick, G.L. Whiting. *Development of a Conductive Biodegradable Ink for Multi-Process Additive Manufacturing*. 2018 MRS Spring Meeting, Boston, MA.

7. H. Redondo, **M. Atreya**, M. Kan, J. H. Koo, *Evaluation of Char Strength of Polymer Nanocomposites for Propulsion Systems*, Society for the Advancement of Materials and Process Engineering (SAMPE) 2010, Seattle, WA.

PATENTS

1. **M. Atreya**, G. Marinick, G.L. Whiting. *Method to Sense the Presence and Quantities of Microbes Through the Use of Transient Sensing Materials (12270066).*

2. Y. Sui, **M. Atreya**, J. Nielson, G.L. Whiting. *Additively Fabricated Capacitive Soil Moisture Sensor (filed).*

3. **M. Atreya,** T. Sharpe, G. Whiting. *Soil Decomposition Activity Sensor (provisional)*.

PROFESSIONAL EXPERIENCE

Aug 24 – Feb 25	*Independent Consultant* **BioSensor Solutions, Inc.**
Sep 12 – Apr 16	*Technical Consultant (Mechanical Engineer)* **L&T Technology Services, LLC** **(formerly Dell Product and Process Innovation Services)**
Nov 11 – Sep 12	*Mechanical Design Engineer* **Rapid Tooling, Inc**
Jun 09 – July 10	*Mechanical Project Assistant (intern/temp)* **UT Project Management and Construction Services**
Jun 08 – Aug 08	*Policy Analyst Intern* **Office of Texas State Representative Mark Strama**

PROFESSIONAL ORGANIZATIONS, VOLUNTEER ACTIVIES, AND AWARDS

- Technical Lead, NSF iCorps team, winter 2025 cohort (Jan 2025-March 2025)
- Outstanding Mentor Award (October 2024)
- Soul Dog Rescue volunteer and foster (Feb 2024-present)

- European Geosciences Union (2023-present)
- Materials Research Society (2018-present)
- Society for the Advancement of Material and Process Engineering (SAMPE) (2012-2016)
    - Session Chair, Advancement in Energy Storage, SAMPE 2016
    - 2015-2016 Webmaster, DFW Chapter
    - 2014-2015 Secretary, DFW Chapter
    - 2013-2014 Social Media, DFW Chapter
- Industrial Designers Society of America (IDSA) (2013-2015)