# Ketki M. Lichade, Ph.D.

Assistant Professor, Department of Mechanical and Aerospace Engineering
243 Bell Hall, University at Buffalo, Buffalo, NY 14260
Phone: +1(716)-645-9346
E-mail: ketkilic@buffalo.edu

## Professional Experience

**Assistant Professor** 2023 – Present
Dept. of Mechanical and Aerospace Engineering, University at Buffalo, Buffalo, NY, USA

**Research Assistant** 2019 –2023
Additive Manufacturing Laboratory, University of Illinois at Chicago, IL, USA

**Teaching Assistant** 2018 –2023
Dept. of Mechanical and Industrial Engineering, University of Illinois at Chicago, IL, USA

**Graduate Research Assistant** 05/2022-08/2022
Nanotechnology Core Facility (NCF), University of Illinois at Chicago, IL, USA

## Education

**Ph.D., Dept. of Mechanical and Industrial Engineering** 08/2023

University of Illinois at Chicago (UIC), IL, USA.

Dissertation Title: *Photopolymerization-based Additive Manufacturing of Multimaterial Objects with Multiscale Features*

Dissertation Advisor: Dr. Yayue Pan

**B.E., Mechanical Engineering** 05/2016

Savitribai Phule Pune University, India

## Research Interests

- **Advanced/Additive/Hybrid Manufacturing Process Development**: Investigate novel multiscale and multi-material manufacturing process prototypes for rapid fabrication of functional structures with high structural accuracy and properties programmable in six-dimensional (6D) space.
- **Biomimetic Computational Design**: Develop design methodologies inspired by nature for planning heterogeneous material distribution and smart hierarchical structures based on target functionality.
- **Advanced Functional Materials**: Formulate novel composite material for additive manufacturing using polymers, metal, hydrogel, conducting polymers, magnetic particles, ceramics, etc.
- **Autonomous Devices for Multidisciplinary Applications**: Fabricate multifunctional devices with site-specific properties for autonomous response in the fields of robotics, biomedical, healthcare, electronics, hydrodynamic, optical, and energy storage.
- **Artificial Intelligence in Smart Manufacturing**: Develop and integrate machine learning techniques to predict bio-inspired design and manufacturing parameters based on desired functionality.

## Awards and Honors

- **Grants in Aid of Research** 2023
  Sigma Xi, The Scientific Research Honor Society

- **Provost's Graduate Research Award** 2022
  Graduate College, University of Illinois at Chicago
- **Faydor Litvin Honor Award** 2022
  University of Illinois at Chicago
- **Award for Graduate Research** 2022
  Graduate College, University of Illinois at Chicago
- **Travel Award** 2022
  Graduate Student Council, University of Illinois at Chicago
- **Three Minute Thesis Competition Finalist Award** 2022
  University of Illinois at Chicago
- **Student Presenter Award** 2022
  Graduate College, University of Illinois at Chicago
- **National Scientific Foundation (NSF) Travel Award** 2022
  50th SME North American Manufacturing Research Conference, West Lafayette, Indiana
- **Conference Award** 2021
  Graduate Student Council, University of Illinois at Chicago
- **Outstanding MS Student Award** 2018
  Dept. of Mechanical and Industrial Engineering, University of Illinois at Chicago

## Publications

### Journals (*corresponding author)

J14. **Lichade, K. M.***, Shiravi, S., Finan, J., Pan, Y. *Direct Printing of PEDOT:PSS-based Conductive Hydrogels using Two-photon Polymerization*. Additive Manufacturing. Vol. 84 (2024). DOI: 10.1016/j.addma.2024.104123

J13. **Lichade, K. M.**, Pan, Y. *Acoustic Assembly Photopolymerization of Bioinspired Multifunctional Devices with Programmable Adhesion*. ASME Journal of Micro- and Nano-Manufacturing. Vol. 10 (2023). DOI: 10.1115/1.4064107

J12. **Lichade, K. M.**, Pan, Y. *Continuous Printing of Bone-inspired Hierarchical Porous Objects using Video-Projection Stereolithography*. SME Journal of Manufacturing Processes. Vol. 107 (2023), pp. 14-154. *DOI:* 10.1016/j.jmapro.2023.10.032

J11. **Lichade, K. M.**, Hu, S., Pan, Y. *Acoustic Streaming-assisted Two-Photon Polymerization Process for the , Production of Multimaterial Microstructures*. Additive Manufacturing. Vol. 70 (2023) DOI: 10.1016/j.addma.2023.103552

J10. Plog, J., Wang, W., **Lichade, K. M.**, Pan, Y., Yarin, A., L. *Extremely-fast Electrostatically-assisted Direct Ink Writing of 2D, 2.5D and 3D Functional Traces of Conducting Polymer Poly(3,4-ethylenedioxythiophene) Polystyrene Sulfonate-Polyethylene Oxide (PEDOT:PSS-PEO)*. Journal of Colloid and Interface Science. Vol. 651 (2023) pp. 1043-1053. DOI: 10.1016/j.jcis.2023.07.206

J9. **Lichade, K. M.**, Pan, Y. *Fast and Simple Fabrication of Multimaterial Hierarchical Surfaces using Acoustic Assembly Photopolymerization*. Advanced Materials Interfaces. Vol. 10 (2022). DOI: 10.1002/admi.202201981

J8. Plog, J., Wang, W., **Lichade, K. M.**, Yarin, A. L., Pan, Y. *Three-Dimensional Printing of Highly Conductive PEDOT:PSS-Based Polymers*. ASME Journal of Manufacturing Science and Engineering. Vol. 145 (2022). DOI: 10.1115/1.4055850

J7. Shahriar, M., Lui, Y., Zhang, B., **Lichade, K. M.**, Pan, Y., Hu, S. *Acoustic Tweezer Modulated Biomimetic Patterned Particle-Polymer Composite for Water Vapor Harvesting*. ACS Applied Materials & Interfaces**.** Vol. 14 (2022), pp. 44782–44791. DOI: 10.1021/acsami.2c09280

J6. **Lichade, K. M.**, Joyee, E. B., Pan, Y. *Gradient Light Video Projection-based Stereolithography for Continuous Production of Solid Objects*. SME Journal of Manufacturing Processes. Vol. 65 (2021), pp. 20-29. DOI: 10.1016/j.jmapro.2021.02.048

J5. Joyee, E. B., Huang, J., **Lichade, K. M.**, and Pan, Y. *Multi-material Distribution Planning fo-r Additive Manufacturing of Biomimetic Structures*. Rapid prototyping journal. Vol. 27 (2021), pp. 1917-1927. DOI: 10.1108/RPJ-08-2020-0202

J4. **Lichade, K. M.**, Pan, Y. *Acoustic Field-Assisted Two-Photon Polymerization Process*. ASME Journal of Manufacturing Science and Engineering. Vol. 143 (2021). DOI: 10.1115/1.4050759

J3. **Lichade, K. M.**, Hu, S., Pan, Y. *Two-Photon Polymerization of Anisotropic Composites using Acoustic Streaming*. SME Manufacturing letters. Vol. 31 (2021), pp. 110-115. DOI: 10.1016/j.mfglet.2021.09.001

J2. **Lichade, K. M.**, Jiang, Y., Pan, Y. *Hierarchical Nano/Micro-structured Surfaces with High Surface Area/Volume Ratios*. ASME Journal of Manufacturing Science and Engineering. Vol. 143 (2021). DOI: 10.1115/1.4049850

J1. Jiang, Y., Wang, Y., **Lichade, K. M.**, He, H., Feinerman, A., Pan, Y. *Textured Window Design for Continuous Projection Stereolithography Process*. SME Manufacturing letters. Vol. 24 (2020), pp. 87-97. DOI: 10.1016/j.mfglet.2020.04.007

## Technical Presentations

### Conference Presentations (Presenter underlined)

C3. **Lichade, K. M.**, Pan, Y., "Acoustic Assembly Photopolymerization of Bioinspired Multifunctional Devices with Programmable Adhesion." Proceeding of MSEC 2023, Brunswick, New Jersey.

C2. **Lichade, K. M.**, Pan, Y., "3D Printing of Anisotropic Multimaterial Structures using Acoustic Streaming-assisted Two-Photon Polymerization." Proceeding of NAMRC 2022, West Lafayette, Indiana.

C1. Plog, J., Wang, X., **Lichade, K. M.**, Alexander L. Yarin, Pan, Y., "3d Printing of Highly Conductive PEDOT:PSS-Based Polymers." Proceeding of MSEC 2022, West Lafayette, Indiana.

### Invited Talks

T5. Invited speaker, "Fast and Rapid Manufacturing of Particle-Polymer Composites", DAC-25: Early Career Research: Lightning Talks at IDETC, August 26th, 2024

T4. Invited speaker, "Research overview in Advanced Manufacturing Laboratory", MAE Department Advisory Board, University at Buffalo, November 16th, 2023

T3. Invited speaker, "Research overview in Advanced Manufacturing Laboratory", MAE Department Graduate Research Orientation, University at Buffalo, September 14th, 2023

T2. Plenary Speaker, "*Photopolymerization-based Additive Manufacturing for Productions of Multimaterial Objects with Multiscale Features*" Nanotechnology Core Facility Symposium, University of Illinois at Chicago, September 22nd, 2022

T1. Invited Lecturer, "*Introduction to Linear Stage and Arduino Programming for 3D Printing*", Additive Manufacturing Course, University of Illinois at Chicago, February 24th, 2021

## Teaching Experience

**Courses Taught:** *Department of Mechanical and Aerospace Engineering, UB*

- MAE 502/402 Introduction to Additive Manufacturing, Fall 2024
- MAE 498 Research/Creative Act (Tutorial), Fall 2024
- MAE 560 Masters Research Guidance (Tutorial), Fall 2024
- MAE 501 Individual Problems (Tutorial), Fall 2024
- MAE 364 Manufacturing Processes, Spring 2024
- MAE 560 Masters Research Guidance (Tutorial), Spring 2024
- MAE 502 Introduction to Additive Manufacturing (Newly developed course), Fall 2023

**Teaching Assistant:** *Department of Mechanical and Industrial Engineering, UIC*

- ME/IE 481 Additive Manufacturing Processes, Spring 2023
- IE 472 Operations Research, Spring 2023
- ME/IE 594 Additive Manufacturing Processes, (Asynchronous) Spring 2021
- ME/IE 595 MIE Department Seminar, Fall 2018

**Lab Session Lecturer:** *Department of Mechanical and Industrial Engineering, UIC*

- ME/IE 411 Mechatronics, Fall 2021
- IE 467 Discrete Event Simulation, (Asynchronous), Fall 2020
- ME 397 Senior Design, Spring 2020
- ME/IE 411 Mechatronics, Fall 2019

**Problem-Solving Instructor:** *Department of Mechanical and Industrial Engineering, UIC*

- IE 342 Probability and Statistics for Engineers, Spring 2021
- IE 342 Probability and Statistics for Engineers, Fall 2020

## Research Advising

**Ph.D. research at UB**

- Sai Hamsitha Reddy Guvvala, Ph.D., January 2024-present, degree expected May 2028.

- Mohammed Gayasuddin Shaik, Ph.D., August 2024-present, degree expected May 2029.

**Mater's research at UB**

- Kaushali Aich, M.S., January 2024-present, degree expected May 2025.

- Bhargav Chowdary Ghattamaneni, M.S., May 2024-present, degree expected May 2025.

**Undergraduate research at UB**

- Uma Bhattacharjee, May 2024-present.

    Zimmer Award Recipient, Summer 2024.

**Dissertations/Theses committee member**

- Vinoop Anil, M.S., May 2024.

**Undergraduate/Master's research at UIC**

- Anupam Deshpande, M.S., Summer 2022
- David Laczak, Undergraduate, Summer 2022.
- Xinnian Wang, M.S., Summer 2021.
- Kevin Sanchez, M.S., Fall 2019.

## Professional Activities

### Leadership

- Guest Editor: Special Issue on "Nature-Inspired 3D Printing: Engineering Tomorrow's Functional Structures and Material", Biomimetics, 2024.
- Guest Editor: Special Issue on "Recent Advances in Microfluidic Lab-on-a-Chip Platform in North America and Europe", Micromachines, 2023.

### Conferences

- Session Chair, DAC-06-2: Design for Additive Manufacturing, ASME International Design Engineering Technical Conferences (IDETC), 2024.
- Symposium Co-organizer, Track#3-2: Advanced Manufacturing of Functional Devices and Bioinspired Structures, Manufacturing Science & Engineering Conference (MSEC), 2024.
- Symposium Co-organizer, DAC 6: Design for Additive Manufacturing, ASME International Design Engineering Technical Conferences (IDETC), 2024.
- Session Chair, MRS SF02: Additive Manufacturing - From Material Design to Emerging Applications, Materials Research Society (MRS) Fall 2021 Meetings and Exhibit, 2021.

### Membership in Professional and Honor Societies

- American Society of Mechanical Engineers (ASME), Member.
- Society of Manufacturing Engineers (SME), Member.
- Materials Research Society (MRS), Member.
- Pi Tau Sigma (PTS), Member.

### Reviewer for Proposals

- National Science Foundation, CMMI Program Reviewer, 2024.
- NSF Graduate Research Fellowships Program Reviewer, 2023.

### Invited Reviewer of Peer-reviewed Journals and Conferences

- Journal of Manufacturing Processes, 2024.
- Journal of Mechanical Design, 2024.
- Journal of Manufacturing Processes, 2024.
- Journal of Computing and Information Science in Engineering, 2024.
- Micromachines, 2024.
- Additive Manufacturing Letters, 2024.

- ASME's Manufacturing Science & Engineering Conference (MSEC), 2024.
- SME's North American Manufacturing Research Conference (NAMRC), 2024.
- IEEE Robotics and Automation Letters, 2023.
- SME's North American Manufacturing Research Conference (NAMRC), 2023.
- Journal of Computing and Information Science in Engineering, 2022.
- SME's North American Manufacturing Research Conference (NAMRC), 2022.
- Rapid Prototyping Journal, 2022.

## University Service

- University at Buffalo
  - Poster session judge for 14th Annual Postdoctoral Scholar Research Symposium, 18th September 2024.
  - Served on the Student Excellence and Diversity Committee, 2024.
  - Judge for UB MAE Graduate Poster Competition, 30th January 2024.
  - Student Advising (5 undergraduate students), August 2023-Present.
- University of Illinois at Chicago
  - Planning Committee, SWE University of Illinois at Chicago, Summer 2022.
  - Magazine Editorial Team, Her Campus UIC, 2022-2023.
  - Planning Committee Leader, PTS, 2022-2023.
  - Volunteer for Lab tour, 2020-2023.

## Professional Development

| | |
|---|---|
| October 2024 | Tools for Supervisors Employee Assistance Program (EAP) |
| September 2024 | National Center for Faculty Development & Diversity (NCFDD) Core Curriculum |
| August 2024 | Lab tour for new upcoming students with Women in Science and Engineering (WiSE) |
| August 2024 | Research Fundamentals Workshop, UB Office of Research Advancement |
| August 2023 | Brightspace Training, UB Office of Curriculum, Assessment and Teaching Transformation |