CURRICULUM VITAE: Danna Ma

Postdoctoral Fellow
Biomimetic Millisystems Lab, Prof. Ronald S. Fearing
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RESEARCH INTERESTS

I am interested in how physical design and simple, distributed control produce robust and adaptive behavior. I develop swarms that "think" with their bodies rather than solely with their "brains," exploring how embodied mechanics and minimal sensing can enable intelligent collective behavior. My research topics include embodied and physical intelligence, swarm robotics, active robotic materials, soft robotics, and responsive robotic architecture.

EDUCATION

1. **Ph.D., Electrical and Computer Engineering**
   Cornell University, Ithaca, NY, USA. May 2026.
   Visiting Researcher: Max Planck Institute for Intelligent Systems with Prof. Metin Sitti.
   Thesis Advisors: Prof. Kirstin Hagelskjaer Petersen, Prof. Nils Napp, and Prof. Paul McEuen.
2. **M.Eng., Electrical and Computer Engineering**
   Cornell University, Ithaca, NY, USA. May 2018.
3. **B.S., Electrical Engineering**
   National University of Singapore, Singapore. May 2016.
   Exchange Program: Centrale Supélec, France, January 2015 – June 2015.
   Summer School: Grenoble INP Micro and Nanotechnology, France, June 2013 – July 2013.
   Undergraduate Thesis Advisor: Prof. Armin Gerhard Aberle.

PROFESSIONAL EXPERIENCE

1. **Postdoctoral Fellow, University of California, Berkeley**
   Biomimetic Millisystems Lab of Prof. Ronald S. Fearing. August 2026 – present.
2. **Assistant Teaching Professor in ECE, Cornell University**
   School of Electrical and Computer Engineering. July 2026 – August 2026.
3. **Visiting Lecturer in ECE, Cornell University**
   School of Electrical and Computer Engineering. July 2025 – July 2026.

PUBLICATIONS

Peer-Reviewed Journal Articles

- **Ma, D.**, Chong, B., Goldman, D. I., and Petersen, K. "Cross-link collective: Entangled robotic matter with cohesive motion." *Science Robotics*, 2026. In press.
- **Ma, D.***, Ceron, S.*, Kaiser, G., and Petersen, K. "Simple, low-cost fabrication of soft sensors for shape reconstruction." *IEEE Robotics and Automation Letters*, 2020.

Peer-Reviewed Conference Papers

- **Ma, D.**, Yang, Y., and Cheng, T. "User-Responsive Auxetic Spatial Skin: Design, Engineering, and Evaluation of a Robotic Surface for Shared Third Spaces." *International Conference on Human-Robot Interaction*, 2027 (under review).
- Cutler, S., **Ma, D.**, and Petersen, K. "Strain-coordinated formation, migration, and encapsulation behaviors in a tethered robot collective." *IEEE International Conference on Robotics and Automation (ICRA)*, 2025.
- **Ma, D.**, Chen, J., Cutler, S., and Petersen, K. "Smarticle 2.0: Design of scalable, entangled smart matter." *International Symposium on Distributed Autonomous Robotic Systems (DARS)*, 2022.

Conference Abstracts

- **Ma, D.**, Petersen, K., Murphey, T., and Goldman, D. I. "Smarticles 2.0—robotic modules designed for 3D entanglement." *American Physical Society March Meeting*, 2023.

Conference Posters

- "Harnessing Physical Intelligence for Collective Motion in Entangled Robotic Matter." Northeast Robotics Colloquium, Ithaca, NY, October 2025.
- "Emergent Collective Locomotion through Hybrid Dynamics in Simple Robots." International Symposium on Distributed Autonomous Robotic Systems, Roosevelt Island, NY, October 2024.

*Equal contributing authors.

INVITED TALKS AND PRESENTATIONS

Invited Workshop and Seminar Talks

1. Workshop on Bridging the Gap between Robotic Matter and Active Metamaterials at the International Conference on Intelligent Robots and Systems (IROS), Pittsburgh, PA, "Harnessing Soft Matter Physics for Robotic Metamaterials", October 2026.
2. GRASP Laboratory SFI (Student, Faculty, Industry) Seminar, University of Pennsylvania, Philadelphia, PA, "Harnessing Physical Intelligence for Collective Motion in Robotic Matter", March 2025.
3. Workshop on Enabling Robot Swarms Across Scales at the International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, "Smarticle into Collective Intelligence", October 2023.

Research Seminars and Lab Talks

1. Biorobotics Lab, Carnegie Mellon University, May 2026.
2. Robotics and Embodied Artificial Intelligence Lab, Stanford University, October 2025.
3. Multi-Robot Systems Lab, Stanford University, July 2025.

TEACHING EXPERIENCE

1. **Instructor, ECE 5725: Design with Embedded Operating Systems**
   Cornell University. Fall 2025 (62 students) – Spring 2026 (35 students).
2. **Guest Lecturer, ECE 6680: Bio-inspired Coordination of Multi-Agent Systems**
   Cornell University. Fall 2024.
3. **Head Teaching Assistant, ECE 3140 / CS 3420: Embedded Systems**
   Cornell University. 2020, 2023.

4. **Head Teaching Assistant, ECE 2300 / ENGRD 2300: Digital Logic and Computer Organization**
   Cornell University. 2020, 2023.

RESEARCH MENTORING

1. **M.S. Student**
   Yiwen Yang, Design Technology, Cornell University, 2025 – 2026.
2. **M.Eng. Students**
   Qianran Hong, Electrical and Computer Engineering, Cornell University, 2025 – 2026.
   Kedar Johnson, Electrical and Computer Engineering, Cornell University, 2025 – 2026.
   Puxuan Yang, Systems Engineering, Cornell University, 2025 – 2026.
3. **Undergraduate Students**
   Sophia Franklin, Electrical and Computer Engineering, Cornell University, 2023 – 2024.
   Austin Brown, Electrical and Computer Engineering, Cornell University, 2022.
   Greg Kaiser, Electrical and Computer Engineering, Cornell University, 2019 – 2020.

HONORS AND AWARDS

1. Cornell Graduate School Travel Grant, 2024. $300.
2. University of Stuttgart Graduate Research Fellowship, 2023. €2,200.
3. Cornell Graduate School Travel Grant, 2023. $400.
4. National University of Singapore Engineering Colors Award, 2016.
5. Study Abroad Exchange Scholarship, 2015. $2,000.
6. Singapore Ministry of Education Senior-Middle 1 Scholarship, 2007 – 2011. S$150,000 (approx.).

SERVICE ACTIVITIES

1. Admissions Committee Member, Master of Engineering in Electrical and Computer Engineering, Cornell University, 2026.
2. Program Committee Member, ANTS 2026: Fifteenth International Conference on Swarm Intelligence, 2026.
3. Host, New Vision Engineering Outreach Program, Cornell University, 2022.

REVIEWING ACTIVITIES

IEEE Robotics and Automation Letters (RA-L); Swarm Intelligence; Advanced Intelligent Systems; IEEE International Conference of Robotics and Automation (ICRA);

MEDIA COVERAGE

1. "Robotic collective flows like matter, adapting without centralized control," *TechXplore*, May 2026.
2. "Researchers Develop Collective Robots That 'Flow,' Adapt Through Mechanical Intelligence," *AI Insider*, May 2026.
3. "'Like a flowing material': Robot swarm uses physics, not commands to self-organize," *Interesting Engineering*, May 2026.
4. "Cornell engineers develop robotic collective that flows like soft matter," *Mindplex*, May 2026.
5. Additional Chinese-language coverage in NetEase, Sohu, Tencent News, Baidu Baijiahao, Leader Robot, Toutiao, and other technology/social media platforms, May 2026.