BINBIN YING

Assistant Professor
Phone: +1 (857) 829 9677
Email: Binbin.Ying@UTSouthwestern.edu

EA4.204B, 2336 Inwood Road
Dallas, TX 75235
https://labs.utsouthwestern.edu/ying-lab

RESEARCH INTERESTS

Medical Devices	Hydrogel Bioadhesives	Soft Robotics	Ingestible Electronics	Translational Medicine

PROFESSIONAL POSITION

Assistant Professor	Department of Biomedical Engineering UT Southwestern Medical Center, Dallas, TX, USA	Current
Assistant Professor	Department of Internal Medicine UT Southwestern Medical Center, Dallas, TX, USA	Current
Postdoctoral Fellow	Mechanical Engineering Massachusetts Institute of Technology, Cambridge, MA, USA	08/2025
Research Fellow	Traverso Lab Brigham and Women's Hospital, Cambridge, MA, USA	08/2025

EDUCATION

Ph.D.	Mechanical Engineering McGill University, Montreal, QC, Canada	02/2021
Ph.D. (Visiting)	Mechanical and Industrial Engineering University of Toronto, Toronto, ON, Canada	12/2020
M.Eng.	Biomedical Engineering Shanghai Jiao Tong University, Shanghai, China	03/2015
B.Eng.	Mechanical Engineering Donghua University, Shanghai, China	06/2012

PROFESSIONAL EXPERIENCE

Assistant Professor 10/2021-Current
Department of Biomedical Engineering, UT Southwestern Medical Center

Postdoctoral Fellow 07/2021-08/2025
Mechanical Engineering, MIT; Brigham and Women's Hospital, Harvard Medical School
Advisors: Profs. Giovanni Traverso and Robert Langer

- Developed **IngRI**, an ingestible, battery-free, mucosa-adhering robotic interface for non-invasive and chronic electrostimulation of the gut (***Nature Communication***, *2024;* ***Device***, *2023; NSERC Postdoctoral Fellowship*)
- Developed **e-GLUE,** an electroadhesive hydrogel interface for prolonged mucosal theranostics (***Science Translational Medicine*****,** *2025;* ***Nature Reviews Materials***, *2022; Banting Postdoctoral Fellowship*)

- Developed **BIOSENTER**, a bioinspired soft enteroscopic robot for facilitating locomotion, steering, and intervention in the deep small intestine (***Science Robotics, In Press***)
- Developed **PowerPill-X**, a pill-sized wireless power transfer systems for multi-hundred-milliwatt delivery through deep tissue (*Manuscript in preparation*)
- Co-developed **TIMED,** a hydrogel-based programmed release system for myocardial infarction (***Cell Biomaterials***, *2025; **Biomaterials**, 2023)*

R&D Biomedical Engineering Research Intern 01/2021-05/2021
Myant Inc. Canada

- Developed dry textile electrodes for long-term electrocardiographic (ECG) monitoring (***BioMedical Engineering OnLine**, 2023*)

Graduate Research Assistant 07/2017-12/2020
Mechanical Engineering, McGill University and University of Toronto
Thesis Advisors: Profs. Xinyu Liu and Jianyu Li

- Developed **iSkin**, an anti-freezing, ambient-stable and highly stretchable ionic skin with strong surface adhesion for wearable sensing and soft robotics (***Advanced Functional Materials**, 2022; **iScience**, 2021)*
- Developed **AIskin**, an ambient-stable and stretchable hydrogel diode for wearable sensing, human-machine interaction and energy harvesting (***Materials Horizons**, 2020*)
- Developed **iTENG**, an anti-freezing and stretchable triboelectric nanogenerator for self-powered sensing and mechanical energy harvesting in harsh environments (***ACS Applied Electronic Materials**, 2022*)

Graduate Research Assistant 09/2015-06/2017
Mechanical Engineering, McGill University
Advisor: Prof. Xinyu Liu

- Developed **NanoPADs**, a transparent nanopaper-based analytical device for disease detection (***Lab on a Chip**, 2020*)
- Developed a nanocellulose-paper-based SERS multiwell plate with high sensitivity and high signal homogeneity (***Advanced Materials Interface**, 2019*)

Graduate Research Assistant 04/2015-08/2015
Biomedical Engineering, Shanghai Jiao Tong University, China
Advisor: Prof. Qiu Huang

- Registered 3D images of SPECT pulmonary perfusion with CT based on machine learning for radiotherapy planning

Graduate Research Assistant 09/2012-03/2015
Biomedical Engineering, Shanghai Jiao Tong University, China
Thesis Advisors: Profs. Lisa Xuemin Xu and Aili Zhang

- Developed a miniaturized cryo-thermal system for tumor therapy through the induction of anti-tumor immunity

FELLOWSHIPS

Banting Postdoctoral Fellowship ($140,000) 2023-2025
The Canadian Institutes of Health Research (CIHR)
NSERC Postdoctoral Fellowship ($90,000) 2021-2023
Natural Sciences and Engineering Research Council of Canada
J W McConnell Memorial Fellowship 2016-2017

McGill University
L Trottier Engineering Fellowship 2015
McGill University
McGill Graduate Fellowship 2015
McGill University
NIH Pathway to Independence Award (K99/R00) (Submitted for the June cycle) 2024
National Institutes of Health

HONORS AND AWARDS

Daniel R. King Memorial Travel Scholarship 2025
The Adhesion Society
Flash Talk Contest Winner (1st Prize) 2024
Controlled Release Society
Outstanding Students Abroad 2022
China Scholarship Council
2020 Materials Horizons Outstanding Article 2021
Royal Society of Chemistry
CHEMINAS, Widmer, MDPI Sensors Finalist 2020
MicroTAS2020
Graduate Merit Scholarship 2012-2015
Shanghai Jiao Tong University
National Graduate Mathematical Contest in Modelling (2nd Prize) 2014
Ministry of Education of China
Summa Cum Laude 2012
Ministry of Education of Shanghai
National Aspiration Scholarship 2009-2011
Ministry of Education of China
Academic Excellence Scholarship 2009-2011
Donghua University
The Scholarship of Santoni Knitting Machinery Co., Ltd. 2011
Donghua University
Zhou Huasheng Scholarship 2010
Donghua University
Tang Xiangqian Scholarship 2009
Donghua University

PUBLICATIONS

Note: † indicates equal contribution. * indicates the corresponding author(s).

After joining UT Southwestern

1. **Binbin Ying**†, Giovanni Traverso*, et al., Bioinspired soft robots for navigating gastrointestinal environments in the deep small intestine, ***Science Robotics***, *In Press*.
2. Chong Zhang, ...,**Binbin Ying*,** Kewang Nan*, et al**.**, Ingestible electronic capsules for in situ sensing of diverse biomarkers, ***Device*** ***(Cell Press, Invited)****,* 2025.
3. Erika Yan Wang,…,**Binbin Ying**, …,Robert Langer*, Ana Jaklenec*. A Hybrid Polymeric System for Programmed Drug Release After Myocardial Infarction. ***Cell Biomaterials*** ***(Cell Press)****, 2025*. (*MIT News*)

Before joining UT Southwestern

4. **Binbin Ying,** et al**.**, An electroadhesive hydrogel interface for prolonged mucosal theranostics (e-GLUE), ***Science Translational Medicine****,* 2025.
5. Kewang Nan†, Kiwan Wong†, Dengfeng Li†, **Binbin Ying**†, et al., An ingestible, battery-free, tissue-adhering robotic interface for non-invasive and chronic electrostimulation of the gut. ***Nature Communication***, 2024.
6. Erika Yan Wang†, Morteza Sarmadi†, **Binbin Ying**†, Ana Jaklenec*, Robert Langer*. Recent advances in micro- and nanoscale carrier systems for controlled delivery of vaccines, ***Biomaterials***, 2023**.**
7. **Binbin Ying†,** Hao Huang†, Yuyan Su, Julia G Howarth, Zhen Gu*, Kewang Nan*. Theranostic gastrointestinal residence systems, ***Device*** (*Cell Press, invited*)**,** 2023.
8. Kewang Nan†, Vivian Feig†, **Binbin Ying†,** Julia G Howarth, Ziliang Kang, Yiyuan Yang, and Giovanni Traverso, Mucosa-interfacing electronics, ***Nature Reviews Materials*****,** 2022.
9. **Binbin Ying,** Runze Zuo, Yilun Wan and Xinyu Liu*. An ionic hydrogel-based anti-freezing triboelectric nanogenerator. ***ACS Applied Electronic Materials*****,** 2022.
10. **Binbin Ying,** Xinyu Liu*. Skin-like hydrogel devices for wearable sensing, soft robotics and beyond. ***iScience*** *(Cell Press, invited)*, 2021.
11. **Binbin Ying,** Ryan Chen, Runze Zuo, Jianyu Li, Xinyu Liu*. An anti-freezing, ambient-stable and highly stretchable ionic skin with strong surface adhesion for wearable sensing and soft robotics. ***Advanced Functional Materials***, 2021. (*Selected into Hot Topic session: Robotics)*
12. **Binbin Ying**, Siwan Park, Longyan Chen, Xianke Dong, Edmond W. K. Young, and Xinyu Liu*. NanoPADs and NanoFACEs: an optically transparent nanopaper-based device for biomedical applications. ***Lab on a Chip***, 2020. (*Highlighted as the Inside-Back-Cover article*)
13. Longyan Chen†, **Binbin Ying†,** Pengfei Song, and Xinyu Liu*. A nanocellulose-paper-based sers multiwell plate with high sensitivity and high signal homogeneity. ***Advanced Materials Interface****,* 2019. *(Highlighted as the Back-Cover article and selected into Hot Topic session)*
14. **Binbin Ying**, Qiyang Wu, Jianyu Li*, Xinyu Liu*, An ambient-stable and stretchable ionic skin with multimodal sensation, ***Materials Horizons***, 2020. (*2020 Horizons Outstanding Paper Award Winners, Materials Horizons Emerging Investigators Series, and 2020 Materials Horizons most popular articles*)
15. **Binbin Ying**, Qing Zhu, Aili Zhang*. Study of specific absorption rate of radiofrequency in frozen tissue. ***Progress in Biomedical Engineering***, 2015.
16. Anita Dey Barsukova, **Binbin Ying**[#], Giovanni Traverso*, et al., A Better Way to Visualize the Cervix: a Low-Cost Cervical Cancer Screening Device for LMIC Settings, ***Journal of Medical Devices***, 2025. (#Student mentor)
17. Xian Wang, Zheyuan Gong, Tiancong Wang, Junhui Law, Xin Chen, Siyi Wanggou, Jintian Wang, **Binbin Ying**, et al. Mechanical nanosurgery of chemoresistant glioblastoma using magnetically controlled carbon nanotubes, ***Science Advances***, 2023.
18. Shriya S. Srinivasan, Sabrina Liu, Ryo Hotta, Sukhada Bhave, Amro Alshareef, **Binbin Ying**, et al. Luminal Electrophysiological Neuroprofiling System for gastrointestinal neuromuscular diseases, ***Device*** *(cell press)*, 2024.
19. Yidan Lyu, Hao Huang, Yuyan Su, **Binbin Ying**, Wen-Che Liu, Kairu Dong, Ningjie Du, Robert S. Langer, Zhen Gu, and Kewang Nan, Macroencapsulated bacteria for in vivo sensing and therapeutics. ***Matter*** (*cell press, invited*), 2024.
20. Junyu Chen, Yichao Shi**, Binbin Ying**, et al., Wearable heater based on laser induced graphene and kirigami structure. ***Materials Horizons***, 2024.
21. Zhanfeng Zhou†, Runze Zuo†, **Binbin Ying**, and Xinyu Liu*. A sensory soft robotic gripper capable of learning-based object recognition and force-controlled grasping. ***IEEE Transactions on Automation Science and Engineering***, 2022.
22. Yueyue Pan, Zhen Qin, Sina Kheiri, **Binbin Ying**, et al., Optical printing of conductive silver on ultrasmooth nanocellulose paper for flexible electronics. ***Advanced Engineering Materials*** *(highlighted as the Cover article),* 2022.

23. Alizadeh-Meghrazi Milad, **Binbin Ying**, et al., Evaluation of dry textile electrodes for long-term electrocardiographic monitoring. ***BioMedical Engineering OnLine***, 2021.
24. Runze Zuo, Zhanfeng Zhou**, Binbin Ying#,** Xinyu Liu. A soft robotic gripper with anti-freezing ionic hydrogel-based sensors for learning-based object recognition. 2021 **IEEE *International Conference on Robotics and Automation (ICRA)***. (#Student supervisor)
25. Zhen Yin, Bihe Chen, Xiangkun Elvis Cao, **Binbin Ying**, et al., Young martlets: Exploring the world of academia and beyond." ***Matter*** (cell press, invited), 2021.
26. Alexander Winkler-Schwartz, Recai Yilmaz, **Binbin Ying**, et al., Creating artificial tumors with similar biomechanical and imaging characteristics to human brain tumors, ***World Neurosurgery***, 2020.

PATENTS

1. **Binbin Ying**, Xinyu Liu. Nanofibrillated-cellulose-paper-based microfluidic devices, PCT/CN2018/114863, 2019.
2. Giovanni Traverso, **Binbin Ying**, Ahmad Mujtaba Jebran, Sahab Babaee. Bioinspired soft robots for navigating gastrointestinal environments in the deep small intestine. Submitted for US Patent, 2025.

PRESENTATIONS AND INVITED LECTURES

1. "Soft Medical Devices for Hard Health Problems in Extreme Environments.", MIT Langer Lab Seminar, 2025.
2. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Mechanical and Process Engineering, ETH Zurich, 2025.
3. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2025.
4. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar (Virtual), School of Biomedical Engineering, ShanghaiTech University, 2025.
5. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar (Virtual), School of Engineering, Westlake University, 2025.
6. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar (Virtual), Faculty of Medicine and Health Technology, Tampere University, 2025.
7. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar (Virtual), Department of Biomedical Engineering, University of Galway, 2025.
8. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Materials Science and Engineering, Monash University, 2025.
9. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Biomedical Engineering, UT Southwestern Medical Center, 2025.
10. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Mechanical Engineering, University of Wisconsin-Madison, 2025.

11. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Mechanical and Aerospace Engineering, New York University, 2025.
12. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Biomedical Engineering, UMass Amherst, 2025.
13. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Chan Zuckerberg Biohub Chicago, 2024.
14. "Engineering Soft Medical Devices to Solve Hard Health Problems in Extreme Environments." Faculty Candidate Seminar, Department of Mechanical Engineering, University of Hong Kong, 2024.
15. "An Electroadhesive Hydrogel Interface for Prolonged Gastrointestinal Theranostics," MRS Spring Conference, 2024.
16. "Medical Robotics," Faculty Candidate Seminar, Department of Mechanical Engineering, Stevens Institute of Technology, 2024
17. "Medical Robotics," Scientific Symposium 2024, Max Planck Institute for Intelligent Systems, 2024
18. "An Electroadhesive Hydrogel Interface for Prolonged Gastrointestinal Theranostics," MIT Marble Cancer Seminar, 2024.
19. "Hydrogel wearable and ingestible electronics," Design Medical Devices Conference, University of Minnesota, 2022.
20. "An anti-freezing, ambient-stable and highly stretchable ionic skin with strong surface adhesion for wearable sensing and soft robotics," MRS Spring Conference, 2022.
21. "An anti-freezing, ambient-stable and highly stretchable ionic skin with strong surface adhesion for wearable sensing and soft robotics," Toronto Biomedical Engineering Conference (ToBE), University of Toronto, 2021. (Best Abstract Award)
22. "An ambient-stable and stretchable ionic skin with multimodal sensation," Harvard Engineering and Applied Science Forum (EASF), 2020.
23. "NanoFACEs: an optically transparent nanopaper-based device for cell culture," The International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2020. (CHEMINAS, Widmer, MDPI Sensors Finalist)
24. "An ambient-stable and stretchable ionic skin with multimodal sensation," 2020 MRS Fall & Spring Meeting, 2020.
25. "A highly-transparent nanocellulose-paper-based microfluidic device," MIE symposium, University of Toronto, 2020. (Best Abstract Award)
26. "A highly-transparent nanocellulose-paper-based microfluidic device," The International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2018. (Poster)
27. "A nanopaper device for highly sensitive and homogeneous SERS biosensing," The International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2017.

MEDIA COVERAGES (SELECTED LIST)

1. The paper "An anti-freezing, ambient-stable and highly stretchable ionic skin with strong surface adhesion for wearable sensing and soft robotics (published in *Advanced Functional Materials*)" was covered in *University of Toronto News* and *TechXplore*.
2. The paper "An ambient-stable and stretchable ionic skin with multimodal sensation (published in *Materials Horizons*)" was covered in *University of Toronto News*, *Science Daily, EurekAlert, Tech Xplore, New Atlas,* and *The Engineer*.

TEACHING

Kaufman Teaching Certificate Program 01/2023-05/2023
MIT
- Systematically trained with a pedagogical theory based on student-centered teaching philosophy.
- Designing the framework for a new course on Medical Device Design

MECH 547 Mechanics of Biological Materials 11/2023
Mechanical Engineering, McGill University
- Served as a Guest Lecturer on the topic of Mucosa-Interfacing Electronics/Robotics.

BWH Breakfast Seminar 11/2023
Brigham and Women's Hospital, Harvard Medical School
- Served as a Guest Lecturer on the topic of Wireless Power Transfer for Ingestible Electronics/ Robotics.

Course 2.750 Medical Device Design 01/2022-05/2022
Mechanical Engineering, MIT
- Served as a team mentor for the project of Facilitating a Screen and Treat Approach in Cervical Cancer.
- Held weekly team meeting and mentored activities including idea generation, device fabrication, final presentation, and project paper writing.

MECH 383 Applied Electronics and Instrumentation 01/2017-05/2017
Mechanical Engineering, McGill University
- Served as a TA for MECH 383 Applied Electronics and Instrumentation.
- Held weekly office hours, conducted lab tutorials, and graded lab reports.

STUDENT MENTORSHIPS

Mentored 20 students at high school, undergraduate, and graduate levels

SERVICE

Conference/Symposium Co-Chair
- SB03 MRS Symposium on Robotic Materials, MRS Spring Meeting 2022
- IEEE EMBS International Summer School of Neural Engineering, SJTU 2015

Webinar Organizer
- Cofounder and VP External, The Martlets Society (TMS, a non-profit international community for young scholars to build connections, share work and exchange ideas)
- TMS Talk S4E1: Designing robotic materials from sensorized soft and architected matter
- TMS Talk S3E5: Bio-inspired flexible surfaces, adhesives, and tentacles for soft robots
- TMS Talk S3E1: Green electronics to gray matter
- TMS Talk S2E8: Designing intelligent nano-electronics for biological applications
- TMS Talk S2E7: Conductive hydrogels for next-generation bio-electronic interfaces
- TMS Talk S2E3: Smart textiles for personalized health care
- TMS Talk S1E6: Adaptive biodesign for medical, and microrobots

Guest Editor
- *Microsystems & Nanoengineering,* Springer Nature 2025

- *Robotics and AI,* Frontiers 2022

Peer-Review for Scientific Journals and Conferences

- AAAS (*Science Advances*)
- Robotics Conferences (*ICRA, RoboSoft*)
- Cell Press (*Matter, Device*)
- Wiley (*Advanced Materials, Advanced Functional Materials*)
- RSC (*Materials Horizons, Soft Matter, Journal of Materials Chemistry B*)

Membership

- Controlled Release Society 2024-present
- Biomedical Engineering Society 2024-present
- Materials Research Society 2019-present
- Canadian Biomaterial Society 2016-present
- Canadian Society for Mechanical Engineering 2016-present

Others

- Student representative, UofT MIE Faculty Searching Committee, University of Toronto
- Poster judge, Summer Undergraduate Research in Engineering (SURE), McGill University
- Team leader, National Graduate Mathematical Contest in Modelling, Shanghai Jiao Tong University
- President, Shanghai Jiao Tong University Alumni Association-Montreal
- VP external, McGill Chinese Graduate Student Association
- Team co-founder, Chunhui Cup Entrepreneurship Competition of Chinese scholars abroad
- Council representative, McGill Post Graduate Students' Society
- Founder and president, Donghua Referee Association
- Volunteer vice chair, Shanghai World EXPO 2010

REFERENCES

Postdoc Advisor: Giovanni Traverso, MD**,** Ph.D.
Associate Professor
Department of Mechanical Engineering
Massachusetts Institute of Technology
77 Massachusetts Avenue, 3-340, Cambridge, MA 02139
Email: cgt20@mit.edu

Postdoc Advisor: Robert S. Langer, Ph.D.
Institute Professor
Department of Chemical Engineering
Massachusetts Institute of Technology
77 Massachusetts Avenue, 76-661, Cambridge, MA 02139
Email: rlanger@mit.edu

PhD Advisor: Xinyu Liu, Ph.D.
Professor
Department of Mechanical and Industrial Engineering
University of Toronto
5 King's College Road, MC 312, Toronto, ON, M5S 3G8
Email: xyliu@mie.utoronto.ca

PhD Advisor: Jianyu Li, Ph.D.
Associate Professor
Department of Mechanical Engineering
McGill University
817 Sherbrooke Street West, MD 159, Montreal, QC H3A 0C3
Email: jianyu.li@mcgill.ca