

Dear CMBE-SIG Committee

I am writing to nominate myself for the position of CMBE Council Member. As a proud member and active participant in the CMBE community for over 12 years, I deeply admire the sustained effort and vision of past and current leadership in fostering a collegial and inclusive community of scientists and engineers. I am eager to contribute my own experiences and perspectives to support the continued growth of the CMBE community.

I am an Associate Professor of Biomedical Engineering and Chemical Engineering at Syracuse University (SU). I earned my Ph.D. in Bioengineering from Clemson University in 2011, followed by postdoctoral research at the University of California, Berkeley. I joined SU as a faculty member in 2016 and was granted tenure in 2022. My lab's research focuses on leveraging human hiPSC technology for organoid engineering and the scalable extracellular vesicle therapeutics. In addition, I am leading a convergent, transdisciplinary collaboration with three other research labs at SU to design and build advanced organoid systems with tailored properties.

At SU, I serve as the Graduate Program Director for both Biomedical Engineering and Chemical Engineering programs, roles in which I work to enhance graduate education and mentorship. I was also a member of the executive committee of the BioInspired Institute, an interdisciplinary initiative at SU focused on addressing grand challenges in biology and bioengineering. I currently serve as the Co-PI and executive committee member for our newly funded NSF Research Traineeship (NRT) program. These leadership roles have allowed me to advocate for increased mentorship, professional development, and career advancement for students, postdoctoral fellows, and junior faculty. To further enhance my leadership and collaborative skills, I was recently selected to participate in an Academic Leadership Training workshop hosted by John Hopkins University in February 2025.

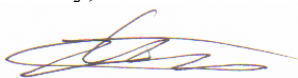
My relationship with the CMBE community has been instrumental in shaping my professional development. My work was honored with the CMBE Postdoctoral Fellow Award in 2016 and the Rising Star Award in 2021. These experiences have inspired my commitment to giving back to the community that has supported me throughout my academic career. I have contributed as an abstract reviewer for CMBE conferences. Beyond CMBE, I have held key service roles in professional organizations, including organizing committees, session chairing, and award committees for BMES, the Society for Biomaterials (SFB), and the American Heart Association (AHA). Notably, I serve on the SFB Education and Professional Development (E&PD) Committee, where I work to further our existing framework to inspire and mentor the next generation of biomaterial scientists and engineers.

If elected to the CMBE Council, I am committed to fostering a collaborative, inclusive, and supportive environment that enables the success of all members. Specifically, I propose the following initiatives:

1. **Prioritizing Early-Career Support:** Expand opportunities for early-career faculty and trainees by enhancing existing award mechanisms. Create pathways for fostering their leadership in CMBE community through roles such as session co-chairing, abstract reviewing, and committee involvement.
2. **Sustaining Visibility of Awardees:** Ensure that past awardees remain actively engaged and visible in the community by inviting them for session short talks alongside new rising stars. This continuity will foster a culture where contributions are celebrated over the long term, reinforcing inclusivity and belonging.
3. **Promoting Collaboration with Minority-Serving Institutions:** Strengthen partnerships with minority-serving institutions by creating dedicated initiatives and inviting participation in annual conferences, thereby fostering a more diverse and equitable community.

At the heart of these efforts is my unwavering commitment to fostering a sense of community, belonging, and collaboration within CMBE. I will advocate for the resources and initiatives necessary to empower the next generation of biomedical scientists and engineers while supporting the professional growth of all CMBE members.

Sincerely,



Zhen Ma
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EMPLOYMENT

Associate Professor; 2022 ~ Present

Department of Biomedical and Chemical Engineering
Department of Biology (Courtesy Affiliation)
BioInspired Institute for Materials and Living Systems
Syracuse University, NY, USA

Assistant Professor; 2016 ~ 2022

Department of Biomedical and Chemical Engineering
BioInspired Institute for Materials and Living Systems
Syracuse University, NY, USA

Visiting Associate Professor; 2022

Nancy E. and Peter C. Meinig School of Biomedical Engineering
Cornell University, NY, USA

Affiliated Faculty; 2019 ~ Present

Masonic Medical Research Institute (MMRI)
Utica, NY, USA

Postdoctoral Fellow, Prof. Kevin E. Healy's Laboratory; 2012 ~ 2016

Department of Bioengineering, University of California, Berkeley, CA, USA
California Institute for Quantitative Biosciences

EDUCATION

Doctor of Philosophy; 2007 ~ 2011

Department of Bioengineering, Clemson University, Clemson, SC, USA
Dissertation: Electrical coupling between micropatterned cardiomyocytes and stem cells

Master of Science, Laboratory of Biomedical Instruments; 2005 ~ 2007

College of Precision Instrument & Optoelectronics Engineering, Tianjin University, China
Thesis: Floating-reference for non-invasive blood glucose sensing based on near-infrared spectroscopy

Bachelor of Science, Control Technology and Instruments; 2001 ~ 2005

College of Precision Instrument & Optoelectronics Engineering, Tianjin University, China

AWARDS AND HONORS

- 2024 RoosterBio Development Award, RoosterBio, Inc.
- 2022 Young Investigator Award of the Journal *Cells Tissues Organs*
- 2021 CMBE Rising Stars Award of BMES Cellular and Molecular Bioengineering Special Group
- 2020 NSF CAREER Award, National Science Foundation
- 2019 Syracuse University Travel Award, NSF Grant Conference
- 2019 2nd Place Poster Award, Asian Cardiovascular Symposium, BCVS-AHA
- 2017 Lush Prize Young Researcher at Americas, Lush Cosmetics
- 2016 Disease Models & Mechanisms Journal Travel Grants
- 2016 American Heart Association (AHA) Postdoctoral Fellowship
- 2016 Fellow Award of Biomedical Engineering Society, Advanced Biomanufacturing Conference
- 2015 Fellowship of UC Systemwide Bioengineering Symposium
- 2013 Biomedical Engineering Society (BMES) Spotlight Member

- 2013 Fellow Award of Biomedical Engineering Society, Cellular and Molecular Bioengineering Group
- 2012 Siebel Institute Postdoctoral Fellowship
- 2012 CNR Biological Imaging Facility “Image of Month”
- 2008 Clemson Graduate Student Travel Scholarship

ACADEMIC SERVICES

Professional Membership

Biomedical Engineering Society (**BMES**), American Heart Association (**AHA**), Society of Biomaterials (**SFB**)

Guest Editor

BioNanoScience, Topic Issue “*Microsystem for stem cell research*”
 Frontiers in Bioengineering and Biotechnology “*Bioengineering and Biotechnology Approaches in Cardiovascular Regenerative Medicine, Volume IP*” with Jianyi Zhang (UAB) and Vahid Serpooshan (Emory)

Conference, Meeting and Symposium Chair

- 2024 Panelist: “Research and Creative Activities”, New Faculty Orientation, the Office of Research
- 2024 Panelist: “Biomufacturing – Health-Related”, NSF Future Manufacturing Grantee Conference
- 2024 Co-Chair: BMES Session “*Emerging Tissue Engineering Technologies*”
- 2022 Co-Chair: BMES Session “*3D Cellular Engineering Models*”
- 2022 Chair: International Conference on PharmScience, Session “*Analysis, Pharmaceutical Technology*”
- 2021 Chair: Biophysics Society (BPS) Annual Meeting, Session “*Platform: Muscle I*”
- 2019 Co-Chair: BMES Session “*Cardiomyocyte Mechanobiology and Contractility*”
- 2019 AHA BCVS Session Moderator “*Heart Failure in a Dish: iPSCs to Organoids*”
- 2018 PREDiCT 3D Models Summit, Workshop Leader “*Development of stem cell organoid models for drug screening applications*”
- 2017 Co-Chair: BMES Session “*Organ-on-a-Chip Models for Drug Discovery and the Study of Disease III*”
- 2017 Co-Chair: BMES Session “*Mechanobiology of the Vascular and Nervous Systems*”

Grant Reviewer

- 2025 NSF NRT Panel
- 2024 AHA Predoctoral Fellowship Review Panel
- 2024 NIH CMT Study Session Panel
- 2024 Upstate-Watson (Binghamton University) collaborative pilot grant reviewer
- 2024 NIH NIAID U01 Panelist
- 2024 NIH NIA SBIR Panelist
- 2023 BioInspired Seed Grant Reviewer
- 2023 NSF ERC Site Visit Review Panelist
- 2023 Reviewer, UK Research and Innovation, Biotechnology and Biological Sciences Research Council
- 2022 DoD CDMRP *Ad Hoc* Reviewer
- 2022 NSF ERC Site Visit Review Panelist
- 2022 NSF CBET RECODE Program Pre-Proposal and Full-Proposal Panelist
- 2021 NASA/NIH/FDA Space Biology Review Panelist
- 2021 European Research Council Consolidator Grant External Reviewer
- 2021 Internal CUSE Grant Review Panelist
- 2020 DoD CDMRP Pre-Application Review Panelist
- 2020 Reviewer, University of Padova (Italy), Intramural Research Program
- 2020 NSF CBET Unsolicited Panelist
- 2019 Reviewer, Masonic Medical Research Institute, Halfond-Weil Postdoctoral Fellowship
- 2019 Reviewer, Internal Gerber Endowed Fund for the Gerber Laboratory in Auditory Science
- 2018 Reviewer, Internal Gerber Endowed Fund for the Gerber Laboratory in Auditory Science
- 2017 NSF CBET CAREER Panelist, Cellular Engineering & Microfluidics

Leadership and Services

- 2024 - Graduate Program Director, Biomedical Engineering and Chemical Engineering Programs
 2024 – 2025 Society of Biomaterial, Education & Professional Development (E&PD) Committee
 2025 Participant in Cottrell Scholars Collaborative Academic Leadership Training Workshop
 2024 – 2028 NSF NRT Executive Committee
 2024 BMCE Internal Department Chair Search Committee
 2023 – 2025 ECS College Tenure & Promotion Committee
 2023 BMCE Department Chair Reappointment Committee
 2023 – 2024 Search Committee Chair, BioInspired Cluster Hires “*Drug Delivery*”
 2022 – 2024 BioInspired Institute, Executive Committee
 2022 – 2023 ECS College Strategic Plan Departmental Committee
 2022 – 2023 Search Committee Chair, BioInspired Cluster Hires “*Mechanobiology*” and “*Drug Delivery*”
 2019 – 2021 BioInspired Institute, Focus Group Co-Leader “*Mechanics of Development and Disease*”
 2018 Cluster Hire Initiative, Co-Leader “*BeST: Biological Enabled Science & Technology*”
 2017 – 2020 Organizer and Chair: Syracuse Biomaterials Institute, Stevenson Biomaterial Poster Session
 2016 – 2021 Faculty Search Committee for the Departments of Biomedical & Chemical Engineering (BMCE), Biology, and Physics
 2017 – Present Graduate Student Recruitment Committee
 2019 Departmental Committee for Teaching Peer Evaluation

GRANTS

- 2024 NIH/NICHHD R21; \$411,125
Stem Cell-Derived Microfluidic Placenta Organoids
 PI: Yi Zheng; MPI: Zhen Ma
 Period: 9/25/2024 – 8/31/2026
- 2024 Intramural Team Building for Large Collaborative Grant; \$25,000
Advancing Designer Organoids via Biomaterial Innovations
 PI: Zhen Ma; Co-PIs: Michael Blatchley, Era Jain, Yi Zheng
 Period: 1/1/2025 – 12/31/2025
- 2024 National Science Foundation; \$2,993,166
NRT-URoL: Emergent Intelligence Research for Graduate Excellence in Biological and Bio-Inspired Systems (EmIRGE-Bio)
 PI: Mary Lisa Manning; Co-PIs: Heidi Hehnly, Teng Zhang, Carlos Castaneda, Zhen Ma
 Period: 9/1/2024 – 8/31/2029
- 2024 American Heart Association; \$10,000
International Collaboration on Modeling Left Ventricular Non-Compaction Using Cardiac Organoids
 PI: Zhen Ma; Co-PI: José Eduardo Marques Bragança (University of Algarve)
 Period: 4/1/2024 – 3/31/2025
- 2024 Bela & Catherine Schick Foundation; \$2,000
Fetal Development and Drug-Induced Congenital Heart Defects
 PI: Zhen Ma
 Period: 2/5/2024 – 2/4/2025
- 2023 National Science Foundation, Future Manufacturing; \$500,000
FMSG: Bio: Advancing Extracellular Vesicle Biomanufacturing of CRISPR-Edited Human iPSC-Derived MSCs with Next-Generation Purification
 PI: Zhen Ma; Co-PI: Thomas R. Gaborski (RIT), Karin Wuertz-Kozak (RIT)
 Period: 1/1/2023 – 12/31/2025
- 2022 BioMarin Pharmaceutical Inc.; \$180,668
Recapitulating Noonan Syndrome (NS)-Associated Hypertrophic Cardiomyopathy in hiPSC-Derived Cardiomyocytes and Cardiac Organoids.
 PI: Zhen Ma
 Period: 11/4/2022 – 11/3/2024

- 2022 Intramural CUSE Grant; \$25,000
Understanding Cardiomyocyte Autonomous Repair of Sarcomere Microinjury Induced by Active Mechanical Actuation based on Shape Memory Polymer Substrate
PI: Zhen Ma, co-PI: James Henderson
Period: 5/1/2022 – 4/30/2024
- 2022 Internal COVID Relief Grant; \$24,500
Accelerate Graduate Student Research Progress Impacted by COVID19 Pandemic
PI: Zhen Ma
Period: 1/24/2022 – 12/31/2022
- 2021 National Science Foundation, Biomechanics and Mechanobiology (NSF BMMB); \$406,551
Probing Cellular Dynamic Mechanobiology Using Human Cardiomyocytes on a Stimuli-Responsive Nano-Topographic Substrate
PI: Zhen Ma; co-PI: James H. Henderson
Period: 11/1/2021 – 10/31/2025
- 2021 Internal Small Equipment Grant; \$13,563
Small Equipment Proposal: Acquiring a Hypoxic Cell Culture System
PI: Zhen Ma; co-PI: Era Jain
Period: 7/1/2021 – 12/31/2021
- 2021 Internal Small Equipment Grant; \$37,500
Automated Histology System for Paraffin Based Tissue Processing, Embedding and Sectioning
PI: Era Jain; co-PIs: Zhen Ma, Pranav Soman, Mary Beth Monroe
Period: 7/1/2021 – 12/31/2021
- 2021 Internal Small Equipment Grant; \$13,577
High-Speed Centrifuge for Biomaterials and BioInspired Research
PI: James Henderson; co-PIs: Zhen Ma, Era Jain, Pranav Soman
Period: 7/1/2021 – 12/31/2021
- 2020 BioInspired Institute Seed Grant; \$30,000
Designer Microgels for Generation of Synthetic Blastocyst Mimics
PI: Era Jain; co-PI: Zhen Ma
Period: 1/1/2021 - 12/31/2021
- 2020 Gerber Auditory Research Grant; \$9,500
Generating Inner Ear Stem Cell Organoids for Hearing Loss Repair
PI: Zhen Ma
Period: 7/1/2020 – 6/30/2021
- 2020 Intramural CUSE Grant; \$8,800
Interdisciplinary Biomaterial Seminar Series
PI: Zhen Ma
co-PI: Dacheng Ren, Shikha Nangia, Teng Zhang, Liviu Movileau
Period: 6/1/2020 – 5/30/2022
- 2020 Intramural CUSE Grant; \$21,000
An Integrated Modeling and Experimentation Platform to Explore the Biophysical Mechanisms of Tissue Structures and Mechanics
PI: Teng Zhang, co-PI: Zhen Ma
Period: 6/1/2020 – 5/30/2022
- 2020 Intramural CUSE Grant; \$28,000
Taking Syracuse University to the Next Level with Advanced Microscopy
PI: Jennifer Ross, co-PI: Zhen Ma, Heidi Hehnly
Period: 6/1/2020 – 5/30/2022
- 2020 NIH/NICHD R01; \$2,315,109
Establishing an In Vitro Embryotoxicity Risk Classification System Based on Human Cardiac Organoid
PI: Zhen Ma, Co-Is: Brittany Kmush and Jeffrey Amack
Period: 04/01/2020 – 02/28/2026
- 2020 NIH/NIAMS R21; \$370,470
In Vitro Model to Study the Role of Microvascular Physiology in Regulation Osteogenesis

- PI: Pranav Soman, Co-I: Zhen Ma
 Period: 1/21/2020 – 12/31/2021
- 2020 National Science Foundation, Engineering Biomedical System (NSF EBMS); \$500,000
CAREER: Engineering Stem Cell-Based Cardiac Organoids
 PI: Zhen Ma
 Period: 4/1/2020 – 3/31/2025
- 2019 American Heart Association (AHA) Predoctoral Fellowship; \$53,688
 Engineering Cardiac Organoids for Embryotoxicity Screening
 PI: Zhen Ma; Awardee: Plansky Hoang
 Period: 1/1/2019 – 12/31/2020
- 2019 Internal Funding for Small Equipment Grant; \$170,000
Acquiring a 3D Whole Tissue Imaging System
 PI: Zhen Ma, co-PI: Pranav Soman
 Period: 1/1/2019 – 7/1/2019
- 2018 National Science Foundation, Engineering Biomedical System (NSF EBMS)
 Syracuse University (\$298,500) and University of California Berkeley (\$300,000)
Collaborative Research: Engineering Human 3D Cardiac Tissue Model of Hypertrophic Cardiomyopathy
 PI: Zhen Ma
 Period: 7/1/2018 – 6/30/2021
- 2018 Intramural CUSE Grant; \$30,000
Modeling Embryo Gastrulation via an In Vitro Experimental-Theoretical Combined Framework
 PI: Zhen Ma, co-PI: M. Lisa Manning
 Period: 5/1/2018 – 5/30/2020
- 2018 Intramural CUSE Grant; \$10,000
Interdisciplinary Seminar Series on Biomaterials
 PI: Dacheng Ren, co-PI: Zhen Ma, Shikha Nangia, Teng Zhang, Jennifer Schwarz
 Period: 5/1/2018 – 5/30/2020
- 2017 Lush Prize for Young Researchers at Americas; \$13,250
Human Developing Heart Model for Animal-Free Embryotoxicity Drug Screening
 PI: Zhen Ma
 Period: 11/1/2017 – 10/31/2018

PUBLICATIONS

(Corresponding authors are underlined)

1. Kandula A.K.R., Phamornratanakun T. Gomez A.H., Bhoi R., El-Mokahal M., **Ma Z.**, Feng Y., Yang H. (2025) “Generative AI for cardiac organoid fluorescence generation” (Submitted)
2. Song Y., Seitz M., Jain E., Yang H., **Ma Z.** (2025) “Mechanically and chemically defined PEG hydrogels for human cardiac organoids development” (Under Revision)
3. Mai N.Y., Wu X., Shi H., Mather P.T., Henderson J.H., **Ma Z.** (2025) “Disrupted sarcomere reorganization of BAG3-knockout human iPSC-derived cardiomyocytes on a dynamic topographic substrate” (Submitted)
4. Song Y., Mai N.Y., Liu H., Seitz M., Jain E., **Ma Z.** (2025) “Biomaterials in human cardiac organoid development and applications” *Heart-Relevant Organoids: Fabrication, Characterization, and Biomedical Application*. (Book Chapter) (Submitted)
5. Thai N.L.B. Fittante E., **Ma Z.**, Monroe M.B. (2025) “Rapid fabrication of polyvinyl alcohol hydrogel foams with encapsulated mesenchymal stem cells for chronic wound treatment” *Journal of Biomedical Materials Research Part A* 113(1): e37868.
6. Winston T., Song Y., Shi H., Yang J., Alsudais M., Kontaridis M.I., Wu Y., Gaborski T.R., Meng Q., Cooney R.N., **Ma Z.** (2024) “Lineage-specific mesenchymal stromal cells derived from human iPSCs showed distinct patterns in transcriptomic profile and extracellular vesicle production” *Advanced Science* 11(28): 2308975.
7. Kowalczewski A., Sun S., Mai N.Y., Song Y., Hoang P., Liu X., Yang H., **Ma Z.** (2024) “Design optimization of geometrically confined cardiac organoids enabled by machine learning techniques” *Cell Reports Methods* 4(6): 100798. **Cover Article**
8. Seitz M., Song Y., Lian X., **Ma Z.**, Jain E. (2024) “Soft polyethylene glycol hydrogels support human PSC

- self-renewal and morphogenesis” *ACS Biomaterials Science & Engineering* 10(7): 4525–4540.
9. Dube D.K., Dube S., Shi H., Benz P., Randhawa S., Fan Y., Wang J., **Ma Z.**, Sanger J.W., Sanger J.M., Poiesz B.J. (2024) “Sarcomeric tropomyosin expression during human iPSC differentiation into cardiomyocytes” *Cytoskeleton* 81(9-10): 448-472.
 10. Meng Q., Winston T., Ma J., Song Y., Wang C., Yang J., **Ma Z.**, Cooney R.N. (2024) “Induced pluripotent stem cell-derived mesenchymal stem cells-derived extracellular vesicles attenuate LPS-induced lung injury and endotoxemia in mice” *Shock* 62(2): 294-303.
 11. Maramraju S., Kowalczewski A., Kaza A., Liu X., Singaraju J.P., Albert M.V., **Ma Z.**, Yang H. (2024) “AI-organoid integrated systems for biomedical studies and applications” *Bioengineering & Translational Medicine* 9(2): e10641
 12. Amoli S.M., **Ma Z.**, Nakada Y., Fukuda K., Zhang J., Serpooshan V. (2024) “Editorial: Bioengineering and biotechnology approaches in cardiovascular regenerative medicine, volume II” *Frontiers in Bioengineering and Biotechnology* 12:1380646.
 13. Shi H., Kowalczewski A., Vu D., Liu X., Salekin A., Yang H., **Ma Z.** (2024) “Organoid Intelligence: integration of organoid technology and artificial intelligence in the new era of in vitro models” *Medicine in Novel Technology and Devices* 21: 100276.
 14. Singaraju J.P., Kadiresan A., Bhoi R.K., Gomez A.H., **Ma Z.**, Yang H. (2023) “Organalysis: multifunctional image preprocessing and analysis software for cardiac organoid studies” *Tissue Engineering Part C Methods* 29(12): 572-582.
 15. Wang C., Ramahdita G., Genin G., Huebsch N., **Ma Z.** (2023) “Dynamic mechanobiology of cardiac cells and tissues: current status and future perspective” *Biophysics Reviews* 4, 011314.
 16. Hoang P., Sun S., Tarris B., **Ma Z.** (2023) “Controlling morphology and functions of cardiac organoids by two-dimensional geometrical template” *Cells Tissues Organs* 212(1): 64–73.
 17. Shi H., Wang C., Gao B.Z., Henderson J.H., **Ma Z.** (2022) “Cooperation between myofibril growth and costamere maturation in human cardiomyocytes” *Frontiers in Bioengineering and Biotechnology* 10: 1049523.
 18. Kowalczewski A., Sakolish C.M., Hoang P., Liu X., Jacquir S., Rusyn I., **Ma Z.** (2022) “Integrating nonlinear analysis and machine learning for human induced pluripotent stem cell-based drug cardiotoxicity testing” *Journal of Tissue Engineering and Regenerative Medicine* 16(8): 732-743.
 19. Wang J., Fan Y., Wang C., Dube S., Poiesz B.J., Dube D.K., **Ma Z.**, Sanger J.M., Sanger J.W. (2022) “Inhibitors of the ubiquitin proteasome system block myofibril assembly in cardiomyocytes derived from chick embryos and human pluripotent stem cells” *Cytoskeleton* 78 (10): 461-491.
 20. Winston T., Chen C., Suddhapas K., Tarris B.A., Elattar S., Sun S., Zhang T., **Ma Z.** (2022) “Controlling mesenchyme tissue remodeling via spatial arrangement of mechanical constraints” *Frontiers in Bioengineering and Biotechnology* 10: 833595.
 21. Wang C., Vangelatos Z., Grigoropoulos C.P., **Ma Z.** (2022) “Micro-Engineered Architected Metamaterials for Cell and Tissue Engineering” *Materials Today Advances* 13: 100206.
 22. Wang C., Vangelatos Z., Winston T., Sun S., Grigoropoulos C.P., **Ma Z.** (2022) “Remodeling of architected mesenchymal microtissues generated on mechanical metamaterials” *3D Printing & Additive Manufacturing* 9(6), 483-489. **Cover Article**
 23. Wang C., **Ma Z.** (2022) “Biomaterial interfaces for cardiac cell and tissue engineering” *Advanced Technologies in Cardiovascular Bioengineering*, 249-280, Springer (Book Chapter)
 24. Shi H., Wu X., Sun S., Wang C., Ash-Shakoor A., Mather P.T., Henderson J.H., **Ma Z.** (2022) “Profiling the responsiveness of focal adhesions of human cardiomyocytes to extracellular dynamic nano-topography” *Bioactive Materials* 10: 367-77.
 25. Hoang P., **Ma Z.** (2021) “Biomaterial-guided organoid engineering for modeling development and diseases” *Acta Biomaterialia* 132(15): 23-36.
 26. Hoang P., Kowalczewski A., Sun S., Winston T.S., Archilla A., Lemus S., Ercan-Sencicek A.G., Gupta A.R., Liu W., Kontaridis M.I., Amack J., **Ma Z.** (2021) “Engineering spatial-organized cardiac organoids for developmental toxicity testing” *Stem Cell Reports* 16(5): 1228-1244.
 27. Anandkrishnan N., Ye H., Guo Z., Chen Z., Mentkowski K.L., Lang J.K., Rajabian N., Andreadis S.T., **Ma Z.**, Spornyak J.A., Lovell J.F., Wang D., Xia J., Zhou C., Zhao R. (2021) “Fast stereolithography printing of

- large-scale biocompatible hydrogel models” *Advanced Healthcare Materials* 10(10): 2002103.
28. Shi H., Wang C., **Ma Z.** (2021) “Stimuli-responsive materials for cardiac tissue engineering and dynamic mechanobiology” *APL Bioengineering* 5(1), 011506 **Feature Article**
 29. Vangelatos Z., Wang C., **Ma Z.**, Grigoropoulos C.P. (2020) “Architected mechanical designs in tissue engineering” *MRS Communications* 10(3): 379-390.
 30. Sun S., Shi H., Moore S., Wang C., Ash-Shakoor A., Mather P., Henderson J.H., **Ma Z.** (2020) “Progressive myofibril reorganization of human cardiomyocytes on a dynamic nano-topographic substrate” *ACS Applied Materials & Interfaces* 12(19): 21450-21462.
 31. Wang C., Koo S., Park M., Vangelatos Z., Hoang P., Conklin B.R., Grigoropoulos C.P., Healy K.E., **Ma Z.** (2020) “Maladaptive contractility of 3D human cardiac microtissues to mechanical nonuniformity” *Advanced Healthcare Materials* 9(8): 1901373. **Cover Article**
 32. Vangelatos Z., Grigoropoulos C.P., Farsari M., Gu G., **Ma Z.**, Komvopoulos K. (2020) “Biomechanical metamaterials fabricated through multiphoton lithography by tailoring 3D buckling” *Proc. SPIE* 11268.
 33. Wang C., Tran V., **Ma Z.**, Wen X. (2020) “Rapid prototyping technologies for tissue regeneration” *Rapid Prototyping of Biomaterials 2nd Edition, Techniques in Additive Manufacturing*, Chapter 5, 113-164, Elsevier
 34. Hoang P., Jacquir S., Lemus S., **Ma Z.** (2019) “Quantification of contractile dynamic complexities exhibited by human stem cell-derived cardiomyocytes using nonlinear dimensional analysis” *Scientific Reports* 9: 14714.
 35. Xiong Z., Li H., Kunwar P., Ramos R., Zhu Y., Mcloughlin S., Winston T.S., **Ma Z.**, Soman P. (2019) “User-defined cellular alignment using femtosecond laser hydrogel densification” *Biofabrication* 11(3): 035005.
 36. Winston T.S., Suddhapas K., Wang C., Ramos R., Soman P., **Ma Z.** (2019) “Manufacturing mesenchymal stem cell tissue rings from human induced pluripotent stem cells” *Stem Cells International* 2019: 5654324.
 37. Natividad-Diaz S., Browne S.A., Jha A.K., **Ma Z.**, Hossainy S., Kurokawa Y., George S.C., Healy K.E. (2019) “A combined hiPSC-derived endothelial cell and *in vitro* microfluidic platform for assessing biomaterial-based angiogenesis” *Biomaterials* 194: 73-83.
 38. Santoni S.M., Winston T.S., Hoang P., **Ma Z.** (2018) “Microsystems for electromechanical stimulations to engineered cardiac tissues” *Microphysiological Systems* 2(11): 1-21.
 39. Hoang P., Bang S.H., Huebsch N., Siemons B., Conklin B.R., Healy K.E., **Ma Z.**, Jacquir S. (2018) “Quantitatively characterizing drug-induced arrhythmic contractile motions of human stem cell-derived cardiomyocytes” *Biotechnology and Bioengineering* 115(8): 1958-70.
 40. **Ma Z.**, Huebsch H., Koo S., Mandegar M.A., Siemons B., Conklin B.R., Grigoropoulos C.P., Healy K.E. (2018) “Contractile deficits in engineered cardiac microtissues as a result of MYBPC3 deficiency and mechanical overload” *Nature Biomedical Engineering* 2(12): 955–67.
 41. Hoang P., Wang J., Conklin B.R., Healy K.E., **Ma Z.** (2018) “Generation of spatial-patterned developing cardiac organoids using human pluripotent stem cells” *Nature Protocols* 13(4): 723-737. **Cover Article**
 42. Koo S., Santoni S.M., Gao B.Z., Grigoropoulos C.P., **Ma Z.** (2017) “Laser-assisted biofabrication in tissue engineering and regenerative medicine” *Journal of Materials Research* 32(1): 128-142. **Special Issue: Early Career Scholars in Materials Science**

Prior to Syracuse University -----

43. Huebsch N., Loskill P., Deveshwar N., Spencer C.L., Judge L.M., Mandegar M.A., Fox C., Mohammed T., **Ma Z.**, Mathur A., Sheehan A.S., Truong A., Saxton M., Yoo J.C., Srivastava D., Desai T.A., So P.L., Healy K.E., Conklin B.R. (2016) “Miniaturized iPSC-cell-derived cardiac muscles for physiologically relevant drug response analyses” *Scientific Reports* 6:24726.
44. Yang H., Borg T.K., **Ma Z.**, Xu M., Wetzel G., Wang Z., Saraf L.V., Markwald R., Runyan R.B., Gao B.Z. (2016) “Biochip-based study of unidirectional mitochondrial transfer from stem cells to myocytes via tunneling nanotubes” *Biofabrication* 8: 015012.
45. Mathur A., **Ma Z.**, Loskill P., Jeawoody S., Healy K.E. (2016) “*In vitro* cardiac tissue models: current status

- and future prospects” *Advanced Drug Delivery Reviews* 96:203-13.
46. **Ma Z.**, Wang J., Loskill P., Huebsch N., Koo S., Svedlund F.L., Marks N.C., Hua E., Grigoropoulos C.P., Conklin B.R., Healy K.E. (2015) “Self-organizing cardiac microchamber mediated by geometric confinement” *Nature Communications* 6: 7413.
 47. Huebsch N., Loskill P., Mandegar M.A., Marks N.C., Sheehan A.S., **Ma Z.**, Mathur A., Nguyen T.N., Yoo J.C., Judge L.M., Spencer C.I., Chukka A.C., Russell C.R., So P.L., Conklin B.R., Healy K.E. (2015) “Automated video-based analysis of contractility and calcium flux in human-induced pluripotent stem-derived cardiomyocytes cultured over different spatial scales” *Tissue Engineering Part C* 21(5): 467-79
 48. **Ma Z.**, Koo S., Finnegan M.A., Loskill P., Huebsch N., Marks N.C., Grigoropoulos C.P., Conklin B.R., Healy K.E. (2014) “Three-dimensional filamentous human diseased cardiac tissue model” *Biomaterials* 35(5): 1367-77.
 49. Yang H., Borg T.K., Wang Z., **Ma Z.**, Gao B.Z. (2014) “Role of the basement membrane in regulation of cardiac electrical properties” *Annals of Biomedical Engineering* 42(6): 1148-57.
 50. **Ma Z.**, Liu Q., Yang H., Runyan R.B., Eisenberg C.A., Xu M., Borg T.K., Wang Y., Gao B.Z. (2013) “Laser patterning for MSC cardiogenic differentiation study at the single-cell level” *Light: Science and Application* 2: e68.
 51. **Ma Z.**, Yang H., Liu H., Xu M., Runyan R.B., Eisenberg C.A., Markward R.R., Borg T.K., Gao B.Z. (2013) “Mesenchymal stem cell-cardiomyocyte interactions under defined contact modes on laser-patterned biochips” *PLoS One* 8(2): e56554.
 52. Liu H., Shao Y., Qin W., Runyan R.B., Xu M., **Ma Z.**, Borg T.K., Markward R.R., Gao B.Z. (2013) “Myosin filament assembly onto myofibrils in live neonatal cardiomyocytes observed by TPEF-SHG microscopy” *Cardiovascular Research* 97 (2): 262-70. **Editor Choice and Cover Article**
 53. Qin W., Schmidt L., Yang X., Wei L., Huang T., Yuan J.X., **Ma Z.**, Peng X., Yuan X., Gao B.Z. (2013) “Laser guidance in a microfluidic biochip” *Proc. SPIE* 8615.
 54. **Ma Z.**, Liu Q., Liu H., Yang H., Yun J.X., Eisenberg C.A., Borg T.K., Gao B.Z. (2012) “Laser-patterned stem-cell bridges in a cardiac muscle model for on-chip electrical conductivity analyses” *Lab on a Chip* 12(3): 566-73. **Cover Article**
 55. Yang H., Ma Z. (2012) “Microsystem for stem cell-based cardiovascular research” *BioNanoScience* 2(4): 305.
 56. **Ma Z.**, Liu Q., Liu H., Yang H., Yun J.X., Xu M., Eisenberg C.A., Borg T.K., Markward R.R., Gao B.Z. (2012) “Cardiogenic regulation of stem-cell electrical property in a laser-patterned biochip” *Cellular and Molecular Bioengineering* 5(3): 327-36.
 57. **Ma Z.**, Gao B.Z. (2012) “Quantitatively analyzing the protective effect of mesenchymal stem cells on cardiomyocytes in single-cell biochips” *Biotechnology Letters* 34(7): 1385-91.
 58. Liu H., Qin W., Shao Y., Liu Q., **Ma Z.**, Borg T.K., Gao B.Z. (2012) “Live cardiomyocyte imaging via hybrid SHG-TPEF microscopy” *Proc. SPIE* 8225.
 59. **Ma Z.**, Pirlo R.K., Qin W., Yun J.X., Yuan X., Xiang P., Borg T.K., Gao B.Z. (2011) “Laser-guidance based cell deposition microscope for heterotypic single-cell micropatterning” *Biofabrication* 3(3): 034107. **IOP Featured Article, Highlights of 2011 collection**
 60. Liu H., Qin W., Shao Y., **Ma Z.**, Ye T., Borg T.K., Gao B.Z. (2011) “Myofibrillogenesis in live neonatal cardiomyocytes observed with hybrid two-photon excitation fluorescence-second harmonic generation microscopy” *Journal of Biomedical Optics* 16: 126012. **Cover Article**
 61. **Ma Z.**, Gao B.Z. (2011) “Laser-guidance based cell detection for identifying malignant cancerous cells without any fluorescent markers” *Biotechnology Letters* 33(9): 1767-72.
 62. Pirlo R.K., **Ma Z.**, Sweeney A., Liu H., Yun J.X., Peng X., Yuan X., Guo G.X., Gao B.Z. (2011) “Laser-guided cell micropatterning system” *Review of Scientific Instrument* 82(1): 013708.
 63. **Ma Z.**, Pirlo R.K., Yun J.X., Peng X., Yuan X., Gao B.Z. (2010) “Laser guidance-based cell micropatterning” *Cell and Organ Printing*, Chapter 8, 137-59, Springer. **Book Chapter**
 64. **Ma Z.**, Yun J.X., Wei Y., Burg K.J.L., Yuan X., Gao B.Z. (2009) “Laser-guidance based cell detection” *Proc.*

SPIE 7400.

65. **Ma Z.**, Burg K.J.L., Wei Y., Yuan X., Peng X., Gao B.Z. (2008) “Laser-guidance based cell detection with single-gene modification” *Applied Physics Letters* 92: 213902.
66. Zhang X., Chang M., **Ma Z.**, Peng D., Xu K. (2007) “Comparison between MIR and NIR spectroscopic techniques for the determination of fat and protein contents in milk” *Transactions of Tianjin University* 13(5): 375-78.
67. Chen W., **Ma Z.**, An L., Xu K. (2007) “Applying the floating-reference method to improve the precision of noninvasive blood glucose measurement” *Proc. SPIE* 6445.
68. Luo Y., An L., **Ma Z.**, Liu R., Xu K. (2006) “Discussion on floating-reference method for noninvasive measurement of blood glucose with near-infrared spectroscopy” *Proc. SPIE* 6094.

CONFERENCE PRESENTATION

(Presenting authors are underlined)

1. Kowalczewski A., Yang H., **Ma Z.** “*Design Optimization of Functional Cardiac Organoids Enabled by Machine Learning Techniques*” BMES, Baltimore, MD, 2024. *Oral*
2. Kowalczewski A., Yang H., **Ma Z.** “*Generative AI to Profile Structure-Function Correlation of Human iPSC-Derived Cardiomyocytes*” BMES, Baltimore, MD, 2024. *Oral*
3. Song Y., Yang H., **Ma Z.** “*A Chemically Defined PEG Hydrogels for Human Cardiac Organoid Development*” BMES, Baltimore, MD, 2024. *Oral*
4. Danny Vu, Kowalczewski A., **Ma Z.** “*Data-Driven Approaches to Investigate Cardiotoxicity Using Human Induced Pluripotent Stem Cell-Based High-Throughput Drug Screening*” BMES, Baltimore, MD, 2024. *Poster*
5. Winston T., Song Y., Meng Q., Cooney R.N., Ma Z. “*Induced Mesenchymal Stromal Cells (iMSCs) Derived via Neural Crest and Cytotrophoblast Lineages Showed Distinct Transcriptomic Profile and Extracellular Vesicle Production*” BMES, Baltimore, MD, 2024. *Oral*
6. **Ma Z.** “*Advancing Extracellular Vesicle Biomanufacturing via Human iPSC-Derived Mesenchymal Stromal Cells*” NSF Future Manufacturing Grantees Conference, Washington DC, 2024. *Poster*
7. **Ma Z.**, Song Y. “*Functional Cardiac Organoids Generated in PEG-based Synthetic Hydrogel*” WBC, Daegu, Republic of Korea, 2024. *Poster*
8. **Ma Z.**, Kowalczewski A., Sun S. “*AI-Driven Single Organoids Analysis on Cardiac Contractile Heterogeneity Dictated by Geometric Inputs*” WBC, Daegu, Republic of Korea, 2024. *Poster*
9. Sun S., **Ma Z.** “*Developmental Drug Toxicity Screening Using Cardiac Organoids for Safe Maternal Medication*” BMES, Seattle, WA 2023. *Poster*
10. Song Y., **Ma Z.** “*Development of Functional Cardiac Organoids in a Synthetic Hydrogel System*” BMES, Seattle, WA 2023. *Poster*
11. Seitz M., Song Y., **Ma Z.**, Jain E. “*Soft PEG Hydrogel Regulate Pluripotency and Morphogenesis in 3D Human Induced Pluripotent Stem Cell Culture*” BMES, Seattle, WA 2023. *Oral*
12. Kowalczewski A., Sun S., Hoang P. **Ma Z.** “*Integrated Functional Analysis for Engineered Cardiac Organoids Enabled by Artificial Intelligence*” SFB, San Diego, CA 2023. *Oral*
13. **Ma Z.** “*Engineering Cardiac Organoids for Safe Pregnancy Medication*” NIH Workshop for Innovative Approaches to Improve Maternal Health, DC, 2023. *Poster*
14. **Ma Z.** “*Profiling Structure-Function Relationship of Cardiac Organoids Using Artificial Intelligence*” Workshop for Biophysics of Organoids, Princeton, NJ 2023. *Oral*
15. Wang C., Mai N.Y., Henderson J.H., **Ma Z.** “*Modeling Eccentric Cell Remodeling of Gene-Edited hiPSC-Derived Cardiomyocytes Micropatterned on an Active Shape-Changing Biomaterial Substrate*” BMES, San Antonio 2022. *Oral*
16. Hoang P., McKellar D., Cosgrove B.D., **Ma Z.** “*Size-Driven Mesoderm-Endoderm Lineage Divergence in*

- Engineered Cardiac Organoids*” BMES, San Antonio 2022. *Oral*
17. Winston T., Chen C., Zhang T., **Ma Z.** “*Morphogenetic Evolution of hiPSC-Derived Mesenchymal Tissues under Spatial Mechanical Constraints*” BMES, San Antonio 2022. *Oral*
 18. **Shi H.**, Sun S., Wang C., Henderson J.H., **Ma Z.** “*Mechanical-Dependent Costamere Assembly and Incorporation to Cardiomyocyte Sarcomeres*” BMES, San Antonio 2022. *Oral*
 19. **Shi H.**, Wu X., Sun S., Wang C., Mather P.T., Henderson J.H., **Ma Z.** “*Time-Dependent Response of hiPSC-Derived Cardiomyocytes to a Dynamic Topographic Surface*” BMES, San Antonio 2022. *Poster*
 20. **Kowalczewski A.**, Sakolish C., Rusyn I., **Ma Z.** “*Integrating Nonlinear Analysis and Machine Learning for Cardiotoxicity Classification Based on hiPSC-Derived Cardiomyocytes*” BMES, San Antonio 2022. *Poster*
 21. **Kowalczewski A.**, Sun S., Hoang P., **Ma Z.** “*Functional Physiomics of Engineered Cardiac Organoids Enabled by Explored Data Analytics*” BMES, San Antonio 2022. *Poster*
 22. Hoang P., Kowalczewski A., Sun S., **Ma Z.** “*Establish Structure-Function Correlation for Geometrically Templated Cardiac Organoids Using Artificial Intelligence*” SFB, Baltimore 2022. *Oral*
 23. Winston T., Chen C., Zhang T., **Ma Z.** “*Controlling Mesenchyme Tissue Remodeling via Spatial Arrangement of Mechanical Constraint*” SFB, Baltimore 2022. *Poster*
 24. Kowalczewski A., **Ma Z.** “*Integration of Nonlinear Analysis and Artificial Intelligence for Human iPSC-based Drug Cardiotoxicity Classification*” AHA, Boston 2021. *Poster*
 25. **Wang C.**, Vangelatos Z., Winston T., Grigoropoulos C.P., **Ma Z.** “*Generation of mesenchymal meta-tissues using multiphoton lithography*” SFB, Virtual 2021. *Oral*
 26. **Hoang P.**, Kowalczewski A., Sun S., Amack J.D., **Ma Z.** “*Micropattern-guided cardiac organoids production for developmental toxicity screening*” SFB, Virtual 2021. *Oral*
 27. Wang C., Koo S., Park M., Hoang P., Grigoropoulos C., Healy K., **Ma Z.** “*Contractile dysfunctions of 3D human cardiac microtissues induced by mechanical nonuniformity*” WBC, Virtual 2020. *Oral*
 28. Hoang P., Kowalczewski A., Sun S., **Ma Z.** “*Engineering spatial-organized cardiac organoids under biophysical controls*” Virtual Meeting from Stem Cells to Human Development, 2020. *Poster*
 29. **Sun S.**, Shi H., Moore S., Wang C., Ash-Shakoor A., Mather P.T., Henderson J.H., **Ma Z.** “*Probing developmental mechanobiology of human cardiomyocytes using a dynamic nano-topographic substrate*” BMES, Virtual 2020. *Poster*
 30. **Vangelatos Z.**, Grigoropoulos C.P., Farsari M., Gu G., **Ma Z.**, Komvopoulos K. “*Biomechanical metamaterials fabricated through multiphoton lithography by tailoring 3D buckling*” SPIE Photonics West, San Francisco CA 2020. *Oral*
 31. **Xiong Z.**, Li H., Kunwar P., Zhu Y., Ramos R., McLoughlin S., Winston T., **Ma Z.**, Soman P. “*Femtosecond laser induced densification within cell-laden hydrogels results in cellular alignment*” SPIE Photonics West, San Francisco 2020. *Oral*
 32. Hoang P., Archilla A., **Ma Z.** “*Directing spatial architecture of human cardiac organoids via geometric confinement*” CMBE, Puerto Rico 2020 **Selected Talk**
 33. **Winston T.S.**, Suddhapas K., Wang C., Ramos R., Soman P., **Ma Z.** “*Serum-free manufacturing of mesenchymal stem cells from hiPSCs for engineering tissue constructs*” BMES, Philadelphia, PA, 2019 *Oral*
 34. **Wang C.**, Koo S., Park M., Hoang P., Grigoropoulos C.P., Healy K.E., **Ma Z.** “*Maladaptive contractility of 3D human cardiac microtissues under mechanical nonuniformity*” BMES, Philadelphia, PA, 2019 *Oral*
 35. **Hoang P.**, Lemus S., Jacquir S., **Ma Z.** “*Nonlinear analysis of contractile complexities exhibited by human stem cell-derived cardiomyocytes*” BMES, Philadelphia, PA, 2019 *Oral*
 36. **Hoang P.**, Archilla A., Lemus S., **Ma Z.** “*Directing spatial architecture of human cardiac organoids via geometric confinement*” BMES, Philadelphia, PA, 2019 *Oral*
 37. **Sun S.**, Shi H., Moore S., Wang C., Ash-Shakoor A., Henderson J.H., **Ma Z.** “*Myofibril reorganization of human cardiomyocytes on a dynamic topographic substrate*” BMES, Philadelphia, PA, 2019 *Poster*
 38. Wang C., Koo S., Hoang P., Grigoropoulos C.P., Healy K.E., **Ma Z.** “*Engineering complex tissue mechanical*

environment for cardiac microtissues derived from human induced pluripotent stem cells” AHA-BCVS, Boston MA, 2019 *Poster Asian Cardiovascular Symposium Poster Award*

39. Moore S., Sun S., Wang C., Hoang P., Henderson J.H., **Ma Z.** “Alignment of human cardiomyocytes through nano-wrinkles on shape memory polymers” NEBEC, Rutgers NJ, 2019 *Oral*
 40. Wang C., Koo S., Hoang P., Grigoropoulos C.P., Healy K.E., **Ma Z.** “Contractile imbalance of human cardiac microtissues on the mechanical hybrid filamentous matrices” SFB, Seattle WA, 2019 *Oral*
 41. Sun S., Moore S., Wang C., Ash-Shakoor A., Henderson J., **Ma Z.** “Myofibril remodeling of human stem cell-derived cardiomyocytes responding to dynamic surface topography” SFB, Seattle WA, 2019 *Rapid Fire*
 42. Wang J., Fan Y., Dube D., Wang C., **Ma Z.**, Sanger J.M., Sanger J.W. “Three step model of assembly of myofibrils in human iPS cell-derived cardiomyocytes” ASCB-EMBO, San Diego CA, 2018. *Poster*
 43. **Ma Z.**, Huebsch N., Mandegar M.A., Siemons B., Boggess S., Conklin B.R., Grigoropoulos C.P., Healy K.E. “Contractile deficits in engineered cardiac microtissues as a result of MYBPC3 deficiency and mechanical overload” NYSCF, New York NY, 2018. *Poster*
 44. Hoang P., Lemus S., **Ma Z.** “Engineering spatial-patterned human cardiac organoids for embryotoxicity testing” BMES, Atlanta, GA 2018, *Poster*
 45. Hoang P., Huebsch N., Healy K., Jacquir S., **Ma Z.** “Quantitative classification of drug-induced arrhythmias in human stem cell-derived cardiomyocytes” BMES, Atlanta, GA 2018, *Oral*
 46. **Ma Z.**, Huebsch N., Conklin B.R., Grigoropoulos C.P., Healy K.E. “Biomechanics-guided disease modeling of human familial cardiomyopathy” CMBE, Key Largo, FL, 2018 *Poster*
 47. **Ma Z.**, Koo S., Huebsch N., Mandegar M., Siemons B., Grigoropoulos C.P., Conklin B.R., Healy K.E. “Exercise-induced disease modeling of familial cardiomyopathy” BMES, Phoenix, AZ, 2017 *Oral*
 48. **Ma Z.**, Koo S., Hoang P., Huebsch N., Conklin B.R., Grigoropoulos C.P., Healy K.E. “Biomechanical mismatch in human iPS-based cardiac microtissues for modeling myocardial fibrosis” BMES, Phoenix, AZ, 2017 *Poster*
 49. **Ma Z.**, Koo S., Hoang P., Conklin B.R., Grigoropoulos C.P., Healy K.E. “Contractile abnormalities induced by biomechanical mismatch in human iPS-based cardiac microtissues” SFB, Minneapolis, MN, 2017 *Oral*
- Prior to Syracuse University (only oral presentations are listed) -----*
50. **Ma Z.**, Koo S., Mandegar M., Huebsch N., Siemons B., Conklin B.R., Grigoropoulos C.P., Healy K.E. “Exercise-Induced iPS-based Disease Modeling of Human Hypertrophic Cardiomyopathies” BMES, Minneapolis, MN, 2016 *Oral*
 51. **Ma Z.**, Wang J., Loskill P., Huebsch N., Koo S., Svedlund F.L., Grigoropoulos C.P., Conklin B.R., Healy K.E., “Self-organizing human cardiac organogenesis controlled by patterned substrata” New Frontiers Symposium, WBC, Montreal, QC, Canada, 2016 *Oral*
 52. **Ma Z.**, Koo S., Mandegar M., Huebsch N., Loskill P., Conklin B.R., Grigoropoulos C.P., Healy K.E. “Biomaterial-guided isogenic iPS disease modeling of hypertrophic cardiomyopathy” Keystone Symposia: Cardiac Development, Regeneration and Repair, Snowbird, UT, 2016 **Selected Short Talk**
 53. **Ma Z.**, Koo S., Mandegar M., Loskill P., Huebsch N., Mathur A., Grigoropoulos C.P., Conklin B.R., Healy K.E. “Biomaterial-guided isogenic iPS disease modeling of hypertrophic cardiomyopathy” Cellular and Molecular Bioengineering (CMBE) and Advanced Biomanufacturing (ABioM) Joint Conference, New Orleans, LA, 2016 **Selected Oral Presentation and Fellow Award**
 54. **Ma Z.**, Koo S., Loskill P., Huebsch N., Mathur A., Grigoropoulos C.P., Conklin B.R., Healy K.E. “Biomaterial-guided patient-specific cardiac disease modeling and drug toxicity screening” BMES, Tampa, FL, 2015 *Oral*
 55. **Ma Z.**, Wang J., Loskill P., Huebsch N., Koo S., Svedlund F.L., Grigoropoulos C.P., Conklin B.R., Healy K.E. “Self-organizing human cardiac microchambers mediated by geometric confinement” BMES, Tampa, FL, 2015 *Oral*
 56. **Ma Z.**, Wang J., Loskill P., Huebsch N., Koo S., Svedlund F.L., Marks N.C., Finnegan M.A., Grigoropoulos C.P., Conklin B.R., Healy K.E. “Self-organizing cardiac microchamber mediated by geometric confinement”

UC Systemwide Bioengineering Symposium, Santa Cruz, CA, 2015. **Selected Rapid Fire Talk**

57. **Ma Z.**, Wang J., Huebsch N., Finnegan M.A., Marks N.C., Conklin B.R., Healy K.E. “*Biophysical cues for spatially differentiating human induced pluripotent stem cells into cardiac lineage*” Keystone Symposia: Engineering Cell Fate and Function, Olympic Valley, CA, 2014. **Selected Short Talk**
58. **Ma Z.**, Koo S., Finnegan M.A., Loskill P., Huebsch N., Marks N.C., Grigoropoulos C.P., Conklin B.R., Healy K.E. “*Three-dimension filamentous human cardiac tissue model for preclinical drug testing*” MRS, San Francisco, CA, 2014. *Oral*
59. **Mathur A.**, Loskill P., Hong S.G., **Ma Z.**, Huebsch N., Finnegan M.A., Marcus S.G., Marks N.C., Conklin B.R., Lee L.P., Healy K.E. “*Design, fabrication and characterization of a microphysiological platform for drug screening in cardiac tissue*” MRS, San Francisco, CA, 2014. *Oral*
60. **Mathur A.**, Loskill P., Hong S.G., **Ma Z.**, Huebsch N., Finnegan M.A., Marcus S.G., Marks N.C., Conklin B.R., Lee L.P., Healy K.E. “*Disease-specific cardiac tissue models for drug discovery and toxicology*” SFB, Denver, CO, 2014. *Oral*
61. **Ma Z.**, Koo S., Finnegan M.A., Marks N.C., Grigoropoulos C.P., Conklin B.R., Healy K.E. “*Disease-specific bioinspired 3D cardiac model*” Berkeley Stem Cell Retreat, Monterey, CA, 2013. **Selected Rapid Fire Talk**
62. **Ma Z.**, Koo S., Finnegan M.A., Marks N.C., Grigoropoulos C.P., Conklin B.R., Healy K.E. “*Bioinspired 3D cardiac model derived from human induced pluripotent stem cells*” Cellular and Molecular Bioengineering (CMBE) Conference, Kohala Coast, HI, 2013. **Selected Talk and Fellow Travel Award**
63. **Yang H.**, **Ma Z.**, Schmidt L., Wang Z., Borg T.K. Gao B.Z. “*Tunneling nanotube formation between single neonatal cardiomyocyte and mesenchymal stem cell on a biochip*” BMES, Atlanta, GA, 2012. *Oral*
64. **Ma Z.**, Yang H., Liu Q., Yun J.X., Gao B.Z. “*MEA-based cardiac muscle fiber model to measure electrical conduction across the laser-patterned stem cells bridge*” BMES, Hartford, CT, 2011. *Oral*
65. **Ma Z.**, Pirlo R.K., Yun J.X., Liu H., Yuan X., Gao B.Z. “*Portable cell-deposition microscope based on laser guidance technique*” International Conference of Biofabrication (ICBF), Philadelphia, PA, 2010. *Oral*
66. **Ma Z.**, Gao B.Z. “*Laser-guidance based cell detection*” SPIE, San Diego, CA, 2009. *Oral*

PATENTS

Zhen Ma, Plansky Hoang “*Engineering spatial-organized cardiac organoids for developmental toxicity testing*” Provisional Patent Filed 63/209,501 (SU 2021-024).

Zhen Ma, Tackla Winston “*Generation of perinatal-like mesenchymal stem cells from human induced pluripotent stem cells*” Provisional Patent Filed (SU 2020-031).

Kevin E. Healy, Zhen Ma “*Cardiac tissue models and methods of use thereof*” US Patent App. 16/335,644, 2020

INVITED TALKS

In Vitro Biology Meeting, Michael E. Horn Emerging Technologies Symposium, Norfolk VA, Jun. 9, 2025

Title: AI-driven Cardiac Organoid Optimization for Enhanced Physiological Functions

Department of Pharmacology, SUNY Upstate Medical University, Syracuse NY, Jan. 23, 2025

Title: Data-Powered Cardiac Organoid Engineering: from Systems Biology to Artificial Intelligence

Department of Chemical Engineering, University of Rochester, Rochester NY, Sept. 18, 2024

Title: Scalable Extracellular Vesicle Therapeutics Enabled by Human iPSC Technology

Department of Biomedical Engineering, Penn State University, Virtual; Aug. 29, 2024

Title: Lineage-Specific Mesenchymal Stromal Cells for Scalable Extracellular Vesicle Therapeutics

BioInspired Symposium CAREER Talks, Syracuse NY; Oct. 19, 2023

Title: Shaping the Organoids for Defined Functions

Organoids and Organ-on-a-Chip Frontier Development, Beihang University, China (Keynote Talk, 30 min); Jun 4, 2023

Title: From Microtechnology to Artificial Intelligence: The Engineered Cardiac Organoid Model

Department of Biology, Syracuse University, Syracuse NY; Feb. 27, 2023

- Title: Biomanufacturing Mesenchymal Stromal Cells (MSCs) with Lineage Specificity*
PharmScience Research & Development, San Francisco, CA (Invited Talk, 20 min); Feb 24, 2022
- Title: Integration of Nonlinear Analysis and Machine Learning for Drug Cardiotoxicity Testing*
Department of Biomedical Engineering, New York University, Virtual, Feb 11, 2022
- Title: Engineering Cardiac Model Systems from Single Cells to 3D Organoids*
Department of Biomedical Engineering, Rochester Institute of Technology, Virtual, Feb 3, 2022
- Title: Profiling Dynamic Cardiac Mechanobiology Using Programmable Biomaterial Substrate*
Department of Biomedical Engineering, University of Alabama Birmingham, Birmingham AL, Jan 28, 2022
- Title: Profiling In Vitro Cardiac Organogenesis with Advanced Biomedical Data Analytics*
Department of Biomedical Engineering, University of North Texas, Virtual, Nov 3, 2021
- Title: Dynamic Mechanobiology in Cardiomyocyte Development and Diseases*
Department of Biomedical & Chemical Engineering, Syracuse University, Syracuse NY, Sept 17, 2021
- Title: Harnessing Dynamic Mechanobiology for Modeling Cardiac Development and Diseases*
Department of Biomedical Engineering, University of California Irvine, Virtual, May 14, 2021
- Title: Engineering Synthetic-Living Interface for Cells and Organoids*
Department of Biomedical Engineering, University of Minnesota Twin Cities, Virtual, Apr 26, 2021
- Title: Decipher Multi-Lineage Induction within Engineered Stem Cell Organoids*
BioArt Mixer, Syracuse University, Virtual, Apr 23, 2021
- Title: The Beauty of Stem Cell Organoids*
Department of Biomedical Engineering, Georgia Institute of Technology, Virtual; Apr 13, 2021
- Title: Mechanical-Driven Multi-Lineage Stem Cell Organoids*
Department of Biomedical Engineering, University of South California, Virtual; Mar 12, 2021
- Title: Engineering Spatial-Organized Multi-Lineage Stem Cell Organoids*
Center for Biomedical Engineering, Brown University, Virtual; Feb 4, 2021
- Title: 3D Cardiac Organoids for Human-Specific Embryotoxicity Drug Testing*
Biophysical Society Annual Meetings (BPS), Virtual (Feature Speaker, 25 min); Feb 23, 2021
- Title: Cardiac Contractile Deficits Induced by Synergistic Outcome of MYBPC3 Mutation and Mechanical Overloading*
CMBE Award Symposium, Virtual (Rising Star Award, 20 min); Jan 22, 2021
- Title: Engineering Multi-Lineage Organoids with Defined Structure-Function Relationship*
Department of Biomedical Engineering, University of Rochester, Rochester, NY; Feb. 4, 2020
- Title: Designing Cardiac Tissue Mechanics for In Vitro Disease Modeling*
Department of Biomedical Engineering, Cornell University, Ithaca, NY; Jan. 24, 2020
- Title: Engineering Spatial-Organized Human Cardiac Organoids*
Department of Bioengineering, Clemson University, Clemson, SC; Nov. 14, 2019
- Title: Engineering Cardiac Mechanobiology for Modeling Human Cardiomyopathy*
Masonic Medical Research Institute, Utica, NY; Nov. 8, 2019
- Title: Engineering In Vitro Cardiac Organogenesis Using Human iPSCs*
Department of Biomedical Engineering, Binghamton University, Binghamton, NY; Sept. 13, 2019
- Title: Engineering Mechanical Overloading for In Vitro Cardiac Disease Modeling*
Biomedical Engineering Program, University of South Carolina, Columbia, SC; Apr. 9, 2019
- Title: Engineering Complex 3D Cardiac Microtissues for In Vitro Disease Modeling*
PREDiCT 3D Models Summit, Boston MI, USA; Aug. 23, 2018
- Title: Designing iPSC Derived Organoids for Cardiac Safety Efficacy Testing*
TACNY Jr. Café Scientifique, MOST, Syracuse NY, USA; Apr. 21, 2018
- Title: The Superpower of Stem Cells*
Cell & Developmental Biology Interest Group, Syracuse NY, USA; Mar. 22, 2018
- Title: Engineering 3D Cardiac Organoids for Human-Specific Embryotoxicity Drug Testing*
Syracuse Biomaterials Institute Seminar Series, Syracuse, NY, USA; Sept. 27, 2017
- Title: Biomaterial-Guided hiPSC-Based Cardiac Disease Modeling*
Selected Bioscience: Stem Cells in Drug Discovery & Toxicity Screening, Boston, MA, USA; Jul. 11, 2017
- Title: Biomaterial-Guided Patient-Specific Cardiac Disease Modeling and Drug Toxicity Screening*
Department of Biomedical & Chemical Engineering, Syracuse University, Syracuse, NY, USA; Jan. 27, 2016
- Title: Modeling Heart in a Dish: Engineering Microenvironment for Understanding Diseases*

Gladstone Institute, University of California, San Francisco, CA, USA; Jun. 11, 2015

Title: Engineering Tissue Morphogenesis: In Vitro Modeling a Developing Heart

Biomedical R&D Center, Jinan University, Guangzhou, China; Aug. 15, 2014

Title: Multi-Scale Heart Modeling: from Single-Cell Analysis to 3D Micro-Organ Construction

Department of Physics, Northeastern University, Boston, MA, USA; Oct. 17, 2011

Title: Electrical Coupling between Stem Cell and Cardiomyocyte in Laser-Patterned Biochips

TRAINEE MENTORING

Visiting Professor:

José Eduardo Marques Bragança 2024

Faculty of Medicine and Biomedical Sciences, Algarve Biomedical Centre Research Institute

University of Algarve, Portugal

Postdoctoral Scholars:

- Plansky Hoang 2021 ~ 2023
- Yuanhui Song 2020 ~ 2025

Graduate (PhD) Students:

- Plansky Hoang 2016 ~ 2020
Dissertation: Cardiac Organoid Technology and Computational Processing of Cardiac Physiology for Advanced Drug Screening Applications
- Tackla Winston 2017 ~ 2022
Dissertation: Targeted Mesenchymal Stem Cell Differentiation from Induced Pluripotent Stem Cells for Therapeutic Applications
- Chenyan Wang 2017 ~ 2022
Dissertation: Engineering Temporal and Spatial Complexity in Biomaterial Scaffolds for Cardiac Disease Modeling and Mechanobiology
- Shiyang Sun 2018 ~ 2024
Dissertation: Geometric-Templated Cardiac Organoids for Drug Developmental Toxicity Screening
- Andrew Kowalczewski 2019 ~ 2025 (Expected)
- Huaiyu Shi 2020 ~ 2024 (Suspended due to healthy issue)
- Michael Seitz (Lead PI: Era Jain)
- Nhu Y Mai 2022
- Susan M. Nasab 2022

Graduate (MS) Students:

- Anthony Watts 2024 ~ 2025 (Expected)
- Fiona Pepper 2024 ~ 2026 (Expected)
- Huiyao Liu 2024 ~ 2026 (Expected)
- Meng Chai 2021 ~ 2024
Thesis: Embryotoxicity of Chemotherapeutic Agents Tested Using Engineered Cardiac Organoids
- Xiangjun Wu 2019 ~ 2022
Thesis: BAG3 Mutation Interferes Myofibril Integrity of hiPSC-Derived Cardiomyocytes on a Dynamic Substrate
- Huaiyu Shi 2018 ~ 2020
Thesis: Cell-Adhesion Activities Responding to Nano-Dynamic Substrate
- Shiyang Sun 2017 ~ 2019
Thesis: Dynamic Change of Cardiomyocytes on Shape Memory Polymer
- Kantaphon Suddhapas 2017 ~ 2018
Thesis: Fabrication of 3D Tissue Constructs Using Standing Post Platform

Independent Studies

- Paul Sagoe (Jain Lab) 2023 Fall ~ 2024 Spring
Project: Encapsulation of extracellular vesicles into polymer microparticles

- Nghia Thai (Monroe Lab) 2024 Spring
Project: Encapsulation of mesenchymal stem cells into porous hydrogel scaffolds

Undergraduate Students

- Charity Mae Hosler 2024 ~ Present
- Somya Chakraborty 2024 ~ Present
- Lukas Ling 2024 ~ Present
- Danny Vu 2022 ~ Present
- Ashly Contreras (REU) 2024
- Anthony Watt 2023 ~ 2024
- Mrigayu Ghosh (REU) 2023
- Sheila Addison Legus-Christman 2022
- Kristen Allen (REU) 2022
- Suado Mohamed (Summer Internship) 2022
- Bearett Tarris 2019 ~ 2021
- Anna Brunson 2019 ~ 2022
- Adriana Archilla 2018 ~ 2020
- Saif N. Elattar (REU) 2019
- Phraew Sakon 2019
- Samantha Santoni 2016 ~ 2019
- Sarah Moore 2017 ~ 2019
- Alexander Edmonson (REU) 2018
- Stephanie M. Lemus 2017 ~ 2019
- Alex Li (REU) 2017
- Shin Hyuk Bang 2016

High School Students

- Lauren Lammers Summer 2018
- Suado Mohamed Summer 2019

Thesis Defense Committee

- 2025 Johnson Agyapong, Advisor: James H. Henderson
- 2024 PhD Thesis Defense (*Committee Chair*): Sadie Novak, Advisor: James Hougland
- 2023 Master Thesis Defense (*Committee Chair*): Songruo Li, Advisor: Li-Ru Zhao
- 2022 PhD Thesis Reviewer: Jake Ireland, Advisor: Kristopher Kilian (University of New South Wales)
- 2022 PhD Thesis Defense: Henry Beaman, Advisor: Mary Beth Monroe
- 2022 PhD Thesis Defense: Kairui Zhang, Advisor: Pranav Soman
- 2021 Master Thesis Defense: Courtney Ogando, Advisor: Pranav Soman
- 2021 PhD Thesis Defense: Xiong Zheng, Advisor: Pranav Soman
- 2020 PhD Thesis Defense: Preeti Sahu (*Committee Chair*), Advisor: Jennifer Schwarz and Lisa Manning
- 2020 PhD Thesis Defense: Sang Won Lee, Advisor: Dacheng Ren
- 2020 PhD Thesis Defense: Saeid Biria, Advisor: Ian Hosein
- 2019 Master Thesis Defense: Vaikhari Marathe, Advisor: Pranav Soman
- 2019 Master Thesis Defense: Xichen Xu, Advisor: Shikha Nangia
- 2018 PhD Thesis Defense: Hao Wang, Advisor: Dacheng Ren
- 2018 Master Thesis Defense: Rafael Ramos, Advisor: Pranav Soman
- 2018 Master Thesis Defense: Haiyan Li, Advisor: Pranav Soman
- 2018 PhD Thesis Defense: Melodie Lawton, Advisor: Patrick Mather
- 2018 PhD Thesis Defense: Giuseppe Passucci, Advisor: Lisa Manning
- 2017 Master Thesis Defense (*Committee Chair*): Hansheng Li, Advisor: Ian Hosein
- 2017 PhD Thesis Defense: Megan Brasch, Advisor: James H. Henderson
- 2017 PhD Thesis Defense: Ariel Ash-Shakoor, Advisors: Patrick Mather & James H. Henderson
- 2017 PhD Thesis Defense: Wenbin Kuang, Advisor: Patrick Mather
- 2017 Master Thesis Defense: Lucas Albrecht, Advisor: Pranav Soman
- 2017 Master Thesis Defense: Sanika Suvarnapathaki, Advisor: Pranav Soman
- 2016 Master Thesis Defense: Jianan Lin, Advisor: Jeremy Gilbert
- 2016 PhD Thesis Defense: Erin McMullin, Advisor: Patrick Mather

PhD Exam Committee

- 2024 Ali Zareein (Qualify), Advisor: Yaoying Wu
- 2023 Ashley Scott (Qualify), Advisor: Jennifer L. Ross
- 2022 Johnson Agyapong (Qualify), Advisor: James H. Henderson
- 2022 Elizabeth Oguntade (Qualify), Advisor: James H. Henderson
- 2021 Yikang Xu (Qualify), Advisor: Dacheng Ren
- 2021 Arun Poudel (Qualify), Advisor: Pranav Soman

- 2019 Sang Won Lee (Candidacy), Advisor: Dacheng Ren
2019 Paul Chando (Qualify), Advisor: Pranav Soman & James H. Henderson
2018 Kairui Zhang (Qualify), Advisor: Pranav Soman
2018 Xiong Zheng (Qualify), Advisor: Pranav Soman
2018 Katy Pieri (Qualify), Advisor: James Henderson
2018 Michelle E. Pede (Candidacy), Advisor: James Henderson
2018 Hao Wang (Candidacy), Advisor: Dacheng Ren
2018 Dave Quinn (Candidacy), Advisor: Pranav Soman
2017 Preeti Sabu (Candidacy), Advisor: Lisa Manning & Cristina Marchetti
2017 Fred J Donelson (Candidacy), Advisor: James H. Henderson
2017 Saeid Biria (Candidacy), Advisor: Ian Hosein
2017 Shelby Buffington (Candidacy), Advisors: Patrick Mather & James H. Henderson
2017 Nandhini Rajagopal (Old Qualify), Advisor: Shikha Nangia
2017 Alexander Jannini (Old Qualify), Advisor: Julie M. Hasenwinkel

STUDENT AWARDS

- 2024 Andrew Kowalczewski (Graduate) – Best Publication Award at BioInspired Institute
2024 Andrew Kowalczewski (Graduate) – Arlene and Stanley Young Scholarship
2024 Danny Vu (Undergrad) – SOURCE Bridge Award
2024 Danny Vu (Undergrad) – Kessler Scholar, Summer Research Opportunity Program at U. Mich
2023 Shiyang Sun (Graduate) – Graduate Summer Dissertation Fellowship
2023 Tackla Winston (Graduate) – Outstanding Graduate Student Award in Bioengineering
2023 Chenyan Wang (Graduate) – All University Doctor Prize
2022 Suado Mohamed (REU) – Benton Scholars at Colgate University
2022 Danny Vu (Undergrad) – Young Research Fellows Program
2022 Tackla Winston (Graduate) – Graduate Summer Dissertation Fellowship
2022 Chenyan Wang (Graduate) – Graduate Summer Dissertation Fellowship
2022 Chenyan Wang (Graduate) – Graduate Dean’s Award for Excellence in Research and Creative Work
2021 Tackla Winston (Graduate) – Stevenson Biomaterials Lecture Rapid-Fire Presentation 2nd Place Award
2021 Yuanhui Song (Postdoc) – Winner nCounter[®] Stem Cell Grant, NanoString
2021 Plansky Hoang (Graduate) – All University Doctor Prize
2021 Bearett Tarris (Undergrad) – Bioengineering Founders Award
2021 Plansky Hoang (Graduate) – Outstanding Graduate Student Award in Chemical Engineering
2020 Bearett Tarris (Undergrad) – Syracuse SOURCE Summer Research Scholarship
2020 Plansky Hoang (Graduate) – Graduate Dean’s Award for Excellence in Research and Creative Work
2020 Tackla Winston (Graduate) – Stevenson Biomaterials Lecture Poster Competition 2nd Place Award
2019 Adriana Archilla (Undergrad) – Summer Research Scholarship at NDnano, University of Notre Dame
2019 Chenyan Wang (Graduate) – ECS Research Day First Place Pitch Competition
2019 Plansky Hoang (Graduate) – American Heart Association (AHA) Predoctoral Fellowship
2018 Alexander Edmonson (REU) – Fifth Place, Summer Undergraduate Research Symposium
2018 Chenyan Wang (Graduate) – University Graduate Student Fellowship
2018 Sarah Moore (Undergrad) – SU Undergraduate Summer Research Award
2018 Plansky Hoang (Graduate) – Stevenson Lecture Best Commercialization Potential Poster Award
2018 Plansky Hoang (Graduate) – ECS Research Day Second Place Pitch Competition
2018 Plansky Hoang (Graduate) – ECS Research Day Best BMCE Department Poster Presentation
2017 Plansky Hoang (Graduate) – SU WiSE Program
2017 Alex Li (REU) – Third Place, SU Undergraduate Poster Symposium
2017 Tackla Winston (Graduate) – SU STEM Fellowship
2017 Sarah Moore (Undergrad) – BMCE Department Summer Research Award
2017 Shin Hyuk Bang (Undergrad) – Honorable Mention, CFSA Young Research Fellow Program
2016 Samantha Santoni (Undergrad) – Astronaut Scholarship Nominee, Syracuse University

TEACHING AND CURRICULUM DEVELOPMENT**BEN375 Biomedical System, Signal & Control**, Undergraduate Core Course <2024 Spring>

This course is designed to introduce the techniques that apply mathematical tools to extract important diagnostic information from biomedical and biological data. Artificial intelligence and machine learning are also discussed for healthcare and medical image analysis.

BEN481 Bioinstrumentation, Undergraduate Core Course <2016 Fall> <2019 – 2020 Fall>

This course focuses on the measurement and analysis of biological signals in both time and frequency domain. This includes operational amplifiers, analog and digital signal processing, sensors, transducers, sources of biopotentials, and BioMEMS.

BEN468/668 Biomaterials & Medical Devices, Undergraduate/Graduate Core Course <2018 – 2019 Spring>

This course is designed to be an introduction to the field of biomaterials and medical devices. Metals, ceramics, polymers, and biological materials will be introduced for the design and performance of biomaterials-based medical devices.

BEN 521 Stem Cell Engineering, Undergraduate/Graduate Tech Elective <2017 – 2023 Fall>

Stem cell engineering is one of the most intriguing and active areas of modern biomedical engineering and biotechnology. The aim of this course is to illuminate and explore this interdisciplinary research area, covering bioengineering focus on understanding and engineering stem cell for therapeutic applications.

Guest Lecture: Stem Cells and Regenerative Medicine (7/19/2022)

Class: Biotechnology Basics (Lecturer: Ruth Phillips, Biology Dept), SU Office of Pre-College Programs