



Message from the Associate Chair for Education

Dear Colleagues, Alumni, Students, Staff, and Friends:

It is an exciting time for Biomedical Engineering at UAB! I am pleased to see the continued growth of our faculty and student bodies, and the new opportunities for enhancing the educational experiences of our students. Consistent with our Strategic Plan, we are developing a new sequence of courses in Tissue Engineering and Regenerative Medicine, which will allow students ranging from undergraduate to graduate to specialize in this growing field. Along with these new offerings, our primary and secondary faculty have introduced new courses in Industrial Bioprocessing and Biomanufacturing, as well as new electives in Rehabilitation Science and Pharmaceutical Engineering.

We are pleased to announce the second annual offering of our BME Summer Scholars Program, which allows high school juniors and seniors to spend a full month working alongside faculty mentors, post-docs, and graduate students to solve real-world problems in BME research. Our undergraduate program remains the only ABET-accredited BME program in the state of Alabama, and continues to produce outstanding students – in 2016, for example, 40% of our undergraduates graduated with honors. We are pleased to see increasing enrollment in our undergraduate program – a 17% increase from Fall 2016 to Fall 2017. In addition, we are currently



Alan W. Eberhardt, Ph.D.
*Associate Chair, Professor
Department of Biomedical Engineering
School of Engineering*

recruiting students for our graduate program, and are happy to announce our BME Recruitment Visit on March 2-4, which coincides with the Cardiovascular Tissue Engineering (CVTE) Symposium and BME Graduate Student Symposium.

And things are only going to get better. As UAB Medicine continues its ascension in US News and World report rankings, the educational experience for our students will also continue to improve; our BME department, now joint with the School of Engineering and School of Medicine, will continue to seek out opportunities to bring modern medicine into the classroom and to get students into the lab.

Best regards,

Alan W. Eberhardt, Ph.D.

Professor and Associate Chair for Education

Department of Biomedical Engineering

School of Medicine | School of Engineering

UAB | The University of Alabama at Birmingham

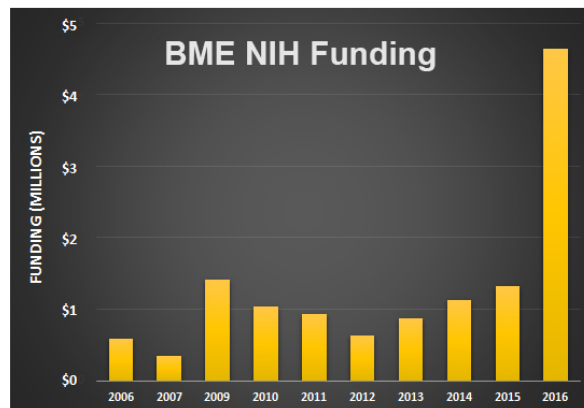
Top 4 in NIH Funding

The UAB Department of Biomedical Engineering is pleased to announce that it now ranks in the top four BME departments in the nation in the amount of funding it receives from the National Institutes of Health (NIH).

With \$4.3 million in funding for fiscal year 2016, UAB BME ranks 4th overall, behind the BME departments at Stanford, Johns Hopkins, and Oregon Health & Science University. The rankings are published annually by the Blue Ridge Institute for Medical Research, which lists NIH funding for all U.S. medical schools.

UAB BME's rise in the ranks to #4 in 2016 NIH departmental funding was largely the result of department faculty being awarded new U01, R01, and R21 grants. Additionally, four new faculty with NIH funds have recently been recruited to support the growing department. We congratulate all BME faculty for their recent achievements and extend our sincere appreciation for their tireless efforts and continued support!

[Read more](#)



Heart Tissue Patch Supported by new \$8 Million Grant

The heart cannot regenerate muscle tissue after a heart attack has killed part of the muscle wall, and that dead tissue can strain surrounding muscle, leading to a lethal heart enlargement. To prevent this heart failure and restore heart function, UAB researchers, led by Biomedical Engineering Chair Jianyi “Jay” Zhang, M.D., Ph.D., as well as his collaborators at the University of Wisconsin-Madison and Duke University, will work to create a bioengineered human heart tissue patch that is large, standardized, and highly functional. Dr. Zhang's pre-clinical studies will be supported by a seven-year, \$8 million grant recently awarded by the National Heart, Lung, and Blood Institute (NHLBI) as part of the Progenitor Cell Translational Consortium (PCTC) U01 funding mechanism.

[Read more](#)



Jianyi “Jay” Zhang, M.D., Ph.D.
*Chair, Department of Biomedical Engineering
T. Michael and Gillian Goodrich Endowed Chair
of Engineering Leadership
Professor of Medicine, of Engineering
School of Medicine, School of Engineering*

AIMTech awarded \$500,000 from U.S. Department of Commerce

Robert Hergenrother, Ph.D. - Director of AIMTech and Professor, Department of Biomedical Engineering

Robert Hergenrother, Ph.D., UAB Professor of Biomedical Engineering, was recently awarded a \$500,000 grant from the U.S. Department of Commerce to expand the *Alliance for Innovative Medical Technology* (AIMTech) proof-of-concept program.

The award is part of nearly \$15 million in funds that have been allocated across 35 organizations in 19 states to create and expand cluster-focused, proof-of-concept commercialization programs, and early-stage seed capital funds through the Economic Development Administration's Regional Innovation Strategies program. The grants are broken into two categories, the i6 Challenge and the Seed Fund Support Grants, with AIMTech being a winner in the i6 group.

[Read more](#)

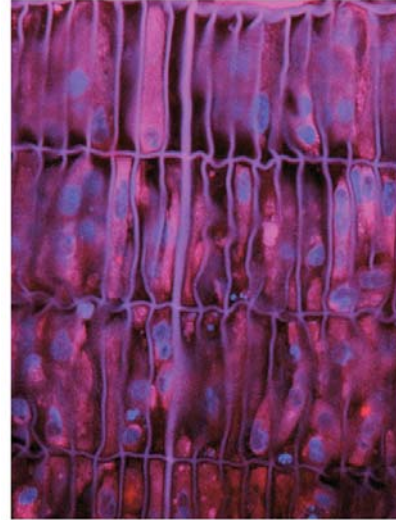


Robert W. Hergenrother, Ph.D.
*Professor
Department of Biomedical Engineering
School of Engineering*

Tissue engineering advance reduces heart failure in model of heart attack

The collaborations of Drs. Jay Zhang (UAB), Brenda Ogle (UMN), and Paul Campagnola (UW) have demonstrated to successfully fabricate heart tissue by seeding a mix of human cells onto a 1-micron-resolution scaffold made with a 3-D printer. The cells organized themselves in the scaffold to create engineered heart tissue that beats synchronously in culture. When the human cell-derived heart muscle patch was surgically placed onto a mouse heart after a heart attack, it significantly improved heart function and decreased the amount of dead heart tissue.

[Read more](#)



Heart cells growing in rectangular, box-like scaffold made with 3-D printing.

Interdisciplinary Collaboration with UAB Solution Studios

Interdisciplinary Collaboration with UAB Solution Studios™

UAB Solution Studios™ is a new program that developed as a partnership between the UAB School of Nursing, the UAB Department of Biomedical of Engineering, the UAB Honors College, and UAB Hospital. The program provides a convenient and robust digital space for students, faculty, and clinicians to collaborate, share ideas, and work through steps to find solutions to clinical problems using a 5-step design thought process. The idea was conceived in early 2016 by BME faculty member Joel Berry, Ph.D., and School of Nursing faculty member Nancy Wingo, Ph.D., as a way to accelerate the translation of clinical innovation. It was implemented at UAB Hospital with the help of Clinical Nurse Leader Kristen Noles.

The approach begins by assessing the problem, rather than the idea. Honors College STEM students, senior undergraduate BME students, and BME graduate students form teams with Nursing faculty, clinicians, and Clinical Nurse Leader students, who offer students the opportunity to empathize with them through clinical shadowing. Students and clinicians also work together to define the true problem, ideate multiple solutions, then prototype, test, and iterate a workable solution. This design thought process is performed in the context of structured for-credit classes in engineering and STEM disciplines. BME

professor Alan Eberhardt, Ph.D., has utilized a similar approach for more than a decade in his senior capstone class. During the Fall of 2016, the capstone class first utilized the UAB Solution Studios digital space for needs-finding and team-formation, and this has expanded to Eberhardt's BME masters students as well.

The early success of UAB Solution Studios has caught the attention of UAB President Dr. Ray Watts, who contributed scholarship funds to the BME Masters of Engineering program, as well as funds to support summer scholarships for Honors College clinical innovation fellows. These funds will be used to further develop the technology readiness of ideas born out of this process. Some of the ideas which emerged from the pilot launch of UAB Solution Studios were improvements to increase the quality of life for patients with ostomy bags, improvements to patient transport, a better way to secure wires and tubing to patient's skin, improvements to capsule endoscopy for internal bleeding, strategies to reduce PICC line abuse, a system for safely lifting obese patients, and a redesign of the continuous passive motion device.

UAB Solution Studios provides a digital tool for tackling unsolved clinical problems by bringing together the academic and clinical enterprises at UAB. The secret to its early success has been the focus on problems first, then ideas. This approach gives clinical partners hope for improvements in patient care.

New Faculty

Congratulations & Welcome to UAB!

Chunxiang "Kevin" Zhang, M.D., Ph.D., FACC

Dr. Kevin Zhang joined UAB in August 2016 as a tenured Professor in the Department of Biomedical Engineering. Before joining the University of Alabama at Birmingham, Dr. Zhang served as an Endowed Chair and Professor of the Department of Pharmacology at Rush University in Chicago.

Dr. Zhang's research programs are focused on non-coding RNAs (microRNAs, nuclear lncRNAs, mitochondrial lncRNA, and circular RNAs) in atherosclerosis & restenosis, myocardial infarction, ischemic pre-conditioning, cardiac hypertrophy, cardiovascular aging, diabetic cardiovascular complications, cardiovascular inflammation including HIV, Kawasaki disease, and sepsis. He also performs studies on stem cells, using a non-coding RNA approach to improve stem cell function under diabetic and aging conditions. In a third set of his research, he is trying to uncover the roles of Golgi phosphoprotein 3 (GOLPH3) in vascular biology and vascular diseases.

Dr. Kevin Zhang has published over 100 peer-reviewed research articles in high-impact academic journals, such as *Science*, *JACC*, *J Exp Med*, *Cell Metab*, *Mol Cell*, and *Circ Res* (total impact factor: 528; h-index: 41; citations: 8,186). His achievements are also well-documented in his grant funding and awards. Since 2001, Dr. Zhang has obtained nearly \$25 million in research grants from NIH, AHA, and ADA, in which he worked as either a Principal Investigator, Co-Principal Investigator, or Co-Investigator.

In addition to his achievements in administration, collaborative research, and teaching, he is also highly active in national and international academic service activities. He is the Chair of the Events/Conference Committee and the Section Chair of Molecular Medicine for the International Society for Translational Medicine (ISTM), the President of the North American Chinese Association of Pharmacology and



Chunxiang Zhang, M.D., Ph.D., FACC.
Professor
Department of Biomedical Engineering
School of Medicine, School of Engineering

Therapeutics, the Councilor of ACC Chicago, and honored as Director of the Translational Medicine Institute. He is currently a professional member of 6 academic associations and societies. He has served as editor, associate editor, or editorial board member for 20 peer-reviewed journals, and has served as a grant reviewer for 9 national and international research organizations, including NIH and the VA system. Since 2001, he has given over 80 invited seminars and talks at national meetings and universities, and has been invited to chair many international professional meetings.

Prasanna Krishnamurthy, MVSc, Ph.D., F.A.H.A.

Dr. Krishnamurthy joined the UAB Department of BME in the Summer of 2016 as a tenured Associate Professor of Medicine, coming to UAB from the Department of Cardiovascular Sciences at the Houston Methodist Research Institute and the Department of Cardiothoracic Surgery at the Weill Cornell Medical College of Cornell University. The overall research theme in Dr. Krishnamurthy's laboratory is to understand the mechanisms of cardiovascular diseases that will aid in developing innovative new therapies and translate that information to clinics to treat heart disease and improve the lives of patients.



Prasanna Krishnamurthy, Ph.D.
Associate Professor
Dept. of Biomedical Engineering
School of Engineering, of Medicine

Broad research areas of emphasis in his laboratory include:

- study of molecular mechanisms of cardiovascular diseases under pathophysiological stress
- stem cell function and regenerative medicine
- strategies to enhance wound repair in diabetes

Over the years, the Krishnamurthy Lab has developed expertise in cardiovascular pathophysiology, with an approach involving the use of pharmacological, biochemical, molecular, cellular and physiological techniques, including transgenic mice and relevant surgical (MI/TAC) or pharmacologically-induced heart disease models, to address fundamental questions about the mechanisms of cardiovascular disease progression in diabetes, and to develop potential therapeutic approaches to disease intervention. Research in the Krishnamurthy Lab is supported through grants from National Institutes of Health (NIH) and American Heart Association (AHA).

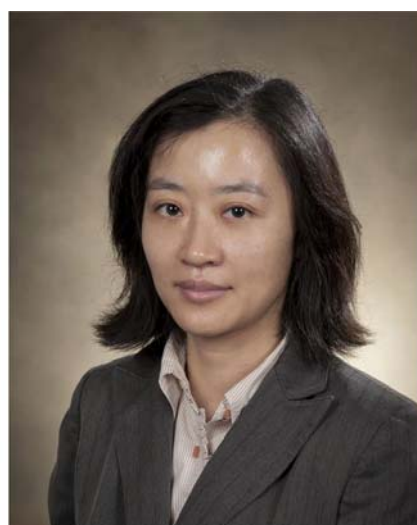
X. Margaret Liu, Ph.D.

Dr. Margaret Liu joined the UAB Department of Biomedical Engineering as an Associate Professor in October 2016. Prior to joining UAB BME, Dr. Liu was an Assistant Professor in the Department of Chemical and Biological Engineering at the University of Alabama in Tuscaloosa.

Dr. Liu's research interests range from developing anti-cancer pharmaceuticals to bioprocess engineering to improve production of iPSCs to Bioenergy. She is PI on an NSF BRIGE grant and co-PI on a DOE grant on green bioenergy. She has published over 30 papers in peer-reviewed journals on these topics.

She boasts three patents of her own and trains students to work towards translation of their research to result in economic development. This includes teaching her newly created course in Industrial Biotechnology, which will enhance ongoing efforts to bring industry-related topics into the UAB BME curriculum.

Dr. Liu has been active in AIChE as a program chair and co-chair. She serves on editorial boards and is a consulting editor for five active journals, including the Journal of Biopharmaceutical



Margaret X. Liu, Ph.D.
Associate Professor
Dept. of Biomedical Engineering
School of Engineering, of Medicine

Bioprocessing and the Journal of Biomedical Engineering and Bioinformatics.

One of Dr. Liu's current studies investigates novel targeting therapy development for cancer and other disease treatment. One project will develop a cellular biomanufacturing platform to produce reliable and reproducible large quantities of human T cells (or CAR T cells) and engineer the T cells via understanding the intracellular metabolism using systems biology for immune cancer therapy. Another project will utilize advanced molecular biology and cell engineering techniques to develop stable cell lines expressing mitochondrial ChR2 and precisely control mitochondria. Multiple human cancer cell lines are used to develop and evaluate the novel anti-cancer technology. In these projects, the unique systems biology-based metabolic cell-process engineering (MCPE) technology will be applied to understand and regulate cellular metabolism and identify key regulators of host cell and process.

BME Summer Scholars Program 2017

UAB BME will once again host a four-week summer scholars program designed to give students an immersive experience in high-level biomedical research.

The 2017 BME Summer Scholars Program will be open to high school students who will be entering their junior or senior years, as well as incoming college freshmen. Participants will work alongside biomedical engineering faculty researchers in labs in the BME Department for a hands-on experience in a real-world setting with world-class BME faculty scientists and clinicians. At the end of each week, the students will come together as a group to share lunch and their experiences, and have the opportunity to hear from BME professionals working in the field.

The UAB camp was introduced in 2016 by BME Department Chair Dr. Jianyi "Jay" Zhang, and aims to promote young engineers and diversity in the biomedical engineering community.

DETAILS:

- Age Group: High School juniors and seniors, as well as incoming college freshmen.
- Dates: June 5 - June 30, 2017
- Cost: \$250 per participant
- Location: UAB Campus - Biomedical Engineering laboratories within the UAB Schools of Engineering and Medicine
- Application Deadline: March 31, 2017
- Additional Information: <http://www.uab.edu/engineering/home/209-news/1142-summer-2016-application-information>

Awards

Congratulations to these BME faculty and students on their outstanding achievements!

1. Dr. Jay Zhang has been awarded an NIH NHLBI Progenitor Cell Translational Consortium (PCTC) U01 grant (Total \$8M) for his work on *Heart Tissue Patch for Myocardial Repair*. The research hub is led by Zhang, Timothy Kamp, M.D., of the University of Wisconsin, and Nenad Bursac, Ph.D., of Duke University. The goal is to bring cardiac tissue engineering therapies into the clinic for human use by the end of the grant period. In this collaborative effort, the teams at the three institutions will work with individual cells, along with bioengineered patches made up of many cells. They will test the bioengineered cells in mice and the bioengineered patches in pigs.
2. Dr. Margaret Liu has been awarded NSF grant 1719625, titled "*EAGER: Biomanufacturing: Metabolic cell process engineering (MCPE)-based stirred-tank bioproduction of large quantities of human T cells*".
3. Dr. Ho-Wook Jun was promoted to full Professor and appointed Director of the Graduate Program in the UAB Department of Biomedical Engineering.
4. Dr. Yuhua Song has been chosen as one of the recipients of the UAB Graduate Dean's Excellence in Mentorship Award for 2017.
5. BME students David Chasteen-Boyd and Lily Deng won 1st place in the engineering oral presentation, and Maggie Collier won 2nd place in engineering poster presentation at the UAB EXPO.
6. Lily Deng also won 1st place for podium presentation at the 15th Annual University of Alabama Systems Honors Conference.
7. BME student Grant Alexander received the Alabama EPSCoR GRSP Fellowship for Round 11.
8. Asher Knell won first place at 2016 Medical Student Research Day.
9. Dishant Shah and Alex Garcia won first place in the student Engineering Category at the 2016 UAB Fall EXPO.

Events

2017 NIH NHLBI PCBC Cardiovascular Tissue Engineering (CVTE) Symposium – March 2 & 3, 2017

The National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH) has provided \$27,105 in funding for the annual **Progenitor Cell Biology Consortium (PCBC) Cardiovascular Tissue Engineering (CVTE) Workshop and Symposium** ("*CVTE Symposium*"), which will be led by Dr. Jianyi (Jay) Zhang at The University of Alabama at Birmingham (UAB) next month.

The 2017 CVTE Symposium, entitled "***Overcoming Roadblocks to CV Tissue Engineering Therapy***", will take place on **Thursday, March 2nd and Friday, March 3rd**. The Symposium brings together a working group of leading investigators in the area of cardiovascular tissue engineering (CVTE) to address roadblocks to making CVTE therapy products, and to organize a Consensus Conference on CVTE. The aim is for biologists, engineers, and clinician-scientists to converge and conduct research related to cardiac repair or regeneration; enhance continuing synergies between PCBC investigators; and foster development of young investigators and junior faculty in these areas.

This will be the third annual CVTE Workshop & Symposium funded by the NHLBI PCBC under NIH Award Number U01HL099997 and hosted by Dr. Zhang; the first was held at Stanford University in 2015, the second at UAB in 2016, and the third will again be hosted at UAB in 2017.

Additional information is available on the CVTE Symposium [page](#).

Fellowship Opportunities

Pre-doctoral Fellowship:

- National Institute of Health provides several predoctoral fellowships in specified health and health-related areas. For eligibility and application, click [here](#).
- National Science Foundation (NSF) graduate research program supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited United States institutions. For eligibility and other details, click [here](#).
- To help students initiate careers in cardiovascular and stroke research American Heart Association provides multiple pre-doctoral fellowships. For eligibility and application, click [here](#).

Postdoctoral Fellowship:

- To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in specified health-related areas, National Institute of Health provides several fellowships. For eligibility and application, click [here](#).
- National Science Foundation (NSF) provides several postdoctoral research fellowships in biology. Application deadline November 7, 2017. For details, click [here](#).
- American Heart Association (AHA) provides multiple postdoctoral fellowships to empower postdoctoral trainees who are not yet independent with assistance and training from a mentor to initiate careers in cardiovascular and stroke research. For eligibility and application, click [here](#).

Featured Publications

1. Zhu W, Gao L, Zhang J. Pluripotent Stem Cell Derived Cardiac Cells for Myocardial Repair. *J Vis Exp*. 2017;120:e55142. doi:10.3791/55142
2. Kannappan R, Zhang J. Meeting Report for NIH 2016 Progenitor Cell Biology Consortium Cardiovascular Tissue Engineering. *Circ Res*. 2016 Oct 14;119(9):981-983.
3. Gao L, Kupfer M, Jung J, Yang L, Zhang P, Sie Y, Tran Q, Ajeti V, Freeman B, Fast V, Campagnola P, Ogle B, Zhang J. Myocardial Tissue Engineering With Cells Derived from Human Induced-Pluripotent Stem Cells and a Native-Like, High-Resolution, 3-Dimensionally Printed Scaffold. *Circ Res*. 2017 Jan 9. pii: CIRCRESAHA.116.310277. doi: 10.1161/CIRCRESAHA.116.310277. [Epub ahead of print]
4. Borovjagin AV, Ogle BM, Berry JL, Zhang J. From Microscale Devices to 3D Printing: Advances in Fabrication of 3D Cardiovascular Tissues. *Circ Res*. 2017 Jan 6;120(1):150-165.
5. Patrick TJ Hwang, Dong-Jin Lim, Timothy Fee, Grant C Alexander, Ajay Tambralli, Adinarayana Andukuri, Liqun Tian, Wanxing Cui, Joel Berry, Shawn R. Gilbert, Ho-Wook Jun. A Bio-inspired Hybrid Nanosack for Graft Vascularization at the Omentum. *Acta Biomaterialia*. 2016;41:224-234.
6. Kannappan R, Matsuda Alex, Ferreira-Martins João, Zhang Eric, Palano G, Czarna Anna, Castro Cabral-Da-Silvaa M, Bastos-Carvalho A, Sanada F, Ide N, Rota M, Blasco MA, Serrano M, Anversa P, Leri A. p53 Modulates the Fate of Cardiac Progenitor Cells Ex Vivo and in the Diabetic Heart *in vivo*. *EBioMedicine*. January 2017. [In press]
7. Wang Q, Yang H, Bai A, Jiang W, Li X, Wang X, Mao Y, Lu C, Qian R, Guo F, Ding T, Chen H, Chen S, Zhang J, Liu C, Sun N. Functional Engineered Human Cardiac Patches Prepared from Nature's Platform Improve Heart Function after Acute Myocardial Infarction. *Biomaterials*. 2016 Oct;105:52-65.
8. Kang X, Wei X, Wang X, Jiang L, Niu C, Zhang J, Chen S, Meng D. Nox2 Contributes to the Arterial Endothelial Specification of Mouse Induced Pluripotent Stem Cells by Upregulating Notch Signaling. *NATURE Scientific Reports*. 2016 Sep 19;6:33737.

9. Gao L, Cui W, Zhang P, Jang A, Zhu W, Zhang J. 31P NMR 2D Mapping of Creatine Kinase Forward Flux Rate in Hearts with Postinfarction Left Ventricular Remodeling in Response to Cell Therapy. *PLoS One*. 2016 Sept 8;11(9):e0162149.
10. Kang X, Wei X, Jiang L, Niu C, Zhang J, Chen S, Meng D. Nox2 and Nox4 Regulate Self-renewal of Murine Induced-Pluripotent Stem Cells. *IUBMB Life*. 2016 Dec;68(12):963-970. Epub 2016 Oct 31.
11. Sagar Kaushik, Bogeun Kim, Alexander Walma, Sungchul Choi, Hui Wu, Jeremy Mao, Ho-Wook Jun, Kyounga Cheon. Construction of biomimetic microenvironments for regenerative endodontics: a review. *Biomaterials Research*. 2016;20:14.
12. Patrick TJ Hwang, Dishant K. Shah, Jacob A. Garcia, Chae Yun Bae, Dong-Jin Lim, Ryan C. Huiszoon, Grant C. Alexander, Ho-Wook Jun, progress and challenges of the bioartificial pancreas. *Nano Convergence*. 2017. [In press]
13. Do-Yeon Cho, Kyle Hoffman, Daniel Skinner, Dongjin Lim, Grant Alexander, Chaeyun Bae, Dongkeun Han, Ho-Wook Jun, Bradford Woodworth. *International Forum of Allergy & Rhinology*. 2016 Dec 19. [Epub ahead of print]
14. Rogers AJ, Fast VG, Sethu P. Biomimetic Cardiac Tissue Model Enables the Adaption of Human Induced Pluripotent Stem Cell Cardiomyocytes to Physiological Hemodynamic Loads. *Anal Chem*. 2016 Oct 4;88(19):9862-9868.
15. York SL, Sethu P, Saunders MM. In vitro osteocytic microdamage and viability quantification using a microloading platform. *Med Eng Phys*. 2016 Oct;38(10):1115-1122.
16. Patibandla PK, Rajasekaran NS, Shelar SB, Giridharan GA, Litovsky SH, Sethu P. Evaluation of the effect of diminished pulsatility as seen in continuous flow ventricular assist devices on arterial endothelial cell phenotype and function. *J Heart Lung Transplant*. 2016 Jul;35(7):930-932.
17. York SL, Sethu P, Saunders MM. Impact of Gap Junctional Intercellular Communication on MLO-Y4 Sclerostin and Soluble Factor Expression. *Ann Biomed Eng*. 2016 Apr;44(4):1170-80.
18. Budhwani KI, Thomas V, Sethu P. Lab-on-a-brane: Nanofibrous polymer membranes to recreate organ-capillary interfaces. *J Micromech Microeng*. 2016;26:035013.
19. Budhwani KI, Wood AT, Gangrade A, Sethu P, Thomas V. Nanofiber and stem cell enabled biomimetic systems and regenerative medicine. *J Nanosci Nanotechnol*. 2016;16:8923-8934.
20. Li N, Yuan Q, Cao XL, Zhang Y, Min ZL, Xu SQ, Yu ZJ, Chen J, Zhang C, Hu XM. Opposite effects of HDAC5 and p300 on MRTF-A-related neuronal apoptosis during ischemia/reperfusion injury in rats. *Cell Death Dis*. 2017. [In press]
21. Chu M, Wu R, Qin S, Hua W, Shan Z, Rong X, Zeng J, Hong L, Sun Y, Liu Y, Li W, Wang S, Zhang C. Bone marrow-derived microRNA-223 works as an endocrine genetic signal in vascular endothelial cells and participates in vascular injury of Kawasaki disease. *J Am Heart Assoc*. 2017;6:e004878.
22. Zhou M, Wang M, Wang X, Liu K, Wan Y, Li M, Liu L, Zhang C. Abnormal Expression of MicroRNAs Induced by Chronic Unpredictable Mild Stress in Rat Hippocampal Tissues. *Mol Neurobiol*. 2017 Jan 12. (in press)
23. Tang N, Jiang R, Wang X, Wen J, Liu L, Wu J, Zhang C. Insulin resistance plays a potential role in postoperative cognitive dysfunction in patients following cardiac valve surgery. *Brain Res*. 2017 Feb 15;1657:377-382.
24. Wang ZG, Li H, Huang Y, Li R, Wang XF, Yu LX, Guang XQ, Li L, Zhang HY, Zhao YZ, Zhang C, Li XK, Wu RZ, Chu MP, Xiao J. Nerve growth factor-induced Akt/mTOR activation protects the ischemic heart via restoring autophagic flux and attenuating ubiquitinated protein accumulation. *Oncotarget*. 2017 Jan 17;8(3):5400-5413.
25. Rong X, Jia L, Hong L, Pan L, Xue X, Zhang C, Lu J, Jin Z, Qiu H, Wu R, Chu M. Serum miR-92a-3p as a New Potential Biomarker for Diagnosis of Kawasaki Disease with Coronary Artery Lesions. *J Cardiovasc Transl Res*. 2016 Dec 15. [Epub ahead of print]
26. Zhan J, Qin S, Lu L, Hu X, Zhou J, Sun Y, Yang J, Liu Y, Wang Z, Tan N, Chen J, Zhang C. miR-34a is a common link in both HIV- and antiretroviral therapy-induced vascular aging. *Aging*. 2016 Nov 26;8(12):3298-3310.
27. Wang Z, Rong X, Luo B, Qin S, Lu L, Zhang X, Sun Y, Hu Q, Zhang C. A Natural Model of Mouse Cardiac Myocyte Senescence. *J Cardiovasc Transl Res*. 2016 Dec;9(5-6):456-458.
28. Xu, N., Liu, M., and Liu, X.M. *Pharmacology, Pharmacokinetics, and Pharmacodynamics of Antibodies. Biosimilar*. December 2016. [Book Chapter]
29. Yang, S.T. and Liu, X. Chapter 8. *Metabolic Process Engineering for Biochemicals and Biofuels Production. New Biotechnologies for Increased Energy Security*. CRC Press. Editor, Juan Carlos Serrano-Ruiz. January 2017. [Book Chapter]