**Aylin Acun**

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**RESEARCH EXPERIENCE**

**HARVARD MEDICAL SCHOOL - MASSACHUSETTS GENERAL HOSPITAL – CENTER FOR ENGINEERING IN MEDICINE** Boston, MA

*Postdoctoral Research Fellow*  September 2018-Ongoing

* Whole human liver decellularization and recellularization for repurposing livers clinically not accepted for transplantation
* Recellularizing decellularized rat livers with iPSCs for developing in vitro and in vivo functional liver substitutes
* Developing novel wound closure remedies for chronic wound healing

**UNIVERSITY OF NOTRE DAME** Notre Dame, IN

*Doctoral Researcher, Bioengineering* January 2013 – May 2018

* Designed and developed the first hiPSC-derived, in vitro aged myocardial tissue models for modeling age-related cardiovascular diseases using tissue engineering and stem cell culture techniques.
* Involved in design and development of myocardium-on-chip model with integrated flow using hiPSC-derived cardiomyocytes and endothelial cells.
* Developed HIF-1a knock down hiPSC-derived endothelial cells using shRNA and siRNA targeting to investigate endothelial cell-mediated cardio-protection under cardiac reperfusion injury conditions.

**harvard UNIVERSITY** Boston, MA

*Visiting Researcher, Stem Cell and Regenerative Biology* June 2014 – February 2015

* Developed and characterized HIF-1a knockout hiPSCs using CRISPR/Cas9 technology.
* Implemented stem cell culture and differentiation techniques to develop human-origin endothelial cells and cardiomyocytes.

**Middle east technical university** Ankara, Turkey

*Graduate Researcher, Biotechnology* February 2011 – January 2013

* Designed and developed a two-layered, collagen-based tissue engineered cornea model using phase separation and electrospinning techniques and characterized its structure and functionality.

**RESEARCH INTERESTS**

**Tissue Engineering and Regenerative Medicine**

* Developing 3D in vitro tissue models towards whole organ fabrication

**Aging Research – in vitro Aged Tissue Models to Study Age-related Diseases**

* Modeling Age-related Cancers and Neurodegenerative Diseases in vitro and in vivo

**Stem Cell Research**

* Developing iPSC-based therapies using tissue and animal models

**BIOMEMS - Organ-on-chip Technology**

* Cancer, brain, and heart-on-chip models for clinical applications

**EDUCATION**

**UNIVERSITY OF notre dame** Notre Dame, IN

* Ph.D., Bioengineering Graduate Program May 2018
* Dissertation topic: **hiPSC-based, human-origin, aged in vitro cardiac disease models**
* Advisor: Dr. Pinar Zorlutuna

**Middle east technical university** Ankara, Turkey

* MSc., Biotechnology Graduate Program January 2013
* Thesis topic: **Collagen-based, double layer cornea tissue engineering**
* Advisor: Dr. Vasif Hasirci

**Middle east technical university** Ankara, Turkey

* B.S., Biological Sciences June 2010

**tECHNICAL sKILLS**

* Whole and partial rat and human liver decellularization and recellularization
* Induced pluripotent stem cell culture and differentiation to endothelial cells and cardiomyocytes
* Tissue engineering construct fabrication, characterization, and culture
* Microfluidic heart-on-chip fabrication and culture
* Confocal and fluorescence microscopy
* CRISPR/Cas9 editing
* Molecular biology techniques (shRNA and siRNA editing, RT-qPCR)

**AWARDS AND HONORS**

* **2nd International Conference on Stem Cells Student Travel Award**, Aegean Conferences, Rhodes, Greece (September 2017)
* **Graduate Student Union Conference Presentation Grant**, University of Notre Dame, IN (October 2017)
* **Middle East Technical University Research Coordination Office Graduate Student Research Grant** (METU-BAP- DPT, 2011-2012)
* **Graduated with Honors from METU**, Department of Biological Sciences, Biology Program (2010)

**CERTIFICATIONS**

* **Striving for Excellence in Teaching Certificate**, Kaneb Center for Teaching and Learning, University of Notre Dame (February 2018)
* **Cancer Nanotechnology and Cell Mechanics Workshop Completion Certificate**, University of Illinois at Urbana-Champaign, 2015 BioNanotechnology Summer Institute (August 2015).

**Publications**

B. Bulutoglu, J. Devalliere, S. Deng, **A. Acun**, S. Kelangi, B. Uygun, M. Yarmush, (2019). Tissue Scaffolds Functionalized with Therapeutic Elastin Biopolymer Particles. Biofabrication (Submitted)

**A. Acun,** R. Ogenasyan, B. Uygun (2018). Liver Bioengineering Promise, Pitfalls, and Hurdles to Overcome. Current Transplantation Reports, 1-8.

**A. Acun,** & P. Zorlutuna (2018). CRISPR/Cas9 edited hiPSC-based vascular tissues to model aging and disease-dependent impairment. Tissue Engineering Part A. Published Online: Feb 1 2019, https://doi.org/10.1089/ten.TEA.2018.0271.

**A. Acun**, T.D. Nguyen, P. Zorlutuna (2018). hiPSC-derived in vitro aged heart tissue model shows molecular and functional deterioration resembling aged mammalian heart. Acta Biomaterialia.*(Under Review)* [BioRxiv preprint] doi: https://doi.org/10.1101/287334

**A. Acun**, D.C. Vural, P. Zorlutuna (2017). Beyond Cellular Aging: Interdependence and Cooperative Effects in Failing Tissues. **Scientific Reports**. 7, 5051.

**A. Acun**, P. Zorlutuna. (2017). Engineered Myocardium Model to Study the Roles of HIF-1α and HIF1A-AS1 in Paracrine-only Signaling under Pathological Level Oxidative Stress. **Acta Biomaterialia**. 58, 323–336.

X. Yue, **A. Acun**, P. Zorlutuna. (2017). Transcriptome Profiling of 3D Co-cultured Cardiomyocytes and Endothelial Cells under Oxidative Stress using a Photocrosslinkable Hydrogel System. **Acta Biomateriala**. 58, 337–348.

B. Ellis, **A. Acun**, U.I. Can, P. Zorlutuna. (2017). Human iPSC-Derived Myocardium-on-chip with Capillary-like Flow for Personalized Medicine. **Biomicrofluidics** 11, 024105.

A. YekrangSafakar, **A. Acun**, J.W. Choi, E. Song, P. Zorlutuna, K. Park (2018). Hollow microcarriers for large scale expansion of anchorage-dependent cells in a stirred bioreactor. Biotechnology and Bioengineering DOI: 10.1002/bit.26601

D. Suma, **A. Acun**, P. Zorlutuna, D.C. Vural (2018). Interdependence Theory of Tissue Aging: Bulk and Boundary Effects. Royal Society Open Science DOI:10.1098/rsos.171395

J. Casey, X. Yue, D.T. Nguyen, **A. Acun**, V. Zellmer, S. Zhang, P. Zorlutuna.(2017). 3D Hydrogel-Based Microwell Arrays As A Tumor Microenvironment Model To Study Breast Cancer Growth. **Biomedical Materials**. 12(2):025009

**A. Acun**, A. Panzo, P. Zorlutuna (2015), “Hydrogels in controlling stem cell fate” in Applications of Hydrogels in Regenerative Medicine, World Scientific Publishing Company, Editor-in-chiefs: Ali Khademhosseini and Utkan Demirci

**A. Acun**, V. Hasirci (2014). Construction of a collagen-based, split-thickness cornea substitute. Journal of Biomaterials Science Polymer Edition. 1-23:8.

**presentations**

2017 International Conference on Stem Cells, Rhodes, Greece. “Tissue engineered disease models using human iPSC-derived myocardial cells for personalized medicine” September 2017

2017 Summer Biomechanics, Bioengineering, and Biotransport Conference, Tucson, AZ.“Interdependence Driven Aging in Synthetic Tissues” June 2017

University of Notre Dame Stem Cell Colloquium, Notre Dame, IN. “Tissue Engineered Myocardium to Study the Role of Cellular Interactions in Protection from Reperfusion Injury” August 2016

University of Notre Dame Bioengineering Program Departmental Seminar, Notre Dame, IN. “Engineering myocardial tissues to study the role of HIF1α and endothelial cells in cardioprotection under oxidative stress” February 2015

**posters**

2017 BMES Annual Meeting, Phoenix, AZ.“An Aged, Human-Origin, Engineered Infarct Model” October 2017

2017 International Conference on Stem Cells, Rhodes, Greece.“Optimization of Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes for Tissue Engineering and Disease Modeling” September 2017

2016 BMES Annual Meeting, Minneapolis, MN.“A Tissue Engineered Model of Aging” October 2016

2016 BMES Annual Meeting, Minneapolis, MN. “A hiPSC-Derived 3-D Myocardium-On-A-Chip for The Study of Cardiovascular Disease” October 2016

Eli Lilly and Company Grand Rounds Seminar Series, Indianapolis, IN. Invited poster presentation. “hiPSC-derived Engineered Myocardium Towards Personalized Medicine Applications” October 2016

Indiana CTSI 8th Annual Meeting, Indianapolis, IN.“hiPSC-derived Engineered Myocardium Towards Personalized Medicine Applications” September 2016

2015 BMES Annual Meeting, Tampa, FL.“A microfluidic system to study the role of hif1a and endothelial cells in reperfusion injury” October 2015

EMBS Micro and Nanotechnology in Medicine Conference, Translating Technology from the Bench to the Bedside, Oahu, HI.“An Engineered Microfluidic Device for Modeling Cardiac Tissue”December 2014

3rd Annual AD&T Symposium, Notre Dame, IN. “Engineering Myocardial Disease Models using Genetically Modified Human iPSCS” November 2014

2014 BMES Annual Meeting, San Antonio, TX. “Oxygen Monitoring for Three-Dimensional Engineered Tissues” October 2014

Frontiers in Bioengineering Symposium, Urbana-Champaign, IL. “Baby Steps Towards Living Micromachines” September 2014

**Teaching experience**

**UNIVERSITY OF NOTRE DAME** Notre Dame, IN

**Graduate Teaching Assistant**, Aerospace and Mechanical Engineering Fall 2017

AME 50548 Next Generation Nano-scale Manufacturing of Biomedical Systems:

I demonstrated hydrogel tissue model fabrication, microfluidic device assembly, graded homework and midterm, and prepared and presented a full lecture.

**Graduate Teaching Assistant**, Aerospace and Mechanical Engineering Springs 2016, 2017

AME 21213 Solid Mechanics: I was in charge of demonstrating the experiments such as tensile testing, building a beam, and three and four point bending tests and guiding the students during the experiments. Helped students with their questions on the related theoretical information, and graded lab reports for this Sophomore level class with over 150 students.

**Graduate Teaching Assistant**, Aerospace and Mechanical Engineering Spring 2015, Fall 2016

AME 60677 Biomimetic Tissue Engineering: Graded quizzes and midterms, lead graduate and undergraduate students in cell/tissue culture room and demonstrated basic steps of cell culture and cell encapsulation in hydrogels for this Graduate level class with 12 students.

**Graduate Teaching Assistant**, Aerospace and Mechanical Engineering Fall 2014, Fall 2015

AME 30362 Design Methodologies: Graded homework and quizzes for this Sophomore level class with over 100 students.

**LEADERSHIP AND SERVICE**

**High School Student Mentorship**, University of Notre Dame

Trained a high school junior on basic principles of tissue engineering for introducing her to science and research and help her to have her own project for two years.

**Undergraduate Student Mentorship**, University of Notre Dame

Trained 7 undergraduate students with various backgrounds on basic principles of tissue engineering for introducing them to science and research in graduate level and mentoring them on their own projects.

**Workshop Organization**, University of Notre Dame

Organized and lead the workshops that includes an oral presentation and hands-on experience of cell and tissue culture and basic tissue engineering concepts for my research group in Expending Your Horizons Conference in 2016 and 2017.

**REFERENCEs**

**Dr. Basak Uygun, Postdoctoral Advisor, Harvard Medical School**

e-mail: buygun@mgh.harvard.edu

**Dr. Pinar Zorlutuna, Ph.D. advisor, University of Notre Dame**

e-mail: Pinar.Zorlutuna.1@nd.edu

**Dr. Kidong Park, Collaborator, Louisiana State University**

e-mail: kidongp@lsu.edu

**Dr. Vasif Hasirci, M.Sc. advisor, Middle East Technical University**

e-mail: vhasirci@metu.edu.tr