

Asst. Prof. ALTUĞ ÖZÇELİKKALE

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Publons / Web Of Science ResearcherID: ABA-2198-2020

ScopusID: 54972309800

Yoksis Researcher ID: 317066



Biography

Dr. Altuğ Özçelikkale holds a B.S (2008) and an M.S (2010) degree in Mechanical Engineering from Middle East Technical University and a Ph.D. (2015) degree from Purdue University. He pursued his Ph.D. studies at Biotransport Phenomena Laboratory in the School of Mechanical Engineering. Before he joined METU, he was a Postdoctoral Research Associate in the Department of Physics and Institute for Physical Science and Technology at the University of Maryland College Park. He was also a Visiting Scholar at Johns Hopkins University.

Education Information

2010 - 2015	Doctorate, Purdue University, United States Of America
2008 - 2010	Postgraduate, Middle East Technical University, Turkey
2004 - 2008	Undergraduate, Middle East Technical University, Faculty of Engineering, Turkey

Foreign Languages

English, C2 Mastery

Dissertations

2015	Freezing-Induced Deformation of Biomaterials in Cryomedicine, Purdue University, Faculty of Engineering, School of Mechanical Engineering, Doctorate
2010	Development of an incompressible, laminar flow solver based on least squares spectral element method with P-type adaptive refinement capabilities, Middle East Technical University, Postgraduate

Research Areas

Bioengineering and MEMS, Bioinstrumentation and Microelectromechanical Systems (MEMS), Biomedical Image Processing, Biomechanics, Artificial Organs and Biomaterials, Non-traditional manufacturing methods, Biomechanics, Heat and Mass Transfer

Academic Titles / Tasks

2021 - Continues	Assistant Professor, Middle East Technical University, Graduate School of Natural and Applied Sciences, Biomedical Engineering
2020 - Continues	Assistant Professor, Middle East Technical University, Faculty of Engineering, Department of Mechanical Engineering
2017 - 2019	Researcher, University of Maryland, College Park, Institute for Physical Science and Technology, Department of Physics
2016 - 2017	Researcher, Johns Hopkins University, School of Engineering, Department of Mechanical Engineering
2015 - 2016	Researcher, Purdue University, College of Engineering, School of Mechanical Engineering
2010 - 2015	Research Assistant, Purdue University, College of Engineering, School of Mechanical Engineering

Academic and Administrative Experience

2024 - Continues	Laboratory Committee Coordinator, Middle East Technical University, Faculty Of Engineering, Department Of Mechanical Engineering
2023 - Continues	Quality Coordinator, Middle East Technical University, Faculty Of Engineering, Department Of Mechanical Engineering
2022 - Continues	Publicity and Communication Committee Member, Middle East Technical University, Faculty of Engineering, Department of Mechanical Engineering
2022 - Continues	Biomechanics Track Representative, Middle East Technical University, Graduate School of Natural and Applied Sciences, Biomedical Engineering
2020 - Continues	ÜZEM Advisory Board Member, Middle East Technical University, Faculty of Engineering, Department of Mechanical Engineering
2020 - Continues	Distance Education Coordinator, Middle East Technical University, Faculty of Engineering, Department of Mechanical Engineering

Advising Theses

2024	Acar A., Özçelikkale A., Postgraduate, C.ILDIZ(Student), INVESTIGATION OF MIGRATION OF BREAST CANCER CELLS IN RELATION TO FIBROBLASTS ON A MICROFLUIDIC SYSTEM
2023	Özçelikkale A., Postgraduate, A.AYKUT(Student), Modeling and characterization of fluid, macromolecule, and nanoparticle transport in fibrous collagen hydrogels
2023	Özçelikkale A., Postgraduate, B.DEDEKARGINOĞLU(Student), Rapid prototyping of microfluidic tissue culture systems via mask based photo polymerization
2023	Özçelikkale A., Yıldırım E., Postgraduate, S.FARAHANI(Student), Development of a micro-well-based microfluidic 3D cell culture for cytotoxicity assays

Published journal articles indexed by SCI, SSCI, and AHCI

1. Exploiting Matrix Stiffness to Overcome Drug Resistance

Aydin H. B., ÖZÇELİKKALE A., ACAR A.

ACS BIOMATERIALS SCIENCE & ENGINEERING, vol.10, no.8, pp.4682-4700, 2024 (SCI-Expanded)

II. **Predictive Design and Analysis of Drug Transport by MultiScale Computational Models Under Uncertainty**

AKALIN A. A., DEDEKARGINOĞLU B., Choi S. R., Han B., ÖZÇELİKKALE A.

Pharmaceutical Research, vol.40, no.2, pp.501-523, 2023 (SCI-Expanded)

III. **Migration and 3D Traction Force Measurements inside Compliant Microchannels**

Afthinos A., Bera K., Chen J., Ozcelikkale A., Amitrano A., Choudhury M. I., Huang R., Pachidis P., Mistriotis P., Chen Y., et al.

NANO LETTERS, vol.22, no.18, pp.7318-7327, 2022 (SCI-Expanded)

IV. **Cytotoxic T Lymphocyte Activation Signals Modulate Cytoskeletal Dynamics and Mechanical Force Generation**

Pathni A., Ozcelikkale A., Rey-Suarez I., Li L., Davis S., Rogers N., Xiao Z., Upadhyaya A.

FRONTIERS IN IMMUNOLOGY, vol.13, 2022 (SCI-Expanded)

V. **An engineered pancreatic cancer model with intra-tumoral heterogeneity of driver mutations**

Moon H., Ozcelikkale A., Yang Y., Elzey B. D., Konieczny S. F., Han B.

LAB ON A CHIP, vol.20, no.20, pp.3720-3732, 2020 (SCI-Expanded)

VI. **Differential response to doxorubicin in breast cancer subtypes simulated by a microfluidic tumor model**

Ozcelikkale A., Shin K., Noe-Kim V., Elzey B. D., Dong Z., Zhang J., Kim K., Kwon I. C., Park K., Han B.

JOURNAL OF CONTROLLED RELEASE, vol.266, pp.129-139, 2017 (SCI-Expanded)

VII. **Effects of dynamic matrix remodelling on en masse migration of fibroblasts on collagen matrices**

Ozcelikkale A., Dutton J. C., Grinnell F., Han B.

JOURNAL OF THE ROYAL SOCIETY INTERFACE, vol.14, no.135, 2017 (SCI-Expanded)

VIII. **Enzyme-Induced Matrix Softening Regulates Hepatocarcinoma Cancer Cell Phenotypes**

Liang Y., Clay N. E., Sullivan K. M., Leong J., Ozcelikkale A., Rich M. H., Lee M. K., Lai M., Jeon H., Han B., et al.

MACROMOLECULAR BIOSCIENCE, vol.17, no.9, 2017 (SCI-Expanded)

IX. **In vitro microfluidic models of tumor microenvironment to screen transport of drugs and nanoparticles**

Ozcelikkale A., Moon H., Linnes M., Han B.

WILEY INTERDISCIPLINARY REVIEWS-NANOMEDICINE AND NANOBIO TECHNOLOGY, vol.9, no.5, 2017 (SCI-Expanded)

X. **Subcellular domain-dependent molecular hierarchy of SFK and FAK in mechanotransduction and cytokine signaling**

Wan Q., ThucNhi TruongVo T. T., Steele H. E., Ozcelikkale A., Han B., Wang Y., Oh J., Yokota H., Na S.

SCIENTIFIC REPORTS, vol.7, 2017 (SCI-Expanded)

XI. **Modulation of Matrix Softness and Interstitial Flow for 3D Cell Culture Using a Cell-Microenvironment-on-a-Chip System**

Clay N. E., Shin K., Ozcelikkale A., Lee M. K., Rich M. H., Kim D. H., Han B., Kong H.

ACS BIOMATERIALS SCIENCE & ENGINEERING, vol.2, no.11, pp.1968-1975, 2016 (SCI-Expanded)

XII. **Role of intracellular poroelasticity on freezing-induced deformation of cells in engineered tissues**

Ghosh S., Ozcelikkale A., Dutton J. C., Han B.

JOURNAL OF THE ROYAL SOCIETY INTERFACE, vol.13, no.123, 2016 (SCI-Expanded)

XIII. **DNA Walker-Regulated Cancer Cell Growth Inhibition**

Li F., Cha T., Pan J., Ozcelikkale A., Han B., Choi J. H.

CHEMBIOCHEM, vol.17, no.12, pp.1138-1141, 2016 (SCI-Expanded)

XIV. **Thermal Destabilization of Collagen Matrix Hierarchical Structure by Freeze/Thaw**

Ozcelikkale A., Han B.

PLOS ONE, vol.11, no.1, 2016 (SCI-Expanded)

XV. **Simulation of complex transport of nanoparticles around a tumor using tumor-microenvironment-on-chip**

Kwak B., Ozcelikkale A., Shin C. S., Park K., Han B.

JOURNAL OF CONTROLLED RELEASE, vol.194, pp.157-167, 2014 (SCI-Expanded)

XVI. **Role of Cells in Freezing-Induced Cell-Fluid-Matrix Interactions Within Engineered Tissues**

Seawright A., Ozcelikkale A., Dutton C., Han B.

JOURNAL OF BIOMECHANICAL ENGINEERING-TRANSACTIONS OF THE ASME, vol.135, no.9, 2013 (SCI-Expanded)

XVII. **Multifaceted Transport Characteristics of Nanomedicine: Needs for Characterization in Dynamic Environment**

Ozcelikkale A., Ghosh S., Han B.

MOLECULAR PHARMACEUTICS, vol.10, no.6, pp.2111-2126, 2013 (SCI-Expanded)

XVIII. **Least-squares spectral element solution of incompressible Navier-Stokes equations with adaptive refinement**

Ozcelikkale A., SERT C.

JOURNAL OF COMPUTATIONAL PHYSICS, vol.231, no.9, pp.3755-3769, 2012 (SCI-Expanded)

Articles Published in Other Journals

I. **Tumor-Microenvironment-on-Chip Platform for Assessing Drug Response in 3D Dynamic Culture**

Aydin H. B., Moon H., Han B., ÖZÇELİKKALE A., ACAR A.

Methods in molecular biology (Clifton, N.J.), vol.2764, pp.265-278, 2024 (Scopus)

II. **Spatiotemporal characterization of extracellular matrix microstructures in engineered tissue: A whole-field spectroscopic imaging approach**

Xu Z., ÖZÇELİKKALE A., Kim Y. L., Han B.

Journal of Nanotechnology in Engineering and Medicine, vol.4, no.1, 2013 (Scopus)

Refereed Congress / Symposium Publications in Proceedings

I. **Prototyping of a Microfluidic Mechanochemical Gradient Chip by 3D Printed Molding for In Vitro Drug Testing**

Fathi M., Mehrasa A., Özcelikkale A.

SB3C2024 Summer Biomechanics, Bioengineering and Biotransport Conference, Wisconsin, United States Of America, 10 - 14 June 2024, pp.806-807

II. **Parametric design and manufacturing of mammary carcinoma chip by stereolithography for simulating drug transport around the tumor**

Fathi M., Dedekargınođlu B., Akalın A. A., Özcelikkale A.

The 2nd Microphysiological Systems World Summit, Berlin, Germany, 26 - 30 June 2023, vol.11, no.1, pp.235-236

III. **Rapid prototyping of microfluidic co-culture platform based on a 3D printing workflow for systematic investigation of tumor stromal interactions**

Dedekargınođlu B., Ildız C., Acar A., Özcelikkale A.

The 2nd Microphysiological Systems World Summit, Berlin, Germany, 26 - 30 June 2023, vol.11, no.1, pp.200

IV. **Capillary pressure barriers for spatial confinement in organ-on-a-chip devices**

Açıkgöz B. C., Dirmenciođlu U., Farahani S., Özcelikkale A., Yildirim E.

5th NOVEL FLUIDIC TECHNOLOGIES WORKSHOP WITH AN EMPHASIS ON TISSUE ENGINEERING, İzmir, Turkey, 4 - 05 May 2023, pp.29-31

V. **Modeling and Characterization of Nanomedicine Transport within Tumor Microenvironment across Scales**

Akalın A. A., Özcelikkale A.

16th Nanoscience and Nanotechnology Conference, Ankara, Turkey, 5 - 08 September 2022, pp.338

VI. **Rapid Low-Cost Prototyping of Organ-on-Chip Platforms by 3D-Printed Microfluidics**

Dedekargınođlu B., Akalın A. A., Özcelikkale A.

3rd Annual European Organ-on-Chip Society Meeting, Uppsala, Sweden, 01 July 2021

VII. **Regulation of Cytoskeletal Dynamics during T Cell Activation by Substrate Stiffness**

Özçelikkale A., Upadhyaya A.

American Physical Society March Meeting, California, United States Of America, 07 March 2018, pp.1

VIII. **NANOSCALE FLUID-STRUCTURE INTERACTIONS IN CYTOPLASM DURING FREEZING**

Ozcelikkale A., Han B.

ASME International Mechanical Engineering Congress and Exposition, Texas, United States Of America, 9 - 15 November 2012, pp.711-716

IX. **EFFECTS OF FREEZING ON COLLAGEN NANOSCALE STRUCTURE IN ENGINEERED TISSUES**

Ozcelikkale A., Li Y., Xu X., Han B.

2nd ASME Global Congress on NanoEngineering for Medicine and Biology, Massachusetts, United States Of America, 4 - 06 February 2013, pp.29-30

X. **FUNCTIONAL IMAGING OF MATRIX STRUCTURE OF CRYOPRESERVED ENGINEERED TISSUES USING BACK-DIRECTIONAL GATED MESOSCOPIC IMAGING**

Kim Y. L., Xu Z., Ozcelikkale A., Han B.

ASME Summer Bioengineering Conference (SBC), Fajardo, Puerto Rico, 20 - 23 June 2012, pp.259-260

XI. **ROLE OF CELLS IN FREEZING-INDUCED CELL-FLUID MATRIX INTERACTIONS WITHIN ENGINEERED TISSUES**

Seawright A., Ozcelikkale A., Dutton J. C., Han B.

ASME Summer Bioengineering Conference (SBC), Fajardo, Puerto Rico, 20 - 23 June 2012, pp.409-410

XII. **h- and p-Adaptive Incompressible Flow Solutions on Cartesian Grids Using Least Squares Spectral Element Method**

Özçelikkale A., Sert C.

5th European Conf. on CFD (ECCOMAS CFD), Lisbon, Portugal, 14 - 17 June 2010, pp.1-16

Supported Projects

2023 - Continues	Mikroakışkan Sistemlerin Biyomedikal Uygulamaları İçin Düşük Maliyetli Stereolitografi Mikro İmalat Yaklaşımları, Project Supported by Higher Education Institutions
2023 - 2024	Stres Granül Bozulununun Zaman Aşamalı Mikroskop ile Takibi, Project Supported by Higher Education Institutions
2020 - 2023	Artificial Tissue Environments with Microfluidics for Next Generation Predictive Disease Models, TUBITAK Project

Scientific Refereeing

August 2023	Research Project of the Presidency of Turkey Health Institutes (TÜSEB), Middle East Technical University, Turkey
June 2023	Project Supported by Higher Education Institutions, BAP Research Project, Middle East Technical University, Turkey

Metrics

Publication: 32

Citation (WoS): 459

Citation (Scopus): 505

H-Index (WoS): 11

H-Index (Scopus): 12

Invited Talks

September 2024	How to Stop Worrying and Love the Microscope: An Introduction to Microscopy Imaging Techniques and Analysis, Workshop, ODTÜ MEMS Merkezi, Turkey
November 2022	Next-Generation Engineered Models of Physiological Tissue Microenvironment in Health and Disease, Seminar, Sabancı Üniversitesi, Turkey
April 2022	Next Generation Engineered Models of Physiological Tissue Microenvironment in Health and Disease, Seminar, Orta Doğu Teknik Üniversitesi, Turkey

Scholarships

2020 - 2023	2232 International Fellowship for Outstanding Researchers , TUBITAK
2010 - 2011	Ross Graduate Fellowship, University
2008 - 2010	National Scholarship for M.S. Students, TUBITAK