

Mohammad Ajoudanian

Tel: (+9891)2044-1239 | Email: ajoudanian@sbmu.ac.ir

SUMMARY

The motivated scientist has over eight-year experiences in microfluidics. The bulk of his expertise lies in designing and fabrication of microfluidics for biofabrication in disease modeling and drug discovery. Has Experience on biofabrication of hydrogel microbeads for the self-organization of cells. Extensive experiences in primary culture of tumor in the microfluidic system by digesting them with collagenase and capturing spheroids for chemo-sensitivity assays. Has knowledge in CTC isolation from whole blood in spiral microfluidics. The Micro machining, hot embossing and photolithography are his key skills to produce microfluidics devices for Liver-on-chip, Brain-on-Chip and Tumor-on-chip. Designing and simulating the piezoelectric actuator and sensor for thrombus dissolution. Has Experience in designing and engineering of mechanical parts of mobile robots. Proven professional with over 5 years of teaching and advising microfluidics for undergraduate and graduate students.

EDUCATION & EXPERIENCE

Assistant Professor at Shahid Beheshti University of Medical Sciences (Iran) (November 2015-Now)

Department of Tissue Engineering, School of Advanced Technology in Medicine

Postdoctoral research fellow at Keio University(Japan) (September 2013-October 2015)

Postdoctoral Fellowship Researcher at MIT(USA) (August 2012- August 2013)

Research Associate at Keio University (Japan) (December 2011-July 2012)

Topic: Liver Tissue Engineering with Microfluidic Device, (Grant-In-Aid for Scientific Research based on my proposal: 115,000\$)

Advisor: Professor Ryo Sudo(Keio University) and Professor Roger Kamm(MIT)

PhD in Biomechanics at Yamaguchi University-Japan (2008- 2011)

PhD Thesis: "Design Novel Piezoelectric Actuator as a Micro Stirrer for Thrombus Dissolution"

Advisor: Dr.Minrou Morita and Zhongwei Jiang; Professor of Micro-Mechatronics Lab.

Research Student at Yamaguchi University (2007-2008)

M.Sc. Mechanical Engineering (Manufacturing)-Isfahan University of Technology - Iran(2004- 2006).

MSc Thesis: Design and Fabrication of a Two Dimensional Servo Press Transfer System (Automation)

Adviser: Dr Mahmud Farzin. Department of Mechanical Eng.

B.Sc. Mechanical Engineering (Manufacturing) -Isfahan University of Technology- Iran (1999-2003).

BSc Project title: Design and Fabrication and Control of Mobile Robot.

SKILLS

Lab:

- Photo lithography, soft lithography, laser micromachining, hot embossing, injection molding and CNC machining, 3D Printing
- 2D and 3D cell culturing in microfluidic device: endothelial cells, hepatocyte and hepatic stellate cells
- Perfusion surgery and isolation of parenchymal cell and non-parenchymal cell of rat liver cell
- Microsphere hepatocyte with static, rotating and hanging drop methods, Immunocytochemistry and Immunofluorescence

Computer:

- Finite element software :ANSYS - COMSOL; 3D CAD Software(SolidWorks, Inventor)
- ; Programing: Delphi, MATLAB ;

Language:

- English (fluent), Farsi (native), Japanese (basic), French(basic)

PATENTS

- Japan Patent (特願 2010-150714), "Micro-piezoelectric Stirrer for Thrombus Dissolution".
- Iran Patent 33324," Two Dimensional Servo Press Transfer System"
- Iran Patent "Submission number:139950140003008653" ,Production of paper based microfluidics by FDM 3D printer"

WORKSHOP

- **Organizing and Teaching in "3D cell culture in microfluidics & Tumor-on-Chip"**2018, Shahid Beheshti University of Medical Sciences

COMPETITIVE RESEARCH GRANTS EXPERIENCE

- Main researcher in " Angiogenesis in Liver Tissue Engineering by Microfluidics", Japan Society for Promotion of Science, 2013, (3,000,000 Yen)
- PI in "Organ of Corti on chip: a human iPSc based in vitro model of inner ear on microfluidic devices as a platform for drug development, disease modeling and personalized medicine", National Institute for Medical Research Development,(NIMAD) No. 942968 , 2016, (1,700,000,000 IRR)
- PI in "Circulating Tumor Cell Isolation by Microfluidics", Iranian Technology Development Fund, 2018,(2,000,000 IRR)
- CoPI in " Brain on Chip", National Institute for Medical Research Development,(NIMAD), No.957049, 2017, (2,730,000,000 IRR)

- CoPI in “ Liver on Chip”, National Institute for Medical Research Development,(NIMAD), No.957049, 2016, (2,500,000,000 IRR)

PUBLICATIONS

Journal

- **Ajoudanian**, M., Enomoto, K., Tokunaga, Y., Minami, H., Chung, S., Tanishita, K., ... & Sudo, R. (2019). Self-organization of hepatocyte morphogenesis depending on the size of collagen microbeads relative to hepatocytes. **Biofabrication**, 11(3), 035007. **IF:8.2**
- Musavi, M., Kohram, F., Abasi, M., Bolandi, Z., **Ajoudanian, M.**, Mohammadi - Yeganeh, S., ... & Ghanbarian, H. (2019). Rn7SK small nuclear RNA is involved in cellular senescence. **Journal of cellular physiology**, 234(8), 14234-14245.
- Jeibouei, S., Akbari, M. E., Kalbasi, A., Aref, A. R., **Ajoudanian, M.**, Rezvani, A., & Zali, H. (2019). Personalized medicine in breast cancer: pharmacogenomics approaches. **Pharmacogenomics and Personalized Medicine**, 12, 59.
- Derakhshan S,...**Ajoudanian M.**, Piryaei, “Investigation of in vitro Functionality of Liver Microtissues Produced by Co-Culture of Mesenchymal Stem Cells, Endothelial, and Hepatic Cell Line, *Research on Medicine*, 2021 ;Vol.44; No.4
- M. Ajoudanian, Z. Jiang, M. Morita, Study on a new type micro-stirrer excited by longitudinal elastic wave for thrombus dissolution, *International Journal for Applied Electromagnetics and Mechanics*, 2011, Vol.37,pp 67-77.
- M. Ajoudanian, Z. Jiang, M. Morita, Design of a Novel Type Micro-Stirrer Excited by Longitudinal Elastic Wave for Thrombus Dissolution, *Journal of Biomechanical Science and Engineering (JBSE)*, 2011, Vol.6, No.4, pp262-9.
- M. Ajoudanian, Z. Jiang, M. Morita, Structural Analysis and Design of Micro-Stirrer Driven at a Requested Frequency for Thrombus Dissolution, *International Journal for Applied Electromagnetics and Mechanics*, 2013, Vol.41, No.3, pp 217-225

Book Chapter:

- Software for analytical mechanics, M. Forouzan and Others, ISBN: 9648617457, Mechsoft Section (M.Ajoudanian), 2004.

Invited Conference & Seminar

- M.Ajoudanian, “ Application of Bio-Microfluidics in Ophthalmology Research, Basir Eys Health Research Center,Tehran, 2020
- M.Ajoudanian,” Microfabrication of Hydrogel in Liver tissue Engineering”, 24th Iranian & 3rd International Congress of Physiology & Pharmacology, Tehran, 2019
- M.Ajoudanian, “Opportunities and Challenges of Scientific Research in Iran”, 2th National Festival and the International Congress of stem cell and Regenerative Medicine,Tehran, 2017
- M.Ajoudanian, “Application of Microfluidics in Tissue engineering”, Symposium of Microfluidics in Health Sciences, Tehran,2017
- Member of Panel Board in 3rd Iranian congress on Progress in Tissue Engineering and Regenerative Medicine congress Tehran, 2016
- M. Ajoudanian, “Angiogenesis in Liver Tissue Engineering by Microfluidics” 2nd Iranian congress on Progress in Tissue Engineering and Regenerative Medicine congress, Tehran, 2015.
- M.Ajoudanian, ”Microfluidics in Stemcell Research”, Iran University of Medical Sciences, Tehran, 2015
- Executive Board of 1st Nanotechnology Symposium of Iran in Japan,2012

Presentations at professional Conferences

- M. Ajoudanian, R. Sudo, *Preparation and Study on Microsphere Collagen as a Scaffold of Liver Tissue Engineering*, 4th TERMIS World Congress on Past, Present, Future and The Evolution of Regenerative Medicine in Boston, USA, September 2015
- M. Ajoudanian, K. Yasuda, R. Sudo, *Effect of hepatocytes on capillary morphogenesis in a three-channel microfluidic device*, 7th World Congress of Biomechanics in **Boston**, USA, July 2014
- M. Ajoudanian, Z. Jiang, M. Morita, *Analysis and modeling of vibratable end-effector of catheter for thrombus dissolution*, Proceeding of ASME 2010 Conference on Smart Materials, Adaptive Structures and Intelligent Systems in **USA**, Volume 2 pp. 349-353 - Paper no. SMASIS2010-3712 doi:10.1115/SMASIS2010-3712
- M. Ajoudanian, Z. Jiang, M. Morita, *Study on micro piezoelectric actuator by using longitudinal wave energy for catheter application*, will be held November 12 -18, in **Vancouver**, ASME international mechanical engineering congress & exposition, Canada, 2010.
- M. Morita, M. Ajoudanian, Z. Jiang, , Analysis and modeling of end-effector of bending vibrate catheter for thrombus dissolution, JSME Mechanical Engineering Congress, in Japanese, **Japan** , 2010
- M. Ajoudanian, S. Ziaeirad, A. Abdolahi, H. Ostadi “Singularity Analysis Of A 3-Dof 4-Legged Parallel Manipulator With A non-Slippery Passive Constraining Leg” International Conference **Romania** 2006.
- M. Ajoudanian, M.Farzin, “Design and Fabrication of a Two Dimensional Servo Press Transfer System Using Linear Stepper Actuators”, International Congress on Manufacturing Engineering, **Tehran** 2005
- M. Ajoudanian, A. Abdolahi, H. ostadi, M. keshmiri, “Fabrication of a 3 DOF Wave Simulator Robot with a Non-Slippery

Passive Leg”, International Mechanical Engineering Conference **Iran** 2005.

- M. Ajoudanian, M. Safavi, A. Movahedian , “Control of an Omni Directional Asymmetrical Robot. ICINCO Conference, Barcelona ,**Spain**, 2005.
- M. Shams, M. Ajoudanian, “Light composite Bricks With Natural Fiber”, Conference of Metallurgy Engineering Isfahan, **Iran**, 2004.
- Members of IUT Robocop Team, “IUT Flush Team Description Paper 2003”, The International Robocop Symposium proceedings. Robot Soccer World Cup VII, **Italy** 2003.
- Members of IUT Robocop Team, IUT Persia Team Description Paper 2003, The International Robocop Symposium proceedings. Robot Soccer World Cup VII, **Italy** 2003
- Members of IUT Robocop Team, IUT Persia Team Description Paper 2002, The International Robocop Symposium proceedings. Robot Soccer World Cup VI, **Japan** 2002

ENGINEERING JOB EXPERIENCE

- Iran International Engineering Company, IRITEC, (Design Engineer) <http://www.iritec.com> (Fall 2003).
- Isfahan Science & Technology Town, (Research Engineer) <http://www.Istt.org> (2004).

AWARDS & HONORS

- Ali Kazemi Ashtiani Award from the National Elite Foundation Iran 2016
- Exempted from military service
- Japan Society for the Promotion of Science (JSPS) Fellowship for Foreigner Researcher
- Young Researcher Overseas Visits Program for Vitalizing Brain Circulation, 2011
- The Japanese Government Monbukagusho Scholarship as a PhD, 2007.
- European Committee Scholarship “Erasmus Mundus” for MS.c in France & Spain, 2006-2008
- 3rd Place in world Robocop Middle size league Italy, 2003
- 3rd Place in Robocop Small size league German Open, 2003
- Robocup2002 Japan Certificate for the successful participation at the middle size competitions, 2002

TEACHING EXPERIENCE

- 3D Cell Culture (PhD Students)
- Animal Cell Culture (PhD Students)
- Biomechanics (PhD Students)
- Standards for Clean Room Design and Behavior (PhD Students)
- Tissue Engineering (Scaffolds, Mathematical Modeling)- (PhD Students)
- Animal Lab (Isolation of Hepatocyte form Rat)- (PhD Students)
- Bio-Microfluidics (PhD Students)
- Bio-Mems (PhD Students)

ACADEMIC SERVICE

- Reviewer of Proposal from National Institute for Medical Research Development, (NIMAD)
- Reviewer of Proposal from Iran National Science Foundation (INSF)
- Member of National Microfluidics Conference

REFERENCES

- Professor Roger D. Kamm, Professor of Biological and Mechanical Engineering, Massachusetts Institute of Technology.
 - Tel: +1-617-253-6236, Email : rdkamm@mit.edu
- Professor Ryo Sudo, Tissue Engineering Lab. Graduate School of Science and Technology, Keio University, Tokyo, Japan
 - Tel: +81-455-66-1745, Email: sudo@sd.keio.ac.jp
- Professor Minoru Morita, Graduate School of Science and Engineering, Yamaguchi University,
 - Tel: +81-836-85-9138, Email: mmorita@yamaguchi-u.ac.jp