Yubing Sun, Ph.D.

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I. EDUCATION

University of Michigan, Ann Arbor (UMich) — Ann Arbor, MI
PhD. Mechanical Engineering. — June. 2015
Thesis advisor: Prof. Jianping Fu

University of Science and Technology of China (USTC) — Hefei, Anhui
Bachelor of Science, Materials Science and Engineering — Aug. 2010
Honors degree program in physical science.

II. WORK EXPERIENCE

University of Massachusetts, Amherst — Amherst, MA
Assistant Professor — Jan. 2016 -
Department of Mechanical and Industrial Engineering

Adjunct Assistant Professor
Department of Biomedical Engineering

Faculty Member
Institute for Applied Life Sciences, Initiative of Neurosciences, Neuroscience and Behavior Graduate Program, Molecular and Cellular Biology Graduate Program, Center for Evolutionary Materials, Center for Biological Physics

Leadership Team
Soft Materials for Life Sciences National Research Traineeship

University of Michigan, Ann Arbor — Ann Arbor, MI
Research Fellow — Aug. 2015 – Dec. 2015
Department of Mechanical Engineering

University of Michigan, Ann Arbor — Ann Arbor, MI
Graduate Student Research Assistant — Aug. 2010 - Aug. 2015
Department of Mechanical Engineering

University of Science & Technology of China
Undergraduate Research Assistant — Oct. 2008 - July 2010

III. AWARDS AND RECOGNITION

- Barbara H. and Joseph J. Goldstein Outstanding Junior Faculty Award, College of Engineering, UMass 2022
- Temporary Member, BMBI study section, NIH 2020
- NSF CAREER Award 2019
- UMass Acorn Innovation Award, UMass 2018
- ProQuest Distinguished Dissertation Awards, Honorable Mention, UMich 2015
- Chinese Government Award for Outstanding Self-Financed Students Abroad, CSC 2014
- Robert M. Caddell Memorial Award for Research, UMich 2014
- Rackham Conference Travel Grant, UMich 2012, 2013, 2014
- Rackham International Students Fellowship, UMich 2011
- Department Fellowship, Department of Mechanical Engineering, UMich 2010
- Lixun Scholarship, Institute of Metal Research, Chinese Academy of Sciences 2009
- Ya Yang Scholarship, USTC Alumni Foundation 2008
- Outstanding Student Scholarship (Grade1), USTC 2007, 2008
- National Lizhi Scholarship, Ministry of Education of the P. R. China 2007
- Paper published and featured in leading journals including ***Nature Materials***, ***Matter***, and ***eLife***

IV. REFEREED PUBLICATIONS

(*: equal contribution; #: corresponding author; graduate students/postdoctoral fellows; undergraduate students)

At the University of Massachusetts Amherst:

[1] ChangHui Pak[#] and **Yubing Sun**[#]. Organoids: Expanding Applications Enabled by Emerging Technologies: Organoids: emerging technologies and applications, ***Journal of Molecular Biology***, vol. 434 (3), 167411, 2022

[2] Jamar Hawkins*, Xiaosu Miao*, Wei Cui[#] and **Yubing Sun**[#]. Surface functionalization of PDMS substrates facilitates culture of preimplantation mouse embryos by blocking nonselective adsorption, ***Journal of Royal Society Interface***, vol. 19(189), 2022

[3] Tianfa Xie*, Sarah R. St. Pierre*, Nonthakorn Olaranont*, Lauren E. Brown, Min Wu[#], and **Yubing Sun**[#]. Condensation tendency and planar isotropic actin gradient induce radial alignment in confined monolayers, ***eLife,*** 10:e60381, 2021

[4] Tiankai Zhao, **Yubing Sun**, Xin Li, Mehdi Baghaee, Yuenan Wang, and Hongyan Yuan. A contraction-reaction-diffusion model for circular pattern formation in embryogenesis, ***Journal of the Mechanics and Physics of Solids,*** vol. 157, 104630, 2021.

[5] Puspam Keshri, Bin Zhao, Tianfa Xie, Yousef Bagheri, James Chambers, **Yubing Sun**, and Mingxu You. Quantitative and multiplexed fluorescence lifetime imaging of intercellular tensile forces, ***Angewandte Chemie International Edition***, vol. 60, 15548-15555, 2021.

a. Selected as "a **V**ery **I**mportant **P**aper (VIP), 2021.

[6] Ningwei Li, Feiyu Yang, Sarah St. Pierre, Subiksha Parthasarathy, Kelly Hong, and **Yubing Sun**[#], Patterning neuroepithelial cell sheet via a sustained chemical gradient generated by localized passive diffusion devices, ***ACS Biomaterials Science & Engineering***, vol. 7, 1713-1721, 2021.

[7] Jamar Hawkins, Sue Miao, Wei Cui[#], **Yubing Sun**[#], Biophysical Optimization of Preimplantation Embryo Culture: What Mechanics Can Offer ART, ***Molecular Human Reproduction***, 22; 27(1):gaaa087., 2021.

[8] Bin Zhao, Ningwei Li, Tianfa Xie, Chungwen Liang, Yousef Bagheri, **Yubing Sun**[#], and Mingxu You. Quantifying Tensile Forces at Cell–Cell Junctions with a DNA-based Fluorescent Probe. ***Chemical Science***, vol. 11, 8558-8566, 2020.

[9] Tianfa Xie*, Jiming Kang*, Changhui Pak, Hongyan Yuan, and **Yubing Sun**[#]. Temporal modulations of NODAL, BMP and WNT signals guide the spatial patterning in self-organized human ectoderm tissues. ***Matter*** (Cell Press), vol. 2, 1621-1638, 2020.

[10] Peiran Zhu*, Jamar Hawkins*, Will Hamilton Linthicum, Menglin Wang, Ningwei Li, Nanjia Zhou, Qi Wen, Alicia Timme-Laragy, Xiaofei Song[#], **Yubing Sun**[#]. Heavy metal exposure leads to rapid changes in cellular biophysical properties. ***ACS Biomaterials Science & Engineering***, vol 6, 1965-1976, 2020.

[11] Dacheng Mao*, Ningwei Li*, Zheshun Xiong, **Yubing Sun**[#], and Guangyu Xu[#], Single-cell optogenetic control of calcium signaling with a high-density micro-LED array. ***iScience***, vol. 21, 403-412, 2019.

[12] Bahador Marzban, Jiming Kang, Ningwei Li, **Yubing Sun**, and Hongyan Yuan. A contraction-reaction-diffusion model: Integrating biomechanics and biochemistry in cell migration. ***Extreme Mechanics Letters***, vol. 32, 100566, 2019.

[13] Peiran Zhu, Ning-Hsuan Tseng, Tianfa Xie, Ningwei Li, Isaac Fitts-Sprague, Shelly R. Peyton, and **Yubing Sun**[#]. Biomechanical microenvironment regulates fusogenicity of breast cancer cells. ***ACS Biomaterials Science & Engineering***, vol. 5, 3817-3827, 2019.

[14] Weiqiang Chen, Steven G. Allen, Weiyi Qian, Zifeng Peng, Shuo Han, Xiang Li, **Yubing Sun**, Chelsea Fournier, Liwei Bao, Raymond H.W. Lam, Sofia D. Merajver, and Jianping Fu. Biophysical phenotyping and modulation of ALDH+ inflammatory breast cancer stem-like cells. ***Small***, 1802891, 2019.

[15] Nariman Banaei, Javad Moshfegh, Arman Mohseni-Kabir, JeanMarie Houghton, **Yubing Sun**[#], and Byung Kim[#]. Machine learning algorithms enhancing the specificity of cancer biomarkers detection based on SERS immunoassays in microfluidic chips. ***RSC Advances***, vol. 9, 1859-1868, 2019.

a. Selected for the RSC Advances 10th Anniversary collection.

[16] Ningwei Li*, Tianfa Xie*, **Yubing Sun**[#]. Towards organogenesis and morphogenesis in vitro: harnessing engineered microenvironment and autonomous behaviors of pluripotent stem cells. ***Integrative Biology***, vol. 10, 574-586, 2018.

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[17] Yen Peng Kong, Ana Y Rioja, Xufeng Xue, **Yubing Sun**, Jianping Fu, Andrew J Putnam. A systems mechanobiology model to predict cardiac reprogramming outcomes on different biomaterials. ***Biomaterials***, vol. 181, 280, 2018.

[18] Xufeng Xue, **Yubing Sun***[#], Agnes M. Resto-Irizarry, Ye Yuan, Koh Meng Aw Yong, Yi Zheng, Shinuo Weng, Yue Shao, Yimin Chai, Lorenz Studer & Jianping Fu, Mechanics-guided embryonic patterning of neuroectoderm tissue from human pluripotent stem cells, ***Nature Materials***, vol. 17, 633, 2018.

a. Highlighted by UMich CoE News, Physics.org, UMass News.

b. Commented by Mukul Tewary & Peter W. Zandstra, **Nature Materials**, vol. 17, pp 571-572, 2018

[19] **Yubing Sun**[#], Deok-Ho Kim, and Pak Kin Wong, Guest Editorial Advancing Mechanobiology by Micro/Nanosystems. ***IEEE Transactions on Nanotechnology***, vol. 13, 2018.

[20] Weiqiang Chen, Shuo Han, Weiyi Qian, Shinuo Weng, Haiou Yang, **Yubing Sun**, Luis G. Villa-Diaz, Paul H. Krebsbach, and Jianping Fu. Nanotopography Regulates Motor Neuron Differentiation of Human Pluripotent Stem Cells. ***Nanoscale***, vol. 10, 3556, 2018.

[21] Bin Zhao, Casey O'Brien, Aruni P. K. K. Karunanayake Mudiyanselage, Ningwei Li, Yousef Bagheri, Rigumula Wu, **Yubing Sun**, and Mingxu You. Visualizing Intercellular Tensile Forces by DNA-Based Membrane Molecular Probes. ***Journal of the American Chemical Society***, vol. 139, 18182. 2017.

[22] Nariman Banaei, Anne Foley, JeanMarie Houghton, **Yubing Sun**[#], and Byung Kim[#]. Multiplex detection of pancreatic cancer biomarkers using a SERS-based immunoassay. ***Nanotechnology***, vol. 28, 45, 2017.

a. Selected as the *Annual Highlights of 2017* by Nanotechnology

[23] Xin Cui, Weijin Guo, **Yubing Sun**, Baoce Sun, Shuhuan Hu, Dong Sun, Raymond HW Lam. A microfluidic device for isolation and characterization of transendothelial migrating cancer cells. ***Biomicrofluidics***, vol. 11, 014105, 2017.

[24] Tianfa Xie, Jamar Hawkins, **Yubing Sun**[#]. Traction Force Measurement Using Deformable Microposts. In: Rittié L. (eds) Fibrosis. ***Methods in Molecular Biology***, vol. 1627, Humana Press, New York, NY, 2017.

Before UMass:

[25] Koh Meng Aw Yong, **Yubing Sun**, Sofia D. Merajver, and Jianping Fu. Mechanotransduction-induced reversible phenotypic switching in prostate cancer cells. ***Biophysical Journal***, vol.112, pp. 1236-1245, 2017.

[26] Yi Zheng, **Yubing Sun**, Xinwei Yu, Yue Shao, Ping Zhang, Guohao Dai, and Jianping Fu. Angiogenesis in liquid tumors: An in-vitro assay for leukemic cell induced bone marrow angiogenesis. ***Advanced Healthcare Materials***, vol. 5, pp. 1014-1024, 2016.

[27] Hui Wang, Jing Di, **Yubing Sun**, Jianping Fu, Zengyan Wei, Hiroshi Matsui, Alejandra del C. Alonso, and Shuiqin Zhou. Biocompatible PEG-chitosan@carbon dots hybrid nanogels for two-photon fluorescence imaging, near-infrared light/pH dual-responsive drug carrier and synergistic therapy. ***Advanced Functional Materials***, vol. 25, pp. 5537-5547, 2015.

[28] **Yubing Sun**, Yue Shao, Xufeng Xue, and Jianping Fu. Emerging roles of YAP/TAZ in mechanobiology. ***Molecular and Cellular Mechanobiology*** (edited by Shu Chien, Adam J. Engler, and Yingxiao Wang), the American Physiological Society, 2015.

[29] Di Chen*, **Yubing Sun***, Cheri X. Deng, and Jianping Fu. Improving survival of disassociated human embryonic stem cells by mechanical stimulation using acoustic tweezing cytometry. ***Biophysical Journal (Biophysical Letter)***, vol. 108, pp. 1315-1317, 2015.

[30] Hui Wang, **Yubing Sun**, Jinhui Yi, Jianping Fu, Jing Di, Alejandra del Carmen Alonso, and Shuiqin Zhou. Fluorescent porous carbon nanocapsules for two-photon imaging, NIR/pH dual-responsive drug carrier, and photothermal therapy. ***Biomaterials***, vol. 53, pp. 117-126, 2015

[31] Di Chen, **Yubing Sun**, Madhu S. R. Gudur, Yising Hsiao, Ziqi Wu, Jianping Fu, and Cheri X. Deng. Two bubble acoustic tweezing cytometry for biomechanical probing and stimulation of cells. ***Biophysical Journal***, vol. 108, pp. 32-42, 2015.

[32] Lin Han, Jing Zhou, Kristin Schimert, **Yubing Sun**, Yu Zhang, Jung Han, Jianping Fu, and Rong Fan. Single-crystalline, nanoporous gallium nitride films with fine tuning of pore size for stem cell engineering. ***ASME Journal of Nanotechnology in Engineering and Medicine,*** vol. 5, 041004, 2014.

[33] **Yubing Sun** and Jianping Fu. Harnessing mechanobiology of human pluripotent stem cells for regenerative medicine. ***ACS Chemical Neuroscience***, vol. 5, pp. 621-623, 2014.

a. Selected as the front cover page story by ***ACS Chemical Neuroscience*.**

[34] **Yubing Sun**, Koh Meng Aw Yong, Luis G. Villa-Diaz, Xiaoli Zhang, Weiqiang Chen, Renee Philson, Shinuo Weng, Haoxing Xu, Paul H. Krebsbach and Jianping Fu. Hippo/YAP-mediated rigidity-dependent motor neuron differentiation of human pluripotent stem cells. ***Nature Materials***, vol. 13, pp. 599-604, 2014.

a. Commentary by Emily Rhodes Lowry & Christopher E. Henderson, ***Nature Materials***, vol. 13, pp. 543-544, 2014.

b. Commentary by Ning Wang, ***Cell Stem Cell***, vol. 14, pp. 701-703, 2014.

c. Highlighted by *Michigan News, UM ME Dept News, Detroit Local 4 News, Crain's Detroit Business, ABC 7 Sarasota -WWSB, ABC News Radio, Headlines & Global News, Red Orbit, The Doctor Will See You Now, Consultant360, Guardian Liberty Voice, The Australian, International Business Times UK, The Times of India, Israel Herald, Business Standard, Milwaukee Wisconsin Journal Sentinel, Scicasts, Wired.co.uk, Medical News Today, Phys.org, and ScienceDaily* .

[35] Zhenzhen Fan*, **Yubing Sun***, Di Chen*, Weiqiang Chen, Cheri Deng, and Jianping Fu. Acoustic tweezing cytometry for live-cell subcellular control of intracellular cytoskeleton contractility. ***Scientific Reports***, vol. 3, 2176, 2013.

[36] Shinuo Weng, Yue Shao, **Yubing Sun**, and Jianping Fu. Micromachined elastomeric microposts and their applications for mechanotransduction research. ***Dynamic Control of the Cellular Microenvironment*** (book chapter, edited by Wendy Liu and Elliot Hui), Springer, 2013.

[37] **Yubing Sun** and Jianping Fu. Mechanobiology: A new frontier for human pluripotent stem cells. ***Integrative Biology***, vol. 5, pp. 450-457, 2013.

a. Selected as the front cover page story and HOT article by ***Integrative Biology***.

[38] Weiqiang Chen, **Yubing Sun**, and Jianping Fu. Microfabricated nanotopological surfaces for study of adhesion-dependent cell mechanosensitivity. ***Small***, vol. 9, pp. 81-89, 2013.

a. Selected as the front cover page story by ***Small***.

[39] **Yubing Sun**, Liang-Ting Jiang, Ryoji Okada, and Jianping Fu. UV-modulated substrate rigidity for multiscale study of mechanoresponsive cellular behaviors. ***Langmuir***, vol. 28, pp. 10789-10796, 2012.

[40] **Yubing Sun**, Shinuo Weng, and Jianping Fu. Microengineered synthetic cellular microenvironment for stem cells. ***Wiley Interdisciplinary Reviews (WIREs): Nanomedicine and Nanobiotechnology***, vol. 4, pp. 414-427, 2012.

[41] **Yubing Sun**, Christopher S. Chen, and Jianping Fu. Forcing stem cells to behave: A biophysical perspective of cellular microenvironment. ***Annual Review of Biophysics***, vol. 41, pp. 519-542, 2012.

[42] **Yubing Sun**, Luis G. Villa-Diaz, Raymond Hiu-Wai Lam, Weiqiang Chen, Paul H. Krebsbach, and Jianping Fu. Matrix mechanics regulates fate decisions of human embryonic stem cells. ***PLoS ONE***, vol. 7, e37178, 2012.

a. Highlighted by *ESC & iPSC News*, *UM ME Dept News*, and *UM CoE News*.

b. Top 10% most cited PLOS ONE articles.

[43] Weiqiang Chen, Luis G. Villa-Diaz, **Yubing Sun**, Shinuo Weng, Raymond Hiu-Wai Lam, Paul H. Krebsbach, and Jianping Fu. Nanotopography influences adhesion, spreading, and self-renewal of human embryonic stem cells. ***ACS Nano***, vol. 6, pp. 4094-4103, 2012.

a. Highlighted by *ESC & iPSC News*, *C&EN Online Story*, *UM ME Dept News*, and *UM CoE News*.

[44] Raymond Hiu-Wai Lam, **Yubing Sun**, Weiqiang Chen, and Jianping Fu. Elastomeric microposts integrated into microfluidics for flow-mediated endothelial mechanotransduction analysis. ***Lab on a Chip***, vol. 12, pp. 1865-1873, 2012.

[45] Jennifer M. Mann*, Raymond Hiu-Wai Lam*, Shinuo Weng, **Yubing Sun**, and Jianping Fu. A silicone-based stretchable micropost array membrane for monitoring live-cell subcellular cytoskeletal response. ***Lab on a Chip***, vol. 12, pp. 731-740, 2012.

a. Selected as one of the top 10% of all ***Lab on a Chip*** articles published in year 2012.

[46] Hui Wang*, **Yubing Sun***, Yifei Yu, Jian Chen, Ran Li, Kai Cheng, Qianwang Chen. A general route to synthesize water-dispersive noble metal–iron oxide bifunctional hybrid nanoparticles. ***Dalton Transactions***, vol. 41 (2), pp. 346-350, 2012.

[47] Ran Li, Qianwang Chen, Hao Zhang, Xiankai Kong, **Yubing Sun**, Hao Zhong, Hui Wang, Shuai Zhou. Experimental investigations on the weakening effect of magnetic fields on surface-enhanced Raman scattering. ***The Journal of Raman Spectroscopy***, vol. 44, pp. 525-530, 2012.

[48] Hui Wang, Qianwang Chen, Yifei Yu, Kai Cheng, and **Yubing Sun**. Size- and solvent-dependent magnetically responsive optical diffraction of carbon-encapsulated superparamagnetic colloidal photonic crystals. ***The Journal of Physical Chemistry C***, vol. 115 (23), pp. 11427–11434, 2011.

[49] Hui Wang, Qianwang Chen, **Yubing Sun**, Mingsheng Wang, Lixia Sun. Synthesis of necklace-like magnetic nanorings. ***Langmuir***, vol. 26 (8), pp. 5957–5962, 2010.

[50] Hui Wang, Qianwang Chen, **Yubing Sun**, Mengyuan He. Synthesis of superparamagnetic colloidal nanochains as magnetic-responsive Bragg reflectors. ***The Journal of Physical Chemistry C***, vol. 114 (46), pp. 19660–19666, 2010.

[51] Mingsheng Wang, Jie Xiong, **Yubing Sun**, Qianwang Chen. Assembly of non-crystalline Co particles into nanowires under external magnetic fields. ***CrystEngComm***, vol. 12 (10), pp. 3262-3266, 2010.

[52] Hui Wang, **Yubing Sun**, Qianwang Chen, Yifei Yu and Kai Cheng. Synthesis of carbon-encapsulated superparamagnetic colloidal nanoparticles with magnetic-responsive photonic crystal property. ***Dalton Transactions***, vol. 40 (39), pp. 9565-9569, 2010.

[53] Hui Wang, Yifei Yu, **Yubing Sun** and Qianwang Chen. Magnetic nanochains: A review. ***Nano***, vol. 6 (1), pp. 1-17, 2010.

V. PAPER UNDER REVIEW

(*: equal contribution; #: corresponding author; graduate students/postdoctoral fellows; undergraduate students)

[1] Han Jiang, Min Wu, and **Yubing Sun**[#]. Collective motion and rearrangement in confluent cell layers: the role of cellular and intercellular forces and mechanical properties, Invited Review, ***Biophysics Reviews***, in preparation, 2022

[2] Hongyan Gao, Feiyu Yang, Kianoosh Sattari, Xian Du, Tianda Fu, Shuai Fu, Xiaomeng Liu, Jian Lin, **Yubing Sun**, Jun Yao. Bioinspired Two-in-One Nanotransistor Sensor for the Simultaneous Measurements of Electrical and Mechanical Cellular Responses, ***Science Advances***, under review, 2022.

[3] Tianfa Xie, Lauren E. Brown, ChangHui Pak, and **Yubing Sun**[#]. Self-organized anteroposterior regionalization of early midbrain and hindbrain using micropatterned human embryonic stem cells, in preparation, 2022.

[4] Feiyu Yang and **Yubing Sun**[#]. Directional Cell Migration Guided by a Strain Gradient, in preparation, 2022. [bioRxiv]

[5] Yihao Zhang, **Yubing Sun**, and George Lykotrafitis. A deep reinforcement learning model based on deterministic policy gradient for collective neural crest cell migration, in preparation, 2022. [arXiv]

VI. REFEREED CONFERENCE PROCEEDINGS

[1] **Yubing Sun**, Luis G. Villa-Diaz, Raymond Hiu-Wai Lam, Weiqiang Chen, Paul H. Krebsbach, and Jianping Fu. Micromechanical elastomeric devices for investigations of mechanobiology in human embryonic stem cells. *Proc. 16th International Conference on Miniaturized Systems for Chemistry and Life Sciences* (*μTAS 2012*), Okinawa, Japan, Oct. 2012, pp. 1714-1716.

[2] Jennifer M. Mann, Raymond Hiu-Wai Lam, **Yubing Sun**, Shinuo Weng, and Jianping Fu. A microengineered stretching platform for live-cell mechanotransductive response analysis. *Proc. 15th International Conference on Miniaturized Systems for Chemistry and Life Sciences* (*μTAS 2011*), Seattle, USA, Oct. 2011, pp. 9-11.

[3] Weiqiang Chen, **Yubing Sun**, and Jianping Fu. Nanotopographic control of human embryonic stem cell function. *Proc. 15th International Conference on Miniaturized Systems for Chemistry and Life Sciences* (*μTAS 2011*), Seattle, USA, Oct. 2011, pp. 36-38.

VII. CONFERENCE PODIUM TALKS AND POSTER PRESENTATIONS

At the University of Massachusetts Amherst:

[1] Tianfa Xie, **Yubing Sun**, "Self-organized Midbrain and Hindbrain Regionalization using Micropatterned Human Pluripotent Stem Cells", *The 48th Annual Northeast Bioengineering Conference (NEBEC 2022)*, New York City, NY, Apr. 2022. (Invited talk as a finalist for the Biomedical Engineering New Innovator Award for Junior Faculty).

[2] Feiyu Yang, Narciso Pavon, ChangHui Pak, **Yubing Sun**, "Patterning human forebrain organoids using localized passive diffusion devices", *Keystone Symposia X7: Engineering Multi-Cellular Living Systems*, Keystone, CO, Apr. 2022. (poster presentation).

[3] Jamar Hawkins, **Yubing Sun**, "Pluronic F127 Mitigates PDMS Sequestration Of Amino Acids In Preimplantation Embryo Culture", *BMES 2021 Annual Meeting*, Orlando, FL, Oct. 2021. (poster presentation).

[4] Tianfa Xie, **Yubing Sun**, "Anteroposterior Regionalization of Early Brain in Micropatterned Human Embryonic Stem Cells", *BMES 2021 Annual Meeting*, Orlando, FL, Oct. 2021. (poster presentation)

[5] Feiyu Yang, **Yubing Sun**, "Directional Cell Migration Guided by a Strain Gradient", *2021 Virtual Summer Biomechanics, Bioengineering, and Biotransport Conference* (SB3C2021, virtual conference, Jun. 2021. (poster presentation).

[6] Tianfa Xie, **Yubing Sun**, "Temporal Modulations of NODAL, BMP and WNT Signals Guide the Spatial Patterning in Self-organized Human Ectoderm Tissues", *2020 Virtual Summer Biomechanics, Bioengineering, and Biotransport Conference* (SB3C2020, virtual conference due to COVID-19), Jun. 2020. (oral presentation).

[7] Sarah R. St. Pierre, Tianfa Xie, Nonthakorn Olaranont, Min Wu, **Yubing Sun**, "Cell contractility and an actin gradient drive polar alignment of fibroblasts in constrained geometries", *2020 Virtual Summer*

Biomechanics, Bioengineering, and Biotransport Conference (SB3C2020, virtual conference due to COVID-19), June, 2020. (oral presentation).

[8] Ningwei Li, Feiyu Yang, **Yubing Sun**, "Patterning neuroepithelial cells using extrinsic chemical gradients", *Development and 3D Modeling of the Human Brain,* Cold Spring Harbor Laboratory, NY, Dec. 2019. (poster presentation).

[9] Tianfa Xie, **Yubing Sun**, "'Modeling the Development of Ectoderm Using Human Pluripotent Stem Cells", *BMES 2019 Annual Meeting,* Philadelphia, PA, Oct. 2019. (poster presentation).

[10] Feiyu Yang, Yubing Sun, "Directional Cell Migration Guided by a Strain Gradient", *BMES 2019 Annual Meeting,* Philadelphia, PA, Oct. 2019. (poster presentation).

[11] Ningwei Li, **Yubing Sun**, "Generating Stable and Sustained Chemical Gradients for Cell Patterning", *BMES 2019 Annual Meeting,* Philadelphia, PA, Oct. 2019. (poster presentation).

[12] Tianfa Xie, **Yubing Sun**, "Modeling the Development of Neural Plate Border and Epidermis Using Human Pluripotent Stem Cells", *ISSCR Annual Meeting,* Los Angeles, CA, Jun. 2019. (poster presentation).

[13] Tianfa Xie, **Yubing Sun**, "Autonomous Alignment of Mesenchymal Cells Mediated by Cell-Cell and Cell-Matrix Interactions", *BMES 2018 Annual Meeting,* Atlanta, GA, Oct 2018. (poster presentation)

[14] Peiran Zhu, Ning-Hsuan Tseng, Shelly Peyton, **Yubing Sun**, "Biophysical factors regulate the initiation and maintenance of multinucleated breast cancer cells", *BMES 2018 Annual Meeting*, Atlanta, GA, Oct 2018. (poster presentation)

[15] Peiran Zhu, Xiaofei Song, **Yubing Sun**, "Biophysical phenotyping of the cytotoxicity of environmental pollutants", *BMES 2018 Annual Meeting*, Atlanta, GA, Oct 2018. (poster presentation)

[16] Peiran Zhu, Ning-Hsuan Tseng, Shelly Peyton, **Yubing Sun**, "Microengineered systems to modulate the fusion of cancer cells", The 40th International Conference of the IEEE EMBS, Honolulu, HI, Jul 2018. (oral presentation)

[17] Nader Hamzavi, **Yubing Sun**, "Biomechanics of Neural Tube Closure in Mammalian Embryos", *Biomedical Engineering Society (BMES) 2017 Annual Meeting*, Phoenix, AZ, Oct. 2017. (oral presentation)

Before UMass:

[18] Yi Zheng, **Yubing Sun**, Xinwei Yu, Yue Shao, Ping Zhang, Guohao Dai and Jianping Fu. "Angiogenesis in liquid tumors: An in-vitro assay for leukemic cell induced bone marrow angiogenesis", *38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBCX16)*, Orlando, FL, Aug. 2016.

[19] **Yubing Sun**. "Acoustic tweezing cytometry for mechanobiology and stem cell applications", *ASME 2015 4th Global Conference on Nanoengineering for Medicine and Biology* (*NEMB 2015*), Minneapolis, MN, Apr. 2015. (oral presentation)

[20] **Yubing Sun**, Koh Meng Aw Yong, Weiqiang Chen, Renee Philson, Shinuo Weng, and Jianping Fu. "Hippo-YAP dependent mechanosensitive motor neuron differentiation of human pluripotent stem cells", *Biomedical Engineering Society (BMES) 2014 Annual Meeting*, San Antonio, TX, Oct. 2014. (oral presentation)

[21] **Yubing Sun**, "Acoustic tweezing cytometry for mechanobiology and stem cell applications", *7th World Congress of Biomechanics*, Boston, MA, Jul. 2014. (invited oral presentation)

[22] **Yubing Sun**, Koh Meng Aw Yong, Luis G. Villa-Diaz, Xiaoli Zhang, Haoxing Xu, Paul H. Krebsbach and Jianping Fu. "Biophysical regulation of functional motor neuron generation from human pluripotent stem cells", *2014 Keystone Symposia Conference Z3: Engineering Cell Fate and Function*, Olympic Valley, CA, Apr. 2014. (oral presentation)

[23] **Yubing Sun**, Luis G. Villa-Diaz, Raymond H. W. Lam, Weiqiang Chen, Paul H. Krebsbach, and Jianping Fu. "Micromechanical elastomeric devices for investigations of mechanobiology in human embryonic stem

cells", *16th International Conference on Miniaturized Systems for Chemistry and Life Sciences* (*μTAS 2012*), Okinawa, Japan, Oct. 2012. (poster presentation)

[24] **Yubing Sun**, Luis G. Villa-Diaz, Raymond H. W. Lam, Weiqiang Chen, Paul H. Krebsbach, and Jianping Fu. "Dissecting mechanobiology of human embryonic stem cells using micromechanical elastomeric devices", *Biomedical Engineering Society (BMES) 2012 Annual Meeting*, Atlanta, GA, Oct. 2012. (oral presentation)

[25] Weiqiang Chen, Luis G. Villa-Diaz, **Yubing Sun**, Shinuo Weng, Paul H. Krebsbach, and Jianping Fu. "Nanotopography mediates functional responses of human embryonic stem cells", *2012 Biomedical Engineering Society (BMES) Annual Meeting*, Atlanta, GA, Oct. 2012. (poster presentation)

[26] **Yubing Sun**, Luis G. Villa-Diaz, Raymond H. W. Lam, Weiqiang Chen, Paul H. Krebsbach, and Jianping Fu. "Investigation of mechanoresponsive behaviors of human embryonic stem cells using microfabricated elastomeric post arrays", *2012 ASME Summer Bioengineering Conference*, Fajardo PR, Jun. 2012. (oral presentation)

[27] Weiqiang Chen, Luis G. Villa-Diaz, **Yubing Sun**, Shinuo Weng, Jin Koo Kim, Paul H. Krebsbach, and Jianping Fu. "Nanotopography directs fate of human embryonic stem cells", *2012 ASME Summer Bioengineering Conference*, Fajardo PR, Jun. 2012. (oral presentation)

[28] Weiqiang Chen, **Yubing Sun**, and Jianping Fu. "Cellular sensing and responses to nanotopography", *2011 Biomedical Engineering Society (BMES) Annual Meeting*, Hartford, CT, Oct. 2011. (poster presentation)

[29] Jennifer M. Mann, Raymond Hiu-Wai Lam, Shinuo Weng, **Yubing Sun**, and Jianping Fu. "Dynamic biomechanical responses of single smooth muscle cells to cell stretch", *2011 Biomedical Engineering Society (BMES) Annual Meeting*, Hartford, CT, Oct. 2011. (oral presentation; rated as one of the top abstracts in the Cellular and Molecular Bioengineering Track)

[30] Jennifer M. Mann, Raymond Hiu-Wai Lam, **Yubing Sun**, Shinuo Weng, and Jianping Fu. "A microengineered stretching platform for live-cell mechanotransductive response analysis", *15th International Conference on Miniaturized Systems for Chemistry and Life Sciences* (*μTAS 2011*), Seattle, WA USA, Oct. 2011. (oral presentation; only 8% abstracts selected oral presentation)

[31] Weiqiang Chen, **Yubing Sun**, and Jianping Fu. "Nanotopographical control of cell function", *15th International Conference on Miniaturized Systems for Chemistry and Life Sciences* (*μTAS 2011*), Seattle, WA USA, Oct. 2011. (oral presentation; only 8% abstracts selected oral presentation)

VIII. RESEARCH GRANT

Ongoing Research Support

$1,366,330 ($300,344 to Sun lab) 07/12/2021-06/30/2025
R01DK129990, NIH-NIDDK
Intrasurgical tissue engineering of autologous grafts using irreversible electroporation for bladder reconstruction
The major goal of this award is to develop a in situ electroporation based method to engineer ileal segments for bladder reconstruction.
Role: Co-I (PI: Govind Srimathveeravalli)

$500,000 07/01/2019-06/30/2024
CMMI-1846866, National Science Foundation
CAREER: Mechanobiology of Planar Cell Polarity
The major goal of this NSF CAREER award is to study whether and how mechanical cues regulate the establishment and maintenance of planar cell polarity in epithelial tissues.
Role: PI

$430,608 ($226,830 to Sun lab) 12/09/2019-11/30/2022
R21HD098686, NIH-NICHD
Synthetic Biomimetic Environment for Improving IVF Embryo Culture

The major goal of this award is to systematically investigate how biophysical cues regulate the IVF embryo culture at cellular, genetic, and epigenetic levels. We further aim to develop an artificial cilia system to mimic the microenvironment of oviduct to improve IVF embryo culture.
Role: PI (MPI: Wei Cui)

$411,450 ($215,804 to Sun lab) 07/01/2022-06/30/2024
R21MH130843, NIH-NIMH
Patterning human forebrain organoids by engineering controlled biochemical microenvironment
The major goal of this award is to develop diffusion-based chemical concentration gradient generation devices to pattern forebrain organoids along dorsal-ventral and anterior-posterial axes.
Role: PI

Completed Research Support
$400,000 07/15/2017-06/30/2021
CMMI-1662835, National Science Foundation
Biomechanical Regulation in Human Neural Induction
The major goal of this award is to reveal the functional roles of biomechanical cues, and their interactions with biochemical factors in human neural induction, using novel human pluripotent stem cells based, microengineered integrative model systems.
Role: PI

$30,000 ($15,000 to Sun lab) 10/1/2019 – 6/30/2020
Neuroengineering Seed Grant, Initiative of Neuroscience, UMass Amherst
Engineering Morphogen-gradient Induced brain Organoids (MIBO) with single neural tube-like spatial topography
The major goal of this project is to generate an engineered system that controls the morphogen gradient to induce polarized organoids formation.
Role: PI. (Co-PI: ChangHui Pak)

$50,000 09/01/2016-08/31/2017
Seed Grant, Institute for Applied Life Sciences, University of Massachusetts, Amherst
Self-powered integrated blood separation and SERS-based immunoassay (SIBSI) device for point of care analysis of pancreatic cancer biomarkers
The major goal of this project is to generate an integrated microfluidics technology platform for point-of-care analysis of pancreatic cancer biomarkers in serum using surface-enhanced Raman spectroscopy (SERS).
Role: PI. (Co-PI: Byung Kim)

$15,000 01/02/2019-04/02/2019
Acorn Award, Massachusetts Technology Transfer Center, University of Massachusetts
A SERS-based immunoassay for cancer biomarkers detection
The major goal of this project is to facilitate the commercialization of a SERS-based protein biomarker detection platform.
Role: PI. (Co-PI: Byung Kim)

IX. MEDIA EXPOSURE

[1] "College of Engineering Selects Michael Knodler and Yubing Sun as 2022 Outstanding Faculty Members", UMass College of Engineering News, April. 2022

[2] "Sun and Pak Co-edit Special Issue of Journal of Molecular Biology", UMich College of Engineering News, March, 2022

[3] "NIH Funds Srimathveeravalli to Develop Pioneering Bladder Reconstruction Technique", UMass News, July 2021

[4] "Toward a stem cell model of human nervous system development", UMich College of Engineering News, May 21, 2018

[5] "UMass Amherst Engineer Yubing Sun Receives $400,000 NSF Grant to Study the Mechanics that Cause Neural Tube Birth Defects" UMass News, Nov. 21, 2017.

[6] "Not so silly: Ingredient in Silly Putty boosts stem cell growth" ABC News Radio, April 15, 2014.

[7] "Two important research papers accepted for publication in ACS Nano and PLoS ONE", UMich ME News, June 11, 2012.

[8] "New ways to direct the development of embryonic stem cells", UMich College of Engineering News, June 11, 2012.

[9] "Texture of surroundings influences human embryonic stem cell behavior", Chemical & Engineering News (C&EN), April 24, 2012.

X. INVITED CONFERENCE TALKS

[1] The 48th Annual Northeast Bioengineering Conference (NEBEC 2022), New York City, NY 2022

[2] The ACS Northeast Regional Meeting (NERM), Saratoga Springs, NY 2019

[3] The 2nd UMass Interdisciplinary Neurosciences Conference, Amherst, MA 2019

[4] The 12th IEEE International Conference on Nano/Molecular Medicine and Engineering, Honolulu, HI 2018

[5] The 40th International Conference of the IEEE EMBS, Honolulu, HI 2018

[6] The 54th Society of Engineering Science (SES) Annual Technical Meeting, Boston, MA 2017

[7] EITA-New Materials 2017, Ann Arbor, MI 2017

[8] The 12th IEEE Conference on Nano/Micro Engineered and Molecular Systems, Los Angeles, CA 2017

[9] The 10th IEEE International Conference on Nano/Molecular Medicine and Engineering, Macau 2016

[10] 7th World Congress of Biomechanics, Boston, MA 2014

[11] Keystone Symposia Conference Z3: Engineering Cell Fate and Function, Olympic Valley, CA 2014

XI. INVITED SEMINAR TALKS

[1] Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI 2022

[2] Center for Craniofacial Molecular Biology, University of Southern California, Remote Seminar 2020

[3] Department of Chemical Engineering, University of Massachusetts, Amherst, MA 2020

[4] Department of Mechanical and Industrial Engineering, Northeastern University, Boston, MA 2019

[5] Department of Mechanical Engineering, Worcester Polytechnic Institute, Worcester, MA 2017

[6] Department of Mechanical Engineering, University of Connecticut, Storrs, CT 2017

[7] Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 2017

[8] Department of Biomedical Engineering and Scientific Instrument, Tianjing University 2015

[9] Department of Mechanical Engineering, Massachusetts Institute of Technology 2015

[10] Department of Mechanical and Industrial Engineering, University of Massachusetts, Amherst 2015

XII. STUDENTS MENTORED

Postdoctoral Fellow

[1] Ningwei Li, Postdoctoral Fellow, 2017-2019

[2] Nader Hamzavi Zarghani, Postdoctoral Fellow, 2016 – 2017

Graduate Students (thesis advisor)

[1] Han Jiang, PhD student (Mechanical & Industrial Engineering), 2020-present

[2] Narciso Pavon, PhD student (Neuroscience and Behavior Program, co-mentored with Dr. ChangHui Pak), 2020 – present

[3] Jamar Hawkins, PhD student, (Mechanical & Industrial Engineering), 2018 – present

[4] Feiyu Yang, PhD student, (Mechanical & Industrial Engineering), 2017 – present

[5] Tianfa Xie, PhD student, (Mechanical & Industrial Engineering), 2016 – 2022

[6] Peiran Zhu, Master student, (Mechanical & Industrial Engineering), 2016 – 2018

Thesis committee member for the following students (department, year of graduation)

[1] Zongling Ren, PhD student (Mechanical & Industrial Engineering)

[2] Sacchita Tiwari, PhD student (Mechanical & Industrial Engineering)

[3] Josh Hall, PhD student (Mechanical & Industrial Engineering, 2022)

[4] Yongkuk Park, PhD student (Chemical Engineering, 2022)

[5] Ning-Hsuan Tseng, PhD student (Chemical Engineering, 2022)

[6] Yousef Bagheri, PhD student (Chemistry, 2021)

[7] Gina Georgadarellis, Master student (Mechanical & Industrial Engineering, 2021)

[8] Zimu Zhou, PhD student (Mechanical & Industrial Engineering, 2019)

[9] Jiaying Wang, PhD student (Mechanical & Industrial Engineering, 2018)

[10] Akshay Pujari, Master student (Mechanical & Industrial Engineering, 2017)

[11] Wenbo Wang, Master student (Mechanical & Industrial Engineering, 2017)

PhD Qualifying Exam Committee Member

[1] Jieun Park, PhD student (Mechanical & Industrial Engineering)

[2] Umang Narendrakumar Patel, PhD student (Mechanical & Industrial Engineering)

[3] Duy Nguyen, PhD student (Mechanical & Industrial Engineering)

Honor Thesis Advisor for Undergraduate Students

[1] Lauren Brown (Biomedical Engineering, 2022)

[2] Sabin Dhamala (Biochemistry and Molecular Biology, 2020)

[3] Yizhuo Chen (Chemical Engineering, 2019)

[4] Leonard Zhong (Mechanical & Industrial Engineering, 2018)

[5] Andrew Sheu (Chemical Engineering, 2018)

Honor Thesis Committee Member

[1] Sruthi Tanikella, Undergraduate honor student (Biochemistry and Molecular Biology, 2020)

[2] Sarah Duquette, Undergraduate honor student (Chemical Engineering, 2019)

[3] Kaeden McClintock, Undergraduate honor student (Biochemistry and Molecular Biology, 2018)

Independent Study (with credits)

[1] Aidan Wilder (Mechanical & Industrial Engineering, 2022)

[2] Julia DeAmicis (Biomedical Engineering, 2021)

[3] George Ryan (Chemistry, 2020)

[4] Raya Husami (Biochemistry and Molecular Biology, 2020)

[5] Isaac Fitts-Sprague (Mechanical & Industrial Engineering, 2018)

[6] Priyanka Ghosh (Chemical Engineering, 2018)

[7] Jamar Hawkins (Mechanical & Industrial Engineering, 2017)

[8] Denise Buciuman-Coman (Chemical Engineering, 2017)

[9] Elizabeth Humble (Chemical Engineering, 2017)

Undergraduate Research Assistant

[1] Connor Glynn (Biomedical Engineering, 2021, 2022)

[2] Vanaalika Vaid (Biomedical Engineering, 2021)

[3] Lauren Brown (Biomedical Engineering, 2020, 2021, 2022)

[4] Kelly Hong (Amherst College, 2020)

[5] Collin Maley (Biomedical Engineering, 2019)

[6] Logan Meo (Biomedical Engineering, 2019)

[7] Rachel Poskanzer (Biochemistry and Molecular Biology, 2019)

[8] Maci Russell (Chemical Engineering, 2019)

[9] Sewit Fiseha (Mechanical & Industrial Engineering, 2018)

[10] Jacob Hancock (Mechanical & Industrial Engineering, 2018)

[11] Gene Munnis (Mechanical & Industrial Engineering, 2018)

[12] Sid Virpura (Chemical Engineering, 2018)

[13] Eric Brazell (Mechanical & Industrial Engineering, 2017)

NSF REU Researcher (Sponsored by NSF REU Supplements to my NSF Grants)

[1] Julia DeAmicis (Biomedical Engineering, 2021).

[2] Sruthi Tanikella (Biochemistry and Molecular Biology, 2020).

[3] Subiksha Parthasarathy (Biomedical Engineering, 2019).

Visiting Scholar

[1] Xiaofei Song, Senior Lab Technician, South China University of Technology, 2017-2018

High School Student

[1] Seo-Ho Lee, High School Student, Amherst High, Mentor for her MIT THINK Scholars project, 2020-

[2] Benjamin Fang, High School Student, Amherst High, Research Assistant, 2018-2019

[3] Sophia Fang, High School Student, Amherst High, Research Assistant, 2016-2017

Others

[1] Nariman Banaei, PhD student, (Mechanical & Industrial Engineering, co-mentored with Dr. Byung Kim), 2016- 2020

[2] Kaitlyn Gilliam, PhD student (Molecular and Cellular Biology Program, lab rotation) 2019 – 2020

[3] Sarah St. Pierre, Post-Baccalaureate Research Assistant (Mechanical & Industrial Engineering, Current position: PhD student at the Standford University), 2019-2020

XIII. RECOGNITIONS RECEIVED BY MENTEES

[1] **Jamar Hawkins** (as graduate student) Hubertus W. V. Willems Scholarship 2021

[2] **Sarah St. Pierre** (Post-Baccalaureate Research Assistant) NSF Graduate Research Fellowship 2021

[3] **Jamar Hawkins** (graduate student) Nominated by UMass for the Gilliam Fellowships, HHMI 2020

[4] **Narciso Pavon** (graduate student), NIH BTP Fellowship 2020

[5] **Tianfa Xie** (graduate student), Murthy Award, UMass 2020

[6] **Seo-Ho Lee** (Amherst High student), 2020 MIT THINK Scholars Program Finalists (6 out of 325) 2020

[7] **Yizhuo Chen** (Undergraduate student), Second Place, UMass Innovation Challenge Final 2019

[8] **Nariman Banaei** (graduate student), Third Place, UMass Innovation Challenge Final 2018

[9] **Sophia Fang** (Amherst High student), Regeneron Science Talent Search 2018 Scholars 2018

[10] **Jamar Hawkins** (as undergraduate student), UMass Rising Researcher Award 2017

XIV. TEACHING ACTIVITIES

Formal Classroom Teaching

a) MIE 302 Mechanical Engineering Lab I, 3 credits, Spring 2022. *Undergraduate core course*.

b) MIE 210, *Statics*, 3 credits, Spring 2018, 2019, Fall 2019, 2020, 2021. *Undergraduate core course*.

c) MIE 597/697MB / BME597MB, *Molecular, cellular and tissue biomechanics*, 3 credits, Fall 2016, 2017, 2018, 2021; Spring 2020; 2021. (**New course developed**). *Advanced undergraduate and graduate elective.*

d) MIE 230, *Thermodynamics, 3 credits.* Spring 2016. *Undergraduate core course*.

Public Outreach Activities

a) **CoE's Summer ENGineering Institute for High School Students (SENGI) program**

- Giving three lectures on organ-on-chip technology in Summer 2018, Summer 2019)

b) **Amherst Region Middle School**

- Gave an advisory talk during lunch talk at ARMS to introduce bioengineering to all the middle school students.
- Went to ARMS in one day to teach a lab course (3 × 1 hr sessions for total >50 students) for collecting DNA from their own
  saliva. This is sponsored by a company DNA Genotek Inc, which provides the collection kit.
- Invited interested students (~20) to UMass to visit my research lab and showed them modern biotechnologies.

XV. PROFESSIONAL ACTICITIES

1. Department Service

a) MIE Undergraduate Committee (2020-2022)
b) MIE Department Personnel Committee (2018-2019, Promotion: Nonnenmann)
c) Judge for MIE capstone design presentation (2017-2018, 2018-2019, 2019-2020)
d) Member of the Bioengineering Faculty Search Committee (2018-2019, led to the successful recruitment of Dr. Jinglei Ping)
e) Member of the Biomedical Faculty Search Committee (2017 – 2018, led to the successful recruitment of Dr. Xian Du and Dr. Leo Liu)
f) MIE Department Seminar Committee (2017-2018, 2018-2019)
g) New student orientation advisor (Summer 2017, 2018)

2. College / University Service

a) Member of the Neuroscience and Behavior program seminar committee (2018-2020); steering committee (2021-2022) and admission committee (2022).
b) Member of the leadership team of the NSF soft materials for life science NRT (PI: Ken Carter and Greg Tew), 2017-2020
c) Judge: PSE SMLS NRT poster session (2019, 2020).
d) Molecular and cell biology (MCB) graduate program admission committee (Fall 2018, 2019)
e) Member of the Steering committee of Initiative of Neurosciences (IONs), since 2018.

3. Membership of Professional Societies

a) American Society of Mechanical Engineers (ASME)
b) Biomedical Engineering Society (BMES)
c) American Heart Association (AHA)
d) Institute of Electrical and Electronics Engineers (IEEE)

4. Member of Grant Review Panels

a) Panelist, NSF Review Panel for CMMI Biomechanics and Mechanobiology Program (2021).
b) Temporary member, BMBI Study Section, National Institutes of Health (2020).
c) Member of Basic Sciences Group Committee, *Innovative Project Award*, American Heart Association (2019, 2020).
d) Panelist, NSF Review Panel for CBET Biotechnology and Biochemical Engineering Program (2017).

5. *Ad hoc* Grant Reviewer

a) *Ad hoc* reviewer, *OPUS and PRELUDIUM* funding schemes, National Science Center of Poland (2019, 2020).
b) *Ad hoc reviewer*, Dutch Research Council NWO Domain Applied and Engineering Sciences grant (2019).
c) *Ad hoc* reviewer, *NSERC Discovery Program*, Natural Sciences and Engineering Research Council of Canada (2018).
d) *Ad hoc* reviewer, *Research Grant Awards*, Human Frontier Science Program (2017).

6. *Ad hoc* Journal Reviewer

Advanced Materials, Advanced Science, Matter, Advanced Functional Materials, Biomaterials, ACS Applied Materials and Interfaces, Chemical Engineering Journal, Environmental Science Nano, ACS Sensors, Acta Biomaterialia, Advanced Healthcare Materials, Tantala, Biomacromolecules, Chemistry – A European Journal, Journal of Materials Chemistry B, Scientific Reports, Biophysical Journal, Tissue Engineering, Advanced Biosystems, Integrative Biology, Journal of Biomedical Materials Research: Part A, RSC Advances, PLoS ONE, Cellular and Molecular Bioengineering, Biomedical Microdevices.

7. Conference Organizer and Session Chair

a) Session chair: Cellular and Molecular Bioengineering, NEBEC 2022 (New York City, NY).
b) Tissue & Cellular Engineering sub-theme co-chair, ASME SB3C 2021 (Remote).
c) Session co-organizer, ASME SB3C 2020 (Remote).
d) Session chair: Micro and Nano-Fluidic Engineering and Bioinspired Nano Devices session, BMES 2018 (Atlanta, GA).
e) Session Chair: Current Topics in Biomechanics session and Biomechanics of Biomaterials session, BMES 2017 (Phoenix, AZ).
f) Session Organizer and Chair: IEEE NEMS 2017 (Los Angeles, CA).

8. Journal Editorial Services

a) Guest Editor: Special Issue: "Organoids" for Journal of Molecular Biology. (2022)
b) Guest Editor: Special Issue: "Mechanobiology in Health and Disease" for Biomolecules. (2018)
c) Guest Editor: Thematic Issue: "Letters: Micro/Nanosystems Mechanobiology" for The IEEE Transactions on Nanotechnology. (2017)
d) Editorial Board Member: Nature - Scientific Reports. 2017-
e) Topic Editorial Board Member: Micromachines, 2021-.

9. Member of Professional Society Committee

a) Development & Morphogenesis theme co-chair, ASME B3C Tissue & Cellular Engineering Committee, 2020-2022
b) Technical Program Committee Member, IEEE NEMS 2019-
c) Steering Committee Member, New Materials Research, EITA Meeting. 2017-

10. Entrepreneurship

[1] **Kinase Life Inc.**, led by graduate student Nariman Banaei, won the 3rd place in the final UMass Innovation Challenge Competition, $15,000. The company developed SERS-based assays for cancer diagnostics based on our research.

[2] **21st Biotech** (https://www.21stbiotech.com/), led by two undergraduate student, George Ryan and Yizhuo Chen, won the 2nd place in the in the final UMass Innovation Challenge Competition, $21,000. The company developed an active band-aid, which apply gentle stretch to accelerate wound healing, based on their independent studies in my lab.