CMBE Council Nomination
Allen Liu, University of Michigan

I am seeking nomination to be put on the ballots for the CMBE Council election. I have been a member of BMES since 2012 and consider CMBE my home Special Interest Group. My lab has a long-standing interest in mechanobiology, cell mechanics, microfluidics, and bottom-up synthetic biology. Much of our past and present work revolves around investigating how physical forces control biological processes and using that knowledge to build synthetic cell-like systems capable of generating and responding to forces.

I have chaired sessions at the BMES annual meeting (twice), served as an annual meeting abstract reviewer and resume reviewer (five times), and served as the track co-chair for biomedical imaging and instrumentation at the BMES annual meeting in 2020. Specific to CMBE-SIG, I have been an abstract reviewer for the BMES CMBE Conference four times (three times for the Rising Star awards). Besides my service to BMES, I have also served my research community broadly through the organization of meetings and conferences. I have organized four meetings in the past: Meeting on The New Advances in Probing Cell-ECM Interactions (Berlin, Germany, 2016), 9th International Conference on Microtechnologies in Medicine and Biology (Monterey, CA, 2018), 2nd Square Table Workshop on Biomaterials and Synthetic Biology (Alexandria, VA, 2019), Lorentz Center Workshop on Reconstituting Biology (Leiden, The Netherlands, 2022).

I have always been an engaged member of my research communities and I am looking for ways to contribute positively to my professional societies. Having been a BMES CMBE Rising Star awardee (2017) and *Cellular and Molecular Bioengineering*'s Young Innovator in Cellular and Molecular Bioengineering (2014, the inaugural class), I have benefited greatly from this vibrant research community. Serving on the CMBE Council is a form of giving back and continuing to promote our research areas and the new generation of trainees. The topical areas for CMBE have expanded over the years and cover contemporary areas of cellular and molecular bioengineering. I believe there is an opportunity for CMBE to expand more into synthetic biology. I also will seek to create ways for trainees to make connections with established investigators. The mentoring lunch that the CMBE conference holds is a wonderful event. I can foresee the creation of monthly virtual coffee hours available to our SIG trainees on specific mentoring topics. Having an inclusive atmosphere and approach is also central to the mission of CMBE and I will work to broaden participation in CMBE events and ensure the continued growth and prosperity of the CMBE community.

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POSITIONS:

2018- Associate Professor, Department of Mechanical Engineering, Department of Biomedical Engineering, Cellular and Molecular Biology Program, Department of Biophysics, Applied Physics, University of Michigan

2012-2018 Assistant Professor, Department of Mechanical Engineering, Department of Biomedical Engineering, Cellular and Molecular Biology Program, Department of Biophysics, University of Michigan

EDUCATION:

B.Sc., Biochemistry (with Honors), University of British Columbia, 2001
Ph.D., Biophysics, University of California-Berkeley, 2007 (advisor: Daniel Fletcher)

RESEARCH EXPERIENCE:

2007-2011 Postdoctoral Fellow, Cell Biology, The Scripps Research Institute, La Jolla, CA (advisors: Gaudenz Danuser and Sandra Schmid)

2002-2007 Graduate Student, Biophysics, University of California-Berkeley, Berkeley, CA

2000-2001 Undergraduate Thesis, Biochemistry, University of British Columbia, Vancouver, Canada (advisor: Natalie Strynadka)

AWARDS AND HONORS:

2023 Pioneering Investigator from *Chemical Communications*
2023 Monroe-Brown Foundation Service Excellence Award
2022 Mechanical Engineering Departmental Faculty Award
2022 Robert M. Caddell Memorial Award for Research
2021 Nominated for the University of Michigan Golden Apple award (only student nomination-based teaching award given to instructors)
2019 Invited participant, National Academy of Engineering German-American Frontiers of Engineering Symposium
2018 Invited participant, National Science Foundation Square-Table on Living Interfaces: Exploring Synthetic Biology and Evolution for the Development of Next-Generation Biomaterials
2018 Invited participant and speaker, National Science Foundation workshop on synthetic and artificial cells
2018 Humboldt Fellowship for Experienced Researcher (Germany)
2018 Endeavour Executive Fellowship (Australia)
2017 Emerging Investigator from *Chemical Communications*
2017 Future of Biophysics Symposium Speaker at Biophysical Society Meeting
2017 Rising Star Award from BMES-Cellular and Molecular Bioengineering
2014 Young Innovator in Cellular and Molecular Bioengineering
2013 UROP Outstanding Research Mentor Award – Honorable Mention, University of Michigan
2012 American Heart Association Scientist Development Grant (declined)

2012 NIH Director's New Innovator Award
2011 Society of Fellows Travel Award, The Scripps Research Institute
2008 Bernie Gilula Travel Award, The Scripps Research Institute
2008 Leukemia and Lymphoma Society Postdoctoral Fellowship
2008 Finalist, Helen Hay Whitney Foundation Fellowship
2007 Summer meeting travel award, American Society of Cell Biology
2005 Student travel award, Biophysical Society
2005 PGS-B Scholarship; Natural Sciences and Engineering Research Council, Canada
2003 PGS-A Scholarship; Natural Sciences and Engineering Research Council, Canada
2000 Science Scholar, University of British Columbia

PUBLICATIONS

1. Loi KJ#, Moghimianavval H#, Liu AP, Reconstitution of the bacterial glutamate receptor channel by encapsulation of a cell-free expression system, *Journal of Visualized Experiments*, accepted. # equal contribution
2. Rothschild LJ, Averesch NJH, Strychalski E, Moser F, Glass JI, Perez RC, Yekinni IO, Rothschild-Mancinelli B, Roberts Kinsman GA, Wu F, Waetershoot J, Ioannou IA, Jewett MC, Liu AP, Noireaux V, Sorenson C, Adamala K, Building synthetic cells – from the technology infrastructure to cellular entities, ACS Synthetic Biology, in press.
3. Xu H, Herzog J, Zhou Y, Bashirzadeh Y, Liu AP, Adera S, Visualization and experimental characterization of wrapping layer using planar laser-induced fluorescence, ACS Nano, 18, 5, 4068-4076, 2024.
4. Wubshet NH, Young CJ, Liu AP, Rearrangement of GUV-confined actin networks in response to micropipette aspiration, *Cytoskeleton*, in press.
5. Hwang S-W, Lim C-M#, Huynh CT#, Moghimianavval H, Kotov NA, Alsberg E*, **Liu AP***, Hybrid vesicles enable mechano-responsive self-degradable hydrogel, *Angewandte Chemie*, e202308509, 2023. # equal contribution, * co-corresponding authors
6. Hsu Y-Y#, Hwang S-W#, Chen SJ, Alsberg E, **Liu AP**, Development of mechanosensitive synthetic cells for biomedical applications, *SLAS Technology*, S2472-6303(23)00042-0, 2023. # Equal contribution
7. Hsu Y-Y, Chen SJ, Bernal-Chanchavac J, Sharma B, Moghimianavval H, Stephanopoulos N, **Liu AP**, Calcium-triggered DNA-mediated membrane fusion in synthetic cells, *Chemical Communications*, 59, 8806-8809, 2023.
8. Moghimianavval H, Mohapatra S, **Liu AP**, A mammalian-based synthetic biology toolbox to engineer membrane-membrane interfaces, *Methods in Molecular biology*, in press.
9. Hsu Y-Y, Resto-Irizarry AM, Fu JP, **Liu AP**, Mechanosensitive channel-based optical membrane tension report, *ACS Sensors*, 8, 1, 12-18, 2023.
10. Wubshet NH, **Liu AP**, Methods to mechanically perturb and characterize GUV-based minimal cell models, *Computational and Structural Biotechnology*, 21, 550-562, 2023.
11. Wubshet NH, Wu B, Veerapaneni S, **Liu AP**, Differential regulation of GUV mechanics via actin network architectures, *Biophysical Journal*, 122, 1-14, 2023.
12. Ma Y, Kapoor R, Sharma B, **Liu AP**, Ferguson AL, Computational design of self-assembling peptide chassis materials for synthetic cells, *Molecular Systems Design & Engineering*, 8, 39-52, 2023.
13. Lin S-S, Joseph, J, **Liu AP**, Mechanical regulation of exocytosis and endocytosis, *Exocytosis from Molecules to Cell*, IOP Publishing, December 2022.

14. Poddar A#, Hsu Y-Y#, Zhang F, Muller C, Malla M, **Liu AP***, Chen Q*, Membrane stretching activates calcium-permeability of putative fission yeast Pkd2 channel, *Molecular Biology of the Cell*, accepted. # equal contribution, * co-corresponding authors
15. Cai G, Nguyen A, Bashirzadeh Y, Lin S-S, Bi D, **Liu AP**, Compressive stress drives adhesion-dependent unjamming transitions in breast cancer cell migration, *Frontiers in Cell and Developmental Biology*, 10:933042, 2022.
16. Joseph JG, Mudgal R, Lin S-S, Ono A, **Liu AP**, Biomechanical role of epsin in influenza A virus entry, *Membranes*, 12(9), 859, 2022
17. Majumder S, Hsu Y-Y, Moghimianavval H, Andreas M, Giessen TW, Luxton GWG, **Liu AP**, *In vitro* synthesis and reconstitution using mammalian cell-free lysates enables the systematic study of the regulation of LINC complex assembly, *Biochemistry*, 61, 14, 1495-1907, 2022.
18. Moghimianavval H#, Patel C#, Mohapatra S#, Hwang S-W, Kayikcioglu T, Bashirzadeh Y, **Liu AP***, Ha T*, Engineering functional membrane-membrane interface by InterSpy, *Small*, e2202104, 2022. # equal contribution, * co-corresponding authors
19. Bashirzadeh Y, Moghimianavval H, **Liu AP**, Encapsulated actomyosin patterns drive cell-like membrane shape changes, *iScience*, 104236, 2022.
20. **Liu AP***, Appel EA, Ashby PD, Baker BM, Franco E, Gu L, Haynes KA, Joshi NS, Kloxin AM, Kouwer PHJ, Mittal J, Morsut L, Noireaux V, Parekh S, Schulman R, Tang SKY, Valentine MT, Vega SL, Weber W, Stephanopoulos N*, Chaudhuri O*, The living interface between synthetic biology and biomaterial design, *Nature Materials*, 21, 390-397, 2022. * co-corresponding authors
21. Moghimianavval H*, Hsu Y-Y *, Groaz A, **Liu AP**, In vitro reconstitution platforms of mammalian cell-free expression of membrane proteins, *Methods in Molecular Biology*, 2433:105-120, 2022.
22. Luo M, Cai G, Ho KKY, Wen K, Tong Z, Deng L, **Liu AP**, Compressive stress enhances invasive phenotype of breast cancer cells via Piezo 1 activation, *BMC Molecular and Cell Biology*, 23(1):1, 2022.
23. Sharma B, Moghimianavval H, Hwang S-W, **Liu AP**, Synthetic cell as a platform for understanding membrane-membrane interactions, *Membranes*, 11, 912, 2021.
24. Sharma B, Ma Y, Hiraki H, Baker BM, Ferguson AL, **Liu AP**, Facile formation of giant elastin-like polypeptide vesicles as synthetic cells, *Chemical Communications*, 57, 13202 – 13205, 2021.
25. Bashirzadeh Y, Wubshet NH, Litschel T, Schwille P, **Liu AP**, Rapid encapsulation of reconstituted cytoskeleton inside giant unilamellar vesicles, *Journal of Visualized Experiments*, 177, e63332, 2021.
26. Wubshet NH, Arreguin-Martinez E, Nail M, Annamalai H, Koerner R, Rousseva M, Tom T, Gillespie RB, **Liu AP**, Simulating microgravity using a 3-D clinostat for inducing cellular responses to mechanotransduction in human osteoblasts, *Review of Scientific Instruments*, 92, 114101, 2021.
27. Tsan Y-C, Zhao Y-T, Capilnasiu A, DePalma SJ, Wu Y-W, Elder B, Panse I, Friedline S, O'Leary TS, Wubshet NH, Ho KYY, Previs MJ, Baker BM, Nordsletten D, Isom LL, **Liu AP**, Helms AS, Biomechanics and myofibrillar alignment drive contractile maturation in stem cell derived cardiac muscle without stromal cells, *Nature Communications*, 2021.
28. Bashirzadeh Y, Redford SA, Lorpaiboon C, Groaz A, Litschel T, Schwille P, Hocky GM, Dinner AR*, **Liu AP***, Actin crosslinker competition and sorting drive emergent GUV size-dependent actin network architecture, *Communications Biology,* 2021. * co-corresponding authors
29. Wubshet NH, Bashirzadeh Y, **Liu AP**, Fascin-induced actin protrusions are suppressed by dendritic networks in GUVs, *Molecular Biology of the Cell*, 32(18):1634-1640, 2021.
30. Ufford K, Friedline S, Tong Z, Tang VT, Dobbs A, Tsan YC, Bielas S, **Liu AP**, Helms AS, Myofibrillar development variability underlies contractile function in stem cell-derived cardiomyocytes, *Stem cell Reports*, 16(3): 470-477, 2021.

31. Khodadadei F, **Liu AP**, Harris CA, How is hydrocephalus shunt failure dependent on shear stress? A high-resolution real-time quantification of astrocyte cytokine secretion by shear stress, *Communications Biology*, 2, 387, 2021.
32. Sharma B, Ma Y, Ferguson AL, **Liu AP**, In search of a novel chassis material for synthetic cells: emergence of synthetic peptide compartment, *Soft Matter*, 16, 10769-10780, 2020.
33. Groaz A, Moghimianavval H, Tavella F, Giessen TW, Vecchiarelli AG, Yang Q, **Liu AP**, Engineering spatiotemporal organization and dynamics in synthetic cells, *WIREs Nanomedicine & Bionanotechnology*, e1685, 2020.
34. Bashirzadeh Y, Wubshet NH, **Liu AP**, Confinement geometry tunes fascin-actin bundle structures and consequently the shape of a lipid bilayer vesicle, *Frontiers in Molecular Biosciences*, 7, 610277, 2020.
35. DeNies MS, Smrcka AV, Schnell S, **Liu AP**, beta-Arrestin mediates communication between plasma membrane and intracellular GPCRs to regulate signaling, *Communications Biology*, 3:789, 2020.
36. Joseph JG, Osorio C, Yee V, Agrawal A, **Liu AP**, Complementary action of structured and unstructured domains of epsin supports clathrin-mediated endocytosis at high tension, *Communications Biology*, 3:743, 2020.
37. Kunisaki S, Jiang G, Biancotti J, Ho KKY, Dye B, **Liu AP**, Spence J, Human induced pluripotent stem cell-derived lung organoids in an ex vivo model of the congenital diaphragmatic hernia lung, *Stem Cells Translational Medicine*, 2020; 1-17.
38. Liao Y, Gose JW, Arruda EM, **Liu AP**, Merajver SD, Young YL, The effect of shock impulse on cell viability *in vitro*, *PLoS One*, 15(6):e0234138, 2020.
39. Noireaux V, **Liu AP**, The new age of cell-free biology, *Annual Reviews of Biomedical Engineering*, 22, 51-77, 2020.
40. Joseph JG, **Liu AP**, Mechanical regulation of endocytosis: new insights and recent advances, *Advanced biosystems*, 1900278, 2020.
41. Rosselli-Murai LK, Joseph J, Lopes-Cendes I, **Liu AP**, Murai MJ, The Machado-Joseph disease-associated form of ataxin-3 impacts dynamics of clathrin-coated pits, *Cell Biology International*, 1-8, 2020.
42. DeNies MS, **Liu AP**, Schnell S, Are the biomedical sciences ready for synthetic biology? *Biomolecular Concepts*, 11:23-31, 2020.
43. Helms AS, Tzang VY, O'Leary TS, Friedline S, Wauchope M, Arora A, Wasserman AH, Smith ED, Lee LM, Wen X, Shavid JA, **Liu AP**, Previs MJ, Day SM, Effects of MYBPC3 loss of function mutations preceding hypertrophic cardiomyopathy, *JCI Insight*, 5(2):e133782, 2020.
44. Bashirzadeh Y, Liu AP, A soup of segregated cytoskeleton: towards mimicking the mechanics of a cell, *Soft Matter*, 15, 8425-8436, 2019. (Theme issue on Active Matter)
45. Loh J, Joseph J, Chuang, M-C, Lin S-S, Chang Y-C, Su Y-A, **Liu AP**, Liu Y-W, Acute decrease in plasma membrane tension induces micropinocytosis via lipid raft destabilization and PLD2 activation, *Journal of Cell Science*, 132, jcs232579, 2019.
46. Garamella J[*], Majumder S[*], **Liu AP**, Noireuax V, An adaptive synthetic cell based on mechanosensing, biosensing, and inducible gene circuits, *ACS Synthetic Biology*, 8, 1913-1920, 2019. [*] Equal contribution; Liu and Noireaux are co-corresponding authors.
47. Liu C, Elvati P, Majumder S, Wang Y, **Liu AP**, Violi A, Predicting the time of entry of nanoparticles in lipid membranes, *ACS Nano*, 13, 10221-10232, 2019.
48. Majumder S, Wubshet N, **Liu AP**, Encapsulation of complex solutions using droplet microfluidics towards the synthesis of artificial cells, *Journal of Micromechanics and Microengineering,* 29, 8, 083001, 2019.

49. DeNies, MS, Rosselli-Murai LK, Schnell S, **Liu AP**, Clathrin heavy chain knockdown influences CXCR4 signaling and post-translational modification, *Frontiers of Cell and Developmental Biology*, 7, 77, 2019.
50. Wang S, Emery NJ, **Liu AP**, A novel synthetic toehold switch for microRNA detection in mammalian cells, *ACS Synthetic Biology*, 8, 5, 1079-1088, 2019.
51. **Liu AP**, The rise of bottom-up synthetic biology and cell-free biology, *Physical Biology*, 16, 040201, 2019.
52. Majumder S, Willey PT, DeNies MS, **Liu AP**, Luxton GWG, Artificial nuclear membranes: a synthetic biology platform for the reconstitution and mechanistic dissection of LINC complex assembly, *Journal of Cell Science*, 132, jcs219451, 2019. Liu and Luxton are co-corresponding authors. (Theme issue on Reconstituting Biology)
53. Ho KKY, Wang YL, Wu J, **Liu AP**, Advanced microfluidic device designed for cyclic compression of single adherent cell, *Frontiers of Bioengineering and Biotechnology*, 6, 148, 2018.
54. Tan X, Luo M, **Liu AP**, Clathrin-mediated endocytosis regulates fMLP-mediated neutrophil polarization, *Heliyon*, 4, e00819, 2018.
55. DeNies M, Rosselli-Murai LK, Murray VL, Steel EM, **Liu AP**, Proximity biotinylation for studying G protein-coupled receptor dimerization (2018), In: Fuxe K., Borroto-Escuela D. (eds) Receptor-Receptor Interactions in the Nervous System. *Neuromethods,* vol 140, Humana Press, New York, NY.
56. Fox ZD, Jiang G, Ho KKY, Walker K, **Liu AP**, Kunisaki SM, Fetal lung transcriptome patterns in an *ex vivo* compression model diaphragmatic hernia, *Journal of Surgical Research*, 231, 411-420, 2018.
57. Heureaux-Torres J, Luker KE, Haley H, Pirone M, Lee LM, Herrera Y, Luker GD, **Liu AP**, The effect of mechanosensitive channel MscL expression in cancer cells on 3D confined migration, *APL Bioengineering*, 2, 032001, 2018.
58. Wang S, Majumder S, Emery NJ, **Liu AP**, Real-time monitoring of transcription and translation in mammalian cell-free expression in bulk and cell-sized droplets, *Synthetic Biology*, 3(1), ysy005, 2018.
59. Guan Y, Li Z, Wang S, Barnes PM, Liu X, Xu H, Jin M, **Liu AP**, Yang Q, A robust and tunable mitotic oscillator in artificial cells, *eLife*, 7:e33549, 2018.
60. Rosselli-Murai LK, Yates JA, Yoshida S, Bourg J, Ho KKY, White M, Prisby J, Tan X, Altemus M, Bao L, Wu Z-F, Veatch SL, Swanson J, Merajver SD, **Liu AP**, Loss of PTEN promotes formation of signaling-specific clathrin-coated pits, *Journal of Cell Science*, 131, jcs2089826, 2018. (Merajver co-corresponding author) (Research Highlight by *J Cell Sci* 2018 131:e0805)
61. Emery NJ, **Liu AP**, Synergistic and non-specific nucleic acid production by T7 RNA polymerase and *Bsu* DNA polymerase catalyzed by single-stranded polynucleotides, *Synthetic and Systems Biotechnology*, 3(2), 130-134.
62. Ma F, Chung MT, Yao Y, Nidetz R, Lee LM, **Liu AP**, Feng Y, Kurabayashi K, Yang G-Y, Efficient molecular evolution for generating enantioselective enzymes by a dual-channel microfluidic droplet screening platform, *Nature Communications*, 9: 1030, 2018.
63. Majumder S, **Liu AP**, Bottom-up synthetic biology: modular design for making artificial platelets, *Physical Biology*, 15, 023001, 2018.
64. Wu X-S, Elias S, Liu H, Heureaux J, Wen PJ, **Liu AP**, Kozlov MM, Wu L-G, Membrane tension inhibits rapid and slow endocytosis in secretory cells, *Biophysical Journal*, 113, 2406-2414, 2017.
65. **Liu AP**, Botelho RJ, Antonescu CN, The big and intricate dreams of little organelles: Embracing complexity in the study of membrane traffic, *Traffic*, 18 (9): 567-579, 2017. Equal contribution (Botelho, Antonescu co-corresponding authors)

66. Majumder S*, Garamella J*, Wang Y.-L., DeNies M, Noireaux V, **Liu AP**, Cell-sized mechanosensitive and biosensing compartment programmed by DNA, *Chemical Communications*, 52, 7349-7352, 2017. * equal contribution (Noireuax co-corresponding author)
67. Zheng Y*, Wang S*, Xue X, Xu A, Liao W, Deng A, Dai G, **Liu AP****, Fu J**, Dll4-Notch signaling in regulating angiogenesis in a 3D biomimetic environment, *Lab on a Chip*, 17, 1948-1959, 2017. * Equal contribution ** corresponding author
68. **Liu AP***, Chaudhuri O*, Parekh S*, New advances in probing cell-extracellular matrix interactions, *Integrative Biology*, 9, 383-405, 2017. * Equal contribution and corresponding author
69. Ho KKY, Lee JW, Durand, G, Majumder S, **Liu AP**, Protein aggregation with poly(vinyl) alcohol surfactant reduces double emulsion-encapsulated mammalian cell-free expression, *PLoS One*, 12(3): e0174689, 2017.
70. Irajizad E, Walani N, Veatch SL, **Liu AP**, Agrawal A, Clathrin polymerization exhibits high mechano-geometric sensitivity, *Soft Matter*, 13, 1455-1462, 2017.
71. Ho KKY, Lee LM, **Liu AP**, Mechanically activated artificial cell using microfluidic deformation, *Scientific Report*, vol 6, 32912, 2016.
72. Lee LM, Lee JW*, Chase D, Gebrezgiabhier D, **Liu AP**, Development of an advanced microfluidic micropipette aspiration device for single cell mechanics studies, *Biomicrofluidics*, 10, 054105, 2016. (Lee and Lee are co-first authors)
73. Peng Z, Pak O, **Liu AP**, Young YN, On the gating of mechanosensitive channels by fluid shear stress, *Acta Mechanica Sinica,* 32: 1012, 2016.
74. Zhu Q, Zheng F, **Liu AP**, Qian J, Fu C, Lin Y, Shape transformation of the nuclear envelope during closed mitosis, *Biophysical Journal*, 111, 2309-2316, 2016.
75. Wen PJ*, Grenklo S*, Hamid E, Tan X, Liao HS, Heureaux J, Chiang HC, Shin W, Zhao WD, Toilin N, Evergreen E, Brodin L, Karlsson R, Jin A, **Liu AP**, Shupliakov O, Wu LG, Actin and ATP provide mechanical force to collapse fusing vesicles at the plasma membrane, *Nature Communications*, 7:12604, 2016.
76. Caschera F*, Lee JW*, Ho KKY, **Liu AP**, Jewett MC, Cell-free compartmentalized protein synthesis inside double emulsion template liposomes with in vitro synthesized and assembled ribosomes, *ChemComm*, 52, 5467-5469, 2016. * equal contribution (co-corresponding author).
77. **Liu AP**, Biophysical tools for cellular and subcellular mechanical actuation of cell signaling, *Biophysical Journal*, vol 111, 1-7, 2016.
78. Tan X, Heureaux J, **Liu AP**, Cell spreading area regulates clathrin-coated pit dynamics on micropatterned substrate, *Integrative Biology*, **7**, 1033 – 1043, 2015.
79. Lee LM, **Liu AP**, The application of micropipette aspiration in molecular mechanics of single cells, *ASME Journal of Nanotechnology in Engineering and Medicine*, 5(4): 040801-04081-6, 2014. (Themed issue on nanotechnology for biology and biomedical applications)
80. Ho KKY*, Murray VL*, **Liu AP**, Engineering artificial cells by combining HeLa-based cell free expression and ultrathin double emulsion template, *Methods in Cell Biology*, vol 128, Chapter 16, 303-318, 2015. * equal contribution
81. Lee LM, **Liu AP**, Microfluidic pipette array for mechanophenotyping of cancer cells and mechanical gating of mechanosensitive channels, *Lab on a Chip*, vol. 15, 264-273, 2015.
82. Heureaux J, Chen D, Murray VL, Deng CX, **Liu AP**, Activation of a bacterial mechanosensitive channel in mammalian cells by cytoskeletal stress, *Cellular and Molecular Bioengineering*, vol. 7 no. 3. 307-319, 2014. *Young Innovators Special Issue
83. Steel EM, Murray VL, **Liu AP**, Multiplex detection of homo- and heterodimerization of G protein-coupled receptors by proximity biotinylation, *PLoS One*, vol 9 (4), e93646, 2014.
84. Coyne C, Patel K, Heureaux J, Stachowiak J, Fletcher DA, **Liu AP**, Lipid bilayer vesicle generation using microfluidic jetting, *Journal of Visual Experiments*, e51510, 2014.

85. Shao Y*, Tan X*, Novitski R, Muqaddam M, List PT, Williamson L, Fu J, **Liu AP**, Uniaxial cell stretching device for high resolution live cell imaging of mechanosensitive functions, *Review of Scientific Instruments*, 84, 114304, 2013. * equal contribution
86. Lin H, **Liu AP**, Smith TH, Trejo J, Dimerization of proteinase-activated receptors and signaling specificity, *Pharmacology Review*, vol 65: 1198-1213, 2013.

Prior to University of Michigan (2005-2011)

87. Nunez D, Antonescu C, Mettlen M, **Liu AP**, Schmid SL, Loerke D, Danuser G, Hotspots organize clathrin-mediated endocytosis by efficient recruitment and retention of nucleating resources, Traffic, vol 12 (12), 1868-1878, 2011.
88. **Liu AP**, Aguet F, Danuser G, Schmid SL, Local clustering of transferrin receptors promotes clathrin-coated pit initiation, *Journal of Cell Biology*, vol 191 (7), 1381-1393, 2010.
89. Banerjee D, **Liu AP**, Voss N, Schmid SL, Finn M.G., Multivalent display of transferrin on virus-like particles by click chemistry and receptor-mediated endocytosis, *ChemBioChem*, vol 11, 1273-1279, 2010.
90. **Liu AP**, Loerke D, Schmid SL, Danuser G, Global and local regulation of clathrin coated pit dynamics detected on patterned substrates, *Biophysical Journal*, vol 97 (4), 1038-1047, 2009.
91. **Liu AP**, Fletcher DA, Biology under construction: *in vitro* reconstitution of cellular processes, *Nature Reviews Molecular Cell Biology*, vol 10 (9), 644-650, 2009.
92. **Liu AP***, Richmond DL*, Maibaum L, Pronk S, Geissler PL, Fletcher DA, Membrane-induced bundling of actin filaments, *Nature Physics*, vol 4, 789-793, 2008. *equal contribution
93. Stachowiak J, Richmond DL, Li TH, **Liu AP**, Parekh SH, Fletcher DA, Giant unilamellar vesicle formation and encapsulation by microfluidic jetting, *Proceeding of National Academy of Sciences*, vol 105, 4697-4702, 2008.
94. Choy JL, Parekh SH, Chaudhuri O, **Liu AP**, Bustamante C, Footer MJ, Theriot JA, Fletcher DA, Differential force microscope for long-timescale biophysical measurements, *Review of Scientific Instruments*, vol 78, 043711, 2007.
95. **Liu AP**, Fletcher DA, Actin polymerization serves as a membrane domain switch in model lipid bilayer, *Biophysical Journal*, vol. 91, 4064-4070, 2006.
    See also New and Notable: M. Edidin, Switching sides: The actin/membrane lipid connection *Biophysical Journal*, vol. 91, 3963, 2006.
96. **Liu AP**, Fletcher DA, Photopatterning of actin filament structures, *Nano Letters*, vol. 5, no. 4, 625-628, 2005.
97. Chen, DHC, **Liu, APC**, and Koga, Y, Excess Partial Molar Enthalpy of 1-Propanol in 1- Propanol-Acetone (or Tetramethyl Urea) - H_2O at 25°C. *Fluid Phase Equil.*, 189: 31-38, 2001.

MANUSCRIPTS UNDER REVIEW

1. Cai G, Li X#, Lin S-S#, Chen SJ, Koning K, Bi D*, **Liu AP***, Matrix stiffness modulates tumor spheroid sorting and unjamming in a 3D collagen-alginate composite hydrogel, *bioRxiv*, https://doi.org/10.1101/2023.07.23.549940. # equal contribution, * co-corresponding authors. # equal contribution
2. Wubshet NH#, Cai G#, Chen SJ, Sullivan M, Reeves M, Mays D, Harrison M, Varnado P, Yang B, Arreguin-Martinez E, Qu Y, Lin S-S, Duran P, Aguilar C, Clements T, **Liu AP**, Cellular mechanotransduction of human osteoblasts in microgravity, under revision. # equal contribution
3. Moghimianavval H, Loi KJ, Hwang S-W, Bashirzadeh Y, **Liu AP**, Light-based juxtacrine signaling between synthetic cells, under review.

PROFESSIONAL SOCIETY

American Society for Cell Biology
Biomedical Engineering Society
Biophysical Society

PROFESSIONAL ACTIVITIES

Biomedical Engineering Society – Cell and Molecular Bioengineering Rising Star Award abstract reviewer, 2022, 2023.
Co-chair, Lorentz Center workshop on Reconstituting Biology, Leiden, The Netherlands – 2022
Session Chair, World Congress of Biomechanics, Taipei, Taiwan (Virtual) – 2022
Associate Editor, *Frontiers of Molecular Biosciences* – 2020 – present
Track co-chair, Biomedical Imaging and Instrumentation Track, Biomedical Engineering Society Annual Meeting, San Diego, CA – 2020 (Virtual)
Co-chair, Lorentz Center workshop on Reconstituting Biology, Leiden, The Netherlands – 2020 (Virtual)
Co-chair, NSF Square-Table workshop on Programmable Interface, Alexandria, VA – 2019
Associate Editor, *RSC Advances* – 2018 – 2020
Co-chair, Microtechnologies for Medicine and Biology, Monterey, CA – 2018
Advisory Editorial Board member, *WIREs Nanomedicine and Nanotechnology* – 2018 – present
Editorial Board member, *Heliyon* – 2017 – 2019
Guest Editor, Special Issue on bottom-up reconstitution, *Physical Biology* – 2017
National Science Foundation Panel Member – 2014, 2015, 2017, 2018, 2019, 2020
Co-chair, Cell-extracellular matrix interaction, Berlin, Germany – 2016
National Institutes of Health Panel Member – 2016
Executive Committee, Microfluidics in Biological Sciences and Technology Program, University of Michigan, 2014 – 2018
Steering Committee, Emerging Information and Technology Conference – Biomedical Science and Engineering track, 2013 – present
Session Chair of Cellular and Molecular Engineering Track at BMES 2013
Session Chair of Characterization of Biological Cells at ASME 2012
Session Chair of Cellular and Molecular Engineering Track at BMES 2012

PATENTS:

1. Forming an artificial cell with controlled membrane composition, asymmetry and contents, US Patent 20,130,028,963.
2. Development of mechanosensitive synthetic cells for biomedical applications, 2115-008354-US-PS1, filed May 2023.
3. Membrane tension reporter, invention disclosure filed, October 2023.
4. Synthetic synNotch cells, invention disclosure filed, October 2023.
5. Development of synthetic cells that generate ATP and NADH from glucose uptake, invention disclosure filed, January 2024.

INVITED TALKS:

1. 'Mechanobiology of collective cell migration', Biophysical Society Annual Meeting Mechanobiology Subgroup, Philadelphia, PA, February 10, 2024.
2. 'Mechanobiology of collective cell migration', Department of Biology Seminar Series, Brandeis University, October 3, 2023.

3. ‘Contact-dependent synthetic cell communication’, Syn Cell 2023, Minneapolis, MN, May 22, 2023.
4. ‘Bottom-up biology: building synthetic cells’, Distinguished Lecture Series, Department of Chemical Engineering and Material Science, University of Southern California, November 8, 2022.
5. ‘Compressive stress drives adhesion-dependent unjamming transitions in breast cancer cell migration’, Society of Engineering Sciences 2022 Annual Conference, Texas A&M University, College Station, TX, October 17, 2022.
6. ‘Engineering functional membrane-membrane interface using cell-free expression’, Artificial Biology 2022, Aarhus, Denmark, August 16, 2022.
7. ‘Push and Pull: Microfluidics for single cell biomechanics’, World Congress of Biomechanics, Taipei, Taiwan, July 10, 2022.
8. ‘Synthetic cells as the next frontier of biomaterials’, US Army DEVCOM Soldier Center, Virtual Seminar, June 2, 2022.
9. ‘Bottom-up biology: building synthetic cells’, Chemical Engineering Seminar Series, Purdue University, April 17, 2022.
10. ‘Actin cytoskeleton dynamics and organization: from collective cell migration to synthetic cytoskeleton’, Applied Physics Program Seminar Series, University of Michigan, March 30, 2022.
11. ‘Translationally active cell-free expression for building synthetic cells’, Microfluidics in Biomedical Sciences Training Program Annual Symposium, University of Michigan, May 14, 2021. (Virtual)
12. ‘Translationally active cell-free expression for building synthetic cells’, Tools and Technology Seminar Series, University of Michigan, October 20, 2020. (Virtual)
13. ‘Translationally active cell-free expression for building synthetic cells’, Build-a-Cell Seminar Series, September 28, 2020. (Virtual)
14. ‘Mechanobiology of membrane: from endocytosis to artificial cells’, Department of Cell Biology Seminar Series, University of Toledo, September 11, 2020, Toledo, OH. (Virtual)
15. ‘Mechanobiology of membrane: from mechanosensitive channels to artificial cells’, University of Michigan, Applied Physics, February 12, 2020, Ann Arbor, MI.
16. ‘TBA’, European Congress on Cell-Free Synthetic Biology, May 2021, Burghausen, Germany (postponed due to COVID)
17. Bottom-up biology: cell-free protein synthesis and building artificial cells, Genentech, January 30, 2020, San Francisco, CA.
18. Interplay between CXCR4 endocytosis, signaling, and post-translational modifications, Signaling Across Scale Symposium, January 28, 2020, UCSF, San Francisco, CA.
19. Mechanobiology of membrane: from mechanosensitive channels to artificial cells, National Chiao Tung University, January 3, 2020, Hsinchu, Taiwan.
20. American Society for Cell Biology Meeting, Washington, DC (12/2019)
21. Mechanobiology of biological membrane: from mechanotransduction to artificial cells, Francis Crick Institute, June 18, 2019, London, United Kingdom.
22. Mechanogenetics: Repurposing Bacterial Mechanosensitive Channel for Cell Biology and Bottom-up Synthetic Biology, Warwick University, June 17, 2019, Warwick, United Kingdom.
23. Repurposing mechanosensitive channel for mechanogenetics and a foray into phase separation, Ludwig Maximilian University of Munich, May 24, 2019, Munich, Germany.
24. Bottom-up synthetic biology to building artificial cells (platelets) and a foray into phase separation, Spanish National Research Council, May 10, 2019, Madrid, Spain.
25. Bottom-up synthetic biology and a foray into phase separation, AMOLF, April 8, 2019, Amsterdam, The Netherlands.

26. Bottom-up synthetic biology and a foray into phase separation, Max Planck Institute of Molecular Cell Biology and Genetics, April 3, 2019, Dresden, Germany.
27. Mechanobiology of biological membranes: from mechanotransduction to artificial cells, Institute Curie, March 23, 2019, Paris, France.
28. Mechanobiology of membrane: from mechanosensitive channel to artificial cells, Wayne State University, Chemical Engineering Seminar Series, February 12, 2019, Detroit, MI.
29. Mechanobiology of membrane: from mechanosensitive channels to artificial cells, University of Trento, December 18, 2018, Trento, Italy.
30. Push and pull: microfluidics for single cell mechanobiology, Department of Chemical and Biological Engineering, Friedrich-Alexander University Erlangen-Nuremberg, November 22, 2018, Erlangen, Germany.
31. Modular approaches to building artificial platelets, International BaSyC Symposium, August 27, 2018, Delft, Netherlands.
32. Repurposing mechanosensitive channels for studying cell mechanics, Mechbio Conference 2018, July 27, 2018, Irvine, CA
33. What functions are necessary in the membrane to have a living cell?, NSF workshop on Synthetic and Artificial Cells, May 14-15, 2018, Alexandria, VA.
34. Microfluidics for single cell mechanobiology, Yeditepe University – Genetics and Bioengineering Student Congress, February 9, 2018, Istanbul, Turkey.
35. Bon appétit: imaging how a cell eats, Koc University, February 8, 2018, Istanbul, Turkey.
36. Bon appétit: imaging how a cell eats, Multiscale Bioimaging in Systems Biology Symposium, University of Michigan, January 31, 2018, Ann Arbor, MI.
37. Repurposing mechanosensitive channels to study confined 3D cell migration, AIChE Annual Meeting, November 1, 2017, Minneapolis, MN.
38. Bottom-up synthetic biology: modular design for making artificial platelets, International Istanbul Technical University Molecular Biology and Genetics Student Congress ’17, October 9, 2017, Istanbul, Turkey.
39. Systems analysis of clathrin-mediated endocytosis, University of Michigan, Quantitative Biology Seminar Series, September 11, 2017, Ann Arbor, MI.
40. Mechanobiology of membrane: from single cell mechanics to artificial cells, National Cheng Kung University, August 9, 2017, Tainan, Taiwan.
41. Systems analysis of clathrin-mediated endocytosis, National Cheng Kung University, August 8, 2017, Tainan, Taiwan.
42. Bottom-up synthetic biology for building artificial cells, Emerging Information Technology Conference (EITC)-Material, July 1, 2017, Ann Arbor, MI.
43. City University of Hong Kong, Department of Mechanical and Biomedical Engineering, Hong Kong (6/2017)
44. University of Hong Kong, Department of Mechanical Engineering, Hong Kong (6/2017)
45. Canadian Society for Molecular Biosciences Annual Meeting, Ottawa, Canada (5/2017)
46. Boston University, Systems biology seminar series, Boston, MA (5/2017)
47. University of California-San Diego, Biomechanics and mechanobiology seminar series, San Diego, CA (4/2017)
48. Stanford University, Biomechanics seminar series, Palo Alto, CA (4/2017)
49. Arizona State University, Center for Biophysics, Tempe, AZ (3/2017)
50. Future of Biophysics Symposium, Biophysics Society Annual Meeting, New Orleans, LA (2/2017)
51. BMES-CMBE Annual Meeting, Hawaii (1/2017)
52. Oakland University, Physics Colloquium, Rochester Hill, MI (10/2016)
53. Max Planck Institute for Polymer Research, Mainz, Germany (10/2016)

54. University of Geneva, Department of Cell Biology, Geneva, Switzerland (10/2016)
55. Brown University, Department of Biomedical Engineering, Providence, RI (10/2016)
56. Pennsylvania State University, Department of Biomedical Engineering, State College, PA (09/2016)
57. Kavli Institute for Theoretical Physics-China, Chinese Academy of Science, Beijing, China (08/2016)
58. Peking University, Center for Life Sciences, Beijing, China (08/2016)
59. Mechanobiology Meeting, Shanghai, China (08/2016)
60. Microtechnologies in Medicine and Biology, Seoul, South Korea (04/2016)
61. Institute of Biological Engineering Annual Meeting, Greenville, SC (04/2016)
62. University of Minnesota, Biophysics Seminar Series, Minneapolis, MN (04/2016)
63. Academia Sinica, Taipei, Taiwan (01/2016)
64. National Taiwan University, Institute of Molecular Medicine, Taipei, Taiwan (01/2016)
65. American Society for Cell Biology Meeting, San Diego, CA (12/2015)
66. University of Michigan, Saturday Morning Physics, Ann Arbor, MI (11/2015)
67. Wayne State University, Undergraduate Research Conference in Physics, Detroit, MI (11/2015)
68. Georgia Institute of Technology, Bioengineering Seminar Series, Atlanta, GA (10/2015)
69. National Cheng Kung University, Medical Device Innovation Center, Tainan, Taiwan (10/2015)
70. National University of Singapore, Mechanobiology Institute, Singapore (07/2015)
71. World Association for Chinese Biomedical Engineers 2015, Singapore (07/2015)
72. Biomedical Engineering Society Meeting, San Antonio, TX (10/2014)
73. Cornell University, Biophysics Department, Ithaca, NY (10/2014)
74. Chicago Cytoskeleton Meeting, Chicago, IL (09/2014)
75. Johns Hopkins University, Department of Cell Biology, Baltimore, MD (05/2014)
76. American Physical Society, Denver, CO (03/2014)
77. Carnegie Mellon University, Department of Biomedical Engineering, Pittsburg, PA (02/2014)
78. Molecular Biophysics Training Grant Symposium, University of Michigan (01/2014)
79. Society for Engineering Sciences, Providence, RI (07/2013)
80. Workshop on Physical Approaches to Studying the Cytoskeleton and Cell Motility, Chicago, IL (03/13)
81. Wayne State University, Department of Biology, Detroit, MI (02/2013)
82. American Society of Mechanical Engineers Meeting, Houston, TX (11/2012)
83. Emerging Information and Technology Conference, Toronto, ON, Canada (08/2012)
84. The Scripps Research Institute Florida, Jupiter, FL (06/2012)
85. University of Michigan Nanotechnology and Integrated Microsystems Student Association Faculty Seminar Series, Ann Arbor, MI (06/2012)
86. Pennsylvania Muscle Institute, University of Pennsylvania, Philadelphia, PA (05/2011)
87. American Chemical Society, Anaheim, CA (3/28/2011)
88. Gordon-Kenan Research Seminar in Molecular Pharmacology, Ventura, CA (01/2011)
89. Harvard Medicial School Computational Cell Biology Retreat, Woods Hole, MA (01/2010)
90. TSRI Cell Biology Retreat, San Diego, CA (10/2009)
91. Biophysical Society Meeting, Boston, MA (03/2009)
92. NIH Nanomedicine Development Center Annual Meeting, Washington, DC (04/2007)
93. Biophysical Society Meeting, Salt Lake City, UT (03/2006)