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APPOINTMENTS

2011 – present **Assistant Professor**, Department of Mechanical Engineering, UC Riverside
2011 – present **Participating Faculty**, Department of Bioengineering, UC Riverside
2011 – present **Faculty Member**, Stem Cell Center, UC Riverside
2009 – 2011 **Postdoctoral Scholar**, Mechanical and Aerospace Engineering Department, UCLA

EDUCATION

Ph.D. in Mechanical Engineering, **University of California - Los Angeles**, 2003–2009

Advisor: Chih-Ming Ho, Ph.D.

Dissertation: “Engineering defined embryonic stem cell culture through feedback system control”

M.S. in Mechanical Engineering, **University of California - San Diego**, 2001–2003

Advisors: Keiko K. Nomura, Ph.D. and James Rottman, Ph.D.

Thesis: “Evolution of a counter-rotating vortex pair in a stably stratified fluid”

B.S. in Mechanical Engineering, **University of Tokyo**, Japan, 1997–2001

Advisors: Nobuhide Kasagi, D-Eng. and Yuji Suzuki, D-Eng.

Thesis: “Development of electrostrictive polymer actuators for feedback control of wall turbulent flows”

RESEARCH PROJECTS (FUNDED)

09/01/2017 – 08/31/2020 **Understanding the role of fluidic microenvironment in stem cell suspension culture toward scalable biomanufacturing**
National Science Foundation (CBET-1707190)
\$399,823
Role: PI (Co-PIs Marko Princevac and Nicole zur Nieden)

07/01/2017 - 06/30/2018 **Regents’ Faculty Development Award: Co-rotating cylinder bioreactor for expansion and differentiation of stem cells**
UCR Academic Senate
\$6,000
Role: PI

02/01/2017 - 01/31/2022 **CAREER: Printable and injectable chromatic nanosensor for one-step, naked-eye detection**
National Science Foundation (CBET-1654010)
\$500,281
Role: PI

07/01/2016 - 06/30/2019 **Label-free, chemiresistive, paper microfluidic nanobiosensor array for multiplexed detection**
National Science Foundation (CBET-1606181)
\$399,484
Role: PI (Co-PI Ashok Mulchandani)

- 07/01/2015 - **Ultrahigh throughput mechanoporation proof-of-concept study for adoptive cell transfer**
 12/31/2015 **cancer immunotherapy**
 UCR Collaborative Seed Grant Program
 \$10,000
 Role: Co-PI (PI Masaru Rao)
- 07/01/2015 - **Injectable colorimetric lateral flow biosensor in food crop leaves**
 12/31/2015 UCR Collaborative Seed Grant Program
 \$10,000
 Role: PI (Co-PI Caroline Roper)
- 09/24/2014 - **Development and validation of a new diagnostic tool for detection and characterization**
 10/31/2018 **of sweet potato viruses in East Africa using next generation sequencing**
 Bill & Melinda Gates Foundation (OPP1112536)
 \$499,928
 Role: Co-PI (PI Richard Echodu)
- 09/01/2013 - **Understanding biomechanics of pluripotent stem cells under controlled fluidic shear**
 06/30/2014 UCR Collaborative Seed Grant Program
 \$60,000
 Role: Co-PI (PI Nicole zur Nieden)
- 07/01/2013 - **Regents' Faculty Fellowship: Impact of fluidic agitation on fate of pluripotent stem cells**
 06/30/2014 **in suspension**
 UCR Academic Senate
 \$4,400
 Role: PI
- 07/01/2013 - **Seed grant for CIRM Tools and Technology**
 12/31/2013 UCR Office of Research
 \$30,000
 Role: PI (Co-PI Nicole zur Nieden)
- 05/01/2012 - **A biotic stress sensor printed on maize leaves**
 04/30/2014 Bill & Melinda Gates Foundation (OPP1059995)
 \$100,000
 Role: PI

TEACHING

Courses taught at Department of Mechanical Engineering, UC Riverside, 2011 – present.

ME10	Statics	S12, S13, S14, W16
ME113	Fluid Mechanics	W13, W15
ME170A	Experimental Techniques	S16, S17
ME197	Paper-based Engineering Devices	S15
ME200	Methods of Engineering Analysis	F13, F14, F15, F16
ME240A	Fundamentals of Fluid Mechanics	F12
ME250	Seminar in Mechanical Engineering	F16, W17, S17
ME273	Principles and Designs of Micro Transducers	W12

POSTDOCTORAL AND GRADUATE TRAINEES

Postdoctoral Trainees

Daniel Nampe 2017 - present

Ph.D. Trainees

Jianhou Zhang 2017 - present

Jenna Roper 2017 - present

Sidharth Modha 2016 - present

Carys Layton 2016 - present

Brent Kalish 2014 - present

Daniel Nampe 2012 - 2016 Postdoctoral Scholar, UCR

Carlos Castro 2011 - 2016 Assistant Professor, Cal Poly Pomona

Jessica Wen 2013 - 2016 MIDP Fellow, Vanderbilt School of Medicine

M.S. Trainees

Brent Kalish 2012 - 2014 Ph.D Student, UCR

Jessica Wen 2012 - 2013 Ph.D Student, UCR

Daniel Nampe 2011 - 2012 Ph.D Student, UCR

AWARDS AND HONORS

2017 Regents' Faculty Development Award, UC Riverside

2017 Faculty Early Career Development (CAREER) Award, National Science Foundation

2013 Invited attendee, Agricultural Research Connections Workshop in Nairobi, Kenya (co-hosted by the Biosciences for east and central Africa (BecA) Hub at the International Livestock Research Institute (ILRI) and the Gates Foundation)

2013 Regents' Faculty Fellowship, UC Riverside

2013 Featured Faculty, UCR Living the Promise, (promise.ucr.edu/profile-sustainability-tsutsui.html)

2012 Awardee, Bill & Melinda Gates Foundation's Grand Challenges Explorations Grant

2011 Finalist, Chancellor's Award for Postdoctoral Research, UCLA

SELECTED EXTERNAL SERVICES

2017 Grant Panel Reviewer, NSF ENG Directorate

2016 Grant Panel Reviewer, NSF ENG Directorate

2015 Grant Panel Reviewer, NSF ENG Directorate

2015 Technical Committee and Session Chair, IEEE Nano/Molecular Medicine and Engineering

2015 - Editorial Board Member, Journal of Laboratory Automation

2013 External Proposal Reviewer, Human Frontier Science Program

2013 Session Chair, ASME International Mechanical Engineering Congress & Expo

2013 - 2014 Co-Guest Editor, Journal of Laboratory Automation

2012 Technical Committee and Session Chair, IEEE Nano/Molecular Medicine and Engineering

2011 External Proposal Reviewer, UK Medical Research Council

2008 - Reviewer for Peer-Reviewed Scientific Journals including *Analytical Chemistry*, *Annals of Biomedical Engineering*, *Lab on a Chip*, *Biosensors and Bioelectronics*, *Biotechnology Journal*, *Biomicrofluidics*, *IEEE Nanotechnology Magazine*, *Journal of the Association for Laboratory Automation*, *Sensors*, *Sensors & Actuators B: Chemical*, *Disruptive Science and Technology*,

PROFESSIONAL MEMBERSHIPS

American Society of Mechanical Engineers (ASME), Biomedical Engineering Society (BMES), Institute of Electrical and Electronics Engineers (IEEE), Society for Laboratory Automation and Screening (SLAS), Sigma Xi

JOURNAL PUBLICATIONS

- J15 Nampe, D., Joshi, R., Keller, K., zur Nieden, N., and **Tsutsui, H.** “Impact of fluidic agitation on human pluripotent stem cells in stirred suspension culture,” *Biotechnology Bioengineering*, Vol. 114, no. 9, pp. 2109-2120, 2017
- J14 Castro, C., Rosillo, C., and **Tsutsui, H.** “Characterizing the effect of humidity and channel size on imbibition in paper-based microfluidic channels,” *Microfluidics Nanofluidics*. 21:21, doi:10.1007/s10404-017-1860-4, 2017.
- J13 Wen, J., Viravathana, P., Ingel, B., Roper, C., and **Tsutsui, H.** “Polydiacetylene-coated sensor strip for immunochromatic detection of *Xylella fastidiosa* subsp. *fastidiosa*,” *SLAS Technology*. Vol. 22, no. 4, pp. 406-412, doi:10.1177/2472630316689286, 2017.
- J12 Wen, J., Bohorquez, K., and **Tsutsui, H.** “Polydiacetylene-coated polyvinylidene fluoride strip aptasensor for colorimetric detection of zinc(II),” *Sensors and Actuators B: Chemical*. Vol. 232: p.313-317, 2016.
- J11 Kalish, B., and **Tsutsui, H.** “Using adhesive patterning to construct 3D paper microfluidic devices,” *Journal of Visualized Experiments*, 110, e53805, doi:10.3791/53805, 2016.
- J10 Wen, J., Castro, C., and **Tsutsui, H.** “In planta microsphere-based lateral flow leaf biosensor in maize,” *Journal of Laboratory Automation*, Vol. 20, pp. 500-505, 2015.
- J9 Kalish, B., and **Tsutsui, H.** “Patterned adhesive enables construction of nonplanar three-dimensional paper microfluidic circuits,” *Lab on a Chip*, Vol. 14, pp. 4354-4361, 2014. (selected as a journal back cover)
- J8 Nampe, D., and **Tsutsui, H.**, “Engineered micromechanical cues affecting human pluripotent stem cell regulations and fate,” *Journal of Laboratory Automation*, Vol. 18(6):482-93, 2013.
- J7 Chiou, E.P.-Y., and **Tsutsui, H.**, "Advancements in biomedical micro/nano tools and technology," *Journal of Laboratory Automation*, vol. 18, no. 6, pp. 425-426, 2013. (Guest Editors' Column)
- J6 Valamehr, B., **Tsutsui, H.**, Ho, C.M., and Wu, H. “Developing defined culture systems for human pluripotent stem cells,” *Regenerative Medicine*, Vol. 6, pp. 623-634, 2011.
- J5 **Tsutsui, H.**, Valamehr, B.*, Hindoyan, A., Qiao, R., Ding, X., Guo, S., Witte, O.N., Liu, X., Ho, C.M., and Wu, H. “An optimized small molecule inhibitor cocktail supports long-term maintenance of human embryonic stem cells,” *Nature Communications*, DOI: 10.1038/ncomms1165, 2011.
- J4 **Tsutsui, H.**, Yu, E., Marquina, S., Valamehr, B., Wong, I., Wu, H., and Ho, C.M., “Efficient dielectrophoretic patterning of embryonic stem cells in energy landscapes defined by hydrogel geometries,” *Annals of Biomedical Engineering*, Vol. 38, pp. 3777–3788, 2010.
- J3 Lillehoj, P.B., **Tsutsui, H.**, Valamehr, B., Wu, H., and Ho, C.M., “Continuous sorting of heterogeneous-sized embryoid bodies,” *Lab on a Chip*, Vol. 10, pp. 1678–1682, 2010.
- J2 **Tsutsui, H.**, and Ho, C.M., “Cell separation by non-inertial force fields in microfluidic systems,” *Mechanics Research Communications*, Vol. 36, pp. 92-103, 2009.

- J1 Nomura, K.K., **Tsutsui, H.**, Mahoney, D., and Rottman, J.W., "Short-wavelength instability and subsequent decay of a vortex pair in a stratified fluid", *Journal of Fluid Mechanics*, Vol. 553, pp. 283-322, 2006.

CONFERENCE PROCEEDINGS & PRESENTATIONS

- C31 Dixit, H.G., Starr, R., Nampe, D., Zhang, Y., Ballas, C. B., **Tsutsui, H.**, Forman, S. J., Rao, M.P. "Recent progress towards ultrahigh throughput microinjection," The 12th Annual IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS). Los Angeles, CA, Apr. 9-12, 2017.
- C30 Kalish, B., Luong, J., Roper, J., Beaudette, C., and **Tsutsui, H.**, "Distance-based quantitative DNA detection in a paper-based microfluidic device," The 12th Annual IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS). Los Angeles, CA, Apr. 9-12, 2017.
- C29 Dixit, H.G., Starr, R., Zhang, Y., Nampe, D., Ballas, C. B., **Tsutsui, H.**, Brown, C., Forman, S. J., Rao, M.P. "Intracellular delivery via ultrahigh throughput mechanoporation for cell therapy applications," 2017 MRS Spring Meeting & Exhibit, Phoenix, AZ, Apr. 17 – 21, 2017.
- C28 Dixit, H.G., Nampe, D., **Tsutsui, H.**, Rao, M.P., "Intracellular delivery of exogenous molecules via ultrahigh throughput mechanoporation," 2016 MRS Spring Meeting. Phoenix, AZ, Mar. 28 - Apr. 1, 2016.
- C27 Wen, J., Bohorquez, K., **Tsutsui, H.**, "Polydiacetylene-coated polyvinylidene fluoride strip aptasensor for chromatic detection of zinc(II)," 2016 SLAS 5th Annual International Conference & Exhibition. San Diego, CA, Jan. 23-27, 2016.
- C26 Castro, C., Rosillo, C., **Tsutsui, H.**, "New model to accurately predict fluid wicking in paper microfluidic devices," 2016 SLAS 5th Annual International Conference & Exhibition. San Diego, CA, Jan. 23-27, 2016.
- C25 Nampe, D., Joshi, R., Karam, J., Gonzalez, M., **Tsutsui, H.**, "Controlling agitation for expansion and differentiation of human pluripotent stem cells in suspension culture," 2016 SLAS 5th Annual International Conference & Exhibition. San Diego, CA, Jan. 23-27, 2016.
- C24 Kalish, B. and **Tsutsui, H.**, "Origami-inspired nonplanar three-dimensional paper microfluidic circuits," The 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences. Austin, TX, Oct. 26-30, 2014, pp.1598-1600.
- C23 Castro, C., Rosillo, C., and **Tsutsui, H.**, "Predicting wicking in wax-bound paper microfluidic channels," BMES 2014 Annual Fall Meeting, San Antonio, TX, Oct. 23-25, 2014.
- C22 Nampe, D., Joshi, R., Beaudette, C., Liew, C., and **Tsutsui, H.**, "Influence of agitation rate and aggregate size on human pluripotent stem cells in dynamic suspension," BMES 2014 Annual Fall Meeting, San Antonio, TX, Oct. 23-25, 2014.
- C21 Kalish, B., **Tsutsui, H.**, "Nonplanar three-dimensional paper microfluidic circuits constructed with patterned adhesive," BMES 2014 Annual Fall Meeting, San Antonio, TX, Oct. 23-25, 2014.
- C20 Nampe, D., Joshi, R., Beaudette, C., Liew, C.G., and **Tsutsui, H.**, "Investigating the Impact of Fluidic Agitation on Human Pluripotent Stem Cells in Dynamic Suspension," 12th Annual Meeting of International Society for Stem Cell Research (ISSCR 2014), Vancouver, Canada, June 18-21, 2014.
- C19 Castro, C., Rosillo, and **Tsutsui, H.**, "Characterizing Wicking for Development of Paper-based Analytical Devices," 2014 AAAS Pacific Division Annual Meeting, Riverside, CA, June 17-20, 2014.
- C18 Nampe, D., Joshi, R., Beaudette, C., Liew, C.G., and **Tsutsui, H.**, "Understanding How Fluidic

- Agitation Impacts Human Pluripotent Stem Cells in Dynamic Suspension,” Clinical Translation of Stem Cells, Palm Desert, CA, April 21-22, 2014.
- C17 Dixit, H.G., Nampe, D., **Tsutsui, H.**, and Rao, M.P., “Optimizing performance of MEMS-based mechanoporation devices for ultrahigh throughput cellular manipulation”, 2014 ASME 3rd Global Congress on Nanoengineering for Medicine and Biology (NEMB 2014), San Francisco, CA, Feb. 2-5, 2014.
- C16 Castro, C., Rosillo, and **Tsutsui, H.**, "Manipulating channel properties in paper-based microfluidic devices to control fluid transport," 2013 ASME International Mechanical Engineering Congress and Exposition (IMECE 2013), San Diego, CA, Nov. 15-21, 2013.
- C15 Dixit, H.G., Nampe, D., Zhang, Y., Ballas, C.B., **Tsutsui, H.**, and Rao, M.P., "Optimizing performance of MEMS-based mechanoporation devices for ultrahigh throughput cellular manipulation," 2013 ASME International Mechanical Engineering Congress and Exposition (IMECE 2013), San Diego, CA, Nov. 15-21, 2013.
- C14 Nampe, D., Beaudette, C., Liew, C.G., and **Tsutsui, H.**, "Characterizing self-renewal of human pluripotent stem cells in dynamic suspension culture," 11th Annual Meeting of International Society for Stem Cell Research (ISSCR 2013), Boston, MA, June 12-15, 2013.
- C13 Castro, C., Rosillo, C., Yoo, J., and **Tsutsui, H.**, "Characterization of wax expansion and capillary wicking for paper-based microfluidics," 7th International Conference on Microtechnologies in Medicine and Biology (MMB 2013), Marina Del Rey, CA, April 10 – 12, 2013.
- C12 Zhang, Y., Nampe, D., Dixit, H.G., Ballas, C.B., **Tsutsui, H.**, and Rao, M.P., "Operational factors affecting performance of MEMS-based ultrahigh throughput mechanoporation devices," 7th International Conference on Microtechnologies in Medicine and Biology (MMB 2013), Marina Del Rey, CA, April 10 – 12, 2013.
- C11 Nampe, D., Beaudette, C., Liew, C.G., and **Tsutsui, H.**, "Optimization of Chemical and Physical Factors toward Clinically Enabling Culture of Pluripotent Stem Cells," The 6th IEEE International Conference on Nano/Molecular Medicine and Engineering (NANOMED 2012), Bangkok, Thailand. November 4 – 7, 2012, pp.41-46.
- C10 Hsu, N., Latterman, P., Tong, M., Tran, C., Wu, A., Ziv, M., and **Tsutsui, H.**, "Self-Assembled Organic Microwires as a New Biosensor Platform," BMES 2011 Annual Fall Meeting, Hartford, CN, October 12–15, 2011.
- C9 **Tsutsui, H.**, Valamehr, B., Wu, H., and Ho, C.M., “Stochastic Optimization of Small Molecule Inhibitor Cocktails for Human Embryonic Stem Cell Culture,” BMES 2009 Annual Fall Meeting, Pittsburgh, PA, October 7 – 10, 2009.
- C8 **Tsutsui, H.**, Yu, E., Marquina S., and Ho, C.M., “Dielectrophoretic Patterning and Assembly of Mammalian Cells Using Inert Microstructure Templates,” BMES 2009 Annual Fall Meeting, Pittsburgh, PA, October 7 – 10, 2009.
- C7 Lillehoj, P., Li, N., **Tsutsui, H.**, and Ho, C.M., “A Compact Microfluidic Continuous Flow Separator for Particle and Cell Sorting,” Proceedings of the 21st Annual IEEE International Conference on Micro-Electro-Mechanical Systems (MEMS’08), pp. 292 – 295, Tucson, AZ, January 13 -17, 2008, pp.292-295.
- C6 **Tsutsui, H.**, Valamehr, B., Wu, H., and Ho, C.M., “Development of Embryoid Body Array toward Systematic Study of Stem Cell Differentiation,” BMES 2007 Annual Fall Meeting, Los Angeles, CA, September 26 – 29, 2007.
- C5 **Tsutsui, H.**, Wu, H., and Ho, C.M., “Stable Poly(ethylene glycol) Microwell Arrays for Long-Term Cell Patterning”, the 10th International Conference on Miniaturized Systems for Chemistry and Life

Sciences (μ TAS2006), Tokyo, Japan, November 5-9, 2006, pp. 242-244.

- C4 **Tsutsui, H.**, Wu, H., and Ho, C.M., "Directed Differentiation of Mouse Embryonic Stem Cells in Patterned Microchannels", The International Conference on Bio-Nano-Informatics (BNI) Fusion, Marina del Rey, USA, July 2005.
- C3 Nomura, K.K., **Tsutsui, H.**, Mahoney, D., Crockett, J., and Rottman, J.W., "Evolution of a Counter-Rotating Vortex Pair in a Stably Stratified Fluid", Proc. of 3rd International Symposium on Turbulence and Shear Flow Phenomena, Sendai, June, 2003. pp. 769-774.
- C2 Nomura, K.K., Mahoney, D., **Tsutsui, H.**, Crockett, J., and Rottman, J.W., "Effects of Stable Stratification on the Short Wave Instability in a Vortex Pair", Bull. Am. Phys. Soc., Vol. 46, No. 10, 2002.
- C1 **Tsutsui, H.**, Suzuki, Y., and Kasagi, N., "Development of Electrostrictive Polymer Actuators for Active Control of Turbulence", Proc. Meeting of Japan Society of Fluid Mechanics, July-August, 2001, pp.441-442.