

# Erica E. Jung

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## **APPOINTMENTS**

|                            |                                                                                                                                                                                                                                                                        |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aug. 2018 - Present        | <p>Assistant Professor<br/>Mechanical and Industrial Engineering<br/>Biomedical Engineering</p> <p><b>University of Illinois at Chicago</b></p>                                                                                                                        |
| 2014 – 2018                | <p>Postdoctoral Associate<br/>Synthetic Neurobiology Laboratory (<a href="http://www.syntheticneurobiology.org/">http://www.syntheticneurobiology.org/</a>)</p> <p><b>Media Lab, MIT, Research advisor: Ed Boyden</b></p>                                              |
| 2013 – 2014<br>2008 – 2013 | <p>Postdoctoral Associate<br/>Graduate Research Assistant (PhD)<br/>Integrated Micro-and Nanofluidic systems Laboratory (<a href="http://www.ericksonlab.org/">http://www.ericksonlab.org/</a>)</p> <p><b>Cornell University, Research advisor: David Erickson</b></p> |

## **EDUCATION**

|             |                                                                                                                                                                   |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2008 – 2013 | <p><b>Ph.D. in Mechanical Engineering</b><br/>Cornell University, Ithaca, NY, USA<br/>Research advisor: Prof. David Erickson</p>                                  |
| 2006 – 2008 | <p><b>M.S. in Mechanical Engineering</b><br/>Korea Advanced Institute of Science and Technology (KAIST), South Korea<br/>Research advisor: Prof. Sang Soo Kim</p> |
| 2002 – 2006 | <p><b>B.S. in Mechanical Engineering</b><br/>Sungkyunkwan University, South Korea</p>                                                                             |

## **HONORS AND AWARDS**

|      |                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2025 | <b>NSF CAREER Award</b> (Recommended)                                                                                                                |
| 2022 | <b>College of Engineering Teaching Award</b>                                                                                                         |
| 2019 | <b>NARSAD Young Investigator Award</b> (Brain & Behavior Research Foundation - supports early-career scientists conducting neurobiological research) |

## **FUNDINGS**

|             |                                                                                                                                           |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 2025 – 2030 | <b>NSF CAREER:</b> Identical Brains in Two Zebrafish: Optical Programming and Replication of Brains (sole PI: \$606,382)                  |
| 2023 – 2026 | <b>NSF CBET-2309589:</b> Neuron-to-Neuron Interface: Optically Connected Neurons Between the Brains of Two Zebrafish (sole PI, \$337,422) |
| 2021 – 2023 | <b>NIH R03DA050962:</b> AgRP Neurons as Modulators of Drug Reactivity (sole PI, \$154,565)                                                |
| 2020 – 2022 | <b>NARSAD Young Investigator Grant</b> (sole PI, \$70,000)                                                                                |
| 2019 – 2022 | <b>NIH R21EB028069:</b> Enabling Technology for a Biomimetic Artificial Retinal Chemical Synapse Chip (Co-I, \$638,604)                   |

## **PROFESSIONAL SOCIETY MEMBERSHIP**

- Society of Neuroscience, SfN, (2016 – present)
- Biomedical Engineering Society, BMES (2019 – 2021)
- American Society of Mechanical Engineers, ASME (2009- 2013)

## **JOURNAL PUBLICATIONS**

- Park, Bumjun, Yujin Song, Dong Hyuk Youn, Aliya Sheik, Erica E. Jung, Yun Suk Huh, and Sung-Min Kang. "One-Step Evaluation of Doxorubicin Toxicity Through Concentration Gradient Generator Integrating Breast Cancer-on-a-Chip." *BioChip Journal* (2025): 1-12.
- Sim, Jueun, Chan E. Park, In Cho, Kyeongbae Min, Minho Eom, Seungjae Han, Hyungju Jeon et al. "Nanoscale Resolution Imaging of Whole Mouse Embryos Using Expansion Microscopy." *ACS Nano* 19, no. 8 (2025): 7910-7927.
- Jeong, Hwanju, Hakchun Kim, Jin-Sil Bae, Gayoung Lee, Seungyeon Han, Yuna Han, Erica E. Jung, Kwon-Yul Ryu, Yun Jung Heo, and Inhee Choi. "Transdermal Drug Delivery System Using Light and Moisture Dual Responsive Hybrid Microneedles." *BioChip Journal* 19, no. 1 (2025): 62-78.
- Bansal, Pushkar, Mitchell F. Roitman, and Erica E. Jung. "d-Amphetamine and Feeding States Cohesively Affect Locomotion and Motor Neuron Response in Zebrafish Larvae." *Brain and Behavior* 14, no. 12 (2024): e70173.
- Sheik, Aliya, Muruganantham Rethinasabapathy, Gothandam Kodiveri Muthukaliannan, Moein Safarkhani, Haneul Kang, Donghyeon Kim, Munirah Alhammadi, Erica Jung, and Yun Suk Huh. "ZIF-8 nanocarriers synthesized by co-encapsulating resveratrol and cellulase for biomedical applications." *International Journal of Biological Macromolecules* 283 (2024): 137756.
- Bansal, Pushkar, Mitchell F. Roitman, and Erica E. Jung. "Modulation of Hypothalamic Dopamine Neuron Activity by Interaction Between Caloric State and Amphetamine in Zebrafish Larvae." *Journal of Neuroscience Research* 102, no. 11 (2024): e25396.
- Safarkhani, Moein, Abdullah Aldhaher, Eder C. Lima, Masoumeh Zargar, Erica E. Jung, YukSuk Huh, and Navid Rabiee. "Engineering MXene@ MOF composites for a wide range of applications: a perspective." *ACS Applied Engineering Materials* 1, no. 11 (2023): 3080-3098.

- Bansal, Pushkar, Mitchell F. Roitman, and Erica E. Jung. "Caloric state modulates locomotion, heart rate and motor neuron responses to acute administration of d-amphetamine in zebrafish larvae." *Physiology & behavior* 264 (2023): 114144.
- Babakhanova, Siranush,\* Erica E. Jung,\* Kazuhiko Namikawa,\* Hanbin Zhang, Yangdong Wang, Oksana M. Subach, Dmitry A. Korzhenevskiy et al. "Rapid directed molecular evolution of fluorescent proteins in mammalian cells." *Protein Science* 31, no. 3 (2022): 728-751. \*equally contributed
- Bansal, Pushkar, Abhinav Abraham, Jay Garg, and Erica E. Jung. "Neuroscience research using small animals on a chip: from nematodes to zebrafish larvae." *BioChip Journal* 15 (2021): 42-51.
- Piatkevich, Kiryl D., Seth Bensussen, Hua-an Tseng, Sanaya N. Shroff, Violeta Gisselle Lopez-Huerta, Demian Park, Erica E. Jung et al. "Population imaging of neural activity in awake behaving mice." *Nature* 574, no. 7778 (2019): 413-417.
- Piatkevich, Kiryl D.,\* Erica E. Jung,\* Christoph Straub, Changyang Linghu, Demian Park, Ho-Jun Suk, Daniel R. Hochbaum et al. "A robotic multidimensional directed evolution approach applied to fluorescent voltage reporters." *Nature Chemical Biology* 14, no. 4 (2018): 352-360. \*equal contribution.
- Chang, Jae-Byum, Fei Chen, Young-Gyu Yoon, Erica E. Jung, Hazen Babcock, Jeong Seuk Kang, Shoh Asano et al. "Iterative expansion microscopy." *Nature Methods* 14, no. 6 (2017): 593-599.
- Barykina, Natalia V., Oksana M. Subach, Kiryl D. Piatkevich, Erica E. Jung, Aleksey Y. Malyshev, Ivan V. Smirnov, Andrey O. Bogorodskiy et al. "Green fluorescent genetically encoded calcium indicator based on calmodulin/M13-peptide from fungi." *PloS one* 12, no. 8 (2017): e0183757.
- Jain, Aadhar, Nina Voulis, Erica E. Jung, Devin FR Doud, William B. Miller, Largus T. Angenent, and David Erickson. "Optimal intensity and biomass density for biofuel production in a thin-light-path photobioreactor." *Environmental Science & Technology* 49, no. 10 (2015): 6327-6334.
- Jung, Erica E., Aadhar Jain, Nina Voulis, Devin FR Doud, Largus T. Angenent, and David Erickson. "Stacked optical waveguide photobioreactor for high density algal cultures." *Bioresource technology* 171 (2014): 495-499.
- Ahsan, Syed Saad, Brandon Pereyra, Erica E. Jung, and David Erickson. "Engineered surface scatterers in edge-lit slab waveguides to improve light delivery in algae cultivation." *Optics Express* 22, no. S6 (2014): A1526-A1537.
- Kalontarov, Michael, Devin FR Doud, Erica E. Jung, Largus T. Angenent, and David Erickson. "Hollow fibre membrane arrays for CO<sub>2</sub> delivery in microalgae photobioreactors." *Rsc Advances* 4, no. 3 (2014): 1460-1468.
- Kalontarov, Michael, Devin FR Doud, Erica E. Jung, Largus T. Angenent, and David Erickson. "In situ hollow fiber membrane facilitated CO<sub>2</sub> delivery to a cyanobacterium for enhanced productivity." *Rsc Advances* 3, no. 32 (2013): 13203-13209.
- Jung, Erica E., Michael Kalontarov, Devin FR Doud, Matthew D. Ooms, Largus T. Angenent, David Sinton, and David Erickson. "Slab waveguide photobioreactors for microalgae based biofuel production." *Lab on a Chip* 12, no. 19 (2012): 3740-3745.
- Jung, Erica E., and David Erickson. "Continuous operation of a hybrid solid-liquid state reconfigurable photonic system without resupply of liquids." *Lab on a Chip* 12, no. 14 (2012): 2575-2579.
- Ooms, Matthew D., Vincent J. Sieben, Scott C. Pierobon, Erica E. Jung, Michael Kalontarov, David Erickson, and David Sinton. "Evanescent photosynthesis: exciting cyanobacteria in a surface-confined light field." *Physical Chemistry Chemical Physics* 14, no. 14 (2012): 4817-4823. *Highlighted in Nature Photonics*
- Jung, Erica E., Aram J. Chung, and David Erickson. "Analysis of liquid-to-solid coupling and other performance parameters for microfluidically reconfigurable photonic systems." *Optics express* 18, no. 11

(2010): 10973-10984.

- Kim, Sang Bok, Eunjung Jung, Hyung Jin Sung, and Sang Soo Kim. "Optical mobility in cross-type optical particle separation." *Applied Physics Letters* 93, no. 4 (2008). \*equal contribution.

## **PREPRINTS AND UNDER REVISION**

- Mehrabi, Hossein, Pushkar Bansal John Jutoy, Jutoy, John, Yat Ho Chan, Mitchell F. Roitman, Ruixuan Gao, Erica E. Jung. "Optogenetic activation of hypothalamic AgRP neurons in transgenic zebrafish larvae increased food intake." Under revision, *Scientific Reports*
- Jutoy, John, Hossein Mehrabi, and Erica E. Jung. "Zebrafish Larva Interface: an accessible, modular platform for Danio Rerio experiments." Under revision, *Frontiers in Neuroscience*
- Jutoy, John, Hossein Mehrabi, and Erica Jung. "Agarose Stamped Device: A simple but effective fixation method for Zebrafish Larvae through customizable 3D printed molds for Danio rerio (Zebrafish)." *bioRxiv* (2025): 2025-03.
- Bansal, Pushkar, and Erica E. Jung. "Hypothalamic dopamine neuron activity is modulated by caloric states and amphetamine abuse in zebrafish larvae." *bioRxiv* (2024): 2024-01.
- Bansal, Pushkar, Mitchell F. Roitman, and Erica E. Jung. "Modulation of locomotion and motor neuron response by the cohesive effect of acute and chronic feeding states and acute d-amphetamine treatment in zebrafish larvae." *bioRxiv* (2024): 2024-01.
- Bansal, Pushkar, Mitchell F. Roitman, and Erica E. Jung. "Food deprivation modulates heart rate, motor neuron, and locomotion responses to acute administration of d-amphetamine in zebrafish larvae." *bioRxiv* (2022): 2022-05.
- Sim, Jueun, Chan E. Park, In Cho, Kyeongbae Min, Minh Eom, Seungjae Han, Hyungju Jeon et al. "Nanoscale resolution imaging of the whole mouse embryos and larval zebrafish using expansion microscopy." *BioRxiv* (2021): 2021-05.

## **CONFERENCE PRESENTATIONS AND PAPERS**

- Jutoy J, Jung E, Larva in the Loop, Utilizing Zebrafish Larvae to Control Robots in Real Time via Optokinetic Response Feedback, Biomimetic and Biohybrid Systems. Living Machines 2024
- Jutoy J, Jung E, Optokinetic response maintained for long durations in Zebrafish Larvae through direction changes of visual stimulation, Society for Neuroscience, Oct. 2024
- Mehrabi H, Jutoy J, Jung E, Enhanced food consumption through optogenetic stimulation of hypothalamic AgRP neurons in transgenic zebrafish larvae, Society for Neuroscience, Oct. 2024
- Bansal P, Jung EE. Optogenetic activation of hypothalamic AgRP neurons in transgenic zebrafish larvae increased food intake, The Allied Genetics Conference (TAGC) 2024
- Jutoy J, Jung EE, Larva in the loop, utilizing optokinetic response of Zebrafish larvae as a control schema for a line following robot through a closed-loop 2D virtual reality system, Society for Neuroscience, Nov. 2023
- Bansal P, Roitman MF, Jung EE. Food deprivation modulates heart rate, motor neuron, and locomotion responses to acute administration of d-amphetamine in zebrafish larvae. Society for Neuroscience, Nov. 2022
- Babakhanova, S., Jung, E. E., Namikawa, K., Zhang, H., Wang, Y., Subach, O. M., Korzhenevskiy, D.

A., Rakitina, T. V., Xiao, X., Wang, W., Shi, J., Drobizhev, M., Park, D., Eisenhard, L., Tang, H., Köster, R. W., Subach, F. V., Boyden, E. S., Piatkevich, K. D. Rapid Directed Molecular Evolution of Fluorescent Proteins in Mammalian Cells. Society for Neuroscience, online, Nov. 2021

- Bansal, P., Aggarwal, D., Jung E. E., “Effects of Hunger on Drug response in Zebrafish”, Society for Neuroscience, Chicago, IL, Nov. 2021.
- Babakhanova, S., Jung, E. E., Namikawa, K., Zhang, H., Wang, Y., Subach, O. M., Korzhenevskiy, D. A., Rakitina, T. V., Xiao, X., Wang, W., Shi, J., Drobizhev, M., Park, D., Eisenhard, L., Tang, H., Köster, R. W., Subach, F. V., Boyden, E. S., Piatkevich, K. D. Rapid Directed Molecular Evolution of Fluorescent Proteins in Mammalian Cells. meeting of International Mammalian Synthetic Biology Workshop (mSBW), online, July, 2021
- Jung, E. E., Piatkevich, K. D., Straub, C., Linghu, C., Park, D., Suk, H. J., Hochbaum, D. R., Goodwin, D., Pnevmatikakis, E., Pak, N., Kawashima, T., Yang, C. T., Rhoades, J. L., Shemesh, O., Asano, S., Yoon, Y.G., Freifeld, L., Saulnier, J. L., Riegler, C., Engert, F., Hughes, T., Drobizhev, M., Szabo, B., Ahrens, M. B., Flavell, S. W., Sabatini, B. L., Boyden, E. S., “Robust, millivolt-resolution, high-speed neural voltage imaging in multiple species”, Society for Neuroscience, San Diego, CA, Nov. 2018.
- Piatkevich, K. D., Jung, E.E., Linghu, C., Suk, H.-J., Park, D., Szabo, B., Drobizhev, M., Chen, F., Shamesh, O., Boyden, E.S “Monomeric far-red and near-infrared fluorescent proteins for neuroimaging”, Society for Neuroscience, San Diego, CA, Nov. 2016.
- Chang, JB, Chen, F. Yoon YG, Jung E.E., Babcock, H., Kang, J.S., Asano, S., Suk, H.-J., Pak, N., P. Tillberg, P., Wassie, A., Zhuang, X., Boyden, E.S. “20-nm resolution imaging of brain circuitry by next-generation expansion microscopy”, Society for Neuroscience, San Diego, CA, Nov. 2016.
- Chang, JB, Chen, F., Jung, E., Babcock, H., Zhuang, X., Ed Boyden “Next generation expansion microscopy for nanoscale imaging”, Society for Neuroscience, Chicago, IL, Oct. 2015.
- Jain, A, Jung, E., Erickson, D, "Thermal and Optical Analysis of a Stacked Photobioreactor Design ", ASME International Mechanical Engineering Congress and Exposition, San Diego, CA. Nov. 2013.
- Kalontarov, M., Jung, E., Aadhar, J., Ahsan, S., Erickson, D, "Hollow Fiber Membrane (HFM) Facilitated CO<sub>2</sub> Delivery to a Cyanobacteria Substrate For Biofuel Production", ASME International Mechanical Engineering Congress and Exposition, San Diego, CA. Nov. 2013.
- Jung E. E., Michael K., Doud D. F. R. Angenent L. T. and Erickson D. “High density photobiorefineries with optimized light delivery” 2nd European Optical Society Conference on Optofluidics (EOSOF), Munich, Germany, May 2013
- Jung. E.E., Erickson, D. " Flexible photonics based optofluidic photobioreactors" ASME 2012 International Mechanical Engineering Congress& exposition, Houston, Nov 2012
- Jung. E.E., Kalontarov, M., Doud, D., Angenent, L., Sinton, D., Erickson, D. " Novel Approach in Algae Biofuel Production using Advanced Photonics" Conference on Lasers and Electrooptics (CLEO), San Jose, May 2012
- Jung, E.E., Chung, A.J., Erickson, D. “Advancements in Microfluidically Reconfigurable Photonics” 1st EOS Conference on Optofluidics, Munich, Germany May 2011
- Kalontarov, M., Cordovez, B., Jung, E., Sinton, D., Erickson, D. "Waveguide Enabled Photo-Bio-Energy Production" CLEO: Science and Innovations, Baltimore, MD May 2011
- Kalontarov, M., Cordovez, B., Jung, E.E., Sinton, D., Erickson, D. “Optofluidically Enabled Bio-Energy Production” ASME International Mechanical Engineering Congress and Exposition, Vancouver, B.C. Nov. 2010
- Jung, E., Huh, Y.S., Erickson D., “Surface Enhanced Raman Scattering (SERS) on-an-Optofluidic Chip

Using Roof Collapse Method” Conference on Lasers and Electrooptics (CLEO), San Jose, May 2010

- Chung, A.J., Jung, E., Erickson D., “Reconfigurable Photonics from Microfluidic Waveguides” Conference on Lasers and Electrooptics (CLEO), San Jose, May 2010
- Chung, A.J., Jung, E., Erickson, D., “A new form of reconfigurable photonic material using optofluidic waveguides.” Micro-Total Analysis Systems ( $\mu$ TAS), Korea, Nov. 2009
- Jung, E., Kim, S.B., Kim, S.S.: Separation of optically different particles in a microchannel using radiation force AAAR27th Annual Conference, Rosen Shingle Creek, Orlando, FL, USA, October 20-24, 2008

## **PATENTS**

- Genetically encoded red fluorescent voltage sensors enabling millivolt-resolution and high-speed neural voltage imaging, Boyden E.S., Piatkevich, K. D. and Jung E. E. Provisional Patent Filed, July, 2018
- Photobioreactor apparatus, method and application, Erickson, D., Angenent, L.T., Doud, D.F.R., Kalontarov, M., and Jung, E.E. Provisional Patent Filed, August, 2013
- Optofluidic Switching Systems and Optofluidic Components Using Solid and Liquid Core Waveguides, and Methods for Using Same, Erickson, D., Chung, A., and Jung, E.E. Patent Filed, May, 2012

## **PROFESSIONAL SERVICE**

- Guest Topic Editor & Chair, Special Research Topic, *Frontiers in Neuroscience* (2024 – present)
- Ad-hoc reviewer, *Lab on a chip*, *Journal of Neuroscience Research*, *Materials Today Advances et al.*
- Advisory committee, Korea Technology Advisory Group (2021)
- Reviewer, DPI Seed Funding Program (2019)

## **INSTITUTIONAL SERVICE**

- Member, Graduate Committee, MIE (2023 – present)
- Member, Committee on Justice, Equity, Diversity, and Inclusion, MIE (2021–2023)
- Member, Student Organizations Committee, MIE (2021–2023)
- Member, Committee Structure Task Force, MIE (2021)
- Member, Restarting Research Labs Committee, COE (2020)

## **STUDENT ADVISING**

- Pushkar Bansal (PhD: 2019 – 2024)
- John Jutoy (PhD: 2021– present)
- Hossein Mehrabi (PhD: 2024 – present)
- Lucas Cardoso Zuccolo (PhD: 2023- 2024)
- Deepika Aggrawal (PhD: 2020 – 2023)
- Reihane Hajy Abady (PhD:2023)
- Arnab Neogi (PhD: 2018)
- Rathin Solanki (MS: 2023 – 2024)
- Rehman Shamsuddin (MS: 2021 – 2023)

- Jay Garg (MS: 2019 – 2021)
- Abhinav K. Abraham (MS: 2021)
- Alexis Gatuz (BS: 2024 – present))
- Anna Elson (BS: 2024 – present)
- John Hahn (BS: 2022 – 2024)
- John Jutoy (BS: 2020 – 2021)
- David Keleher (BS: 2019 – 2020)

## **TEACHING**

|        |      |                                                                              |
|--------|------|------------------------------------------------------------------------------|
| Spring | 2025 | ME211: Fluid Mechanics (student evaluation: TBD)                             |
|        |      | ME321: Heat Transfer (student evaluation: TBD)                               |
| Fall   | 2024 | ME211: Fluid Mechanics (student evaluation: 4.19/5)                          |
|        |      | ME321: Heat Transfer (student evaluation: 4.47/5)                            |
| Spring | 2024 | ME321: Heat Transfer (student evaluation: 4.61/5)                            |
| Fall   | 2023 | ME321: Heat Transfer (student evaluation: 4.67/5)                            |
|        |      | ME594: Microsystems for Biomedical Applications (student evaluation: 4.65/5) |
| Spring | 2023 | ME211: Fluid Mechanics (student evaluation: 4.06/5)                          |
| Fall   | 2022 | ME211: Fluid Mechanics (student evaluation: 4.59/5)                          |
|        |      | ME321: Heat Transfer (student evaluation: 4.67/5)                            |
| Spring | 2022 | ME321: Heat Transfer (student evaluation: 4.07/5)                            |
| Fall   | 2021 | ME321: Heat Transfer (student evaluation: 4.36/5)                            |
|        |      | ME594: Microsystems for Biomedical Applications (student evaluation: 4.44/5) |
| Spring | 2021 | ME321: Heat Transfer (student evaluation: 4.62/5)                            |
| Fall   | 2020 | ME321: Heat Transfer (student evaluation: 4.48/5)                            |
| Spring | 2020 | ME321: Heat Transfer (student evaluation: 4.3/5)                             |
| Fall   | 2019 | ME321: Heat Transfer (student evaluation: 4.79/5)                            |
| Spring | 2019 | ME321: Heat Transfer (student evaluation: 4.25/5)                            |
| Fall   | 2018 | ME421: Intermediate Heat Transfer (student evaluation: 4.29/5)               |