Yongmin Cho, Ph.D.

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RESEARCH INTERESTS

1. Discover healthy aging therapeutics using phenotyping screening, multi-omics, and cross-species approaches

2. Characterize cellular senescence and identify new senolytic drugs that kill senescence cells

3. Quantify the dynamics of the ubiquitin-proteasome system (UPS) to understand protein degradation process

EDUCATION

Ph.D. Georgia Institute of Technology, Atlanta, GA, USA   2017

School of Chemical & Biomolecular Engineering

B.S. Seoul National University, Seoul, South Korea   2012

Department of Chemical and Biological Engineering (*Cum Laude*)

  Discontinued Attendance: 2-year mandatory military service in South Korea (2007 – 2009)

RESEARCH EXPERIENCE

Postdoctoral fellow with Dr. **Marc W. Kirschner** – Harvard Medical School, Boston, MA   2018 – Present

Postdoctoral fellow with Dr. **Hang Lu** – Georgia Institute of Technology, Atlanta, GA   2017 – 2018

Ph.D. Research with Dr. **Hang Lu** – Georgia Institute of Technology, Atlanta, GA   2012 – 2017

Research Assistant with Dr. **Byung-Soo Kim –** Seoul National University, Seoul, South Korea   2011 – 2012

Undergraduate Researcher with Dr. **Kookheon Char** – Seoul National University, Seoul, South Korea   2010

RESEARCH SUMMARY

1. Automated integrated microsystems for the study of animal perception at neural circuit levels

   Cho et al., *Lab Chip*, 2017, Cho et al., *Lab Chip* 2018; Cho et al., *Small*, 2020; Lee and Cho et al., *submitted*

2. High-content phenotyping platforms and machine learning models for the assessment of healthy aging

   Le, Zhan, Cho et al., *Communications Biology*, 2020; Cho et al., *Aging Cell*, 2022, Cho et al., *in preparation*

3. Quantitative characterization of the anti-aging drug efficacy in animals' healthspan and lifespan

   Shindyapina and Cho et al., *Science Advances*; Cho et al., *in preparation*

4. Establishment of organismal biocompatibility test framework with nano-sensors

   Cho et al., (first and corresponding author), *in preparation*

TEACHING EXPERIENCE

Instructor, *Microfluidic workshop***,** Georgia Institute of Technology | June 2016

Teaching Assistant, *Transport Phenomena I,* Georgia Institute of Technology | 2015 Summer

Teaching Assistant, *Biodesign Lab,* Georgia Institute of Technology | 2014 Spring

Teaching Assistant, *Transport Phenomena II,* Georgia Institute of Technology | 2013 Fall

Undergraduate Teaching Assistant, *Engineering Mathematics,* Seoul National University | 2011 Fall

Undergraduate Teaching Assistant, *Chemistry,* Seoul National University | 2009 Fall

Undergraduate Teaching Assistant, *Calculus,* Seoul National University | 2009 Fall

MENTORING EXPERIENCE

Louis Colson, **PhD Student**, Harvard Medical School | 2019-Present

    Project: Single-molecule imaging platform for the study of ubiquitin-proteasome system (UPS)

Sol Ah Lee, **PhD Student**, Georgia Institute of Technology | 2016-2018

    Project: Microfluidic device for the delivery of multimodal stimulation in *C. elegans*

    Project: High-throughput microfluidic platform for the study of thermosensation in *C. elegans*

    Current position: Postdoctoral Fellow at Georgia Institute of Technology

Kirby Broderick, **Undergraduate Student**, Georgia Institute of Technology | 2016-2018

    Project: Microfluidic device for the delivery of multimodal stimulation in *C. elegans*

    Current position: Ph.D. candidate at Carnegie Mellon University

Trent Swords, **Undergraduate Student**, Georgia Institute of Technology | 2015-2016

    Project: Understanding animal perception at the whole-brain level

    Current position: Field Engineer

David N. Oakland, **Undergraduate Student**, Georgia Institute of Technology | 2015-2017

    Project: On-chip functional neuroimaging to mechanical stimulation in *C. elegans* larvae

    Current position: Medical student at Virginia Tech Carilion School of Medicine

INDUSTRY EXPERIENCE

Trader – GS Caltex, Seoul, South Korea | 2011 – 2012

Analyze and monitor Asia Petrochemical product markets (BTX products – Benzene, Toluene, Xylene)

Field Applications of Engineering Knowledge Program – LG Chemical Research Park, Korea | 2010

Conduct a project on Pressure Sensitive Adhesives (PSA)

AWARDS & FELLOWSHIPS

UKC 2022 Fellow, Korea-American Scientist and Engineering Association	2022
SEED Outstanding Presentation Award, Korea-American Scientist and Engineering Association	2022
KASBP Fellowship Award, Korean American Society in Biotech and Pharmaceuticals	2022
CBMS Student/Young Researcher Grant, MicroTAS International Conference	2015
Best Student Research Paper Awards, Seoul National University	2011
National Scholarship for Science and Engineering, Korea Student Aid Foundation	2005 – 2011

Covered the entire 4-year university tuitions

PROFESSIONAL SERVICES

Serve as a **Journal reviewer** at *Lab on a Chip, Sensors, Environmental Research, Journal of Industrial and Engineering Chemistry,* and *STAR Protocols*

Serve as an **Editor** and a **Reviewer** at the *Journal of Emerging Investigators*

COMMUNITY SERVICE

Volunteer, **The Calculus Project**, *Tutoring program for URM high school students*	2022
Volunteer, **Korean Community in ChBE at Georgia Tech**, *Vice president*	2013-2014
Volunteer, **October Sky**, *Assistant for a Science lecture in small-sized city's libraries for young people*	2011
Volunteer, **SNU Buddy**, *Assistant for a foreign exchange student*	2009
Volunteer, **Dong-myung children's social welfare center**, *Tutoring for low-income class young students*	2006
Volunteer, **Raphael House**, *Take care of severely handicapped children*	2005 – 2007

UNFUNDED GRANT APPLICATION

NIH K99 (National Institute of Aging), Received Impact Score: 31

Title: Quantitative characterization of animal aging

Burroughs Wellcome Fund's CASI, Invited for a full proposal

Title: Characterization of cellular senescence in vivo

PUBLICATIONS

A. Refereed Journal Publications [* co-first author]

15.   C. E. Anderson, M. C. Malek, R. A. Jonas-Closs, **Y. Cho**, L. Peshkin, M. W. Kirschner, and L. Y. Yampolsky, "Inverse Lansing effect: maternal age and provisioning affecting daughters' longevity and male offspring production". *American Naturalist*, 2022, 10.1086/721148

14. A. V. Shindyapina, **Y. Cho**, A. Kaya, A. Tyshkovskiy, J. P. Castro, A. Deik, J. Gordevicius, J. R. Poganik, C. B. Clish, S. Horvath, L. Peshkin, V. N. Gladyshev, "Rapamycin treatment during development extends lifespan and healthspan of male mice and Daphnia magna". *Science Advances*, 2022, [10.1126/sciadv.abo5482](https://doi.org/10.1126/sciadv.abo5482)

13. **Y. Cho**, R. A. Jonas-Closs, Lev. Y. Yampolsky, M. W. Kirschner, and L. Peshkin, "Intelligent high-throughput intervention testing platform in Daphnia", *Aging Cell*, 2022, [10.1111/acel.13571](https://doi.org/10.1111/acel.13571)

12. C. E. Anderson, M. N. Ekwudo, R. A. Jonas-Closs, **Y. Cho**, L. M. Peshkin, M. W. Kirschner, and L. Y. Yampolsky, "Lack of Age-related Respiratory Changes in Daphnia", *Biogerontology,* 2022, [10.1007/s10522-021-09947-6](https://doi.org/10.1007/s10522-021-09947-6)

11. D. W. Choi, Y. J. Roh, S. Kim, H. M. Lee, M. Kim, D. Shin, J. H. Park, **Y. Cho**, H. H. Park, Y. S. Ok, D. Kang, J. H. Kim, L. Tarrago, N. N. Danial, V. N. Gladyshev, P. K. Min, B. C. Lee, "Development of a novel fluorescent biosensor for dynamic monitoring of metabolic methionine redox status in cells and tissues", *Biosensors and Bioelectronics,* 2021, [10.1016/j.bios.2021.113031](https://doi.org/10.1016/j.bios.2021.113031)

10. K. N. Le*, M. Zhan*, **Y. Cho***, J. Wan, D. S. Patel, and H. Lu, "An automated platform to monitor long-term behavior and healthspan in *Caenorhabditis elegans* under precise environmental control", *Communications Biology*, 2020, [10.1038/s42003-020-1013-2](https://doi.org/10.1038/s42003-020-1013-2)

9. **Y. Cho***, S. A. Lee*, Y. L. Chew, K. Broderick, W. R. Schafer, and H. Lu, "Multimodal Stimulation in a Microfluidic Device Facilitates Studies of Interneurons in Sensory Integration in *C. elegans*", *Small*, 2020, [10.1002/smll.201905852](https://doi.org/10.1002/smll.201905852) *(This paper was selected as a cover article)*

8. Y. L. Chew, Y. Tanizawa, **Y. Cho**, B. Zhao, A. J. Yu, S. Ahn, C. Rankin, Y. J. You, H. Lu, I. Beets, and W. R. Schafer, "An Afferent Neuropeptide System Transmits Mechanosensory Signals Triggering Sensitization and Arousal in *C. elegans*", *Neuron*, 2018, 99 (6), 1233-1246. e6, [10.1016/j.neuron.2018.08.003](https://doi.org/10.1016/j.neuron.2018.08.003)

7. **Y. Cho**, D. N. Oakland, S. A. Lee, W. R. Schafer, and H. Lu, "On-chip functional neuroimaging to mechanical stimulation in *Caenorhabditis elegans* larvae for studying functional role of neural circuits" *Lab on a chip,* 2018, 18, 601-609, [10.1039/C7LC01201B](https://doi.org/10.1039/C7LC01201B)

6. T. Rouse, G. Aubry, **Y. Cho**, M. Zimmer and H. Lu, "A programmable platform for sub-second multichemical dynamic stimulation and neuronal functional imaging in *C. elegans*" *Lab on a chip*, 2018, 18, 505-513, [10.1039/C7LC01116D](https://doi.org/10.1039/C7LC01116D)

5. **Y. Cho***, D. A. Porto*, H. Hwang, L. J. Grundy, W. R. Schafer, and H. Lu, "Automated and controlled mechanical stimulation and functional imaging in vivo in *C. elegans*", *Lab on a chip*, 2017, 17, 2609-2618, [10.1039/C7LC00465F](https://doi.org/10.1039/C7LC00465F)

4. **Y. Cho**, C. Zhao, and H. Lu. "Trends in High-throughput and Functional Neuroimaging in *C. elegans*", *Wiley Interdisciplinary Reviews - Systems Biology and Medicine*, 2017, e01376, [10.1002/wsbm.1376](https://doi.org/10.1002/wsbm.1376)

3. D. A. F. de Abreu, A. Caballero, P. Fardel, N. Stroustrup, Z. Chen, K. Lee, W. D. Keyes, Z. M. Nash, I. F. Lo´pez-Moyado, F. Vaggi, A. Cornils, M. Regenass, A. Neagu, I. Ostojic, C. Liu, **Y. Cho**, D. Sifoglu, Y. Shen, W. Fontana, H. Lu, A. Csikasz-Nagy, C. T. Murphy, A. Antebi, E. Blanc, J. Apfeld, Y. Zhang, J. Alcedo, Q. Ch'ng, "An Insulin-to-Insulin Regulatory Network Orchestrates Phenotypic Specificity in Development and Physiology", *PLOS Genetics*, 2014, 10(3), e1004225, [10.1371/journal.pgen.1004225](https://doi.org/10.1371/journal.pgen.1004225)

2.   J. Nam, W. La, S. Hwang, Y. S. Ha, N. Park, N. Won, S. Jung, S. H. Bhang, Y. Ma, **Y. Cho**, M. Jin, J. Han, J. Shin, E. KyungWang, S. G. Kim, S. Cho, J. Yoo, B. Kim, S. Kim, "pH-Responsive Assembly of Gold Nanoparticles and "Spatiotemporally Concerted" Drug Release for Synergistic Cancer Therapy", *ACS Nano*, 2013, 7 (4), 3388–3402, 10.1021/nn400223a

1.   H. S. Yang*, W. La*, **Y. Cho**, W. Shin, G. Yeo, B. Kim, "Comparison between heparin-conjugated fibrin and collagen sponge as bone morphogenetic protein-2 carrier for bone regeneration", *Experimental and Molecular Medicine*, 2012, 44, 350-355, DOI: 10.3858/emm.2012.44.5.039

B. Refereed Conference Publications

6.   S. A. Lee, **Y. Cho**, H. Lu, "Microfluidic platform for the study of multimodal sensory integration based on in vivo Functional Imaging of Caenorhabditis elegans", 25th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2021

5.   K. Le, **Y. Cho,** M. Zhan, D. Patel, H. Lu, "Automated microfluidic-based platform for longitudinal healthspan tracking of Caenorhabditis elegans", 22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2018

4.   **Y. Cho**, S. A. Lee, D. N. Oakland, and H. Lu "Microfluidic-based imaging platforms for mechanosensation in C. elegans larvae", 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2017

3.   **Y. Cho**, D. A. Porto, H. Hwang, L. J. Grundy, W. R. Schafer, and H. Lu "Microfluidics for neuronal functional imaging of multi-modal stimulation.", *C. elegans* Neuro meeting, 2016

2.   **Y. Cho**, H. Hwang, D. Porto, and H. Lu, "Microfluidic systems for high-throughput functional imaging of mechanosensing neurons in Caenorhabditis elegans", 19th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2015

1.   M. Zhan, **Y. Cho**, and Hang Lu, "Automatic Long-term microfluidic platform for individual tracking of healthspan and longevity of Caenorhabditis elegans", 19th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), 2015

C. Articles under Review / in Preparation as First / Corresponding Author

5.   **Y. Cho,** "Single-molecule imaging techniques and analysis tools" (Corresponding author, an invited review paper from *Sensors*)

4.   **Y. Cho**, S. Bae et al., "Sensitivity enhanced nanosheet biosensors for long-term measurements" (First and Corresponding author)

3.   **Y. Cho**, L. Peshkin, M. W. Kirschner et al., "Multiple small object tracking using tracking simulation training"

2.   **Y. Cho**, L. Peshkin, M. W. Kirschner et al., "Effect of Early-life rapamycin treatment on the healthspan of *Daphnia*"

1.   S. Lee*, **Y. Cho***, Hang Lu et al., "Dynamical temperature control in microfluidics for in vivo neuronal imaging in cold-sensing in C. elegans", *Submitted*

PRESENTATIONS

A. Invited Talks

2.   "An engineering approach to Systems biology - microfluidics, automation, and machine learning", Trends in Biological Research, UNIST, South Korea, October 2022, (Online seminar).

1.   "An engineering approach to Systems biology - microfluidics, automation, and machine learning", Seminar for Energy and Environmental Process, Sogang University, South Korea, December 2020, (Online seminar).

B. Selected Oral Presentations

13.   "Intelligent High-Throughput Intervention Testing Platform in *Daphnia"* 2022 AIChE, Phoenix AZ, 2022

12.   "Quantitative Strategy for Anti-Aging Drug Discovery using an Intelligent High-Throughput Intervention Testing Platform" 2022 BMES, San Antonio TX, 2022

11.   "Intelligent High-Throughput Intervention Testing Platform in a New Model System" SEED 2022, Arlington VA, August. 2022 (*Outstanding Presentation Awards*)

10.   "An Intelligent High-Throughput Intervention Testing Platform in Daphnia" 2022 KASBP eSymposium Jun 2022, (Online Symposium)

9.   "Microfluidic-based imaging platforms for mechanosensation in *C. elegans* larvae", 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences, Savannah, GA, 2017.

8.   "Microfluidics for neuronal functional imaging of multi-modal stimulation.", *C. elegans* Neuro meeting, Nagoya, Japan, 2016

7.   "Microfluidic Systems for High-Throughput Functional Imaging of Mechanosensing Neurons in *C. elegans*.", Neuro Student Seminar, Georgia Tech, Atlanta, 2016

6.   "Microfluidic Systems for High-Throughput Functional Imaging of Mechanosensing Neurons in *C. elegans*.", Worm Club, Emory University, Atlanta, 2016

5.   "Microfluidic Systems for High-Throughput Functional Imaging of Mechanosensing Neurons in *C. elegans*.", AIChE Annual Meeting, Salt Lake City, 2015.

4.   "Automatic long-term individual tracking microfluidic platform for healthspan and longevity in *C. elegans.",* AIChE Annual Meeting, Salt Lake City, 2015.

3.   "Can you use a microfluidic system for long-term observation of behavior?", International *C. elegans* meeting, Los Angeles, 2015

2.   "Microfluidic Systems for High-Throughput Functional Imaging of Mechanosensing Neurons in *C. elegans*." MicroTAS, South Korea, 2015 *(CBMS Student/Young Researcher Grant)*

1.   "Automated Microfluidic Platforms for Individually Cultured Nematodes and Neuronal Activity Measurement." AIChE Annual Meeting, Atlanta, 2014