Mei Zhen, PhD

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Education

Post-doctoral Fellow in Neuroscience; Mentor: Dr. Yishi Jin, UC Santa Cruz, HHMI	1996-2000
PhD in Biochemistry; Mentor: Dr. Peter Candido, University of British Columbia	1990-1995
BSc in Biochemistry, Wuhan University, China	1986-1990

Appointments

Co-Director, the Nanoscale Biomedical Imaging Facility, Sinai Health System and the Hospital for Sick Children	2018-
Professor of Molecular Genetics, University of Toronto	2012-
Senior Scientist, the Lunenfeld-Tanenbaum Research Institute	2006-
Associate Professor of Molecular Genetics, Physiology, University of Toronto	2006-2012
Scientist, the Lunenfeld-Tanenbaum Research Institute	2001-2006
Assistant Professor of Molecular Genetics, University of Toronto	2001-2006

Distinctions

Visiting Scholar, the EMBL	2024
Fellow, the Canadian Institute for Advanced Research	2023-2028
Canada Research Chair (Tier 1) in Neural Circuit Development and Function	2018-2025
Fellow, The Radcliffe Institute for Advanced Study, Harvard University	2013-2014
Lawrence and Judy Tanenbaum Research Chair in Neuroscience, MSH	2008-2011
Fellow, Mobility Program in Science and Technology, France	2008
Early Researcher Award, the Ontario Ministry of Research and Innovation	2007-2011
EJLB Scholar, the EJLB Foundation	2007-2010
Canada Research Chair (Tier 2) in Neuroscience	2001-2011
Long-term Post-doctoral Fellowship, the Human Frontier Science Foundation	1996-1998
University Graduate Fellowship, the University of British Columbia	1991-1995

Service

Scientific Advisory Board Member, Channeling Hope Foundation	2023-
Reviewing Editor, eNeuron	2023-2026
Faculty Appointments Advisory Committee, Temerty Faculty of Medicine, University of Toronto	2023-2026
Graduate Advisory Team, Department of Molecular Genetics, University of Toronto	2019
Graduate Admissions Committee, Department of Molecular Genetics, University of Toronto	2018
Advisory Board Member, WormBase	2018

Steering Committee, Research Coordination Network on Comparative Neurobiology, NSF	2017-
Review Committee, Canadian Gairdner Foundation	2015-2018
Review Committee, Radcliffe Institute, Harvard University	2014
Graduate Admissions Committee, Department of Physiology, University of Toronto	2014-2016
Graduate Awards Committee, Department of Physiology, University of Toronto	2014-2016
Graduate Awards Committee, Department of Molecular Genetics, University of Toronto	2010-2017
Steering Committee, Graduate Program in Developmental Biology, University of Toronto	2006-2012
Reviewer for Journals	2001-
Reviewer for Grant Panels	2001-
Supervisory Committee for thesis studies, University of Toronto (BSc, MSc, PhD)	2001-

International Conferences, Courses, Workshops

Workshop lectures, Brain Initiative, NIH	2020-2022
Course Coordinator, Neural Systems & Behaviour, MBL	2018-2019
Organizing Committee, International *C. elegans* Meetings and Workshops	2008-2017
Session Chair, American Society for Cell Biology	2013
Program Advisor, 2012 Gairdner Award Neural Symposium	2012
Course Coordinator, *C. elegans* course, Cold Spring Harbor Laboratory	2008-2010

Teaching

International

C. elegans, from genome editing to imaging, EMBL, Heidelberg, Germany	2022
Neural Systems & Behavior, Marine Biological Laboratory, Woods Hole, MA, USA	2019
Developmental Neurobiology, Okinawa Institute of Science and Technology, Japan	2017-2019
The *C. elegans* Course, Cold Spring Harbor Laboratory, Cold Spring, NY, USA	2008-2010

University of Toronto

JDB1025H: Developmental Biology (Collaborative Program in Developmental Biology)
JYG1555H: Cellular and Molecular Neurobiology (Physiology)
MMG1012H: Advanced Imaging: Techniques and Application in Biological Systems (Molecular Genetics)
MMG1012H: Developmental Neurobiology (Molecular Genetics)
MGY480Y: Undergraduate Research Thesis Course (Fourth Year)
MGY399Y: Undergraduate Research Opportunity Program (Third Year)
MGY299Y: Undergraduate Research Opportunity Program (Second Year)

Publications *: correspondence

Connectomics

Pavarino EC, Yang E, Dhanyasi N, Wang M, Bidel F, Lu X, Yang F, Mukesh BR, Drescher B, Hochner B, Katz PS, Zhen M, Lichtman JW, Meriovitch Y. (2023). **mEMbrain: an interactive deep learning MATLAB tool for connectomic segmentation on commodity desktops**. *Frontiers in Neural Circuits* 17:952921. PMID: 37396399

Mulcahy B*, Witvliet D, Mitchell JM, Schalek RL, Berger D, Wu Y, Holmyard D, Lu Y, Ahamed T, Samuel ADT, Chisholm AD, Lichtman JW, Zhen M.* (2022). **Post-embryonic maturation of the *C. elegans* motor circuit**. *Current Biology* 32(21): 4645-4659. PMID: 36283410

Witvliet D*, Mulcahy B, Mitchell JM, Meirovitch Y, Berger DR, Wu Y, Liu Y, Koh WR, Parvathala R, Holmyard D, Schalek RL, Shavit N, Chisholm AD, Lichtman JW*, Samuel ADT*, Zhen M*. (2021). **Connectomes across development reveal principles of brain maturation in *C. elegans.*** *Nature* 596: 257-261. PMID 34349261.

Britz S, Markert SM, Witvliet D, Steyer AM, Tröger S, Mulcahy B, Kollmannsberger P, Schwab Y, Zhen M, Stigloher C. (2021). **Structural analysis of the *C. elegans* dauer larval anterior sensilla by Focused Ion Beam-Scanning Electron Microscopy**. *Frontiers in Neuroanatomy* 15:732520. PMID: 34819841

Cuentas-Condori A, Mulcahy B, He S, Palumbos S, Zhen M, Miller DM III. (2019). ***C. elegans* neurons have functional dendritic spines** *eLife* 8: e47918. PMID: 31584430.

Mulcahy B*, Witvliet D, Holmyard D, Mitchell J, Chisholm A, Samuel ADT*, Zhen M*. (2018). **A Pipeline for Volume Electron Microscopy of the *Caenorhabditis elegans* Nervous System.** *Frontiers in Neural Circuits* 12:94. PMID: 30949033.

Kaltdorf KV, Theiss M, Markert SM, Zhen M, Dandekar T, Stigloher C, Kollmannsberger P. (2018). **Automated classification of synaptic vesicles in electron tomograms of *C. elegans* using machine learning**. *PLoS One Computational Biology* 13(10):e0205348. PMID: 30296290.

Markert SM, Britz S, Proppert S, Lang M, Witvliet D, Mulcahy B, Sauer M, Zhen M, Bessereau JL, Stigloher C. (2016). **Filling the gap: adding super-resolution to array tomography for correlated ultrastructural and molecular identification of electrical synapses at the *C. elegans* connectome**. *Neurophotonics* 3(4): 041802. PMID: 27175373.

Circuits

Meng J, Ahamed T*, Yu B, Hung W, El Mouridi S, Leclercq-Blondel A, Gendrel M, Wang Z, Chen L, Wen Q, Boulin T, Gao S*, Zhen M*. (2024). **A tonically active neuron continuously drives mutually exclusive motor states at different timescales**. *Science Advances* 10(15): eadk0002. PMID: 38598630

Bach M, Bergs A, Mulcahy B, Zhen M, Gottschalk A. (2023). **Coordinated electrical and chemical signaling between two neurons orchestrates switching of motor states**. Under Review, *bioRxiv* 2023.01.04.522780

Li Y, Chitturi J, Yu B, Zhang Y, Wu J, Ti P, Hung W, Zhen M, Gao S (2023). **The glutamate-gating ubiquitin ligase UBR-1 affects the synaptic strength between the GABAergic and glutamatergic signaling.** *EMBO Reports* 24(11), e57014. PMID: 37811674

Lin A*, Qin S, Casademunt H, Wu M, Hung W, Cain G, Tan NZ, Valenzuela R, Lesanpezeshki L, Venkatachalam V, Pehlevan C*, Zhen M,* Samuel ADT.* (2023). **Functional imaging and quantification of multi-neuronal olfactory responses in *C. elegans***. *Science Advances* 9, eade1249. PMID: 36857454

Lu Y, Ahamed T, Mulcahy B, Witvliet D, Guan SA, Hung W, Meng J, Wen Q, Samuel ADT, Zhen M.* (2022). **Extrasynaptic signaling enables an asymmetric juvenile motor circuit to produce a symmetric gait.** *Current Biology* 32: 4631–4644. PMID: 36182701

Susoy V, Hung W, Witvliet D, Whitener JE, Wu M, Graham BJ, Zhen M, Venkatachalam V, Samuel ADT. (2021). **Natural sensory context drives diverse brain-wide activity during *C. elegans* mating.** *Cell* 184(20): 5122-5137.e17. PMID: 34534446

Ji N, Venkatachalam V, Rodgers H, Hung W, Kawano T, Clark C, Lim M, Alkema MJ*, Zhen M*, Samuel ADT*. (2021). **Corollary discharge promotes a sustained motor state in a neural circuit for navigation.** *eLife* 2021;10:e68848. PMID: 33880993

Chen L, Liu Y, Su P, Hung W, Li H, Wang Y, Yue Z, Ge M, Wu Z, Zhang Y, Fei P, Chen L, Tao L, Mao H, Zhen M, Gao S. (2021). **Escape Steering by Cholecystokinin Peptidergic Signaling.** *Cell Reports* 38(6): 110330. PMID: 35139370.

Yuan W, Zhang X, Qi X, Hung W, Florman J, Huo J, Xu T, Xie Y, Alkema M, Zhen M, Wen Q. (2020). **Flexible motor sequence generation during stereotyped escape responses.** eLife 2020;9:e56942/ PMID: 32501216. PMCID: PMC7338056.

Ao Y, Zeng K, Yu B, Miao Y, Hung W, Zhen M, Yang X, Zhang Y, Gao S. (2019). **An Upconversion Nanoparticle Enables Near Infrared-Optogenetic Manipulation of the *C. elegans* Motor Circuit.** *ACS Nano* 13(3): 3373-3386. PMID: 30681836.

Wen Q*, Gao S*, Zhen M*. (2018). ***C. elegans* excitatory ventral cord motor neurons derive rhythm for body undulation**. *Phil. Trans. R. Soc. B*. 373(1758). PMID: 30201835.

Xu T, Huo J, Shao S, Po M, Kawano T, Lu Y, Qu M, Zhen M, Wen Q. (2018). **A descending pathway through electrical coupling facilitates undulatory wave propagation in *C. elegans***. *PNAS* 115(19): E4493-E4502. PMID: 29686107.

Gao S*, Guan S, Fouad AD, Meng J, Huang Y, Li Y, Alcaire S, Hung W, Kawano T, Lu Y, Qi YB, Jin Y, Alkema M, Fang-Yen C, Zhen M*. (2018). **Excitatory Motor Neurons are Local Oscillators for Reverse Locomotion.** eLife 6:e299915. PMID: 29360035.

Lim MA*, Chitturi J, Laskova V, Meng, J, Findeis D, Wiekenbert A, Mulcahy B, Luo L, Li Y, Lu Y, Hung W, Qu Y, Ho C, Holmyard D, McWhirter R, Ni J, Samuel ADT, Miller DM, Schnabel R, Calarco JA, Zhen M*. (2016). **Neuroendocrine modulation sustains the *C. elegans* forward motor state.** eLife. e19887, 2016. PMID: 27855782. PMCID: PMC5120884.

Venkatachalam V*, Ji N, Wang X, Clark C, Mitchell JK, Klein M, Tabone CJ, Florman J, Ji H, Greenwood J, Chisholm AD, Srinivasan J, Alkema M*, Zhen M*, Samuel ADT*. (2016). **Pan-neuronal imaging in roaming *Caenorhabditis elegans*.** *PNAS* 113(8): E1082-8. PMID: 26711989. PMCID: PMC4776525.

Ardeshiri R, Mulcahy B, Zhen M, Rezai P. (2016). **A Hybrid Microfluidic Device for On-demand Orientation and Multidirectional Imaging of *C. elegans* Organs and Neurons**. *Biomicrofluidics* 10(6): 064111. eCollection 2016. PMID: 27990213. PMCID: PMC5135714.

Zhen M* and Samuel ADT.* (2015). ***C. elegans* locomotion: small circuits, complex functions**. *Curr Opin Neurobiol.* 33:117-126. PMID: 25845627.

Wen Q, Po MD, Hulme E, Chen S, Liu X, Kowk SW, Gershow M, Leifer AM, Butler V, Fang-Yen C, Kawano T, Schafer WR, Whitesides G, Wyart M, Chklovskii DB, Zhen M, Samuel, ADT. (2012).

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Kawano T, Po MD, Gao S, Leung G, Ryu WS, Zhen M*. (2011). **An Imbalancing Act: Gap Junctions Reduce the Backward Motor Circuit Activity to Bias *C. elegans* for Forward Locomotion**. *Neuron* 72(4): 572-586. PMID: 22099460.

Gao S and Zhen M.* (2011). **Action potentials drive body wall muscle contractions in *Caenorhabditis elegans***. *PNAS* 108(6): 2557-2562. PMID: 21248227.

Liewald JF, Brauner M, Stephens GJ, Bouhours M, Schultheis C, Zhen M, Gottschalk A. (2008). **Optogenetic analysis of synaptic function**. *Nature Methods* 5(10): 895-902. PMID: 18794862.

Neuronal Excitability

Yue Z, Li, Y, Yu, B, Xu, Y, Chen, L, Chitturi, J, Meng, J, Hung, W, Tian, Y, El Mouridi, S, Zhang, C, Zhen, M, Boulin, T, Gao S. (2024) **A Leak K^+ Channel TWK-40 Regulates Rhythmic Motor Program in *C. elegans.*** *(in revision)*.

Gao S*, Xie L, Kawano T, Po MD, Pirri J, Guan S, Alkema M, Zhen M*. (2015). **The NCA sodium leak channel is required for persistent motor circuit activity that sustains locomotion**. *Nature Communications* 6 (6323). PMID: 25716181.

Qi Y, Po MD, Mac P, Kawano T, Jorgensen EM, Zhen M, Jin Y. (2013). **Hyperactivation of B-type motor neurons results in aberrant synchrony of the *C. elegans* motor circuit**. *Journal of Neuroscience* 33(12): 5319-5325. PMID: 23516296.

Xie L, Gao S, Alcaire SM, Aoyagi K, Wang Y, Griffin JK, Stagljar I, Nagamatsu S, Zhen M*. (2013). **NLF-1 Delivers a Sodium Leak Channel to Regulate Neuronal Excitability and Modulate Rhythmic Locomotion.** *Neuron* 77(6): 1069-1082. PMID: 23522043.

Bouhours M, Po MD, Gao S, Hung W, Li H, Georgiou J, Roder JC, Zhen M*. (2011). **A Co-operative Regulation of Neuronal Excitability by UNC-7 Innexin and NCA/NALCN Leak Channel.** *Molecular Brain* 4:16. PMID: 21489288.

Sancar F, Touroutine D, Gao S, Oh HJ, Gendrel M, Bessereau JL, Kim H, Zhen M, Richmond JE. (2011). **The dystrophin-associated protein complex maintains muscle excitability by regulating Ca(2+)-dependent K(+) (BK) channel localization**. *Journal of Biological Chemistry* 286(38): 33501-10. PMID: 21795674.

Yeh E, Ng S, Zhang M, Bouhours M, Wang Y, Wang M, Hung W, Aoyagi K, Melnik-Martine, K, Li M, Liu F, Schafer WR, Zhen M*. (2008). **A putative cation channel, NCA-1, and a novel protein, UNC-80, transmit neuronal activity in *C. elegans*.** *PLoS Biology* 6(3) e55. PMID: 18336069.

Neural Development and Synaptic Transmission

Das A, Franco J, Mulcahy B, Wang L, Chapman D, Jaisinghani C, Pruitt B, Zhen M, Goodman M (2024) **Conserved basal lamina proteins, laminin and nidogen, are repurposed to organize mechanosensory complexes responsible for touch sensation.** *Current Biology (Accepted).*

Cuentas-Condori A, Chen S, Gallick K, Krout M, Tipps J, Flautt L, Mulcahy B, Zhen M, Richmond J, Miller DM.III (2023). **The Epithelial Na+ Channel UNC-8 promotes an endocytic mechanism that recycles presynaptic components from old to new boutons in remodeling neurons**. *Cell Reports* 42(11):113327. PMID: 37906594

Wu S, Li Y, Roy C, Wang Y, Mulcahy B, William Li, Calarco J, Hung W*, Zhen M*. (2023). **Two Muscle-Specific and Direct Transcriptional Targets of DAF-16/FOXO Activated by Reduced Insulin/IGF-1 Signaling**. Submitted, *bioRxiv* 2022.12.09.519372

Tien C, Yu B, Huang M, Stepien K, Sugita K, Xie X, Han L, Monnier P, Zhen M, Rizo J, Gao S, Sugita S. (2020). **Open syntaxin overcomes synaptic transmission defects in diverse *C. elegans* exocytosis mutants**. *Nature Communications* 11(5516). PMID: 33139696.

Huang YC, Pirri JK, Rayes D, Gao S, Mulcahy B, Grant J, Saheki Y, Francis MM, Zhen M, Alkema AJ. (2020). **Gain-of-function mutations in the UNC-2/CaV2α channel lead to hyperactivity and excitation-dominant synaptic transmission in *Caenorhabditis elegans*** eLife 2019; 8:e45905. PMID: 31364988.

Park S, Bin NR, Yu B, et al. Feng ZP, Monnier P, Sun HS, Zhen M, Gao S, Rizo J, Sugita S. (2017). **UNC-18 and Tomosyn antagonistically control synaptic vesicle priming downstream of UNC-13 in *C. elegans***. *J Neurosci*. 37(36): 8797-8815. PMID: 28821673.

Opperman KJ, Mulcahy B, Giles AC, Risley M, Birnbaum RL, Tulgren ED, Dawson-Scully K, Zhen M, Grill B. (2017). **The HECT family ubiquitin ligase EEL-1 regulates neuronal function and development.** *Cell Reports* 19: 822-835. PMID: 28445732.

Meng J, Ma X, Tao H, JPin X, Witvliet D, Zhu M, Dong M, Zhen M, Jin Y, Qi YB. (2017). **Myrf ER-Bound Transcription Factors Drive *C. elegans* Synaptic Plasticity via Cleavage-Dependent Nuclear Translocation**. *Developmental Cell* 41: 180-194. PMID: 28441531.

Park S, Bin NR, Michael Rajah M, Kim B, Chou TC, Kang SY, Sugita K, Parsaud L, Smith M, Monnier PP, Ikura M, Zhen M, Sugita S. (2015). **Conformational states of syntaxin-1 govern the necessity of N-peptide binding in exocytosis of PC12 cells and *Caenorhabditis elegans***. *Mol Biol Cell* 27(4): 669-85. PMID: 26700321. PMCID: PMC4750926.

Maro GS, Gao S, Olechwier AM, Hung WL, Liu M, Özkan E, Zhen M,* Shen K* (2015). **MADD-4/Punctin and Neurexin Organize the *C. elegans* GABAergic Postsynapses through Neuroligin**. *Neuron* 86: 1420-1432. PMID: 26028574.

Wang J, Chitturi, J, Ge Q, Laskova V, Li X, Ding M, Zhen M,* Huang X*. (2015). **The *C. elegans* COE Transcription Factor UNC-3 Activates Lineage-Specific Apoptosis and Affects Neurite Growth**. *Development* 142(8): 1447-57. PMID: 25790851.

Norris AD, Gao S, Norris ML, Ray D, Ramani AK, Fraser AG, Morris Q, Hughes TR, Zhen M*, Calarco, JA*. (2014). **A Pair of RNA-Binding Proteins Controls Networks of Splicing Events Contributing to Specialization of Neural Cell Types**. *Molecular Cell* 54(6): 946-59. PMID: 24910101.

Hung WL, Hwang, C, Gao S, Liao EH, Chitturi J, Wang Y, Li H, Stigloher C, Bessereau JL, Zhen M.* (2013). **Attenuation of Insulin Signaling Contributes to FSN-1-mediated Regulation of Synapse Development**. *EMBO J*. 32(12): 1745-1760. PMID: 23665919.

Najarro EH, Wong L, Zhen M, Carpio EP, Goncharov A, Garriga G, Lundquist EA, Jin Y, Ackley BD. (2012). ***C. elegans*** **Flamingo Cadherin FMI-1 Regulates GABAergic Neuronal Development.** *Journal of Neuroscience* 32(12): 4196-211. PMID: 22442082.

Po MD*, Calarco JA*, Zhen M*. (2012). **Releasing the inner inhibition for axon regeneration**. *Neuron* 73(2): 207-9. PMID: 22284174.

Stigloher C, Zhan H, Zhen M, Richmond J, Bessereau JL. (2011). **The presynaptic dense projection of the *Caenorhabiditis elegans* cholinergic neuromuscular junction localizes synaptic vesicles at the active zone through SYD-2/liprin and UNC-10/RIM-dependent interactions.** *Journal of Neuroscience* 31(12): 4388-4396. PMID: 21430140.

Kim JS*, Hung W, Zhen M*. (2010). **The Long and the Short of SAD-1 Kinase**. *Communicative and Integrative Biology* 3(3): 1-5. PMID: 20714407.

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Kim JSM, Hung W, Narbonne P, Roy R, Zhen M*. (2010). ***C. elegans*** **STRADα and SAD Cooperatively Regulate Neuronal Polarity and Synaptic Organization**. *Development* 137(1): 93-102. PMID: 20023164.

Yeh E, Kawano T, Ng S, Fetter R, Hung W, Wang Y, Zhen M*. (2009). ***C. elegans*** **Innexins Regulate Active Zone Differentiation**. *Journal of Neuroscience* 29(16): 5207-17. PMID: 19386917.

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Kim JS, Lilley BN, Zhang C, Shokat KM, Sanes JR, Zhen M*. (2008). **A chemical-genetic strategy reveals distinct temporal requirements for SAD-1 kinase in neuronal polarization and synapse formation**. *Neural Development* 3(1): 23. PMID: 18808695.

Li C, Inglis PN, Leitch CC, Efimenko E, Zaghoul NA, Mok CA, Davis EE, Bialas N, Healey MP, Heon E, Zhen M, Swoboda P, Katsanis N, Leroux MR. (2008). **An Essential role for DYF-11/MIP-T3 in assembling functional intraflagellar transport complexes.** *PLoS Genetics* 4(3): e1000044. PMID: 18369462.

Wang W, Bouhours M, Gracheva EO, Liao EH, Xu K, Sengar A, Xin X, Roder J, Boone C, Richmond JE, Zhen M and Egan SE**.** (2008). **ITSN-1 Controls Vesicle Recycling at the Neuromuscular Junction and Functions in Parallel with DAB-1.** *Traffic* 9(5): 742–54. PMID: 18298590.

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Hung W, Hwang C, Po MD, Zhen M*. (2007). **Neuronal polarity is regulated by a direct interaction between a scaffolding protein, Neurabin, and a presynaptic SAD-1 kinase in *Caenorhabditis elegans***. *Development* 134(2): 237-249. PMID: 17151015.

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assembly of presynaptic components in defined *C. elegans* synapses. *Nature Neuroscience* 9(12): 1488-1498. PMID: 17115039.

Wang Y, Gracheva EO, Richmond J, Kawano T, Couto JM, Calarco JA, Vijayaratnam V, Jin Y, Zhen M*. (2006). **The C2H2 zinc-finger protein SYD-9 is a putative post-transcriptional regulator for synaptic transmission**. *PNAS* 103(27): 10450-10455. PMID: 16803962.

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Liao EH, Hung W, Abrams B, Zhen M*. (2004). **An SCF-like ubiquitin ligase complex that controls presynaptic differentiation**. *Nature* 430 (6997): 345-50. PMID: 15208641.

Zhen M.* and Jin. Y.* (2004). **Presynaptic terminal differentiation: transport and assembly**. *Current Opinion in Neurobiology* 14(3): 280-7. PMID: 15194107.

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Methods

Mladjenovic, SM, Chandok, IS, Darbandi, A, Stordy, B, Nguyen, LUN, Zhen, M, Chan W (2024). **3D electron microscopy for nanoparticle tumor analysis**. *(in revision)*.

Pan P, Zoberman M, Premachandran S, Bhatnagar S, Pilaka-Akella PP, Sun W, Zhang P, Li C, Martin C, Hung W, Zuo R, Pe K, Qin Z, Wang S, Li A, Zhen M, Saltzman AL, Calarco JA, Liu X (2024) **Robotic microinjection enables large-scale transgenic studies of *Caenorhabditis elegans* *Nature Communications*** *(in revision)*

Dong XK, Kheiri K, Lu YN, Xu ZY, Zhen M, Liu XY. (2021). **Towards a live soft microrobot: optogenetic locomotion control of *Caenorhabditis elegans***. *Science Robotics* 6(55): eabe3950. PMID: 34193562.

Wang Z, Zhu L, Zhang H, Li G, Li C, Yi L,Yang Y, Ding Y, Zhen M, Gao S, Hsiai T, Fei P. (2021). **Real-time volumetric reconstruction of biological dynamics with light-field microscopy and deep learning**. *Nature Methods*. 18: 551-556. PMID: 33574612.

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Luyben TT, Rai J, Li H, Georgiou J, Avila A, Zhen M, Collingridge GL, Tominaga T, Okamoto K. (2020). **Optogenetic manipulation of postsynaptic cAMP using a novel transgenic mouse line enables synaptic plasticity and enhanced depolarization in the hippocampal dentate gyrus**. *Frontiers in Neural Circuits* 14, No. 24. PMID: 32581725. PMCID: PMC7283606.

Diseases and Stem Cells

Varga BV, Faiz M, Yang H, Pivonkova H, Gao S, Khelifi G, Linderoth E, Zhen M, Hussein SM, Nagy A. (2022). **Signal requirement for cortical potential of transplantable human neuroepithelial stem cells.** *Nature Communications* 13(2844). PMID:35606347.

Markert SM, Skoruppa M, Yu B, Mulcahy, B, Zhen, M, Gao S, Sendtner M, and Stigloher C. (2020). **Overexpression of an ALS-associated FUS mutation in *C. elegans* disrupts NMJ morphology and leads to defective neuromuscular transmission**. *Biology Open* 9(12):bio055129. PMID: 33148607

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Trainees

Undergraduate students (a partial list)

2024-	Ethan Chan, Computer Science, University of Toronto
2024-	Mishaal Kandapath, Computer Science, University of Toronto
2023-	Yuna Lee, Neuroscience and Molecular Genetics and Microbiology, University of Toronto
2023	Xindi Tao, Computer Science and Neuroscience, University of Toronto
2023	Michael Cheng, Neuroscience and Physiology, University of Toronto
2023	Shuyu van Kerkwijk, Biophysics, University of British Columbia
2023	Congrong (Ruby) He, Cell and Molecular Biology, University of Toronto

2023-2024	Huayin Luo, Molecular Genetics, University of Toronto
2023-2024	Danish Islam, Computer Engineering, University of Toronto
2022-2023	Mohamed Ebsim, Biological Physics, University of Toronto
2022-2023	ChengYue Zhang, Bioinformatics and Computational Biology, University of Toronto
2022	Endri Mjeku, Applied Mathematics and Physics, University of Toronto
2022	Szymon Sobczak, Mathematics, University of Oxford
2022	Maximilian Hofmann, Physics, Goethe University
2022-2023	Ishaan Chandok, Mathematics & Physical Sciences, University of Toronto
2021-2023	Rory Gao, School of Engineering, University of Toronto
2020-2023	Mohammad Haddadnia, Molecular Genetics, University of Toronto
2020-2021	Randa Higazy, Cell and Systems Biology, University of Toronto
2019-2022	Shifei Wu, Molecular Genetics, University of Toronto (Current: PhD Candidate, U of T)
2019	Raymond Zhang, Molecular Genetics, University of Toronto
2019	Mindy Kim, Human Biology, Cornell University (Current: PhD Candidate, Harvard)
2018-2020	Alice Xu, Molecular Genetics, University of Toronto (Current: MSc Candidate, U of T)
2018-2020	Christine Wong, Laboratory Medicine and Pathobiology, University of Toronto
2018-2020	Yufang Flora Liu, Computer Science, U of T (Current: Software Engineer, Google)
2018-2019	Xinran Liu, Physiology, University of Toronto (Current: MD Candidate, U of T)
2018-2019	Zonelle Wijesinha, Cell and Systems Biology, U of T (Current: Manager, AdaptX2 Studios)
2018	Danqian Cao, Physics, Chinese University of Science and Technology (Current: PhD Candidate, University College London)
2018	Isis So, Molecular Genetics, University of Toronto (Current: Teaching Assistant, U of T)
2017-2019	Anson Sathaseevan, Molecular Genetics, U of T (Current: Queen's Medical School)
2017-2018	Amelia Srajer, Molecular Genetics, U of T (Current: Resident, Alberta Health Services)
2016-2020	Maggie Chang, Physiology, U of T (Current: PhD Candidate, McGill)
2016-2019	Soomin Maeng, Physiology, University of Toronto (Current: MSc, Engineer, U of T)
2016-2018	Claudia Arndt, Molecular Genetics, U of T (Current: Western Medical School)
2016-2018	Zitong (Jerry) Wang, Physiology, McMaster University (Current: PhD candidate, Caltech.)
2016-2017	Sabrina Chan, Molecular Genetics, University of Toronto (Current: PhD Candidate, U of T)
2015-2016	Sean Ihn, Molecular Genetics, University of Toronto
2015-2016	Richard Li, Molecular Genetics, University of Toronto
2015	Lebohand Radabe, Computer Science, University of Toronto
2015	Angie Qu, Physiology, University of Toronto (Current: Pharmacist, MSH)
2014-2017	Kevin Chan, Molecular Genetics, University of Toronto (Current: Medical School, U of T)
2014-2017	Wan Xian Koh, Physiology, University of Toronto (Current: Medical School, UBC)
2014-2015	Jenny Qian, Biomedical and Systems Engineering, UofT (Current: Queen's medical school)
2014-2015	Ryan Ramos, Neuroscience, McGill University (Current: U of T Medical School)
2012-2013	Peter Jin, Cell and Systems Biology, University of Toronto (Current: PhD, Columbia Uni.)
2010-2011	Sihui Asuka Guan, Pharmacology, University of Toronto (Current: Medical writer)
2010-2011	Cynthia Chan, Molecular Genetics, University of Toronto
2009-2010	Chris Wedeles, Molecular Genetics, University of Toronto (Current: Scientist, Genentech)
2009-2010	Fidelia Famiyeh, Cell and Systems Biology, University of Toronto

2009-2010	Ruixi Lou, Physiology, University of Toronto
2009-2010	Tetyana Pekar, Physiology, University of Toronto (Current: Pekar Tutoring)
2008-2010	Salvador Alcaire, Physiology, University of Toronto (Current: Dentist)
2007-2008	Nazanin Montazeri, Physiology, University of Toronto (Current: Physician)
2007-2010	Catherine Cheng, Molecular Genetics, University of Toronto
2006-2007	Sidrah Ahmad, Faculty of Arts and Science, University of Toronto
2006	Lok Sum Wong, CSB, University of Toronto (Current: Senior Scientist, Otomagnetics)
2005-2006	Michelle Li, Molecular Genetics, University of Toronto (Current: Founder, Clever Carbon)
2005	Maja Salihbegovic, Life Sciences, York University (Current: Physiotherapist)
2003-2005	Sharon Ng, Molecular Genetics, University of Toronto (Current: Scientist, GSK)
2003-2005	Christine Hwang, Institute of Medical Science, University of Toronto (Current: Physician)
2003	Robert Stevenson, Molecular Genetics, University of Toronto

Graduate students

01/2024-	Lucinda Zhu, Molecular Genetics (PhD candidate)
09/2023-	Congrong (Ruby) He, Cell and Molecular Biology (PhD candidate) Co-Supervised with John Calarco
09/2023-	Tian Du, Physiology (PhD Candidate), Co-Supervised with Lu-Yang Wang
09/2023-	Sruthy Ravivarma, Cell and Systems Biology (PhD Candidate)
01/2022-06/2024	Ze Nan (Tommy) Tang, Molecular Genetics (MSc Candidate)
01/2022-	Alanna Love, Molecular Genetics (MSc Candidate)
01/2021-01/2022	Jiacheng Chen, Cell and Systems Biology (PhD Candidate; Withdrawn)
09/2019-	Hongruo Zhang, Physiology (PhD Candidate)
09/2019-07/2022	Julian Moran, MSc, Molecular Genetics (Current: Bioinformatician, TCAG SickKids)
09/2019-09/2022	William Li, MSc, Molecular Genetics
09/2018-	Neeraja Ramakrishnan, Physiology (PhD Candidate)
09/2018-	Dan (Mona) Wang, Molecular Genetics (PhD Candidate)
09/2018-07/2021	Christine Rehaluk, MSc, Physiology
01/2018-	Jayant Rai, Molecular Genetics (PhD Candidate), Co-Supervised with Kenichi Okamoto
04/2016-12/2018	Min Wu, MSc, Molecular Genetics (Current: Bioinformatician, Geneseeq Technology Inc.)
01/2015-11/2021	Jun Meng, Physiology, PhD, Physiology (Current: Postdoctoral fellow, U of T)
01/2015-06/2020	Daniel Witvliet, PhD, Molecular Genetics (Current: Senior Data Scientist, Coursera)
09/2014-02/2020	Yangning Lu, PhD, Physiology (Current: PDF, MIT)
09/2012-03/2015	Sihui Asuka Guan, MSc, Physiology (Current: Scientific Writer, Overland Pharmaceuticals)
09/2011-04/2013	Tetyana Pekar, MSc, Physiology (Current: Tutor and Academic Editor, Pekar Tutoring)
09/2010-04/2013	Salvador Alcaire, MSc, Institute of Medical Science (Current: Dentist)
09/2010-04/2013	Valeriya Laskova, MSc, Physiology (Current: Interior Design Intern, IBI Group)
09/2009-04/2012	Louis Wei-Chun Barbier, MSc, Molecular Genetics (Current: Psychotherapist)
09/2008-05/2011	Nicholas Watkins, MSc, Molecular Genetics (Current: Genetic Diagnostic Specialist, MSH)
03/2008-04/2015	Jyothsna Devi Chitturi, PhD, Institute of Medical Science (Current: PDF, Rutgers Medical School)
09/2007-01/2010	Christine Hwang, MSc, Institute of Medical Science (Current: Physician)
09/2007-04/2013	Lin Xie, PhD, Institute of Medical Science (Current: Managing Partner, HEDA Ventures)

09/2006-08/2011	John Calarco, PhD, Molecular Genetics (Current: Associate Professor, CSB, U of T)
09/2006-03/2012	Calvin Mok, PhD, Medical Science (Current: Lecturer, CSB, U of T)
09/2006-01/2008	Joanne Kim, MSc, Molecular Genetics (Current: Sr. Health Consultant, Prov. of Ontario)
09/2006-01/2008	Sharon Ng, MSc, Molecular Genetics (Current: Scientist, GlaxoSmithKline)
01/2005-10/2011	Michelle Po, PhD, Molecular Genetics (Current: Senior Medical Writer, Highland Therapeutics)
09/2004-04/2006	Yu Liu, MSc, Physiology (Current: Programmer, Applied Systems Inc.)
09/2001-12/2007	Edward Liao, PhD, Molecular Genetics (Current: Director, Cell Biology, Kite Pharma)

Postdoctoral fellows

11/2021-06/2023	Jun Meng, PhD, University of Toronto (Current: PDF, MRC, University of Cambridge)
03/2021-03/2022	Leila Lesanpezeshki, PhD, Texas Tech University (Current: Data Scientist, Red Nucleus)
10/2019-09/2022	Tosif Ahamed, PhD, Okinawa Institute of Science and Technology (Current: Theory Fellow, HHMI/Janelia Research Campus)
01/2018-12/2018	Katarina Pankova, PhD, Ludwig Maximilian University (Current: Senior Product Manager, Singleron Biotechnologies)
09/2015-12/2016	Yan Li, PhD, University of Saskatchewan (Current: Senior Researcher, Zhen Lab)
03/2014-08/2016	Ni Ji, PhD, MIT (Co-Supervised with Aravi Samuel and Mark Alkema) (Current: Principal Investigator, Chinese Institute for Brain Research, China)
09/2013-05/2023	Ben Mulcahy, PhD, University of Southampton (Current: Staff Scientist, Zhen Lab)
09/2012-08/2015	Maria Lim, PhD, University of Pennsylvania (Current: Freelance Medical Writer)
10/2011-09/2013	Michelle Po, PhD, University of Toronto (Current: Senior Writer, Highland Therapeutics)
09/2008-10/2015	Shangbang Gao, PhD, Institute of Biophysics, Chinese Academy of Science (Current: Professor, Huazhong University of Science and Technology, China)
09/2005-04/2007	Kyota Aoyagi, PhD, University of Tokyo (Current: Professor, Kyorin University)
09/2005-03/2010	Magali Bouhours, PhD, University Pierre et Marie Curie (Current: Bilingual Information Specialist, Health Nexus Santé)
01/2004-04/2015	Tsutomo Murakami, PhD, Tokyo University, Co-supervised with Peter St. George-Hyslop (Current: Physician, Japan)
10/2003-12/2011	Taizo Kawano, PhD, Kobe University (Current: Associate Professor, Uni. of Tsukuba)
09/2001-12/2007	Edward Yeh, PhD, University of Toronto (Current: Lab Technologist, Children's Hospital of Eastern Ontario)

Advisees (University of Toronto unless otherwise noted)

01/2024-	Cameron Parro, Cell and System Biology (PhD candidate)
01/2024-	Cheng Xing, Molecular Genetics (PhD candidate)
09/2023-	James Li, Department of Physiology (PhD candidate)
09/2022-	Ernest Liang, PhD Candidate, Dept. of Cell and Systems Biology
01/2021-	Yin Chen Wan, PhD Candidate, Dept. of Molecular Genetics
05/2020-07/2022	Tanzim Hoque, MSc, Dept. of Cell and Systems Biology, UTM
12/2019-	Jade Chan, PhD Candidate, Dept. of Molecular Genetics
09/2019-09/2021	Alexander Kwan, MSc, Dept. of Molecular Genetics
08/2019-	Ronald Xie, PhD Candidate, Dept. of Molecular Genetics
09/2017-02/2023	Madison Gray, PhD, Dept. of Molecular Genetics

01/2017-05/2023	Maria Mercado, PhD, Dept. of Molecular Genetics
01/2017-04/2021	Albert Lin, PhD, Department of Physics, Harvard (Current: Fellow, Center for the Physics of Biological Function, Princeton)
01/2017-08/2019	Rachel Kim, MSc, Dept. of Molecular Genetics
09/2016-11/2022	Weifan Dong, PhD, Dept. of Molecular Genetics (Current: Postdoctoral Fellow, U of T)
09/2016-05/2022	Chidozie Ojobo, PhD, Molecular Genetics (Current: Chief Scientific Officer, Vitract)
09/2016-05/2020	Isabel Mackay-Clakett, MSc, Institute of Medical Science (Current: PhD Candidate, U of T)
09/2016-12/2019	Jarlath Rodgers, PhD, Cell and Systems Biology (Current: Gilder Gagnon Howe & Co)
09/2015-01/2022	Kelli Fenelon, PhD, Molecular Genetics
09/2015-07/2022	Julie Marocha, PhD, Molecular Genetics (Current: Projects Officer, Sunnybrook Res Ins.)
09/2015-06/2017	Megan Valencia, MSc, Molecular Genetics (Current: Research Scientist, U of T)
09/2014-11/2016	Dano Morrison, MSc, Physiology (Current: Research Engineer, Facebook Reality Labs)
09/2013-02/2019	Jelena Borovac, PhD, Molecular Genetics (Current: Medical Editor, Klick Health)
09/2013-06/2018	Alind Gupta, PhD, Molecular Genetics (Current: Research Principal, Data Science, Cytel.)
09/2012-06/2016	Daniel Merritt, MSc, Institute of Medical Science (Current: PDF, Columbia University)
09/2012-09/2017	Thomas Luyben, PhD, Molecular Genetics (Current: Associate, Sixty Degree Capital)
09/2009-01/2012	Evelyn Chea, MSc, Molecular Genetics
09/2009-11/2014	Sabiha Gardezi, PhD, Physiology
09/2007-01/2009	Kunjumon Vadakkan, MSc, Physiology
09/2006-01/2009	Michelle Li, MSc, Molecular Genetics
09/2005-01/2013	Lok Sum Wong, PhD, Cell and Systems Biology (Current: Senior Scientist, Otomagnetics)
09/2005-01/2012	Shu Ito, PhD, Molecular Genetics (Current: Senior Scientist, Otomagnetics Inc.)
09/2005-01/2012	Miriam Alexander, PhD, Molecular Genetics (Current: Physician)
09/2004-01/2006	Jennifer Chou, MSc, Physiology
09/2003-01/2005	Erik Law, MSc, Molecular Genetics
09/2001-01/2003	Sheila With, MSc, Molecular Genetics
09/2001-01/2003	Tilo Kunath, PhD, Molecular Genetics

Research Staff

2023-	Ben Mulcahy, PhD, Research Scientist
2023-	William Li, MSc, Research Assistant
2019-2023	Dylan Fong, BSc, Programmer
2019-2020	Maggie Chang, BSc, Technician (Current: PhD Candidate, McGill University)
2016-2018	Claudia Arndt, BSc, Technician (Current: Medical School, Western University)
2016-2023	Yan Li, PhD, Research Technician
2010-2013	Hang Li, PhD, Technician
2002-	Wesley Hung, PhD, Research Associate
2001-	Ying Wang, MD, Research Technician