

SUEWEI LIN, Ph.D.
林書葦

Assistant Research Fellow
Institute of Molecular Biology
Academia Sinica, Taipei, Taiwan

+886 (0) 2-27899315
sueweilin@gate.sinica.edu.tw
sueweilin.wixsite.com/linlab

Education

Ph.D. in Neuroscience University of Massachusetts Medical School, USA.	2006~2011
MSc in Genetics National Yang-Ming University, Taiwan.	2002~2004
BSc in Life Science National Yang-Ming University, Taiwan.	1998~2002

Career/Academic Positions

Assistant Research Fellow Institute of Molecular Biology Academia Sinica, Taiwan	2015~present
Adjunct Assistant Professor Department of Life Sciences and the Institute of Genome Sciences National Yang-Ming University, Taiwan	2018~present
Postdoctoral Fellow Supervised by Prof. Scott Waddell University of Oxford, UK	2012~2015
Research Associate Supervised by Dr. Tzumin Lee University of Massachusetts Medical School, USA	2005~2006

Awards and honors

Young Scholar Innovation Award (傑出人才基金會年輕學者創新獎) Foundation for The Advancement of Outstanding Scholarship	2019
Future Leader of The STS Forum, Japan	2018
MOST Talented Scholar Fellowship (科技部延攬特殊優秀人才補助)	2015~2018
Academia Sinica Investigator Fellowship (中研院新聘學術獎)	2015~2017
EMBO Advanced Fellowship	2015~2017
EPA Cephalosporin Junior Research Fellowship Linacre College, University of Oxford, UK	2014~2016

EMBO Long-Term Fellowship	2013~2015
James Martin Fellowship Oxford Martin School, University of Oxford	2012~2015
Dean's Award University of Massachusetts Medical School, USA	2008
Best Poster Award National Yang-Ming University Academic Poster Competition, Taiwan	2002 & 2004
President's Award National Yang-Ming University, Taiwan	2002 & 2003

Scientific Meeting Organizer/Co-organizer

Annual IMB Institutional Retreat	2020, SEP
5 th Asia-Pacific Drosophila Research Conference, Pune, India	2020, JAN
2 nd Asia-Pacific Drosophila Neurobiology Conference, Taipei, Taiwan	2019, JAN
Bi-monthly Taiwan Fly Meeting, Taipei, Taiwan	2018, AUG
1 st NPAS Symposium on Drosophila Neurobiology, Taipei, Taiwan	2017, JUL

Scientific Review

Consulting reviewer for grant proposals submitted to: Israel Science Foundation, Taiwan Ministry of Science and Technology.

Consulting reviewer for manuscripts submitted to: Neuron, PLoS Biology, Nature Communications, Brain Research, Current Opinion in Neurobiology, Journal of Biomedical Science, PLoS One, Frontiers In Behavioral Neuroscience, Journal of Neurogenetics.

Consulting reviewer for the 14th Tien Te Lee Biomedical Award (永信李天德醫藥科技獎傑出論文獎).

Scientific poster judge for: Department of Life Sciences and Institute of Genome Sciences at National Yang-Ming University (2017, 2018), Academia Sinica High-School Student Program (2016), Department of Life Sciences at National Taiwan University (2016), 35th Joint Annual Conference of Biomedical Science (2016).

Current and Past Grant Support

Current Grants

Agency: Ministry of Science and Technology 2018/8~2021/7
Grant ID: 107-2311-B-001-042-MY3
Title: Investigating the assembly of a memory circuit in *Drosophila*

Agency: Academia Sinica 2018/1~2020/12
Grant ID: AS-107-TP-L08-3 (Thematic Grant)
Title: Functions of pregnenolone derivatives on memory and neurodegeneration in *Drosophila*

Completed Grants

Agency: Academia Sinica 2018/1~2018/12
Grant ID: GBA-107-TP-115-06 (Seed Grant for Grand Challenges in Neuroscience Research)
Title: Making sense of time in *Drosophila*

Agency: Ministry of Science and Technology 2016/8~2019/7
Grant ID: 105-2628-B-001-005-MY3 (MOST Grant for Excellent Young Investigator)
Title: Neural Mechanisms of thirst-driven water seeking in *Drosophila*

Publications

Lin CH, **Lin S**. (preprint) Assembly of the *Drosophila* mushroom body circuit and its regulation by Semaphorin 1a. bioRxiv. doi.org/10.1101/835595.

Senapati B, Tsao CH, Juan YA, Chiu TH, Wu CL, Waddell S, **Lin S**. (2019, Dec) A neural mechanism for deprivation state-specific expression of relevant memories in *Drosophila*. *Nature Neurosci.* 22(12):2029-2039.

Lin S, Senapati B, Tsao CH. (2019 Mar) Neural basis of hunger-driven behavior in *Drosophila*. *Open Biology* 9(3):180259. (Invited Review)

Tsao CH, Chen CC, Lin CH, Yang HY, **Lin S**. (2018 Mar) *Drosophila* mushroom bodies integrate hunger and satiety signals to control innate food-seeking behavior. *eLife* 7:e35264.

Felsenberg J, Barnstedt O, Cognigni P, **Lin S**, Waddell S. (2017 Apr) Re-evaluation of learned information in *Drosophila*. *Nature* 544(7649):240-244.

Das G, **Lin S**, Waddell S. (2016 Feb) Remembering Components of Food in *Drosophila*. *Front Integr Neurosci.* 19;10:4.

Owald D, **Lin S**, Waddell S. (2015 Sep) Light, heat, action: neural control of fruit fly behaviour. *Philos Trans R Soc Lond B Biol Sci.* 379(1677): 20140211.

Huetteroth W, Perisse E, **Lin S**, Klappenback M, Burke C, Waddell S. (2015 Mar) Sweet taste and nutrient value subdivide rewarding dopaminergic neurons in *Drosophila*. *Curr Biol* 25(6):751-758.

Lin S, Oswald D, Chandra V, Talbot C, Huetteroth W, Waddell S. (2014 Nov) Neural correlates of water reward in thirsty *Drosophila*. *Nat Neurosci* 17:1536-1542.

Lin S, Marin EC, Yang CP, Kao CF, Apenteng BA, Huang Y, O'Connor MB, Truman JW, Lee T. (2013 Oct) Extremes of Lineage Plasticity in the *Drosophila* Brain. *Curr Biol* 23:1908-1913.

Perisse E, Yin Y, Lin AC, **Lin S**, Huetteroth W, Waddell S. (2013 Sep) Different Kenyon cell populations drive learned approach and avoidance in *Drosophila*. *Neuron* 79:945-956.

Lin S, Kao CF, Yu HH, Huang Y, Lee T. (2012 Nov) Lineage analysis of *Drosophila* lateral antennal lobe neurons reveals Notch-dependent binary temporal fate decisions. *PLoS Biol* 10(11): e1001425.

Lin S, Lee T. (2012 Jan) Generating neuronal diversity in the *Drosophila* central nervous system. *Dev Dyn* 241:57-68.

Lin S, Lai SL, Yu HH, Chihara T, Luo L, Lee T. (2010 Jan) Lineage-specific effects of Notch/Numb signaling in post-embryonic development of the *Drosophila* brain. *Development* 137:43-51.

Lin S, Huang Y, Lee T. (2009 Dec) Nuclear receptor Unfulfilled regulates axonal guidance and cell identity of *Drosophila* mushroom body neurons. *PLoS One* 4:e8392.

Chen YC, **Lin S**, Chen YK, Chiang CS, Liaw GJ. (2009 Mar) The torso signaling pathway modulates a dual transcriptional switch to regulate tailless expression. *Nucleic Acid Res* 37:1061-1072.

Lei S*, **Lin S***, Grinberg Y, Beck Y, Grozinger CM, Robinson GE, Lee T. (2007 Oct) Roles of *Drosophila* Kruppel-homolog 1 in neuronal morphogenesis. *Dev Neurobiol* 67:1614-1626. (*equal contribution)

Zhu S, **Lin S**, Kao CF, Awasaki T, Chiang AS, Lee T. (2006 Oct) Gradients of the *Drosophila* Chinmo BTB-zinc finger protein govern neuronal temporal identity. *Cell* 127:409-422.

Wang J, Lee CH, **Lin S**, Lee T. (2006 Apr) Steroid hormone-dependent transformation of polyhomeotic mutant neurons in the *Drosophila* brain. *Development* 133:1231-1240.

Attended Conferences

5 th Asia-Pacific <i>Drosophila</i> Research Conference (session chair) Pune, India	2020, JAN
CSHL Neurobiology of <i>Drosophila</i> Meeting (poster presentation) Cold Spring Harbor Laboratory, NY, USA	2019, OCT
Science and Technology in Society Forum (invited attendee) Kyoto, Japan	2018, OCT
17 th European <i>Drosophila</i> Neurobiology Conference (poster presentation) Krakow, Poland	2018, SEP

AS-NIH-TMU joint Neuroscience Symposium (invited speaker) Taipei, Taiwan	2019, APR
Sinica-KAIST Symposium (invited speaker) Taipei, Taiwan	2018, DEC
Symposium on Systems Neuroscience (invited speaker) Hsinchu, Taiwan	2018, NOV
EMBO Conference on Neural Development (invited speaker) Taipei, Taiwan	2017, OCT
NPAS Symposium on Drosophila Neurobiology (organizer/speaker)	2017, JUL
Across the Taiwan Strait Symposium on Neuroscience (invited speaker)	2016, OCT
Developmental Biology Retreat (invited speaker) Tainan, Taiwan	2016, AUG
The annual meeting for Taiwan Neuroscience Society (invited speaker) Taipei, Taiwan	2015, DEC
Taiwan Scientific Symposium in Oxford Oxford, UK	2015, JUN
The Genetics Society Meeting: Genetic approaches to study learning and memory (speaker) London, UK	2014, NOV
Janelia Meeting on Control of Neuronal Identity (speaker) Ashburn, USA	2011, OCT
51st Annual Drosophila Research Conference (speaker) Washington DC, USA	2010, APR

Talks

Dopamine and motivation—a fly story. Moon-Shan Biomedical Research Forum, Taipei Medical University, Taipei, Taiwan, 7 MAY 2020 (scheduled).

A neural mechanism for deprivation state-specific expression of relevant memories in *Drosophila*. Institute of Neuroscience, National Yang-Ming University, Taipei, Taiwan, 31 OCT 2019.

Deprivation state-specific expression of relevant memories in *Drosophila*. AS-NIH-TMU joint Neuroscience Symposium. Academia Sinica, Taipei, Taiwan. 24-25 APR 2019.

Neural mechanisms of need prioritization. Sinica-KAIST Symposium. Academia Sinica, Taipei, Taiwan, 3-4 DEC 2018.

TMU Talk
27 March 2020

Thirst, hunger, Memory. Symposium on Systems Neuroscience, National Tsing Hua University, Hsinchu, Taiwan, 20-21 NOV 2018.

Unravel the thirsty mind of the fruit fly. Department of Life Science, National Taiwan University, Taipei, Taiwan, 4 JUN 2018.

Neural mechanics of a hunger circuit in *Drosophila*. EMBO Conference on Neural Development, Taipei, Taiwan, 2-6 MAR 2018.

Neural mechanics of a hunger circuit in *Drosophila*. Department of Economics, National Taiwan University, Taipei, Taiwan, 7 DEC 2017.

Neural mechanics of a hunger circuit in *Drosophila*. Department of Entomology, National Taiwan University, Taipei, Taiwan, 31 OCT 2017.

Neural mechanics of a hunger circuit in *Drosophila*. NPAS Symposium on *Drosophila* Neurobiology, Academia Sinica, Taipei, Taiwan, 26 JUL 2017.

Neural mechanics of a hunger circuit. National Taiwan Normal University, Taipei, Taiwan, 7 APR 2017.

Bending the thirsty mind of the fruit fly. National Chiao-Tung University, Hsinchu, Taiwan, 25 OCT 2016.

Neural correlates of water reward in *Drosophila*. Across the Taiwan Strait Symposium on Neuroscience 2016 (兩岸神經科學年會). Academia Sinica, Taipei, Taiwan, 14-15 OCT 2016.

Bending the thirsty mind of the fruit fly. Developmental Biology Retreat 2016 (台灣發育生物學研討會). National Cheng Kung University, Tainan, Taiwan, 19-20 AUG 2016.

Bending the thirsty mind of the fruit fly. National Yang-Ming University, Taipei, Taiwan. 10 MAY 2016.

Bending the thirsty mind of the fruit fly. Taiwan Local Fly Meeting. National Tsing Hua University, Hsinchu, Taiwan, 20 FEB 2016.

The Thirsty Mind: Neural circuits and motivational processes for thirst in *Drosophila*. The annual meeting for Taiwan Neuroscience Society. Academia Sinica, Taipei, Taiwan, 3 DEC 2015.

Neural correlates of water reward in thirsty *Drosophila*. Taiwan Scientific Symposium in Oxford. Saïd Institute, Oxford, UK, 13 JUN 2015.

Neural correlates of water reward in thirsty *Drosophila*. The Genetics Society Meeting: Genetic approaches to study learning and memory. The Royal Society, London, UK, 27-28 NOV 2014.

The thirsty fly: Neural correlates of water reward. The Linacre Seminar Series. The Linacre college, the University of Oxford, Oxford, UK, 28 OCT 2014.

Neural correlates of water reward in thirsty *Drosophila*. Institute of Molecular Biology, Academia Sinica, Taipei, Taiwan, 25 SEP 2014.

Neural correlates of water reward in thirsty *Drosophila*. National Health Research Institute, Zhunan, Taiwan, 23 SEP 2014.

Differential processing of appetitive memories in *Drosophila*. National Yang-Ming University, Taipei, Taiwan, 24 MAY 2013.

Parallel processing of appetitive memories in *Drosophila*. Institute of Cellular and Organismic Biology, Academia Sinica, Taiwan, 17 MAY 2013.

Diversifying a *Drosophila* neuronal lineage by Notch. National Yang-Ming University, Taipei, Taiwan, 8 FEB 2012.

Dual functions for Notch in diversifying *Drosophila* lateral antennal lobe neurons. Janelia Meeting on Control of Neuronal Identity, Howard Hughes Medical Institute, Janelia Farm Research Campus, USA, 9-12 OCT 2011

Independent temporal cell fate specification of sister neurons made by common precursors. Janelia Evo-Devo workshop, Howard Hughes Medical Institute, Janelia Farm Research Campus, Ashburn, VA, USA.

Combinatorial specification of neuronal cell fates through independent temporal patterning between Notch-on and Notch-off neuronal siblings. 51st Annual *Drosophila* Research Conference, Washington DC, USA, 7-11 APR 2010

Teaching Experience

Summer Lecture on <i>Drosophila</i> Genetics	2018
NPAS Imaging Workshop Academia Sinica	2017~present
Developmental Biology Course National Yang-Ming University	2016~present
Seminar Course National Yang-Ming University	2016~present
TIGP Career Education Series Lecture Academia Sinica	2016~present
TIGP-MCB Seminar Course Academia Sinica	2016~present
Cells of the Nervous System Lecture National Defense Medical Center Ph.D. Program	2016~2018
Neural Development and Disease—Neural Circuit and Behavior TIGP-INS Program, Academia Sinica	2016~present
Experimental Approaches in Molecular and Cell Biology—	2015~present

A Brief History of Light Microscopy and How It Transformed Biomedical Research
TIGP-MCB Program, Academia Sinica

Mentoring

Current Lab Member

Chang-Hui Tsao 曹昌暉 2015~present
Postdoctoral Fellow

Bhagyashree Senapati 2016~present
Postdoctoral Fellow (2016~2019 as TIGP-MCB Ph.D. Student)

Chen-Han Lin 林辰翰 2016~present
Ph.D. Student,
Department of Life Sciences and Institute of Genome Sciences at National Yang-Ming University

Chien-Chun Chen 陳建錫 2017~present
Ph.D. Student
TIGP-INS Program, Academia Sinica (2017~2018 as Research Associate)

Meng-Ting Tsai 蔡孟亭 2019~present
MSc Student
Department of Life Sciences and Institute of Genome Sciences at National Yang-Ming University

Wen-Jie Chen 陳文傑 2019~present
Research Associate

Yanting Lin 林妍庭 2016~present
Research Associate

Former Lab Member

I-An Juan 阮奕安 2018~2019
MSc Student
National Central University

Tung-Chun Yao 姚桐均 2016~2017
Ph.D. Student
TIGP-MCB Program, Academia Sinica

Hao-Yu Yang 楊皓宇 2017
Research Associate

Contributions to Science

Neural control of motivated behavior. Hunger and thirst are primary motivations that drive food- and water-seeking behaviors, respectively. We discovered that the mushroom body (MB) in the fly brain interprets the fly's bodily requirements and instructs its evaluation of food- and water-associated olfactory cues. We identified five MB output pathways required for hungry flies to seek food odors. These output pathways are modulated by six dopaminergic neurons that directly receive a rich repertoire of hunger and satiety signals. This work has established the MB as a hunger integration center (Tsao et al., 2018). We also discovered that the neuropeptide leucokinin signals both hunger and thirst in the fly brain. Leucokinin competes and cooperates with other hunger signals on specific MB-projecting dopaminergic neurons to guide appropriate foraging decisions. That study demonstrated for the first time, a detailed neural mechanism for how motivational specificity emerges at the level of dopaminergic neurons (Bhagyashree et al., 2019). Leucokinin is also the first neuropeptide shown to broadcast thirst in the fly brain.

Senapati B, Tsao CH, Juan YA, Chiu TH, Wu CL, Waddell S, **Lin S.** (2019, Dec) A neural mechanism for deprivation state-specific expression of relevant memories in *Drosophila*. *Nature Neurosci.* 22(12):2029-2039.

Tsao CH, Chen CC, Lin CH, Yang HY, **Lin S.** (2018 Mar) *Drosophila* mushroom bodies integrate hunger and satiety signals to control innate food-seeking behavior. *eLife* 7:e35264.

Assembly of the mushroom body circuit. The MB is the most studied brain structure in insects, but how it is assembled during development remains unclear. The MB circuit is composed of three major types of neurons: the intrinsic Kenyon cells (KCs) that form the five MB lobes, and the extrinsic dopaminergic neurons (MB-DANs) and MB output neurons (MBONs) whose axons and dendrites innervate specific compartments in the MB lobes, respectively. We have shown that the innervations of the MB-DAN axons and MBON dendrites are largely independent of each other. The KC axons instruct MB lobe-innervation of the MB-DANs and MBONs via Semaphorin 1a-dependent and -independent mechanisms. Knockdown of *semaphorin 1a* in MBONs impairs their dendritic elaboration in specific lobe compartments. Conversely, overexpression of *semaphorin 1a* in MB-DANs redirects their dendrites, which normally reside outside of the MB lobes, to those compartments. This work is important because it represents the first analysis of assembly of the MB circuit, laying a foundation for future studies of this important brain structure.

Lin CH, **Lin S.** (preprint) Assembly of the *Drosophila* mushroom body circuit and its regulation by Semaphorin 1a. *bioRxiv.* doi.org/10.1101/835595.

Neural mechanisms of learning and re-learning. When I was a postdoc in the lab of Prof. Scott Waddell, I discovered that different rewards (i.e. sugar vs. water) and different reward properties of water are represented by different neural circuits in the fly brain (Lin et al., 2014; Huetteroth et al., 2015). I also contributed to studies revealing the distinct roles of Kenyon cell subpopulations in appetitive and aversive memory retrieval (Perisse et al., 2013), as well as the neural mechanisms underlying memory extinction and reconsolidation (Felsenberg et al., 2017).

Felsenberg J, Barnstedt O, Cognigni P, **Lin S**, Waddell S. (2017 Apr) Re-evaluation of learned information in *Drosophila*. *Nature* 544(7649):240-244.

Huetteroth W, Perisse E, **Lin S**, Klappenback M, Burke C, Waddell S. (2015 Mar) Sweet taste and nutrient value subdivide rewarding dopaminergic neurons in *Drosophila*. *Curr Biol* 25(6):751-758.

Lin S, Oswald D, Chandra V, Talbot C, Huetteroth W, Waddell S. (2014 Nov) Neural correlates of water reward in thirsty *Drosophila*. *Nat Neurosci* 17:1536-1542.

Perisse E, Yin Y, Lin AC, **Lin S**, Huetteroth W, Waddell S. (2013 Sep) Different Kenyon cell populations drive learned approach and avoidance in *Drosophila*. *Neuron* 79:945-956.

Neuronal lineage analysis and Notch/Numb signaling. As part of my Ph.D. study with Dr. Tzumin Lee, I performed a comprehensive lineage analysis to uncover the identities and time of birth of all *Drosophila* lateral antennal lobe (IAL) neurons, providing the groundwork for later studies of this complex neuronal lineage (Lin et al., 2012). While studying the IAL and other neuronal lineages in the fly brain, I discovered that Notch/Numb signaling has distinct effects in different lineages, showing that its classic role of binary cell fate determination can be used in combination with other mechanisms to govern diverse patterns of neural differentiation in a context-dependent manner (Lin et al., 2010, 2012).

Lin S, Kao CF, Yu HH, Huang Y, Lee T. (2012 Nov) Lineage analysis of *Drosophila* lateral antennal lobe neurons reveals Notch-dependent binary temporal fate decisions. *PLoS Biol* 10(11): e1001425.

Lin S, Lai SL, Yu HH, Chihara T, Luo L, Lee T. (2010 Jan) Lineage-specific effects of Notch/Numb signaling in post-embryonic development of the *Drosophila* brain. *Development* 137:43-51.

Temporal cell fate specification and neural morphogenesis. During my Ph.D. study in the lab of Dr. Tzumin Lee, I contributed to the discovery of a novel mechanism that regulates temporal cell fates in a neuronal lineage (Zhu et al., 2006). We identified a protein called Chinmo, level of which exhibits a temporal gradient in Kenyon cell lineages, with high-level expression in early-born neurons and low levels in late-born neurons. The level of Chinmo protein dictates the cell fate of Kenyon cells. This finding adds a new dimension to our understanding of temporal cell fate specification. I also assisted in the identification of several other genes and mechanisms regulating the morphogenesis and developmental plasticity of Kenyon cells (Wang et al., 2006; Lei and Lin et al., 2007; Lin et al., 2009, 2013).

Lin S, Marin EC, Yang CP, Kao CF, Apenteng BA, Huang Y, O'Connor MB, Truman JW, Lee T. (2013 Oct) Extremes of Lineage Plasticity in the *Drosophila* Brain. *Curr Biol* 23:1908-1913.

Lin S, Huang Y, Lee T. (2009 Dec) Nuclear receptor Unfulfilled regulates axonal guidance and cell identity of *Drosophila* mushroom body neurons. *PLoS One* 4:e8392.

Lei S*, **Lin S***, Grinberg Y, Beck Y, Grozinger CM, Robinson GE, Lee T. (2007 Oct) Roles of Drosophila Kruppel-homolog 1 in neuronal morphogenesis. *Dev Neurobiol* 67:1614-1626. (*equal contribution)

Zhu S, **Lin S**, Kao CF, Awasaki T, Chiang AS, Lee T. (2006 Oct) Gradients of the Drosophila Chinmo BTB-zinc finger protein govern neuronal temporal identity. *Cell* 127:409-422.

Wang J, Lee CH, **Lin S**, Lee T. (2006 Apr) Steroid hormone-dependent transformation of polyhomeotic mutant neurons in the Drosophila brain. *Development* 133:1231-1240.