

Yu-Wei Wu

ADDRESS:

Institute of Molecular Biology, Academia Sinica,
128 Academia Road, Section 2, Nankang
Taipei, Taiwan 11529
Phone 886-2-2789-9334
E-mail: wuyuwei@gate.sinica.edu.tw

PERSONAL DATA:

Born: May, 1981, Taipei, Taiwan

EDUCATION:

2012 **Ph.D.** in Neurology & Neuroscience
Institute of Neurology, University College London UCL, London, UK
2007 **M.Sc.** in Neuroscience and Cellular physiology
Institute of Zoology, National Taiwan University, Taipei, Taiwan
2003 **B.Sc.** in Zoology
Department of Zoology, National Taiwan University, Taipei, Taiwan

RESEARCH AND PROFESSIONAL EXPERIENCE:

2019 - present **Assistant Research Fellow**, Institute of Molecular Biology, Academia Sinica, Taipei, Taiwan
2018 - 2019 **Research Scientist**, Department of Neurosurgery, Stanford University School of Medicine, Palo Alto, CA
2013 - 2018 **Postdoctoral Research Fellow**, Department of Neurosurgery, Stanford University
2012 - 2013 **Postdoctoral Research Fellow**, RIKEN Brain Science Institute, Wako, Japan
2007 - 2012 **Research Associate**, RIKEN Brain Science Institute, Wako, Japan

PRESENT POSITION:

Assistant Research Fellow, Institute of Molecular Biology, Academia Sinica.

HONORS AND AWARDS:

2015 Postdoctoral Research Fellowship, \$50K, Parkinson's Disease Foundation, USA

- 2011 Travel Award for Annual Meeting for Society for Neuroscience, Society for Neuroscience, USA
- 2010 Travel Award for FENS Forum, Federation of European Neurosciences
- 2007 The Scholarship for Studying Abroad, \$50K, the Ministry of Education, Taiwan
- 2007 Travel Award for IBRO APRC/RIKEN BSI Advanced School, IBRO APRC, Japan

ACADEMIC ACTIVITIES:

- Review Editor; *Frontiers in Neural Circuits*, *Frontiers in Cellular Neuroscience*, *Cell Calcium*

INVITED LECTURES:

- 2019 Annual Meeting for Taiwan Neuroscience Society 2019, Tainan, Taiwan
- 2018 Institute of Neuroscience, National Yang-Ming University, Taiwan
- 2018 Research Center for Applied Sciences, Academia Sinica, Taiwan
- 2018 Department of Life Science, National Taiwan University, Taiwan
- 2011 Cold Spring Harbor-Asia Conference “Advances in Optical Imaging of Live Cells and Organisms”, Suzhou, China
- 2011 International conference and workshop: “Neuronal Communication Beyond the Synaptic Cleft”, Naeba, Japan

GRANT SUPPORTS:

- Co-PI, MoST research grant “Mechanistic investigation of the cerebral cortex and basal ganglia circuit operation and possible therapeutic applications” 2019/07/01-2020/12/31, NT\$3,000,000.

MENTORING:

CURRENT

No lab member yet.

PUBLICATIONS: (complete list, *co-first author, **corresponding author)

2019

1. Obaid A*, Hanna M*, **Wu YW*** (co-first author), Kollo M*, Racz R, Angle MR, Muller J, Wray W, Franke F, Blackbill N, Chichilinsky EJ, Hierlemann A, Ding JB, Schaefer AT, Melosh NA (2019) Massively parallel microwire arrays integrated with CMOS chips for neural recording *Science Advances* (in Press)
2. **Wu YW***(co-corresponding author), Gordleeva S, Tang X, Shih PY, Dembitskaya Y, Semyanov A* (2019) Morphological profile determines frequency of spontaneous calcium events in thin astrocytic processes. *Glia* 67(2):246-262

2018

3. Parker JG, Marshall JD, Ahanonu B, **Wu YW**, Kim TH, Grewe BF, Zhang Y, Li JZ, Ding JB, Ehlers MD, Schnitzer MJ (2018) Diametric neural ensemble dynamics in parkinsonian and dyskinetic states. *Nature* 557(7704): 177-182
4. Lin HA, Zhu B, **Wu YW**, Sekine J, Nakao A, Luo SC, Yamashita Y, Yu HH (2018) Dynamic Poly(3,4-ethylenedioxythiophene)s integrate low impedance with redox-switchable biofunction. *Advanced Functional Materials* 28, 1703890

2017

5. Du K*, **Wu YW*** (co-first author), Lindroos R, Liu Y, Rózsa B, Katona G, Ding JB, Kotaleski JH (2017) Cell-type specific inhibition of the dendritic plateau potential in striatal spiny projection neurons. *Proceedings of the National Academy of Sciences (PNAS)* 114(36): E7612-E7621.
6. **Wu YW**, Ding JB (2017) A cell-type-specific jolt for motor disorders. *Nature Neuroscience* 20(6): 763–765

2015

7. Kim JI, Ganesan S, Luo SX, **Wu YW**, Park E, Huang EJ, Chen L, Ding JB (2015) Aldehyde dehydrogenase 1a1 mediates a GABA synthesis pathway in midbrain dopaminergic neurons. *Science* 350(6256):102-6
8. Guo L*, Xiong H*, Kim JI*, **Wu YW*** (*co-first author), Lalchandani RR, Cui Y, Shu Y, Xu T, Ding JB (2015) Dynamic rewiring of neural circuits in the motor cortex in mouse models of Parkinson's disease. *Nature Neuroscience* 18(9):1299-309
9. **Wu YW**, Kim JI, Tawfik VL, Lalchandani RR, Scherrer G, Ding JB (2015) Input- and cell type-specific Endocannabinoid-Dependent LTD in the striatum. *Cell Reports* 10(1):75-87

2014 and earlier

10. Danielyan A, **Wu YW**, Shih PY, Dembitskaya Y, Semyanov A (2014) Denoising of two-photon fluorescence images with Block-Matching 3D filtering. *Methods* 68(2):308-16
11. **Wu YW*** (co-first author), Tang X*, Arizono M, Bannai H, Shih PY, Dembitskaya Y, Kazantsev V, Tanaka M, Itohara S, Mikoshiba K, Semyanov A (2014) Spatiotemporal calcium dynamics in single astrocytes and its modulation by neuronal activity. *Cell Calcium* 55(2):119-29
12. Wlodarczyk AI, Xu C, Song I, Doronin M, **Wu YW**, Walker MC, Semyanov A (2013) Tonic GABA_A conductance decreases membrane time constant and increases EPSP-spike precision in hippocampal pyramidal neurons. *Front Neural Circuits*. 7:205
13. **Wu YW**, Grebenyuk S, McHugh TJ, Rusakov DA, Semyanov A. (2012) Backpropagating action potentials enable detection of extrasynaptic glutamate by NMDA receptors. *Cell Reports* 1(4):495-505
14. Min MY, **Wu YW**, Shih PY, Lu HW, Wu Y, Hsu CL, Li MJ, Yang HW. (2010) Roles of A-type potassium currents in tuning spike frequency and integrating synaptic transmission in noradrenergic neurons of the A7 catecholamine cell group in rats. *Neuroscience* 168(3):633-45.
15. Min MY, Shih PY*, **Wu YW***, Lu HW, Lee ML, Yang HW. (2009) Neurokinin 1 receptor activates transient receptor potential-like currents in noradrenergic A7 neurons in rats. *Mol Cell Neurosci*. 42(1):56-65. *contributed equally
16. Min MY, **Wu YW**, Shih PY, Lu HW, Lin CC, Wu Y, Li MJ, Yang HW. (2008) Physiological and morphological properties of, and effect of substance P on, neurons in the A7 catecholamine cell group in rats. *Neuroscience* 153(4):1020-33

MAJOR RESEARCH INTERESTS:

- Neural circuit mechanism underlying motor learning and movement control
- Astrocytic physiology and calcium signaling

1. Neural circuit mechanism underlying motor learning and movement control

In the motor system, re-organization of neural hardwiring is more prominent during motor learning. However, it is unknown how newly learned skills are incorporated into existing neural circuits without affecting movement control. In addition, aberrant synaptic reorganization also results in motor disorders including Parkinson's disease (PD), which affects 7-10 million people worldwide. We use multidisciplinary approaches, including two-photon imaging, optogenetics, and electrophysiology, to investigate the molecular mechanisms underlying this re-organization of neural circuits rewiring.

2. Astrocytic physiology and calcium signaling

Astrocytes express a complex repertoire of intracellular Ca^{2+} transients that represent a major form of signaling in astrocytic network and within individual cells. However, it is largely unknown whether and how this calcium signaling encodes brain information. We have developed new imaging technique and mathematical algorithms to monitor and analyze the spatiotemporal dynamics of calcium signaling in astrocytes. We aim to provide deeper understanding on the physiological role of calcium signaling in astrocytes.