

Curriculum Vitae

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| Name | Chung-Chuan Lo (羅中泉) | Address | Institute of Systems Neuroscience National Tsing Hua University Hsinchu, 30013, Taiwan |
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Education

- 1998-2004** **Boston University**, Boston, Massachusetts
Ph. D. in Physics
Thesis title: Statistical Physics Approaches for Understanding Sleep-Wake Transitions
Thesis advisor: H. Eugene Stanley, Professor of Physics
- 1995-1997** **National Taiwan University**, Taipei, Taiwan
M. S. in Physics
Thesis title: Study of the Effect of Site Mutation on the Structural Stability of Cobra
Cardiotoxin by Time-Resolved Fluorescence
Thesis advisor: Wunshain Fann, Joint Assistant Professor of Physics.
- 1991-1995** **National Taiwan University**, Taipei, Taiwan
B. S. in Physics
Project title: The Effect of Noises on a Cascaded Lorenz System
Project advisor: Yih-Yuh Chen, Associate Professor of Physics.

Employment

- 2018-present** **National Tsing Hua University**, Hsinchu, Taiwan
Professor & director, Institute of Systems Neuroscience
- 2014-2018** **National Tsing Hua University**, Hsinchu, Taiwan
Associate professor, Institute of Systems Neuroscience
- 2009-2014** **National Tsing Hua University**, Hsinchu, Taiwan
Assistant professor, Institute of Systems Neuroscience
- 2008-2009** **National Tsing Hua University**, Hsinchu, Taiwan
Assistant professor, Institute of Bioinformatics and Structural Biology
- 2006-2008** **Yale University**, New Haven, CT.
Postdoc assistant (Supervisor, Dr. Xiao-Jing Wang).
Neural network modeling
- 2004-2006** **Brandeis University**, Waltham, MA.
Postdoc fellow (Supervisor, Dr. Xiao-Jing Wang).
Neural network modeling
- 1997-1998** **Institute of Atomic and Molecular Sciences, Academia Sinica**, Taipei, Taiwan
Research Assistant (Supervisor, Dr. W.-S. Fann)
Experiments on time-resolved fluorescence of conformational changes in protein.

Honors and Awards

- 2021** Future Tech Breakthrough Award (未來科技突破獎), Future Tech Expo 2021, Taipei, Taiwan
(team award)
- 2020** Future Tech Breakthrough Award (未來科技突破獎), Future Tech Expo 2020, Taipei, Taiwan
(team award)

- 2019** Future Tech Breakthrough Award (未來科技突破獎), Future Tech Expo 2019, Taipei, Taiwan (team award)
- 2017** Open Science Prize Finalist (team award)
- 2017** National Tsing Hua University College of Life Science Research Award
- 2014** National Tsing Hua University Publication Award
- 2011** Best paper award. Symposium on Engineering, medicine and biology application, Taichung, Taiwan
- 2010** National Tsing Hua University Publication Award
- 2004-2007** Postdoctoral fellowship in computational neuroscience (Sloan-Swartz foundation)
- 2003** American Physical Society travel awards for Annual Meeting.
- 2001** Sigma Xi award, achievement in graduate research at Boston University.
- 2001** Travel scholarship for Sleep Medicine Conference, Marburg, Germany
- 1998-2003** Boston University Ph.D. research fellowship (2000-2003); teaching fellowship (1998-2000).
- 1991-1995** Ministry of Education (Taiwan) bachelor degree scholarship for outstanding students.

Professional Services

- 2020-present** Chairman of Taiwanese Society for Computational Neuroscience (<https://www.sfcn.org.tw/>)
- 2012-present** Review editor of Frontiers in Decision Neuroscience
- 2011-present** Review editor of Frontiers in Neuroinformatics
- 2011-2012** Technical program committee for Symposium on Engineering, Medicine and Biology Applications & International workshop on Bio-inspired Systems and Prosthetic Devices (Feb 11-13, 2012, Taichung, Taiwan)
- 2009-2013** Member of the task force for the multi-scale modeling, International Neuroinformatics Coordinating Facility (INCF)

Academic Publications

(*corresponding author)

1. Ning Chang, Hsuan-Pei Huang and **Chung-Chuan Lo***. (2023) Global inhibition in head-direction neural circuits: a systematic comparison between connectome-based spiking neural circuit models. *Journal of Comparative Physiology A1-15*
2. Anton P.J. Stampfl et al. (2023). SYNAPSE: An international roadmap to large brain imaging. *Physics Reports* 999, 1-60.
3. Alexander J. White, Chou P. Hung*, **Chung-Chuan Lo*** (2022). HDR luminance normalization via contextual facilitation in highly recurrent spiking neural networks. *Unmanned Systems Technology XXIV SPIE*, p. 138-150.
4. Kuan-Lin Feng, Ju-Yun Weng, Chun-Chao Chen, Mohammed Bin Abubaker, Hsuan-Wen Lin, Ching-Che Chang, **Chung-Chuan Lo**, J. Steven de Belle, Tim Tully, Cheng-Chang Lien*, Ann-Shyn Chiang* (2021). Neuropeptide F inhibits dopamine neuron interference of long-term memory consolidation in *Drosophila*. *iScience* 24.12: 103506.
5. Yi-Shiuan Liu, Chih-Yu Yang, Ping-Fang Chiu, Hui-Chu Lin, **Chung-Chuan Lo**, Alan Szu-Han Lai, Chia-Chu Chang, Oscar Kuang-Sheng Lee* (2021). Machine Learning Analysis of Time-Dependent Features for Predicting Adverse Events During Hemodialysis Therapy: Model Development and Validation Study. *Journal of Medical Internet Research* 23.9: e27098.
6. Rui Han, Hsuan-Pei Huang, Wan-Ju Lee, Chia-Lung Chuang, Hung-Hsiu Yen, Wei-Tse Kao, Hui-Yun Chang, **Chung-Chuan Lo*** (2021). Coordination through inhibition: control of stabilizing and updating

- circuits in spatial orientation working memory. *eNeuro* 8.5 [Selected as a cover art]
7. Zuo-Wei Yeh, Chia-Hua Hsu, Chen-Fu Yeh, Wen-Chieh Wu, Cheng-Te Wang, **Chung-Chuan Lo**, Kea-Tiong Tang* (2021). POPPINS : A Population-Based Digital Spiking Neuromorphic Processor with Integer Quadratic Integrate-and-Fire Neurons. *2021 IEEE International Symposium on Circuits and Systems (ISCAS)* IEEE, p.1-5.
 8. Patricia Parlevliet*, Andrey Kanaev, Chou P Hung, Andreas Schweiger, Frederick D Gregory, Ryad Benjamin Benosman, Guido C H E De Croon, Yoram Gutfreund, **Chung-Chuan Lo**, Cynthia F Moss (2021). Autonomous Flying with Neuromorphic Sensing. *Frontiers in Neuroscience* 15:672161 (PERSPECTIVE article)
 9. Hsin-Yu Wu, Wei-Tse Kao, Harrison Hao-Yu Ku, Cheng-Te Wang*, Chih-Cheng Hsieh, Ren-Shuo Liu, Kea-Tiong Tang and **Chung-Chuan Lo*** (2021). A Bio-Inspired Motion Detection Circuit for the Computation of Optical Flow: The Spatial-Temporal Filtering Reichardt Model. *2021 IEEE 3rd International Conference on Artificial Intelligence Circuits and Systems (AICAS)* IEEE, p.1-4.
 10. Wen-Chieh Wu, Chen-Fu Yeh, Alexander James White, Cheng-Te Wang*, Zuo-Wei Yeh, Chih-Cheng Hsieh, Ren-Shuo Liu, Kea-Tiong Tang and **Chung-Chuan Lo*** (2021). Integer Quadratic Integrate-and-Fire (IQIF): A Neuron Model for Digital Neuromorphic Systems. *2021 IEEE 3rd International Conference on Artificial Intelligence Circuits and Systems (AICAS)* IEEE, p.1-4.
 11. Chen-Zhi Su, Kuan-Ting Chou, Hsuan-Pei Huang, **Chung-Chuan Lo***, Daw-Wei Wang* (2021). Identification of Neuronal Polarity by Node-Based Machine Learning. *Neuroinformatics* 1-16
 12. Rui Han, Tzu-Min Wei, Szu-Chiao Tseng and **Chung-Chuan Lo*** (2021). Characterizing approach behavior of *Drosophila melanogaster* in Buridan's paradigm. *PLoS One* 16.1: e0245990
 13. Hao Chi, Lee Sun, Ren-Huei Shiu, Rui Han, Chien-Ping Hsieh, Tzu-Min Wei, **Chung-Chuan Lo**, Hui-Yun Chang and Tzu-Kang Sang* (2020). Cleavage of human tau at Asp421 inhibits hyperphosphorylated tau induced pathology in a *Drosophila* model. *Scientific reports* 10.1:1-15
 14. Kuo-Wei Kao and **Chung-Chuang Lo*** (2020). Short term depression, presynaptic inhibition and local neuron diversity play key functional roles in the insect antennal lobe. *Journal of Computational Neuroscience* 48:213–227(2020)
 15. Chi-Tin Shih*#, Yen-Jen Lin#, Cheng-Te Wang, Ting-Yuan Wang, Chih-Chen Chen, Ta-Shun Su, **Chung-Chuang Lo***, and Ann-Shyn Chiang* (2019). Diverse Community Structures in the Neuronal-level Connectome of the *Drosophila* Brain. *Neuroinformatics* (online early publication) #: equal contribution
 16. Hung-Hsiu Yen, Rui Han and **Chung-Chuan Lo*** (2019). Quantification of Visual Fixation Behavior and Spatial Orientation Memory in *Drosophila melanogaster*. *Frontiers in Behavioral Neuroscience* 13:215
 17. Huang-Yu Yao, Hsuan-Pei Huang, Yu-Chi Huang and **Chung-Chuan Lo*** (2019). Flyintel - a Platform for Robot Navigation based on a Brain-Inspired Spiking Neural Network. *2019 IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS)* p.219-220 (Conference proceeding)
 18. Yu-Chi Huang, Cheng-Te Wang, Ta-Shun Su, Kuo-Wei Kao, Yen-Jen Lin, Chao-Chun Chuang, Ann-Shyn Chiang and **Chung-Chuan Lo*** (2018). A Single-Cell Level and Connectome-Derived Computational Model of the *Drosophila* Brain. *Frontiers in Neuroinformatics* 12:99
 19. Ta-Shun Su, Wan-Ju Lee, Yu-Chi Huang, Cheng-Te Wang and **Chung-Chuan Lo*** (2017). Coupled symmetric and asymmetric circuits underlying spatial orientation in fruit flies. *Nature Communications*. 8:139.
 20. Po-Yen Chang, Ta-Shun Su, Chi-Tin Shih* and **Chung-Chuan Lo*** (2017). The Topographical Mapping in *Drosophila* Central Complex Network and its Signal Routing. *Frontiers in Neuroinformatics*. 11:26.
 21. **Chung-Chuan Lo*** and Ann-Shyn Chiang* (2016). Toward Whole-Body Connectomics. *Journal of Neuroscience*. 36:11375-11383.

22. **Chung-Chuan Lo***, and Xiao-Jing Wang* (2016). Conflict Resolution as Near-Threshold Decision-Making: A Spiking Neural Circuit Model with Two-Stage Competition for Antisaccadic Task. *PLOS Computational Biology*. 12:e1005081.
23. Cheng-Wei Li, **Chung-Chuan Lo**, and Bor-Sen Chen* (2016). Estimating Sensorimotor Mapping From Stimuli to Behaviors to Infer C. Elegans Movements by Neural Transmission Ability Through Connectome Databases. *IEEE Transactions on Neural Networks and Learning Systems*. 27:2229 - 2241.
24. Cheng-Wei Li, **Chung-Chuan Lo**, and Bor-Sen Chen* (2015). Robust Sensorimotor Control of Human Arm Model under State-Dependent Noises, Control-Dependent Noises and Additive Noises. *Neurocomputing*. 167:61-75.
25. **Chung-Chuan Lo#** , Cheng-Te Wang and Xiao-Jing Wang*# (2015). Speed-accuracy tradeoff by a control signal with balanced excitation and inhibition. *Journal of Neurophysiology*. 114:650-661. (#: equal contribution)
26. Chi-Tin Shih*, Olaf Sporns, Shou-Li Yuan, Ta-Shun Su, Yen-Jen Lin, Chao-Chun Chuang, Ting-Yuan Wang, **Chung-Chuan Lo**, Ralph J. Greenspan, and Ann-Shyn Chiang* (2015). Connectomics-Based Analysis of Information Flow in the Drosophila Brain. *Current Biology*. 25:1-10
27. Yi-Hsuan Lee, Yen-Nan Lin, Chao-Chun Chuang and **Chung-Chuan Lo*** (2014). SPIN: A Method of Skeleton-based Polarity Identification for Neurons. *Neurinformatics*. 12:487.
28. Yen-Nan Lin, Po-Yen Chang, Pao-Yueh Hsiao and **Chung-Chuan Lo*** (2014). Polarity-specific high-level information propagation in neural networks. *Frontiers in Neuroinformatics*. 8:27.
29. Pao-Yueh Hsiao and **Chung-Chuan Lo*** (2013). A Plastic Cortico-Striatal Circuit Model of Adaptation in Perceptual Decision. *Frontiers in Computational Neuroscience*. 7:178.
30. **Chung-Chuan Lo**, Ronny P. Bartsch and Plamen Ch. Ivanov* (2013). Asymmetry and basic pathways in sleep-stage transitions. *EPL (Europhysics Letters)*. 102:10008.
31. Cheng-Te Wang, Chung-Ting Lee, Xiao-Jing Wang, **Chung-Chuan Lo*** (2013). Top-down modulation on perceptual decision by exogenous and endogenous balance of excitation and inhibition. *PLoS One*. 8:e62379.
32. Ying-Zu Huang, Chin-Song Lu, John C. Rothwell, **Chung-Chuan Lo**, Wen-Li Chuang, Yi-Hsin Weng, Szu-Chia Lai, Rou-Shayn Chen* (2012) Modulation of the disturbed motor network in dystonia by multisession suppression of premotor cortex. *PLoS One*. 7:e47574.
33. **Chung-Chuan Lo**, Leanne Boucher, Martin Pare, Jeffery D. Schall and Xiao-Jing Wang* (2009). Proactive inhibitory control and attractor dynamics in countermanding action: a spiking neural circuit model. *Journal of Neuroscience*. 29:9059-9071.
34. **Chung-Chuan Lo** and Xiao-Jing Wang* (2006). Cortico-basal ganglia circuit mechanism for a decision threshold in reaction time tasks. *Nature Neuroscience*. 9:957-963 (2006).
35. **Chung-Chuan Lo**, Thomas Chou, Thomas Penzel, Thomas E. Scammell, Robert E. Strecker, H. Eugene Stanley, and Plamen Ch. Ivanov* (2004). Common scale-invariant pattern of sleep-wake transitions across mammalian species. *Proceedings of the National Academy of Sciences of the United States of America*. 50:17545-17548
36. Thomas Penzel, Jan W. Kantelhardt, **Chung-Chuan Lo**, Karlheinz Voigt and Claus Vogelmeier* (2003). Dynamics of Heart Rate and Sleep Stages in Normals and Patients with Sleep Apnea. *Neuropsychopharmacology* 28:S48-S53
37. **Chung-Chuan Lo**, L. A. Nunes Amaral, S. Havlin, Plamen. Ch. Ivanov, Thomas Penzel, J.-H. Peter and H. Eugene Stanley* (2002). Dynamics of sleep-wake transitions during sleep. *EPL (Europhysics Letters)* 57:625-631.

38. Plamen. Ch. Ivanov* and **Chung-Chuan Lo** (2002). Stochastic Approaches to Modeling of Physiological Rhythms, in *Modeling Biomedical signals*, edit. G. Nardulli & S. Stramaglia. World Scientific.
39. **Chung-Chuan Lo**, Jui-Hung Hsu, You-Cheng Sheu, Chein-Min Chiang, Wen-guey Wu, Wunshain Fann* and Pei-Hsi Tsao (1998). Effect of D57N mutation on membrane activity and molecular unfolding of cobra cardiotoxin. *Biophysical Journal* 75: 2382-2388

Other Publications

1. 電腦與人腦：現代電腦架構之父馮紐曼的腦科學講義 -- 中文版導讀 (貓頭鷹出版社 · 出版日期：2021-05-06)
2. 昆蟲動態視覺與其仿生應用 · <電腦與通訊> 2020年12月號184期
3. 小腦袋大數據-大腦圖譜研究計畫 <科學月刊> 2018 三月號

Media Coverage

1. 聯合報：清華生科、電機團隊聯手 研發仿生物視覺技術(2022/01/27)
Other media sources: 自由日報、鏡週刊、蘋果新聞網
2. [Businesswire: NTHU Research Team Teaches Drone to Fly Like an Insect \(2020\)](#)
[清華研發仿視神經AI晶片 讓無人機學果蠅飛行](#) Central News Agency (中央社), February 2, 2020.
Other media sources: 聯合報、三立
3. Gene Ng, [果蠅腦中的神經元 · 如何跟機械的指南車一樣可以指出固定方向?](#) published September 29, 2017. Inside (<http://www.inside.com.tw/>)
4. Benedicte Ballanger, Top-down control of saccades as part of a generalized model of proactive inhibitory control *Journal of Neurophysiology* published 26 August 2009, 10.1152/jn.00717.2009
5. Roozbeh Kiani, Timothy D Hanks & Michael N Shadlen. When is enough enough? *Nature Neuroscience* 9, 681-683 (2006).
6. Taylor McNeil, Bring on the Sandman. *Bostonia*. Summer 2002.
(<http://www.bu.edu/alumni/bostonia/2002/summer/explorations/sleep/index.html>)
7. Michael Brooks, Feature: Snooze Control. *New Scientist* p. 173, 38-40, Feb. 23, 2002.
8. "Tired? Well, you woke up 35 times last night", *The Daily Mail*, p. 35, Feb. 21, 2002.
9. "Sleep well last night? You woke up 37 times", *The Mirror*, Feb. 21, 2002.
10. *Complex Digest* issue 51, Dec. 19 2001. (<http://www.comdig.de/ComDig01-51/#12>)