

Chao, Ling (趙 玲)

Professor

B.S. in Chemical Engineering
National Taiwan University, 2003

Ph.D. in Chemical Engineering
Massachusetts Institute of Technology, 2009

Postdoc in Biomolecular and Chemical Engineering
Cornell University, 2009-2011

Research and Professional Interests

Phase transformation of bio-membranes

Cell membrane mimic bio-chips

Journal Papers

1. Chia-Wei Kuo, Tse-Han Kuo, Hui-An Lee, Yu-Ting Lin, Cheng-Jung Kuo, Kai-Hung Hsiao, Meng-Hua Yang, Kevin Tanady, Shu-Yu Chang, Tzy-Rong Lin, and **Ling Chao***, Label-free detection of transport kinetics and inhibitor binding of membrane transport proteins with a two-mode plasmonic sensor, *Biosensors and Bioelectronics*: X, 2022, Volume 11, 100183
2. Sin-Han Huang, Bo-Chuan Huang, and **Ling Chao***, Development of Cell Membrane Electrophoresis to Measure the Diffusivity of a Native Transmembrane Protein, *Analytical Chemistry*, 2022, 94, 10, 4531–4537 (SCI, Chemistry, Analytical, 8/87, IF: 7.0)
3. Yu-Shan Chang, Hao-Cin Yang, and **Ling Chao***, Formation of Supported Thylakoid Membrane Bioanodes for Effective Electron Transfer and Stable Photocurrent, *ACS Applied Materials & Interfaces*, 2022, 14, 19, 22216–22224 (SCI, Multidisciplinary, 44/334, IF=9.2)
4. U-Ting Chiu, and **Ling Chao***, “Electron transfer through protein-bound water and its bioelectronic application”, *Biosensors and Bioelectronics*, 2019, 136, 16-22 (SCI, IF: 9.5)
5. Shu-Kai Hu, Fang-Yen Lo, Chih-Chen Hsieh, and **Ling Chao***, “Sensing Ability and Formation Criterion of Fluid Supported Lipid Bilayer Coated Graphene Field-Effect Transistors”, *ACS Sensors*, 2019, 4 (4), 892–899 (SCI, IF: 6.9) (featured on the cover page of Volume 4, Issue 4, 2019)
6. U-Ting Chiu, Bo-Fan Lee, Shu-Kai Hu, Ting-Feng Yu, Wen-Ya Lee*, and **Ling Chao***, “Graphene Memory Based on a Tunable Nanometer-Thin Water Layer”, *J. Phys. Chem. C*, 2019, 12317, 10842-10848 (SCI, IF: 4.5) (featured on the cover page of Volume 123, Issue 17, 2019)
7. Shao-Wei Lyu, Jou-Fang Wang, and **Ling Chao***, “Constructing Supported Cell Membranes with Controllable Orientation”, 2019, *Scientific Reports* volume 9: 2747, p1-p8 (SCI, IF: 4.5)
8. Yu-Ling Shih*, Ling-Ting Huang, Yu-Ming Tu, Bo-Fan Lee, Yu-Chiuan Bau, Chia Yee Hong, Hsiao-lin Lee, Yan-Ping Shih, Min-Feng Hsu, Zheng-Xin Lu, Jui-Szu Chen, and **Ling Chao***, “Active Transport of Membrane Components by Self-Organization of the Min Proteins”, *Biophysical Journal*, 2019, 116, 1469–1482 (SCI, IF: 3.8) (featured on

the cover page of Volume 116, Issue 8, 2019)

9. Po-Chieh Chiang, Kevin Tanady, Ling-Ting Huang, and **Ling Chao***, “Rupturing Giant Plasma Membrane Vesicles to Form Micron-sized Supported Cell Plasma Membranes with Native Transmembrane Proteins”, *Scientific Reports*, 2017, 7: 15139
10. B Lin, S Tsao, Alex Chen, Shu-Kai Hu, **Ling Chao**, and PG Chao*, “Lipid rafts sense and direct electric field-induced migration”, *Proceedings of the National Academy of Sciences(PNAS)*, 2017, 114 (32), 8568-8573
11. Hsing-Ying Tung, Ting-Pi Sun, Ho-Yi Sun, Zhen-Yu Guan. Shu-Kai Hu, **Ling Chao**, and Hsien-Yeh Chen*, “Construction and control of 3D porous structure based on vapor deposition on sublimation solids”, *Applied Materialstoday*, 2017, Volume 7, 77-81

Conference Papers

1. **Ling Chao***, and Meng-Kai Hsu,” Label-Free Detection of Cell Membrane Protein Behaviors by Surface Raman Spectroscopy”, 19th International Workshop on Plant Membrane Biology 2023, Academia Sinica, Taiwan, Mar.31, 2023 (Invited speaker)
2. **Ling Chao***, “Development of Cell Membrane Sheets for Biosensor Applications”, the 69th Taiwan ChE annual meeting, Dec. 02-03, Tamsui, Taiwan, 2022 (2022/12/23, Keynote Speech)
3. **Ling Chao***, and Yi-Kuan Meng,” Label-Free Detection of Toxin Binding on Cell Membrane Platforms”, KSBB conference -Biosensing Technology & Cell Engineering session, (2022/09/30) (Invited speaker)
4. **Ling Chao***, “Development of Cell Membrane Sheets for Biosensor and Bioelectronic Applications”, Kyoto University-NTU matching event, National Taiwan University, Taiwan, (2021/12/22)(invited speaker)
5. **Ling Chao***, “Cell Membrane Sheets for Biosensor and Bioelectronic Applications”, Tokyo University-NTU workshop, National Taiwan University, Taiwan, (2022/10/24)(invited speaker)
6. **Ling Chao***, GRC Bioanalytical Sensors, USA (2022/06/20)(discussion leader)
7. **Ling Chao***, and Shu-Kai Hu, “Ligand-Binding Sensing on Supported Lipid Bilayer Coated Graphene Field-Effect Transistors”, Pacificchem 2021, online, (2021/12/19)(invited speaker)
8. **Ling Chao***, “Cell Membrane Sheets for Biosensing Applications”, Tokyo University-NTU workshop, National Taiwan University, Taiwan, (2021/12/09)(invited speaker)
9. **Ling Chao***, “Cell Membrane Sheets for Biosensing Applications”, NTU-KAIST workshop, National Taiwan University, Taiwan, (2021/11/25)(invited speaker)
10. **Ling Chao***, “Cell Membrane Sensors to Detect Membrane Transporter Behaviors”, the 72nd divisional meeting of Division of Colloid and Surface Chemistry, the Chemical Society of Japan, online meeting (2021/9/21)(invited speaker)
11. **Ling Chao***, and Hui-An Lee “Development of Cell Membrane Platforms to Study Membrane Transporter Behaviors”, Advanced Biomaterials and Medical Membranes

- Symposium-Bio-inspired Interfaces and Membranes, Chung Yuan Christian University, Taiwan, (2020/12/11)(invited speaker)
12. **Ling Chao***, “Development of label-free biosensors to study membrane proteins in their native bilayer environment.” GCBME & TSBME 2020, Nov.13, Taipei, 2020 (invited speaker)
 13. **Ling Chao***, “發展細胞膜電泳平臺以研究膜蛋白的擴散係數與電學性質”, Taiwan ChE Annual Meeting, Oct. 24, Hsinchu, Taiwan, 2020 (invited speaker)
 14. Jheng Jie Hong, **Ling Chao***, “Reversing the Membrane Protein Orientation by a Gelatin Blotting Method”, the 2020 Biophysical Annual Meeting, Feb. 15-19, San Diego, USA, 2020
 15. Bo Chuan Huang, **Ling Chao***, “Measuring Diffusivity and Charge of Membrane Protein GLIT1 in a Supported Cell Membrane Platform”, the 2020 Biophysical Annual Meeting, Feb. 15-19, San Diego, USA, 2020
 16. Ching-Chun Huang, **Ling Chao***, “Detection of Membrane Protein Structural Changes in Supported Plasma Membranes by Raman Spectroscopy”, the 2020 Biophysical Annual Meeting, Feb. 15-19, San Diego, USA, 2020
 17. Shu-Kai Hu, and **Ling Chao***, “Sensing Ability of Fluid Supported Lipid Bilayer Coated Graphene Field-Effect Transistors” , the 14th Asian Congress on Biotechnology, ACB 2019), July 01-04, Taipei, Taiwan, 2019 (invited speaker)
 18. Jheng Jie Hong, **Ling Chao***, “Reversing the Membrane Protein Orientation by a Gelatin Blotting Method”, the 14th Asian Congress on Biotechnology, ACB 2019), July 01-04, Taipei, Taiwan, 2019
 19. Bo Chuan Huang, **Ling Chao***, “Measuring Diffusivity and Charge of Membrane Protein GLIT1 in a Supported Cell Membrane Platform”, the 14th Asian Congress on Biotechnology, ACB 2019), July 01-04, Taipei, Taiwan, 2019
 20. Ching-Chun Huang, **Ling Chao***, “Detection of Membrane Protein Structural Changes in Supported Plasma Membranes by Raman Spectroscopy”, the 14th Asian Congress on Biotechnology, ACB 2019), July 01-04, Taipei, Taiwan, 2019
 21. Bo-Fan Lee, **Ling Chao***, “Using Thylakoid Lipid Membranes to Convert Light to Electrical Signals for Bio-applications”, BPS annual meeting, March 02-06, Baltimore, Maryland, USA, 2019
 22. Kevin Tanady, Akhtar Fikri Kurniawan, Ling-Ting Huang, and **Ling Chao***, “Attachment of Calcium Oxalate Monohydrate Crystals Induces Formation of New Phases in Supported Lipid Bilayers”, BPS annual meeting, March 02-06, Baltimore, Maryland, USA, 2019
 23. Zheng-Xian Lu, **Ling Chao***, “Development of Hydrogel Supported Cell Plasma Membranes” BPS annual meeting, March 02-06, Baltimore, Maryland, USA, 2019
 24. Zheng-Xian Lu, **Ling Chao***, "Development of Hydrogel Supported Cell Plasma Membranes", The 24th Symposium of Young Asian Biochemical Engineer's Community (YABEC 2018), Nov. 15-17, Taipei, Taiwan, 2018
 25. Bo-Fan Lee, **Ling Chao***, "Using Thylakoid Lipid Membranes to Convert Light to Electrical Signals for Bio-applications", Taiwan ChE Annual Meeting, Nov. 9-10, Yunlin, Taiwan, 2018
 26. Kevin Tanady, Akhtar Fikri Kurniawan, Ling-Ting Huang, and **Ling Chao***,

- “Attachment of Calcium Oxalate Monohydrate Crystals Induces Formation of New Phases in Supported Lipid Bilayers”, Taiwan ChE Annual Meeting, Nov. 9-10, Yunlin, Taiwan, 2018
27. Zheng-Xian Lu, **Ling Chao***, "Development of Hydrogel Supported Cell Plasma Membranes", Taiwan ChE Annual Meeting, Nov. 9-10, Yunlin, Taiwan, 2018
 28. Kai-Hung Hsiao, **Ling Chao***, “Using Magnetic Field to Move Membrane Proteins in Supported Cell Plasma Membranes”, BPS annual meeting, February 11-15, New Orleans, US, 2017
 29. Kai-Hung Hsiao, **Ling Chao***, “Using Magnetic Field to Move Membrane Proteins in Supported Cell Plasma Membranes”, Taiwanese Interface Society annual meeting, August 23, Taipei, Taiwan, 2017
 30. U-Ting Chiu, **Ling Chao***, "Using a Light-Driven Proton Pump Protein to Develop Devices for Photocurrent Generation", BPS annual meeting, February 11-15, New Orleans, US, 2017
 31. Shao-Wei Lyu, **Ling Chao***, “Using cell membrane blebs induced by hypertonic buffer to form supported membrane platforms with native membrane proteins”, BPS annual meeting, February 11-15, New Orleans, US, 2017
 32. Shao-Wei Lyu, **Ling Chao***, “Controlling membrane protein topology on a supported plasma membrane platform”, Taiwanese Interface Society annual meeting, August 23, Taipei, Taiwan, 2017

Patents

1. Susan Daniel, **Ling Chao**, “Devices for Sorting, Classifying, and Assaying Partition Behavior of Cell Membrane Biomolecules and Methods Based Thereon” WO/2011/160071, Dec. 22, 2011, US2013/0095512 A1, Apr. 23, 2013
2. Chung-Ta Han and **Ling Chao**, “Biologic Sensing Platforms and Methods of Fabricating the Same” TW201614075, 14-08, I554612
3. Cheng-Rung Kuo and **Ling Chao**, “Chip for Monitoring Transportation Behavior and Method for Monitoring Transportation Behavior with the Same” I589855

Honors and Others

1. 2022年獲李長榮學術研究傑出青年教授獎
2. 2020年獲得科技部哥倫布計畫
3. 獲得第十一屆台灣女科學家新秀獎(2018)
4. 擔任scientific reports 之編委會委員(editorial board member)
5. 國立台灣大學教學優良獎(2018)
6. 獲得傑出人才基金會頒發的年輕學者創新獎(2017)

7. 獲得日本化學學會頒發的 “Lectureship Award 2017”
8. 獲得科技部2016優秀年輕學者計畫
9. 台灣化工學會2015年優秀年輕學者
10. 台灣化工學會2015年化工傑作獎
11. Lab on a chip 期刊封面+2014 熱門文章
12. 指導專題生詹雅筑同學獲得科技部106年度大專學生研究計畫研究創作獎
13. Advised graduate student Yi-Kuan Meng on winning First Place Award in poster presentation, the 69th Taiwan ChE annual meeting, Dec. 02-03, Tamsui, Taiwan, 2022.
14. Advised graduate student Tse-Tzu Liu on winning Honorable Mention Award in English oral presentation, the 69th Taiwan ChE annual meeting, Dec. 02-03, Tamsui, Taiwan, 2022.
15. Advised graduate student Che-Lun Chin on winning First Place Award in poster presentation, the 69th Taiwan ChE annual meeting, Dec. 02-03, Tamsui, Taiwan, 2022.
16. Advised graduate student Che-Lun Chin on winning First Place Award in poster presentation, Taiwan ChE annual meeting, Jan. 06-07, Kaohsiung, Taiwan, 2022.
17. Advised graduate student Hao-Chin Yang on winning First Place Award in poster presentation in Transport Phenomenon Group, Taiwan ChE annual meeting, Jan. 06-07, Kaohsiung, Taiwan, 2022
18. Advised graduate student Sin-Han Huang on winning Second Place Award in poster presentation in Transport Phenomenon Group, Taiwan ChE annual meeting, Jan. 06-07, Kaohsiung, Taiwan, 2022
19. Advised undergraduate student Meng-Hua Yang on winning the Gold Medal Award 2020 in the Undergraduate Research Competition in the Dept. of Chemical Engineering at National Taiwan University
20. Advised undergraduate student Chin-Lun Chin on winning the Bronze Medal Award 2020 in the Undergraduate Research Competition in the Dept. of Chemical Engineering at National Taiwan University
21. Advised undergraduate student Jia-Wei Kuo on winning the Best Undergraduate Thesis Award 2019 in National Taiwan University (only one in the College of Engineering)
22. Advised undergraduate students, Zhe-Han Kuo, Jia-Wei Kuo, on winning the Gold Medal Award 2019 in the Undergraduate Research Competition in the Dept. of Chemical Engineering at National Taiwan University

23. Advised undergraduate student Chin-Chun Huang on winning the Silver Medal Award 2018 in the Undergraduate Research Competition in the Dept. of Chemical Engineering at National Taiwan University
24. Advised undergraduate student Kuan-Lin Chen on winning the Bronze Medal Award 2018 in the Undergraduate Research Competition in the Dept. of Chemical Engineering at National Taiwan University
25. Advised undergraduate student Ya-Chu Chan on winning the 2017 Undergraduate Research Novelty Award from the Ministry of Science and Technology in Taiwan
26. Advised graduate student Yu-Ting Lin on winning First Place Award in oral presentation in Thermodynamic and Interface Engineering Group, Taiwan ChE annual meeting, Nov. 26, Taoyuan, Taiwan, 2016. The presentation title is “Development of a surface plasmon resonance and plasmon-waveguide resonance combined chip for studying the transport behaviors of cell membrane transport proteins”
27. Advised graduate student Shao-Wei Lyu on winning First Place Award in poster presentation in Bioengineering Group, Taiwan ChE annual meeting, Nov. 26, Taoyuan, Taiwan, 2016. The presentation title is “Using Cell Membrane Blebs Induced by Hypertonic Buffer to Form Supported Membrane Platforms with Native Membrane Proteins”.
28. Advised graduate student Kai-Hung Hsiao on winning First Place Award in poster presentation in Transport Phenomenon Group, Taiwan ChE annual meeting, Nov. 26, Taoyuan, Taiwan, 2016. The presentation title is “Using Magnetic Field to Purify Membrane Proteins in Supported Cell Plasma Membranes”.
29. Advised graduate student U-Ting Chiu on winning Second Place Award in poster presentation in Energy Group, Taiwan ChE annual meeting, Nov. 26, Taoyuan, Taiwan, 2016. The presentation title is “Using a Light-Driven Proton Pump Protein to Develop Devices for Photocurrent Generation”.
30. Advised graduate student Chia-Yee Hong on winning the Best Poster Award in Taiwan Interfacial Science Annual Meeting, June. 24, Taipei, Taiwan, 2016. The presentation title is “Nonspecific Binding Domains in Lipid Membranes Induced by Phospholipase A2”.
31. Advised graduate student Jou-Fang Wang on winning the Excellent Poster Award in Taiwan Interfacial Science Annual Meeting, June. 24, Taipei, Taiwan, 2016. The presentation title is “Developing Platforms to Study Transmembrane Proteins from either Intracellular Side or Extracellular Side”.
32. Advised graduate student Shu-Kai Hu on winning the Presentation Award in Graduate Student English Oral Report in the 62th TWICHE Annual Meeting, Nov. 6-7, Kaohsiung, Taiwan, 2015. The presentation title is “Studying Hydrodynamic and Induced Drag Forces on Cell Membrane Embedded Species in Supported Lipid Bilayers”.
33. Advised graduate student Shu-Kai Hu on winning the Presentation Award in Graduate Student English Oral Presentation in the BEST Conference &

- International Symposium on Biotechnology and Bioengineering, Jun. 26-27, Taipei, Taiwan, 2015. The presentation title is "Using Spatially Arranged Lipid Membranes to Reveal Hydrodynamic Separation Mechanism of Biomolecules Embedded in Lipid Membranes".
34. Advised graduate student Cheng-Jung Guo on winning First Place Award in poster presentation in Thermodynamic and Interface Engineering Group in the 61th TWICHE Annual Meeting, Dec. 12-13, Taoyuan, Taiwan, 2014. The poster title is "Using Surface Plasmon Resonance to Study Species Transport across Lipid Membranes."
 35. Advised graduate student Yu-Ming Tu on winning the Best Presentation Award in Graduate Student English Oral Report in the 61th TWICHE Annual Meeting, Dec. 12-13, Taoyuan, Taiwan, 2014. The presentation is "Study of Min Protein-Induced Membrane Waves *in vitro*."
 36. Advised graduate student Po-Chieh Chiang on winning the Best Poster Award in poster presentation in Biochemical and Biomedical Engineering Group in the 61th TWICHE Annual Meeting, Dec. 12-13, Taoyuan, Taiwan, 2014. The poster title is "Using Giant Plasma Membrane Vesicles from Cells to form Supported Lipid Bilayers."
 37. Advised graduate student Yu-Ming Tu on winning the Best Oral Presentation Award in the 3rd International Symposium of Materials on Regenerative Medicine (ISOMRM), Aug. 27-29, Tao-Yuan, Taiwan. The presentation is "Mechanism Study of Min Protein-Induced Membrane Waves *in vitro*."
 38. Advised graduate student Yu-Ming Tu on winning the Best Oral Presentation Award in International Symposium on Chemical Environmental Biomedical Technology (isCEBT) Sep.10-14, 2014, Chang Gung University, Tao-Yuan, Taiwan, 2014. The presentation is "Study of Min Protein-Induced Membrane Waves *in vitro*."
 39. Advised graduate student Chung-Ta Han on winning the Best Presentation Award in Graduate Student English Oral Report in the 60th TWICHE Annual Meeting, Nov. 22-23, Taipei, Taiwan, 2013. The presentation is "Using Phospholipase A2 to Create Air-stable Supported Lipid Bilayers."
 40. Advised graduate student Shu-Kai Hu on winning the Best Poster Award in Transportation Phenomena and Separation Technology Group in the 60th TWICHE Annual Meeting, Nov. 22-23, Taipei, Taiwan, 2013. The poster title is "Using Crosslinkable Diacetylene Phospholipids to Construct Two-Dimensional Packed Beds in Supported Lipid Bilayer Separation Platforms."
 41. Advised graduate student Charng-yu Lin on winning the First Place Award in poster presentation and First Place Award in English oral presentation in The 18th Biophysics Conference, Jun 27-29, Taipei, Taiwan, 2013. The poster and presentation titles are "Tunable Nucleation Time of Functional Enzyme-Lipid Complex Studied by Membrane Array Statistic Tool."
 42. Advised graduate student Charng-yu Lin on winning the Best Poster Award in poster presentation in Transportation Phenomena and Separation Technology Group in the 59th TWICHE Annual Meeting, Nov. 23-24, Taichung, Taiwan,

2012. The poster title is "Tunable Nucleation Time of Functional Sphingomyelinase-lipid Complex Studied by Membrane Array Statistic Tool."

