

## Tai-Yen Chen

Department of Chemistry  
University of Houston  
112 Fleming Building  
Houston, TX 77004-5003

Office: (713) 743-9413  
Fax: (713) 743-2709  
Email: [tchen37@central.uh.edu](mailto:tchen37@central.uh.edu)  
<http://chen.chem.uh.edu>

### EDUCATION AND TRAINING

- 2005 – 2010      Ph.D. in Physical Chemistry: Texas A&M University, College Station, TX  
                          Advisor: *Professor Dong Hee Son*  
                          Thesis Title: "*Electronic and magnetization dynamics of cobalt substituted iron oxide nanocrystals*"
- 1998 – 2004      B.S. and M.S. in Inorganic Chemistry: National Tsing-Hua University, Hsinchu, Taiwan  
                          Advisor: *Professor Chien-Hong Cheng*

### PROFESSIONAL EXPERIENCE

- 2016 – present    *Assistant Professor of Chemistry* – University of Houston (Houston, TX, USA)
- 2011 – 2016      *Postdoctoral Associate* – Cornell University (Ithaca, NY, USA)  
                          Advisor: *Professor Peng Chen*  
                          Field: *Single-Molecule Biophysics*

### HONORS AND AWARDS

- 2021                *John C. Butler Excellence in Teaching Award*, UH
- 2019                *Maximizing Investigators' Research Award for Early Stage Investigators*, NIH
- 2010                *Bruno John Zwolinski Graduate Fellowship, Chemistry*, TAMU
- 2010                *Martell and Corera Award, Chemistry*, TAMU
- 2008                *Richard W. Schmude, Jr. Scholarship*, Chemistry, TAMU
- 2007                *Phi Lambda Upsilon*, Chemistry Department, TAMU
- 2007                *Teaching Award*, FYP Chemistry, TAMU
- 2004                *Phi Tau Phi Award*, NTHU

### PUBLICATIONS (based on work performed at the University of Houston)

(Co-first author: †; Corresponding author: \*)

26. M.-H. Wen<sup>†</sup>, X. Xie<sup>†</sup>, P.-S. Huang, K. Yang, and T.-Y. Chen\* "Crossroads between membrane trafficking machinery and copper homeostasis in the nerve system". *Under revisions*, **2021**.
25. P.-S. Huang, M.-H. Wen, X. Xie, A. Xu, D.-F. Leeb, T.-Y. Chen\* "Generation of a homozygous knock-in human embryonic stem cell line expressing SNAP-tagged SOD1". *Stem Cell Research*, **2021**, 54, 102415. <https://doi.org/10.1016/j.sbi.2020.10.022>
24. H. Chen<sup>†</sup>, X. Xie<sup>†</sup>, T.-Y. Chen\* "Single-Molecule Microscopy for In-Cell Quantification of Protein Oligomeric Stoichiometry". *Current Opinion in Structural Biology*, **2020**, 66, 112-118. <https://doi.org/10.1016/j.sbi.2020.10.022>

23. M. Pan, Y. Zhang, G. Yan, T.-Y. Chen\* “Dissection of interaction kinetics through single-molecule interaction simulation”. *Analytical Chemistry*, **2020**, *92*, 11582–11589. <https://doi.org/10.1021/acs.analchem.0c01014>
22. M.-H. Wen, X. Xie, Jian Tu, Dung-Fang Lee, T.-Y. Chen\* “Generation of a genetically modified human embryonic stem cell expressing fluorescence tagged ATOX1”. *Stem Cell Research*, **2019**, *41*, 101631. <https://doi.org/10.1016/j.scr.2019.101631>
21. X. Xie<sup>†</sup>, Y.-S. Cheng<sup>†</sup>, M.-H. Wen, A. Calindi, K. Yang, C.-W. Chiu, T.-Y. Chen\* “Quantifying the Oligomeric States of Membrane Proteins in Cells through Super-resolution Localizations”. *J. Phys. Chem. B*, **2018**, *122* (46), 10496–10504. <https://doi.org/10.1021/acs.jpcc.8b10402>
20. T.-Y. Chen\*, Y. -S. Cheng, P. -S. Huang, P. Chen\*. “Facilitated Unbinding via Multivalency-Enabled Ternary Complexes: New Paradigm for Protein-DNA Interaction”. *Acc. Chem. Res.*, **2018**, *51*, 860–868. <https://doi.org/10.1021/acs.accounts.7b00541>

**PUBLICATIONS** (based on work prior to UH appointment)

(Co-first author: <sup>†</sup>; Corresponding author: \*)

19. A. G. Santiago<sup>†</sup>, T.-Y. Chen<sup>†</sup>, L. A. Genova, W. Jung, A. M. G. Thompson, M. M. McEvoy, P. Chen. “Adaptor Protein Mediates Dynamic Pump Assembly for Bacterial Metal Efflux”. *Proc. Natl. Acad. Sci. U.S.A.*, **2017**, *114* (26), 6694–6699. <https://doi.org/10.1073/pnas.1704729114>
18. F. Yang, T.-Y. Chen, Ł. Krzemiński, A. G. Santiago, W. Jung, P. Chen. “Single-Molecule Dynamics of the Molecular Chaperone Trigger Factor in Living Cells”. *Mol. Microbiol.*, **2016**, *102*, 992–1003. <https://doi.org/10.1111/mmi.13529>
17. J. B. Sambur, T.-Y. Chen, E. Choudhary, G. Chen, E. J. Nissen, E. M. Thomas, N. Zou, P. Chen. “Sub-Particle Reaction and Photocurrent Mapping to Optimize Catalyst-Modified Photoanodes”. *Nature*, **2016**, *530*, 77–80. <https://doi.org/10.1038/nature16534>
16. T.-Y. Chen<sup>†</sup>, W. Jung<sup>†</sup>, A. G. Santiago, F. Yang, Ł. Krzemiński, P. Chen. “Quantifying Multi-State Cytoplasmic Molecular Diffusion in Bacterial Cells via Inverse Transform of Confined Displacement Distribution”. *J. Phys. Chem. B*, **2015**, *119*, 14454–14459. <https://doi.org/10.1021/acs.jpcc.5b08654>
15. D. J. Martell, C. P. Joshi, A. Gaballa, A. G. Santiago, T.-Y. Chen, W. Jung, J. D. Helmann, P. Chen. “Metalloregulator CueR Biases RNA Polymerase’s Kinetic Sampling of Dead-End or Open Complex to Repress or Activate Transcription”. *Proc. Natl. Acad. Sci. U.S.A.*, **2015**, *112*, 13467–13472. <https://doi.org/10.1073/pnas.1515231112>
14. T.-Y. Chen<sup>†</sup>, A. G. Santiago<sup>†</sup>, W. Jung, Ł. Krzemiński, F. Yang, D. J. Martell, J. D. Helmann, P. Chen. “Concentration- and Chromosome-Organization-Dependent Regulator Unbinding from DNA for Transcription Regulation in Living Cells”. *Nat. Commun.*, **2015**, *6*, 7445. <https://doi.org/10.1038/ncomms8445>
13. P. Chen, A. M. Keller, C. P. Joshi, D. J. Martell, N. M. Andoy, J. J. Benítez, T.-Y. Chen, A. G. Santiago, F. Yang. “Single-Molecule Dynamics and Mechanisms of Metalloregulators and Metallochaperones”. *Biochemistry*, **2013**, *52*, 7170–7183. <https://doi.org/10.1021/bi400597v>
12. S. Maiti, H.-Y. Chen, T.-Y. Chen, C. -H. Hsia, D. H. Son. “Effect of Surfactant and Solvent on Spin-Lattice Relaxation Dynamics of Magnetic Nanocrystals”. *J. Phys. Chem. B*, **2013**, *117* (16), 4399–4405. <https://doi.org/10.1021/jp307321r>
11. C. P. Joshi, D. Panda, D. J. Martell, N. M. Andoy, T. -Y. Chen, A. Gaballa, J. D. Helmann, P. Chen. “Direct substitution and assisted dissociation pathways for turning off transcription by a MerR-family

metalloregulator". *Proc. Natl. Acad. Sci. U.S.A.*, **2012**, *109*, 15121–15126.

<https://doi.org/10.1073/pnas.1208508109>

10. M. Keller, J. Benitez, D. Klarin, L. Zhong, M. Goldfogel, F. Yang, T.-Y. Chen, P. Chen. "Dynamic Multi-Body Protein Interactions Suggest Versatile Pathways for Copper Trafficking". *J. Am. Chem. Soc.*, **2012**, *134* (21), 8934–8943. <https://doi.org/10.1021/ja3018835>
9. H.-Y. Chen, T.-Y. Chen, E. Berdugo, Y. Park, K. Lovering, D. H. Son. "Hot Electron from Consecutive Exciton-Mn Energy Transfer in Mn-Doped Semiconductor Nanocrystals". *J. Phys. Chem. C*, **2011**, *115*, 11407–11412. <https://doi.org/10.1021/jp2016598>
8. T.-Y. Chen, C.-H. Hsia, H. -Y. Chen, D. H. Son. "Dynamics of Spin-Lattice Relaxation in  $\text{Co}_x\text{Fe}_{3-x}\text{O}_4$  Nanocrystals". *Ultrafast Phenomena XVII*, **2010**, 152–153. <https://doi.org/10.1364/UP.2010.TuE39>
7. T.-Y. Chen, C.-H. Hsia, H.-Y. Chen, D. H. Son. "Size Effect on Chemical Tuning of Spin-Lattice Relaxation Dynamics in Superparamagnetic Nanocrystals". *J. Phys. Chem. C*, **2010**, *114*, 9713–9719. <https://doi.org/10.1021/jp103568k>
6. H.-Y. Chen, T.-Y. Chen, D. H. Son. "Measurement of Energy Transfer Time in Colloidal Mn-Doped Semiconductor Nanocrystals". *J. Phys. Chem. C*, **2010**, *114*, 4418–4423. <https://doi.org/10.1021/jp100352m>
5. C.-H. Hsia, T.-Y. Chen, D. H. Son. "Time-Resolved Study on Surface Spin Effect on Spin-lattice Relaxation in  $\text{Fe}_3\text{O}_4$  nanocrystals". *J. Am. Chem. Soc.*, **2009**, *131*, 9146–9147. <https://doi.org/10.1021/ja901484x>
4. T.-Y. Chen, C.-H. Hsia, D. H. Son. "Time-Dependent Elastic Properties and Lattice Temperature of the Photoexcited Iron Oxide Nanocrystals". *J. Phys. Chem. C*, **2008**, *112*, 10125–10129. <https://doi.org/10.1021/jp802461e>
3. C.-H. Hsia, T.-Y. Chen, D. H. Son. "Size-Dependent Ultrafast Magnetization Dynamic in Iron Oxide Nanocrystals". *Nano Lett.*, **2008**, *8* (2), 571–576. <https://doi.org/10.1021/nl072899p>
2. T.-Y. Chen, C.-H. Hsia, H. S. Son, D. H. Son. "Ultrafast Energy Transfer and Strong Dynamic non-Condon Effect on Ligand Field Transitions by Coherent Phonon in  $\gamma\text{-Fe}_2\text{O}_3$  Nanocrystals". *J. Am. Chem. Soc.*, **2007**, *129*, 10829–10836. <https://doi.org/10.1021/ja072578f>
1. C.-H. Lin, T.-Y. Chen, C.-H. Cheng. "Recent Development in Organic Light-Emitting Display". *Instrum. Today*, **2004**, *26*, 38–45.

**CITATIONS** (Google Scholar search conducted on Oct. 13, 2020)

*Total citations: 589; h-index: 11*

**INVITED PRESENTATIONS** (based on work performed at UH)

10. Welch Summer Scholars Program, Houston, TX; June 30, 2021;  
"Dissection of Neuronal Metal Homeostasis at the Single Protein Level"
9. Protein Folding Dynamics, Gordon Research Conference, Galveston, TX; January 5, 2020;  
"Quantifying the Oligomeric States of SOD1 in Cells through Super-Resolution Localizations"
8. Department of Medical Sciences, National Tsing Hua University, Hsin-Chu, Taiwan; October 14, 2019;  
"Single-molecule Dissection of B12 Interaction with Adenosyltransferase (ATR)"
7. Nanoscale & Quantum Phenomena Institute, Ohio University, Ohio University, Athens, OH; September 19, 2019; "Single-molecule Dissection of B12 Interaction with Adenosyltransferase (ATR)"
6. Department of Biochemistry & Molecular Biology, UTHealth, Houston, TX; November 12, 2018;  
"Quantifying the Oligomeric States of Membrane Proteins in Cells through Super-Resolution Localizations"

5. Department of Physiology, Johns Hopkins Medical Institutes, Baltimore, MD; July 10, 2018; “Single-Molecule Metallo-Biophysics”
4. Department of Electrical and Computer Engineering, University of Houston, Houston, TX; January 26, 2018; “Single-Molecule Biophysics”
3. Center for Theoretical Biological Physics, Rice University, Houston, TX; May 1, 2017; “Single-Molecule Metallo-Biophysics: Metallo-Regulator unbinding in living bacteria”
2. Department of Chemistry, Florida Gulf Coast University, Fort Myers, FL; October 1, 2016; “Single-Molecule Metallo-Biophysics: from Bacteria to Neuron Cells”
1. Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan; August 1, 2016; “Single-Molecule Metallo-Biophysics: from Bacteria to Neuron Cells”

#### **CONTRIBUTED PRESENTATIONS** (based on work performed at UH)

5. Cell Biology of Metal, Gordon Research Conference, Barcelona, Spain, 2019 (Poster); “Single-molecule Dissection of B<sub>12</sub> Interaction with Adenosyltransferase (ATR)”
4. 2018 International Copper Meeting, Sorrento, Italy, 2018 (Poster); “Quantifying the Oligomeric States of Membrane Proteins in Cells through Super-resolution Localizations”
3. Single Molecule Approaches to Biology, Gordon Research Conference, West Dover, VT, 2018 (Poster); “Quantifying the Oligomeric States of Membrane Proteins in Cells through Super-resolution Localizations”
2. University of Houston international Symposium on Chemical Research, Houston, TX, 2017; “Single-Molecule Metallo-Biophysics: from Bacteria to Neuron Cells”
1. American Chemical Society Southwest Regional Meeting, Galveston, TX, 2016; “Bacteria modulate regulator unbinding from DNA for transcription regulation”

#### **RESEARCH SUPPORT**

##### **Current Funding:**

##### *Nation-wide Competition*

1. P.I.: Tai-Yen Chen  
“Quantitative Cu-Homeostasis in Live Mammalian Cells at the Single-Molecule Level”  
Sponsor: *National Institutes of Health* (1 R35GM133505-01)  
Funding Period: 08/15/19–5/31/24

##### *State-wide Competition*

2. P.I.: Tai-Yen Chen  
“Time-resolved Super-Resolution Microscope for Drug Discovery and Development”  
Sponsor: *High Priority Area Research Large Equipment Grants Award*  
Funding Period: 04/01/21–10/2/22

##### **Complete Funding:**

##### *University-wide Competition*

1. P.I.: Tai-Yen Chen

“Advancing Metal-Chelator Drug Development for Alzheimer's Disease through Super Resolution Imaging in iPSC-Derived Neurons”

Sponsor: *High Priority Area Research Seed Grants Award, University of Houston*

Funding Period: 02/15/18–2/15/20

2. P.I.: Tai-Yen Chen

“Three-dimensional super-resolution imaging small equipment for drug discovery and development”

Sponsor: *High Priority Area Research Small Equipment Grants Award, University of Houston*

Funding Period: 05/14/18–5/14/20

3. P.I.: Tai-Yen Chen

“Interplay of Redox Status and Cu Homeostasis in Live Neurons at the Single-Molecule Level”

Sponsor: *Welch Foundation* (E19420180324)

Amount: \$195,000

Funding Period: 06/01/18–5/31/21

## **SUPERVISED CO-WORKERS**

### Postdoctoral Associates:

Meng-Hsuan Wen (Ph.D., National Defense Medical Center)

2017–present

Yu-Shan Cheng (Ph.D., Texas A&M University)

2016–2017

Pei-San Huang (Ph.D., Texas A&M University)

2016–2017, 2019–present

### Research Assistant:

Chi-Wei Chiu

Spring–Fall, 2017

### Graduate Students:

Xihong Xie (Chemistry)

2016–present

Guangjie Yan (Chemistry)

2016–present

Manhua Pan (Chemistry)

2017–present

Huanhuan Chen (Chemistry)

2018–present

Yuteng Zhang (Chemistry)

2018–present

### Undergraduate Students:

Aparna Calindi (Chemistry)

2017–2020

Sunkyung Jung (Biochemistry)

2018–2020

Alexis Allamprese (Chemistry)

2021–present

Patrick Sim (Chemistry)

2021–present

### Welch Summer Students (High School):

Karen Yang

2017, 2020 summer

Thomas Su

2018

Carol King

2019

## **COURSES TAUGHT AT UH**

1. CHEM 1332 – *General Chemistry II*: Spring 2017, Fall 2018, and Fall 2020
2. CHEM 4370 – *Physical Chemistry I*: Fall 2016, Spring 2018, Spring 2020, and Spring 2021

## TEACHING EVALUATION STATISTICS

*Evaluation: Numbers in parentheses are the average values for comparable chemistry courses, 5.0 points scale.*

Semester/year	Course	Students Enrolled	Student Responses	Overall Score (Group)	Effectiveness Score (Group)
Fall 2016	CHEM 4370: Physical Chemistry I	27	20	4.7 (3.65)	4.6 (3.5)
Spring 2017	CHEM 1332: General Chemistry II	69	37	4.67 (4.02)	4.73 (4)
Spring 2018	CHEM 4370: Physical Chemistry I	56	37	4.78 (3.91)	4.76 (3.94)
Fall 2018	CHEM 1332: General Chemistry II	248	163	4.36 (3.31)	4.33 (3.16)
Spring 2020	CHEM 4370: Physical Chemistry I	52	44	4.42 (4.25)	4.36 (4.15)
Fall 2020	CHEM 1332: General Chemistry II	284	105	4.18 (3.82)	4.08 (3.66)
Spring 2021	CHEM 4370: Physical Chemistry I	40	29	4.7 (4.3)	4.72 (4.21)

## SERVICE ACTIVITIES

### Within the Department of Chemistry

Chemistry Graduate Program Committee	2016–present
Chemical Sciences Library Liaison	2018–present
Chemistry Department Seminar Coordinator	2019
Chemistry Department Faculty Search Committee	2019
Member of Oral Research Progress Committee, Chemistry	2016–present
Member of M. S. Dissertation Committee, Chemistry	2018–present
Member of Ph. D. Dissertation Committee, Chemistry	2019
Graduate student recruiting activities:	
ACS-Southwest Regional Meeting (SWRM), Galveston, TX	2016
ACS-Southwest Regional Meeting (SWRM), Little Rock, AK	2017

### Within the University of Houston

Member of Ph. D. Dissertation Committee, Electrical Engineering	2018–present
Host of Welch Summer Scholar Program	2017–present
NSM Day of Discovery - 12 Grade AP/Honors Chemistry Students	2018–present

### In the Boarder Scientific Community

Coordinator, American Chemical Society (Greater Houston) Scholarship Exam 2019–present  
Chemistry Judge for the Science Engineering Fair of Houston 2017–present  
Grant reviewer for Petroleum Research Foundation 2018–present  
Training faculty for Houston Area Molecular Biophysics Training Program 2019–present  
Active peer reviewer for the following journals: *ACS Applied Materials & Interfaces*, *ACS Omega*, *Beilstein Journal of Nanotechnology*, *Chemical Communication*, *Journal of Bioinorganic Chemistry*, *Journal of Neuroscience Research*, *Journal of Physical Chemistry B*, *Journal of Physical Chemistry Letters*, *Physical Chemistry Chemical Physics*

#### **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

*American Chemical Society, Biophysical Society*