

## Kuang-Lei Tsai, PhD

Assistant Professor  
CPRIT Scholar  
Department of Biochemistry and Molecular Biology  
McGovern Medical School  
University of Texas Health Science Center at Houston  
6431 Fannin Street, Houston, Texas 77030  
Phone: 1-858-366-3425 Email: Kuang-Lei.Tsai@uth.tmc.edu

---

### Research Interest

- Structure and Dynamics of Biological Macromolecules
- Cryo-Electron Microscopy
- Transcription, Gene regulation, and Epigenetics.
- Enhancer, and non-coding RNA, and Chromatin Architecture

### Education

- 2005 - 2009 Ph.D. National Tsing Hua University, Taiwan  
Bioinformatics and Structural Biology  
Advisor: Dr. Chwan-Deng Hsiao (Academia Sinica)
- 2003 - 2005 M.S. National Tsing Hua University, Taiwan  
Biological Sciences  
Advisors: Dr. Chwan-Deng Hsiao (Academia Sinica) and Yuh-Ju Sun
- 1999 - 2003 B.S. National Cheng Kung University, Taiwan  
Chemical Engineering

### Experience

- 2017.2 – 2017.8 Nanoimaging Services Company  
Principle Scientist
- 2010 - 2017 The Scripps Research Institute, La Jolla, CA  
Research Associate Mentor: Francisco J. Asturias, Ph.D.

### Awards

2017 CPRIT SCHOLAR Cancer Prevention Research Institute of Texas

### Publications

#### Post-doc (2010 – present)

1. Brignole E\*, **Tsai KL\***, Chittuluru J, Li H, Penczek P, Stubbe J, Drennan C, Asturias FJ. 3.3-Å resolution cryo-EM structure of human ribonucleotide reductase with substrate and allosteric regulators bound (\* Authors contributed equally) (**eLIFE**, Vol.7:e31502, 1-23)
2. **Tsai KL**, Yu X, Gopalan S, Chao TC, Zhang Y, Florens L, Washburn MP, Murakami K, Conaway RC, Conaway JW and Asturias FJ. (2017) Mediator structure and rearrangements required for holoenzyme formation. (**NATURE**, Vol.544, 196-203)
3. Sato S\*, Tomomori-Sato C\*, **Tsai KL**, Yu X, Sardi M, Saraf A, Washburn MP, Florens L, Asturias FJ, Conaway RC, and Conaway JW. Integrity of the MED21-MED7 hinge is required for assembly of the Mediator-RNA polymerase II holoenzyme (**JBC**, Epub ahead of print)
4. Murakami K\*, **Tsai KL\***, Kalisman N, Bushnell DA, Asturias FJ, Kornberg RD. (2015) Structure of an RNA polymerase II pre-initiation complex. **PNAS**, Vol.112, 13543-13548. (\* Authors contributed equally)
5. **Tsai KL**, Sato S, Tomomori-Sato C, Conaway RC, Conaway JW and Asturias FJ. (2014) Subunit architecture and functional modular rearrangements of the transcriptional Mediator complex. **Cell**, Vol. 157, 1430-1444.

6. Lai YT, Reading E, Hura GL, **Tsai KL**, Laganowsky A, Asturias FJ, Tainer JA, Robinson CV and Yeates TO. (2014) Structure of a Designed Protein Cage that Self-Assembles into a Highly Porous Cube. **Nature Chemistry**, Vol. 6, 1065-1071.
7. Hsia KC, Wilson-Kubalek, Dottore A, Hao Q, **Tsai KL**, Shimamoto Y, Milligan RA, and Kapoor TM. (2014) Reconstitution of the Hetero-octameric Human Augmin Complex Provides Insights into Its Architecture and Function. **Nature Cell Biology**, Vol. 16, 852-863.
8. **Tsai KL**, Sato S, Tomomori-Sato C, Conaway RC, Conaway JW and Asturias FJ. (2013) A conserved Mediator–CDK8 kinase module association regulates Mediator–RNA polymerase II interaction. **Nature Structural & Molecular Biology**, Vol. 20, 611-9.
9. Lai YT, **Tsai KL**, Sawaya MR, Asturias FJ, Yeates TO. (2013) Structure and flexibility of nanoscale protein cages designed by symmetric self-assembly. **J. Am. Chem. Soc.**, Vol. 135, 7738-43.
10. Imasaki T, Calero G, Cai G, **Tsai KL**, Yamada K, Cardelli F, Erdjument-Bromage H, Tempst P, Berger I, Kornberg GL, Asturias FJ, Kornberg RD, Takagi Y. (2011) Architecture of the Mediator head module. **Nature**, Vol. 475, 240-243.
11. Brignole E\*, **Tsai KL\***, Chittuluru J, Li H, Penczek P, Stubbe J, Drennan C, Asturias FJ. Oligomerization and activity regulation in human ribonucleotide reductase (\* Authors contributed equally) (Manuscript in preparation)

#### **Graduate student (2005 – 2009)**

12. **Tsai KL**, Lo YH, Sun YJ, and Hsiao CD. (2009) Molecular Interplay between the Replicative Helicase DnaC and its Loader Protein Dnal from *Geobacillus kaustophilus*. **J. Mol. Biol.**, Vol. 393, 1056-1069.
13. Lo YH\*, **Tsai KL\***, Sun YJ, Chen WT, Huang CY and Hsiao CD. (2009) The crystal structure of a replicative hexameric helicase DnaC and its complex with single-stranded DNA" **Nucleic Acids Res.**, Vol. 37, 804-814. (\* Authors contributed equally)
14. **Tsai KL**, Sun YJ, Huang CY, Yang JY, Hung MC and Hsiao CD. (2007) Crystal structure of the human FOXO3a-DBD/DNA complex suggests the effects of post-translational modification. **Nucleic Acids Res.**, Vol. 35, 6984-6994.
15. **Tsai KL**, Huang CY, Chang CH, Sun YJ, Chuang WJ, and Hsiao CD. (2006) Crystal Structure of the Human FOXK1a-DNA Complex and Its Implications on the Diverse Binding Specificity of Winged Helix/Forkhead Proteins. **J. Biol. Chem.**, Vol. 281, 17400-17409.

#### **Workshops, Conferences, and Presentations**

- 2016 Invited talk at Department of Molecular Biosciences in UT Austin.  
Invited talk at Van Andel Research Institute.  
Seminar Title: "Molecular Architecture of the Transcriptional Mediator Complex"
- 2014 A Workshop on Advanced Topics in EM Structure Determination, at National Resource for Automated Molecular Microscopy (NRAMM) at Scripps Research Institute. Poster presentation: Subunit architecture and functional modular rearrangements of the transcriptional Mediator complex.
- 2013 2<sup>nd</sup> Annual Waitt Advanced Biophotonics Center Symposium, at Salk Institute, Poster presentation: Mediator–CDK8 kinase module association regulates Mediator–RNA polymerase II interaction
- 2012 A Workshop on Advanced Topics in EM Structure Determination, National Resource for Automated Molecular Microscopy (NRAMM) at Scripps Research Institute. Poster presentation: A conserved Mediator–CDK8 kinase module association regulates Mediator–RNA polymerase II interaction.
- 2009 Conference of the Asian crystallography association (AsCA), Beijing China, Poster presentation: Molecular Interplay between the Replicative Helicase DnaC and its Loader Protein Dnal from *Geobacillus kaustophilus*.
- 2008 21<sup>th</sup> International Union of Crystallography (IUCr), Osaka Japan, Poster presentation: Structure of the FOXO3a-DBD/DNA complex suggests the effects of post-translational modification.