Chih-Te (Ted) Zee

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Education and Awards

University of California, Los Angeles — Los Angeles, CA
Doctor of Philosophy, Chemistry - Biophysics — *Sep. 2016 – Oct. 2021*
George Gregory Fellowship — *Jan. 2020 – Jun. 2020*

University of California, San Diego — La Jolla, CA
Bachelor of Science, Molecular Synthesis — *Sep. 2008 – Dec. 2014*

Relevant Experience

University of California, Los Angeles — Los Angeles, CA
Research Advisor: Prof. Jose A. Rodriguez

Crystallography — *Sep. 2016 – Present*
- Demonstrated racemic crystallography as a technique for phasing electron diffraction data.
- Established collaborations (Profs. Y. Rubin, M. Garcia-Garibay, S. Gellman) and determined structures in fields ranging from materials science to medicinal chemistry.

Peptide Synthesis — *Sep. 2018 – Present*
- Assembled a peptide synthesis laboratory with a $150,000 budget that matches current industry standards in peptide medicinal chemistry with autonomy.
- Developed novel, scalable synthetic route for complex amyloids, eg. Aβ (1-40), circumventing the use of specialized liquid chromatography columns and unnatural amino acid building blocks.
- Drafted and validated protocols for peptide synthesis and quality control analysis of products.

Ferring Research Institute Inc., Medicinal Chemistry Department — San Diego, CA

Research Associate I — *Jul. 2013 – Sep. 2016*
- Developed and optimized synthetic routes to radiolabel peptides with carbon-11, achieving purity appropriate for human administration in positron emission tomography (PET) studies
- Designed structure-activity relationship studies to modulate pharmacokinetic properties of peptides
- Synthesized small-molecule building blocks at gram scale to provide medicinal chemists with materials for the development of drug candidates
- Synthesized linear and cyclic peptides of up to 60 residues for various drug discovery programs

Department Lab Manager — *Jun. 2015 – Sep. 2016*
- Researched and evaluated potential capital equipment and negotiated initial quotes to optimize budget
- Implemented centralized ordering and receiving system, increased compliance to chemical inventory
- Conducted capital equipment repairs and initiated services calls, minimizing instrument down time

Publications

1. **Zee, C.**, Saha, A., Sawaya, M.R., and Rodriguez. J.A. "*Ab initio* determination of peptide structures by MicroED." In *Methods in Molecular Biology*, Brent L. Nannenga, Ed., *in press* (Springer, New York, 2020).

2. Warmack, R.A., Boyer, D.R., **Zee, C.**, Richards, L.S., Sawaya, M.R., Cascio, D., Gonen, T., Eisenberg, D.S., and Clarke, S.G., "Structure of amyloid-β (20-34) with Alzheimer's-associated isomerization at Asp23 reveals a distinct protofilament interface." *Nat. Commun.* 2019, **10**: 3357.

3. **Zee, C.**, Glynn, C., Gallagher-Jones, M., Miao, J., Santiago, C.G., Cascio, D., Gonen, T., Sawaya, M.R., and Rodriguez, J.A. "Homochiral and racemic MicroED structures of a peptide repeat from the ice-nucleation protein InaZ." *IUCrJ*. 2019, **6** (2): 197-205.

4. Gallagher-Jones, M., Ophus, C., Bustillo, K.C., Boyer, D.R., Panova, O., Glynn, C., **Zee, C.**, Ciston, J., Mancia, K.C., Minor, A.M., and Rodriguez. J.A. "Nanoscale mosaicity revealed in peptide microcrystals by scanning electron nanodiffraction." *Commun. Biol*. 2019, **2**: 26.

5. Hattne, J., Shi, D., Glynn, C., **Zee, C.**, Gallagher-Jones, M., Martynowycz, M.W., Rodriguez, J.A., and Gonen, T. "Analysis of global and site-specific radiation damage in cryo-EM." *Structure*. 2018, **26** (5): 759-766.

6. Gallagher-Jones, M., Glynn, C., Boyer, D.R., Martynowycz, M.W., Hernandez, E., Miao, J., **Zee, C.**, Novikova, I.V., Goldschmidt, L., McFarlane, H.T., Helguera, G.F., Evans, J.E., Sawaya, M.R., Cascio, D., Eisenberg, D.S., Gonen, T., and Rodriguez, J.A. "Sub-ångström cryo-EM structure of a prion protofibril reveals a polar clasp." *Nat. Struct. Mol. Biol*. 2018, **25**: 131-134.

7. Lee, K., Elliott, H.L., Oak, Y., **Zee, C.**, Groisman, A., Tytell, J.D., and Danuser, G. "Functional Hierarchy of Redundant Actin Assembly Factors Revealed by Fine-Grained Registration of Intrinsic Image Fluctuations." *Cell Systems.* 2015, **1 (**1): 37-50.

Skills and Qualifications

Laboratory Skills

- Solid-Phase Peptide Synthesis
- X-ray & Electron Diffraction
- Cryo-EM data collection

Instrumentation

- X-ray Diffraction (ALS, APS)
- TEM (T12, TF20, TF30, Titan)
- LC-MS (Thermo, Agilent)
- Preparatory HPLC (Waters, Interchim, Agilent)
- Analytical HPLC (Agilent)
- Peptide Synthesis (PTI: Tribute, CEM: Liberty Blue)

Presentations and Posters

1. **Zee, C.***, Warmack, R.A., Boyer, D.R., Richards, L.S., Goring, A., Sawaya, M.R., Cascio, D., Gonen, T. Eisenberg, D.S., Clarke, S.G., and Rodriguez, J.A. "Using MicroED to probe the atomic structure of complex folds at the core of amyloid fibrils." Poster presented at: Gordon Research Conference, Advancing Peptides as Tools, Material, and Therapeutics. February 9-14, 2020. Ventura, California.

2. Warmack, R.A., Boyer, D.R., **Zee, C.***, Richards, L.S., Sawaya, M.R., Cascio, D., Gonen, T., Eisenberg, D.S., and Clarke, S.G. "MicroED Structures of amyloid-β 20-34 and an analogue with Alzheimer's-associated isomerization of Asp23." Poster presented at: American Peptide Symposium. June 22-27, 2019. Monterey, California.

3. Jakobsen, S., Collins, J.C., Alstrup, A.K.O., Sørensen, J.C., **Zee, C.**, Glud, A.N., Bender, D.A., Grundemar, L., Sandström, R., James, K., Frøkiær, J., and Schteingart, C.D.* "Biodistribution of an oxytocin analogue after intranasal and CSF administration to pigs – A PET imaging study." Talk presented at: 12th World Congress on Neurohypophysial Hormones; July 26-29, 2017. Rio de Janeiro, Brazil.