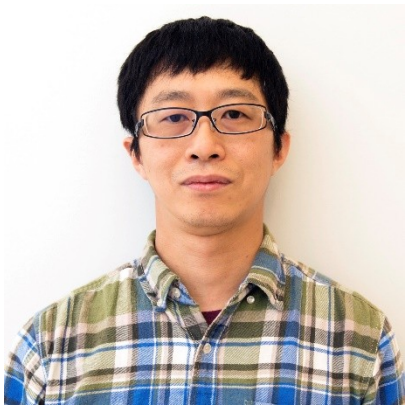
Curriculum Vitae



Name

Jay-How Yang

Current Position

Assistant Professor

Email address

yjh1130823@mail.ndmutsgh.edu.tw

Education & Professional Experiences

Institution and Location	Degree	Completion Date (MM/YYYY)	Field of Study
Griffith University, Australia	M.S.	07/2004	Biotechnology
Arizona State University, Arizona	Ph.D	05/2015	Biochemistry

2025-present: Assistant Professor, Department of Biochemistry, National Defense Medical University

2025-present: Research Assistant Professor, Biodesign CASD, Arizona State University
2015-2024: Associate Research Scientist, Biodesign CASD, Arizona State University

Research Interests

My research focuses on the development and application of serial crystallography techniques, particularly serial femtosecond crystallography (SFX) and time-resolved SFX at X-ray Free Electron Lasers (XFELs). The project in my lab integrates all aspects of SFX, including sample preparation, membrane protein crystallization, nanocrystal optimization, as well as biophysical and biochemical characterization, and cryo-electron microscopy (cryo-EM) single-particle analysis to determine high-resolution structures and dynamic mechanisms of complex biomacromolecules, especially membrane proteins.

Selected Publications

1. Vakili M, Bajt S, Bielecki J, Botha S, Cerniglia C, Chapman HN, **Yang Jay-How** et al.: PEO-sheathed liquid jets increase sample delivery stability for serial femtosecond X-ray crystallography. *Sci Rep.* 2026, 16: 10497.
2. Jernigan RJ, Logeswaran D, Doppler D, Nagaratnam N, Sonker M, **Yang Jay-How** et al.: Room-temperature structural studies of SARS-CoV-2 protein NendoU with an X-ray free-electron laser. *Structure.* 2023, 31: 138–151.
3. **Yang Jay-How**, Williams D, Fromme P, Chiu PL**:** Structure basis of redox

modulation on chloroplast ATP synthase. *Commun Biol.* 2020, 3.
4. Gisriel C, Coe J, Letrun R, Yefanov OM, **Yang Jay-How** et al.: Membrane protein megahertz crystallography at the European XFEL. *Nat Commun.* 2019, 10: 5021.
5. Ayyer K, Yefanov OM, Oberthür D, **Yang Jay-How** et al.: Macromolecular diffractive imaging using imperfect crystals. *Nature.* 2016, 530: 203–206.
6. Kupitz C, Basu S, Grotjohann I, **Yang Jay-How** et al.: Serial time-resolved crystallography of photosystem II using a femtosecond X-ray laser. *Nature.* 2014, 513: 261–265.

Lecture Title

XFEL journey: From Sample preparation to time-resolved femtosecond crystallography using X-ray Fess Electron Lasers (XFEL)

Abstract (500 words maximum)

This presentation presents an overview of the XFEL research workflow, from sample preparation to time-resolved femtosecond crystallography, with a focus on recent advances in sample preparation of Photosystem II (PSII). PSII is a fundamental metalloenzyme responsible for oxygenic photosynthesis, catalyzing the light-driven oxidation of water into molecular oxygen, protons, and electrons. This process occurs at the oxygen-evolving complex (OEC), a Mn_4CaO_5 cluster that cycles through five intermediate states (S_0–S_4) known as the Kok cycle.
Using time-resolved serial femtosecond crystallography (tr-SFX), we aim to capture structural dynamics at the reaction center (RC) and correlate them with changes at the OEC during catalysis. We interest in resolving transient structural and electronic changes that occur during the later stages of the catalytic cycle, especially the $S_4 \rightarrow S_0$ transition associated with O–O bond formation and oxygen release.
Recent progress in crystal optimization has enabled the production of highly stable PSII microcrystals, leading to significant improvements in diffraction quality. Data collected in 2025 demonstrate resolutions at or beyond 2.0 Å, representing a substantial advance from earlier datasets (3.4 Å to 2.6 Å). These improvements provide the foundation for high-resolution, time-resolved studies of catalytic intermediates.
The ultimate goal is to collect high-multiplicity datasets at microsecond time delays (500–1000 μs) from minimally damaged PSII crystals. This approach will allow us to reconstruct a "molecular movie" of coupled structural and redox changes during the critical step of photosynthetic water oxidation. The results will provide new insights into the fundamental mechanism of O–O bond formation and contribute to a deeper understanding of biological energy conversion.