

Curriculum Vitae

FOO Yong Hwee

Contact

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Profile

Nationality | Singaporean

Languages | English, Mandarin, basic Japanese (JLPT N4)

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Background

- Single-molecule fluorescence biophysics and analytical chemistry background.
- Experienced with fluorescence microscopy and single-molecule spectroscopy (including super-resolution imaging PALM/STORM, sptPALM and fluorescence cross-correlation spectroscopy).
- Familiar with common fluorescent proteins and dyes.
- Experienced with molecular cell-biology labs including microbiology labs; experienced in cloning (plasmids and bacteria genome), PAGE/Western blotting and tissue-culture / bacterial culture.
- Experienced with protein purification (His/GST-tag, FPLC and ion-exchange chromatography) and mass spectrometry (Proteomics).
- Experienced with generating custom scripts / programs in MATLAB, Igor Pro and Mathematica.

Education

2006 - 2011 | Ph.D. (Fluorescence Biophysics)

National University of Singapore, Department of Chemistry

- Advisor: Dr Thorsten Wohland in the Biophysical Fluorescence Laboratory and Center for BioImaging Sciences in NUS. Co-Advisor: Dr Sohail Ahmed from the Institute of Medical Biology (A*Star - Biopolis), Neural Stem Cell group.
- The area of study was in biophysical fluorescence which involved applying single molecule sensitive fluorescence correlation spectroscopy (FCS) and fluorescence cross-correlation spectroscopy (FCCS) to quantitate protein-protein interactions in living cells.
- Experienced with cell cultures, green fluorescent proteins, and molecular biology techniques and has knowledge of various imaging techniques (TRIF, confocal, wide-field, FRET, FRAP).

2000 - 2004 | B. Sc. (Hons), Chemistry

National University of Singapore

- Focused in analytical/spectroscopy chemistry. Also took interests in biomolecules and inorganic chemistry.
- Enrolled in the Undergraduate Research Opportunities Program in Science. The project involved measuring the reaction rates of catechin (an antioxidant in tea) with free radicals.
- Final year project (Advisor: Dr Thorsten Wohland) was related to the study of the activity of antimicrobial peptides using lipids monolayer (Langmuir–Blodgett trough technique).

Work Experience:

2020 - current | Senior Research Fellow, Staff of SCELSE's Advanced Biofilm Imaging Facility

2018 - 2020 | Research Fellow

Nanyang Technological University (NTU), Singapore Centre for Environmental Life Sciences Engineering (SCELSE) (Dr Peter Török and Dr Scott Rice's group)

- Development of sensors for metabolite sensing in biofilm.
- Application of super-resolution imaging in bacterial cells to look at changes on the membrane.

2012 - 2018 | Research Fellow

National University of Singapore, Mechanobiology Institute, Bacterial Pathogenesis & Signal Transduction Lab (Dr Linda J Kenney's group)

- Application of super-resolution imaging (PALM/STORM) / single particle tracking in bacterial cells to study two-component system proteins (EnvZ/OmpR; SsrA/B) and nucleoid associated proteins (H-NS).
- Experienced in microbiology sample preparation, cloning techniques and protein purification.

2010 - 2011 | Research Assistant

National University of Singapore, Department of Chemistry, Biophysical Fluorescence Laboratory (Dr Thorsten Wohland's group)

- Applied fluorescence cross-correlation spectroscopy in live cells and managed a customized confocal microscope.

Oct 2009 - Jan 2010 | Short-term fellowship

European Molecular Biology Laboratory (EMBL)

- Hosted by Dr Ernst Stelzer, worked with Dr Carsten Schultz in applying fluorescence cross-correlation spectroscopy in addition to their protein-protein interaction translocation system in live cells.

2004 - 2006 | Research Officer

Singapore Eye Research Institute (Dr Zhou Lei's group)

- Worked in the area of proteomics (biomarker identification in tears) using nanospray liquid chromatography tandem mass spectrometry (LC-MS/MS).
- Also involved in the chemical synthesis of antimicrobial peptides (defensins) using the solid phase peptide synthesis method.

Teaching Experience:

Jun 2019 | SCELSE Summer School 2019

- Gave a short lecture on the principle of fluorescence.

Aug 2017 | SCELSE Microscopy Seminar

- Invited to give two lectures on fluorescent probes in Singapore Centre for Environmental Life Sciences Engineering (SCELSE).

Jul 2015 & Aug 2017 | MBI Boot Camp – An Integrative Approach to Understand Cell Functions (MB5104)

- Conducted one lecture on: “The model organisms: focus on single cells – Bacteria”.

Oct 2014 | MBI Boot Camp on Mechanobiology – From molecules to multicellular systems

- Conducted one lecture on the techniques for the detection of protein-protein interactions.

Jun 2007 & Apr 2009 | European Molecular Biology Organization (EMBO) practical course (Singapore): Imaging in 3-D and the F-techniques: FRET, FCS, FLIM and FRAP.

- Conducted the FCS practical session for the participants.

Research Presentations:

May 2017 | Joint Symposium on Bioimaging between Singapore & Japan

- Title of poster: A novel DNA binding mode of H-NS drives chromosome compaction and gene silencing in single cells.

Feb 2015 | Oral presentation at the Biophysical Society Meeting (Baltimore), Mechanobiology sub-group 2015

- Title of poster: Investigation of the EnvZ/OmpR bacterial signaling system using single particle tracking and single molecule force spectroscopy.

Feb 2014 | Poster presentation at the Biophysical Society Meeting 2014

- Title of poster: Reconstitution of the EnvZ/OmpR bacteria signaling system using supported lipid bilayer.

Feb 2008 | Biophysical Society Annual Meeting, Long Beach (CA) – USA

- Quantitation of Biomolecular Interactions By Single Wavelength Fluorescence Cross-Correlation Spectroscopy (SW-FCCS) *in vivo* (Poster).

Awards:

Jul 2006 - May 2010 | NUS Research Scholarship (for Ph.D.).

Oct 2009 - Jan 2010 | European Molecular Biology Laboratory (EMBL), Short-term fellowship.

Dec 2008 | Poster award at the Joint 5th Structural Biology and Functional Genomics and 1st Biological Physics International Conference – Singapore.

Other merits:

Feb 2014 & 2015 | One of the judges for the Biophysical Society Meeting “Art of Science Image Contest”.

Publications:

1. Liew, A.T.F., **Y.H. Foo**, Y. Gao, P. Zangoui, M.K. Singh, R. Gulvady, and L.J. Kenney. 2019. Single cell, super-resolution imaging reveals an acid pH-dependent conformational switch in SsrB regulates SPI-2. *Elife*. 8. (**Co-author**).
2. Y. F. Gao, **Y. H. Foo**, et al. (2017). Charged Residues in the H-NS linker drive DNA binding and Gene Silencing in Single Cells. *PNAS* 114(47): 12560-12565.
3. Spahn, C., M. Glaesmann, Y. Gao, **Y. H. Foo**, M. Lampe, L. J. Kenney and M. Heilemann (2017). Sequential Super-Resolution Imaging of Bacterial Regulatory Proteins: The Nucleoid and the Cell Membrane in Single, Fixed E. coli Cells. *Methods Mol Biol* 1624: 269-289.
4. R. Machán, **Y. H. Foo**, and T. Wohland. (2016). On the equivalence of FCS and FRAP: Simultaneous lipid membrane measurements. *Biophys J* 111(1): 152-161.
5. **Y. H. Foo**, C. Spahn, H. Zhang, M. Heilemann, and L. J. Kenney. (2015). Single cell super-resolution imaging of E. coli OmpR during environmental stress. *Integr Biol (Camb)* 7:1297-1308.
6. **Y. H. Foo**, Y. Gao, H. Zhang, and L. J. Kenney. (2015). Cytoplasmic sensing by the inner membrane histidine kinase EnvZ. *Prog Biophys Mol Biol* 118:119-129.

Publications during Ph.D.:

7. Lam, C. S., T. K. Mistri, **Y. H. Foo**, et al. (2012). DNA-dependent Oct4-Sox2 interaction and diffusion properties characteristic of the pluripotent cell state revealed by fluorescence spectroscopy. *Biochem J* 448(1): 21-33.

8. **Y. H. Foo**, N. Naredi-Rainer, et al. (2012). Factors affecting the quantification of biomolecular interactions by fluorescence cross-correlation spectroscopy. Biophys J 102(5): 1174-1183.
9. **Foo, Y. H.**, V. Korzh and T. Wohland (2012). Fluorescence Correlation and Cross-Correlation Spectroscopy Using Fluorescent Proteins for Measurements of Biomolecular Processes in Living Organisms. Fluorescent Proteins II: Application of Fluorescent Protein Technology. G. Jung. Berlin, Heidelberg, Springer Berlin Heidelberg: 213-248.
10. Xianke, S., **Yong Hwee, F.**, et al. (2010). Applications of Fluorescence Correlation Spectroscopy in Living Zebrafish Embryos. Imaging in Zebrafish: Insights into Development and Disease. S. Karuna and R. Sudipto. Singapore, World Scientific Publishing Co. Pte. Ltd.: 69-103.
11. Shi, X., **Y. H. Foo**, et al. (2009). Determination of dissociation constants in living zebrafish embryos with single wavelength fluorescence cross-correlation spectroscopy. Biophys J 97(2): 678-686. (**Co-author**).
12. Sudhaharan, T., P. Liu, **Y. H. Foo**, et al. (2009). Determination of in vivo dissociation constant, KD, of Cdc42-effector complexes in live mammalian cells using single wavelength fluorescence cross-correlation spectroscopy. J Biol Chem 284(20): 13602-13609.

Publications while working with Singapore Eye Research Institute:

13. Liu, S., L. Zhou, et al. (2008). Linear analogues of human beta-defensin 3: concepts for design of antimicrobial peptides with reduced cytotoxicity to mammalian cells. ChemBiochem 9(6): 964-973.
14. Zhou, L., R. W. Beuerman, et al. (2007). Proteomic analysis of rabbit tear fluid: Defensin levels after an experimental corneal wound are correlated to wound closure. Proteomics 7(17): 3194-3206.