Siyuan Yin

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EDUCATION

Shanghai Jiao Tong University *Sep 2019 - Mar 2022*
M.Sc in Physics (Optics), School of Physics & Astronomy
Thesis title:"Biomedical microscopy based on few photon imaging"
GPA: 3.79/4.00

Shanghai Jiao Tong University *Sep 2015 - Jun 2019*
B.S. in Biomedical Science (Zhiyuan Honors Program), School of Medicine
GPA: 3.93/4.30 Rank: 2/11

University of Sydney *Jun 2016 - Jul 2016*
English and Biomedical Study Program, School of Medicine

RESEARCH EXPERIENCE

Laboratory of Integrated Photonics and Quantum Information, SJTU Shanghai, China
Supervised by Prof. Xianmin Jin *Jul 2019 - Present*

Project 1: Photon Arrival Time Analysis Enhanced Confocal Microscopy (*Responsible*)

· Developed a single-photon confocal microscopic system that records photon arrival times and uses them to reconstruct images at much lower exposure intensities with comparable quality.
· Constructed the whole experimental platform from the ground up: ordered equipment, built the optical system, and optimized its setup based on practical issues.
· Coordinated pulsed laser, single photon counting, and galvo scan systems by FPGA; and processed data using Matlab.

Project 2: Single photon fluctuation Microscopy (*Responsible*)

· Combined heralded single photon imaging with super-resolution optical fluctuation imaging and paved the way for low-exposure wide-field microscopy applications.
· Used the single photon source generated by the SPDC process from the PPKTP crystal to illuminate the sample and trigger intensified CCD and analyzed data using Matlab.

Project 3: Quantum induced bio-randomness (*Responsible*)

· Created a random number generator that let the micro-organisms scatter photons with free will to break the Bell's inequality.

Project 4-5: Fast correlated-photon imaging enhanced by deep learning and Thresholded single-photon underwater imaging and detection

· Operated the intensified sCMOS for the correlated-photon imaging.

Wyss Insititute for Biologically Inspired Engineering, Harvard University Boston, USA
Supervised by Prof. George Church and mentored by Dr. Yu Wang *Jul 2018 - Apr 2019*

Project 1: Expansion microscopy (ExM) protocol optimization

· Explored a more refined protocol for Expansion Microscopy (ExM) based on the monomer and crosslinker properties.
· Applied the gel protocols (AA, SA, DMAA, etc.) in *in vivo* BSC-1 cell and brain fluorescent imaging using conventional antibodies and DNA-oligo-modified secondary antibodies.

Project 2: Immunostaining with signal amplification by exchange reaction (Immuno-SABER)

· Conducted antibody and DNA oligos conjugation and utilized Immuno-SABER in conventional and ExM imaging.

Laboratory of Skin Immunology, Shanghai Insitiute of Immunology Shanghai, China
Supervised by Prof. Honglin Wang *Sep 2016 - Jun 2018*

Project : Identification of a Th17 Inhibitor in Psoriasis(*Independent*)

· Screened natural compound derivatives for the inhibition of IL-17 production by $CD4^+$ T cells via flow cytometry and validated the *in vitro* efficacy of a candidate compound.
· Applied the selected compound to the imiquimod-induced mouse model of psoriasis through intragastric administration and evaluated its in vivo efficacy through histological analysis of the skin.
· Explored the working mechanism of the IL-17-inhibitory effects through RNA sequencing of T cells treated with the compound.

PUBLICATIONS

1. **Si-yuan Yin**, Zhan-ming Li, Shi-Bao Wu, Heng Zhou, and Xian-Min Jin,"Single photon fluctuation Microscopy" (**2021**). Manuscript in preparation.
2. **Si-yuan Yin**, Zhan-ming Li, Hao-ran Lu,Shi-Bao Wu, Heng Zhou, and Xian-Min Jin,"Photon Arrival Time Analysis Enhanced Confocal Microscopy"(**2021**). Manuscript in preparation.
3. Zhi-qiang Jiao, **Si-yuan Yin**, Jun Gao, Zhe-yong Zhang, Wen-hao Zhou, Chao-ni Zhang, Lu-feng Qiao, Xiao-ling Pang, Jian-Peng Dou and Xian-Min Jin,"Quantum induced bio-randomness"(**2021**). Manuscript in preparation.
4. Zhan-Ming Li, Shi-Bao Wu, Jun Gao, Heng Zhou, Zeng-Quan Yan, Ruo-Jing Ren, **Si-yuan Yin**, and Xian-Min Jin, "Fast correlated-photon imaging enhanced by deep learning" *Optica* 8, 323-328 (**2021**). DOI: 10.1364/OPTICA.408843.
5. Zhan-Ming Li, Heng Zhou, Zhong-Yuan Li, Zeng-Quan Yan, Cheng-Qiu Hu, Jun Gao, Shi-Bao Wu, **Si-yuan Yin**, and Xian-Min Jin, "Thresholded single-photon underwater imaging and detection," *Optics Express* 29, 28124-28133 (**2021**). DOI: 10.1364/OE.436013.
6. Sinem K. Saka, Yu Wang, Jocelyn Y. Kishi, Allen Zhu, Yitian Zeng, Wenxin Xie, Koray Kirli, Clarence Yapp, Marcelo Cicconet, Brian J. Beliveau, Sylvain W. Lapan, **Siyuan Yin**,Millicent Lin, Edward S. Boyden, Pascal S. Kaeser, German Pihan, George M. Church & Peng Yin. "Immuno-SABER enables highly multiplexed and amplified protein imaging in tissues," *Nature Biotechnology* 37, 1080–1090 (**2019**). DOI: 10.1038/s41587-019-0207-y.

SKILLS

Optics related skills

· The construction of optical imaging system such as wide-field microscope, confocal microscope and structured illumination microscope from equipment ordering to optical system realization.
· Single-photon-sensitive instruments such as iCCD, isCMOS, EMCCD and APD.
· FPGA, matlab.

Biological and bio-imaging related skills

· PCR, Gel electrophoresis, DNA extraction, RNA isolation etc.
· Flow cytometry (FACS), Immunohistochemistry, Immunofluorescence, ELISA etc.
· Anatomy, Gavage, Tail intravenous injection, Section cutting, HE staining etc.
· Expansion Microscopy, PER/Immuno-SABER, HCR, PAGE, Antibody-DNA oligo conjugation etc.

HONORS AND AWARDS

Shanghai Jiao Tong University First Class Academic Scholarship for Graduate Students	2020
Zhiyuan Honor Degree of Bachelor of Science In Bioscience(Biomedical Science)	2019
SHSMU JAT Forum Poster Presentation-Second Prize	2018
Shanghai Jiao Tong University Academic Excellence Scholarship for Undergraduates	2016/2017/2018
Zhiyuan Honors Scholarship	2016/2017