



Department of Physics
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SORASAK PHANPHAK, PHD.

EDUCATION

PHD (PHYSICS), UNIVERSITY OF MANCHESTER, 2019.

4-year research program from Biological Physics group, School of Physics and Astronomy, University of Manchester. My thesis is on the topic of **Investigation of K1 bacterial capsular morphology and single molecules in capsular biosynthesis using super-resolution fluorescence microscopy (dSTORM).**

MSC (PHYSICS), KASETSART UNIVERSITY, THAILAND

First-class Honors with the thesis project in **optical manipulation of liquid crystal droplets**. Included courses: Statistical Physics, Methods of Theoretical Physics, Quantum theory and Solid State Theory.

BSC (PHYSICS), KASETSART UNIVERSITY, THAILAND

First-class Honors with a 3.59 GPA. Several physics and biology subjective courses including: Biophysics, Astronomy, Computational physics, Quantum Mechanics, Optics. Industrial Biology, Atomic-Scale simulation and Statistical Mechanics.

SKILLS, ABILITIES, AND EXPERTISE

BIOLOGICAL TECHNIQUES:

- Polymerase chain reaction (PCR), genetic modification (ranging from clone design to protein expression control), Western blots, protein isolation and identification through SDS-PAGE, high-performance liquid chromatography (HPLC), cell culture.

PHYSICAL AND MICROSCOPY TECHNIQUES:

- Atomic force microscopy (AFM), super-resolution fluorescence microscopy (including stochastic optical reconstruction microscopy (STORM) and stimulated emission-depletion microscopy (STED)), Airy-scan confocal microscopy, fluorescence correlation spectroscopy (FCS), single-molecule fluorescence tracking, cryogenic Raman spectroscopy, optical tweezer applications.

COMPUTATIONAL SKILLS:

- MatLab (including a novel fitting and identification algorithm to map the spatial distribution of a bacteria capsule and 2D, two-population FCS simulation), Origin (graph design and data analysis), Fiji (image processing and macro design for data analysis), Imaris (confocal 3D image processing and visualization), Microsoft Office (full proficiency in Word, PowerPoint, Excel).

PUBLICATIONS

Super-resolution fluorescence microscopy study of the production of K1 capsules by *Escherichia coli*: evidence for the differential distribution of the capsule at the poles and the equator of the cell.

Phanphak et al. Langmuir, 35(16): 5635-5646, 2019.

Quenched Stochastic Optical Reconstruction Microscopy (qSTORM) with Graphene Oxide.

Ruiheng Li, Pantelis Georgiades, Henry Cox, **Sorasak Phanphak**, Ian S. Roberts, Thomas A. Waigh and Jian R. Lu. Scientific report, 8:16928, 2018.

Precision Mechanism of Nematic Liquid Crystal Droplets under Low Power Optical Tweezers.

Phanphak et al. Ferroelectrics, 468: 114-122, 2014.

WORKING EXPERIENCE

FACULTY MEMBER (LECTURER) AT DEPARTMENT OF PHYSICS, KASETSART UNIVERSITY

(March 2020 - Present)

Lecturing in Physics for undergraduate, master, and PhD students at the department of Physics, Faculty of Science, Kasetsart university in Bangkok, Thailand. In addition to giving lecture, doing research in optics and biological physics also focus on biomedical and agricultural applications.

BIOLOGICAL PHYSICS POSTGRADUATE RESEARCHER, UNIVERSITY OF MANCHESTER

(June 2015 – August 2019; graduated from September 2019)

Working as a PhD student with Prof. Ian Roberts and Dr. Thomas A. Waigh, my project investigated the dynamics and mechanisms of virulent capsule production in *Escherichia coli*. Furthermore, I studied the kinetics of enzymes and proteins involved in the capsular biosynthesis pathway. Several techniques had been applied, including genetic, chemical and physical methods (e.g. Western blot, chemical assays, super-resolution microscopy (STED and STORM), AFM).

PROJECT SUPERVISOR AND LAB DEMONSTRATOR, UNIVERSITY OF MANCHESTER

(October 2015 – March 2017)

I supervised project students working on bacterial interaction with graphene oxide (GO), training and advising undergraduate and Master's-level physics students to do biological experiments with live bacteria.

I also worked as a physics lab demonstrator, where I conducted, supported and assessed undergraduate students while they were doing experiments. I gained experience interviewing students to evaluate and build their core knowledge in experimental physics.

RESEARCH ASSISTANT, NANYANG UNIVERSITY

(September 2011 – February 2012)

Working as a project officer with Prof. Yu Ting on a study that investigated graphene conductivity using cryogenic Raman spectroscopy.

COMMUNICATION (TRAINING, WORKSHOPS, POSTER & ORAL PRESENTATIONS)

Physics meets biology II (Institute of Physics, IOP)

September 2019. Oxford, UK.

Poster presentation on the topic of "*Investigation of K1 bacterial capsular morphology and single molecules in capsular biosynthesis using super-resolution fluorescence microscopy (dSTORM)*".

2nd Mechanobiology meeting in Vietnam (ICISE)

July 2019. Quy Nhon, Vietnam.

Oral presentation on the topic of "*Investigation of K1 bacterial capsular morphology and single molecules in capsular biosynthesis using super-resolution fluorescence microscopy (dSTORM)*"

The Physics of Microorganism II (Institute of Physics, IOP)

April 2019. London, UK.

Poster presentation on the topic of "*Investigation of K1 capsular polysaccharide, a permeable shield of E. coli against antimicrobial peptides*".

Quantitative approaches to antimicrobial resistance (Institute of Physics, IOP)

July 2017. Edinburgh, UK.

Poster presentation on the topic of "*Antibody labelling to study Escherichia coli K1-polysialic capsules using super-resolution fluorescence microscopy (dSTORM)*".

Physics Meets Biology (IOP)

September 2016. Clare College, Cambridge, UK.

Brief oral talk and poster presentation about latest research scope.

Super-resolution workshop (Royal Microscopy Society, RMS)

July 2015. Leeds, UK

Participated this meeting to explore the super-resolution microscopy community; learned from keynote speakers Dr. Susan Cox, and Prof. Xiaowei Zhuang super-resolution microscopy protocols.

The International Conference of Photonics Solution -ICPS 2013 (SPIE and OSA)

May 2013. Chonburi, Thailand

Oral presentation on my Master's project - *Precession mechanism of nematic liquid crystal droplets under optical tweezer.*

SPONSORSHIP

DPST (Development and Promotion of Science and Technology Talents Project), Thailand
2010-2018 for Bachelor's, Master's, and PhD degrees