



Nuttapol Tanadchangsaeng, D.Eng.

ดร.ณัฐพล ถนัดช่างแสง

Email: nuttapol.t@rsu.ac.th , tnuttapol@gmail.com

Tel.: +66-(0)86-354-4337

Education

DOCTOR OF ENGINEERING

Innovative and Engineered Materials
Tokyo Institute of Technology, Japan
2010

MASTER OF ENGINEERING

Environmental Engineering and
Management, *Asian Institute of
Technology*, Thailand
2007

BACHELOR OF ENGINEERING

Environmental Engineering
Kasetsart University, Thailand
2005

Career Summary

LECTURER

Faculty of Biomedical Engineering,
Rangsit University; Thailand
2013 to present

POST-DOCTORAL RESEARCH FELLOW

Hawai'i Natural Energy Institute,
University of Hawaii; USA
2011 to 2013

INTER. PROG. RESEARCH ASSOCIATE (IPA)

Bioplastic Research Team,
RIKEN Institute; Japan
2007 to 2010

RESEARCH ASSOCIATE

Asian Regional Research Program on
Environmental Technology (ARRPET),
Asian Institute of Technology
2007

Professional Affiliations and Activities:

Faculty Member at Faculty of Biomedical Engineering, Rangsit University, to present

Principal Investigator of numerous Funded Research Projects, 2013 to present:

- Thailand Research Fund as TRF Grant for New Researcher (grant: 1,180,000 baht)
- National Research Council of Thailand as NRCT Grant (grant: 3,500,000 baht)
- Thailand Toray Science Foundation (grant: 210,000 baht)
- Government Pharmaceutical Organization of Thailand (grant: 2,880,000 baht)

Leader and Director of Biomaterials Laboratory, Faculty of Biomedical Engineering, and the Industrial Biomaterials Research Center (IBIOMAT), Rangsit University, to present

Reviewer of the *Journal of Applied Polymer Science*, 2012-present

Advisor and academic committee for numerous bachelor and master thesis in the topics of bioplastics and biomaterials, 2013-present

Research Expertise:

- Material design and characterizations for bio-based polymers and biodegradable plastics: structure, thermo-mechanical properties and physical morphology
- Microbial fermentation for producing polyhydroxyalkanoate (PHA) bioplastics and platform chemicals from renewable resource feedstocks and organic wastes
- Biomaterial applications for medical use: drug delivery system, tissue engineering
- Nano & micro-fiber fabrications by electrospinning for control-released delivery system, biomolecular binding membrane, and tissue scaffold for medical implants
- Naturally and biologically inspired materials as biomimetics for biomedical applications: 3D-bioprinting, organ-on-a-chip, jellyfish-inspired injection system
- Bioinformatics of biomolecules by mass spectrometry: proteomics, metabolomics

Research Experiences:

LECTURER, RANGSIT UNIVERSITY; BANGKOK, 2013 - PRESENT

- I. Clean technology for production and purification of polyhydroxyalkanoate (PHA) bioplastics funded by National Research Council of Thailand (NRCT)
- II. Proteomic examination for gluconeogenesis pathway-shift during PHA formation in *Cupriavidus necator* grown on glycerol funded by TRF and TTFS
- III. Development of biopolymer films containing plai essential oil for topical drug delivery applications as pain relief patches funded by GPO

- IV. Development of electrospun polyhydroxyalkanoate nanofibers for urine protein preparation by syringe-push membrane absorption method of clinical proteomics, funded by TRF and collaborated with Faculty of Medicine Ramathibodi Hospital
- V. Bio-inspired novel injection system from box jellyfish nematocyst venom sting, collaborated with Faculty of Medicine Ramathibodi Hospital and funded by BEDO
- VI. A customized material and design platform for biologically functional soft tissues fabricated by 3D-bioprinting, collaborated with Faculty of Medicine Ramathibodi Hospital Mahidol University
- VII. Development of biopolymer nanofiber mats for topical applications for anti-fungal by electrospinning technique funded by Rangsit University

POST-DOCTORAL RESEARCH FELLOW, HAWAII NATURAL ENERGY INSTITUTE, UNIVERSITY OF HAWAII; USA, 2011 - 2013

- I. Biosynthesis and material characterization of biopolyesters produced from glycerol waste and lignocellulosic biomass
- II. Improvement of PHA processing capabilities by bionanocomposites and blending technique for packaging and biomedical application

DOCTORAL STUDENT AND IPA RESEARCH ASSOCIATE, TOKYO INSTITUTE OF TECHNOLOGY AND RIKEN INSTITUTE; JAPAN, 2007 - 2010

- I. Identified and discovered the novel type of biopolyester containing branched side-chain second-monomer unit produced inside bacteria.
- II. Investigated the methodology of molecular design for the biopolyester to predict and tailor their properties and functions, and the new technology of efficient and precise bioplastic synthesis.
- III. Performed characterization of material properties and biodegradation testing for medical and industrial application.

RESEARCH STUDENT AND RESEARCH ASSOCIATE, ASIAN INSTITUTE OF TECHNOLOGY, 2005 - 2007

- I. Constructed the modeling of Anaerobic Ammonium Oxidation (ANAMMOX) process under nitrite Inhibitory conditions
- II. Operated the anaerobic pilot-scale plant of the rayon-industrial sulfate wastewater removal coupled with sulfur recovery process.

Selected Publications

Nuttapol Tanadchangsang, Asahi Kitagawa, Tetsuya Yamamoto, Hideki Abe, Takeharu Tsuge (2009) Identification, Biosynthesis, and Characterization of Polyhydroxyalkanoate Copolymer Consisting of 3-hydroxybutyrate and 3-hydroxy-4-methylvalerate; *Biomacromolecules* Volume 10, Issue 10, pages 2866-2874. (Impact factor: 5.246)

Nuttapol Tanadchangsang, Takeharu Tsuge, Hideki Abe (2010) Comonomer Compositional Distribution, Physical Properties and Enzymatic Degradability of Bacterial Poly(3-hydroxybutyrate-co-3-hydroxy-4-methylvalerate) Copolyesters; *Biomacromolecules* Volume 11, Issue 6, pages 1615-1622. (Impact factor: 5.246)

Nuttapol Tanadchangsang, Jian Yu (2012) Microbial Synthesis of Polyhydroxybutyrate from Glycerol: Gluconeogenesis, Molecular Weight and Material Properties of Biopolyester; *Biotechnology and Bioengineering* Volume 109, Issue 11, pages 2808-2818. (Impact factor: 4.5)

Nuttapol Tanadchangsang, Jian Yu; (2013) Miscibility of Natural Polyhydroxyalkanoate Blend with Controllable Material Properties; *Journal of Applied Polymer Science* Volume 129, Issue 4, pages 2004–2016. (Impact factor: 1.86)

Michael M. Porter, Steve Lee, Nuttapol Tanadchangsang, Matt J. Jaremko, Jian Yu, Marc Meyers, and Joanna McKittrick (2013) Porous Hydroxyapatite-Polyhydroxybutyrate Composites Fabricated by a Novel Method Via Centrifugation; *Mechanics of Biological Systems and Materials* Volume 5, pages 63-71. (Book chapter)

Nuttapol Tanadchangsang (2014) Structure, Chemomechanical Properties and Degradability of Polyhydroxyalkanoate: A Review; *Bulletin of Health, Science and Technology* Volume 12, Number 1, pages 9-19. (Review Article)

Nuttapol Tanadchangsang, Jian Yu (2015) Thermal Stability and Degradation of Biological Terpolyesters over a Broad Temperature Range; *Journal of Applied Polymer Science* Volume 132, Issue 13, pages 1–10. (Impact factor: 1.86)

Nuttapol Tanadchangsang, Darunee Khanpimai, Pornkanok Weerakiat, Siriprapha Ardwichai, Stayu Kitmongkonpaisan, Wimol Chobchuenchom, Thongchai Koobkokkrud, and Nuankanya Sathirapongsasuti (2016) Fabrication and characterization of electrospun nanofiber films of PHA/PBAT biopolymer blend containing Chilli herbal extracts (*Capsicum frutescens* L.) *International Journal of Food Engineering* Volume 2, Number 1, pages 61-65.

S. Kitmongkolpaisarn, A. Panlomso, S. Boonyagul, T. Koobkorkroad, W. Chobchuenchom, and N. Tanadchangsang "Morphology of Keratinocyte (HaCaT) Cells on Electrospun Nanofibers of Polyhydroxyalkanoate Biopolyester Containing *Zingiber cassumunar* (Plai Oil)" The Rangsit University International Research Conference 2017.