Patcharaporn Wongchadakul, Ph.D.

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Education

- **Bachelor of Engineering in Industrial Engineering** 2007-2010
  Thammasat University, Thailand
- **Master of Business Administration** 2013-2014
  Assumption University, Thailand
- **Doctor of Philosophy in Medical Engineering (Biomechanical engineering)** 2015-2017
  Thammasat University, Thailand
- **Post-doctoral Fellow in Bioengineering**
  Cornell University, New York, USA 2019-2021

Work Experiences

Lecturer 2018-Present
Princess Srisavangavadhana College of Medicine, Chulabhorn Royal Academy, Thailand

- Instructed courses in Laser Physics, Research Methodology, and Physics in Medicine (Fluid dynamics and Biomechanics), for Master's and Bachelor's programs.
- Provided mentorship and guidance to PhD students on research projects within the medical engineering field.
- Conducted research and published findings, with a focus on integrating engineering principles into medical practices, by utilizing FEA (COMSOL) and CAD (SolidWorks).
- Collaborated with medical professionals to identify challenges and develop surgical techniques aligned with clinical requirements.

Post-doctoral Researcher: Numerical Modeling of Radiofrequency Cardiac Ablation 2019-2021
Department of Biological and Environmental Engineering, Cornell University, NY, USA
Advisor Professor, Ashim K. Datta

- Developed numerical models to simulate heat and blood perfusion during radiofrequency cardiac ablation, considering thermal and mechanical reactions.
- Emphasized heat transfer, porous media, fluid dynamics, poromechanical deformation, and phase change transitions, using FEA (COMSOL) and CAD (SolidWorks).
- Goal was to improve surgical outcomes and reduce complications like steam pop.

Researcher: Numerical Modeling of Heat Transfer and Fluid Dynamics in Medicine 2016-Present
Department of Mechanical Engineering, Thammasat University, Thailand
Advisor Professor, Phadungsak Rattanadecho

- Conducted extensive numerical studies focusing on innovative medical engineering modeling techniques, particularly in heat transfer and fluid dynamics.
- Utilized FEA (COMSOL) and CAD (SolidWorks) for mathematical problem-solving.
- Supervised undergraduate and graduate student research, providing technical guidance and support.

Special Instructor 2019
Faculty of Engineering, Panyapiwat Institute of Management, Thailand

- Instructed Drawing and Engineering Design by using CAD software: SOLIDWORKS and AutoCAD.

Teaching Assistant 2015
Faculty of Engineering, Thammasat University, Thailand

- Subjects: Heat and Mass Transfer/Drawing and Engineering Design.
- Assisted a class of 50 students ensuring good understanding with advanced, challenging topics.
- Evaluated coursework, as well as constructed the mid-tern and final examinations.

Design Engineer 2012-2014
Division of Research and Development, Thai Stanley Electric Public Co., Ltd., Thailand

- Designed and developed automotive lamps using CAD (CATIA V5 and SOLIDWORKS).
- Employed mold design techniques, considering draft angle, wall thickness, and gate design, to ensure ease of disassembly during the plastic injection molding process.
- Created 2D and 3D drawings to communicate across multiple disciplines including marketing, regulatory, quality, product design, production engineering, and with clients, ensuring the success of the project.
- Conducted photonic design validation testing and created prototypes.
- Engaged in plastic injection molding simulations to optimize production efficiency and cost-effectiveness.

Marketer
Central Marketing Group Co., Ltd., Thailand 2012
- Developed and executed marketing strategies for Japanese cosmetic brand.
- Conducted market research and competitor analysis.
- Created cross-functional communication plans and marketing campaigns to align initiatives With business goals.
- Managed FDA registration, ensuring compliance with Thai FDA regulations for product safety and effectiveness.

Sales Engineer and Technical Supporter 2011-2012
Division of Sensors and Automations System, Keyence (Thailand) Co., Ltd., Thailand
- Assisted customer troubleshooting and design project by conducting automation system.
- Provided technical instruction and consulted on device installation.

Engineering Intern 2010
Division of Pipe and Fitting Production, Nawaplastic Industries Co., Ltd., Thailand
- Designed new manufacturing work operations to improve quality of life for workers.

Fields of Expertise

Computational Fluid Dynamics (CFD) • Heat and Mass Transfer • Porous media • Shear Stress • Hemodynamics • Numerical Simulation • Finite Element Analysis (FEA) • Solid Mechanics • Computer-Aided Design (CAD) • Computer-Aided Surgical Simulation • Radiofrequency Cardiac Ablation • Vascular Access • Arterio-Venous Fistular • Thrombosis • Vascular Surgery • Coronary artery bypass graft • Septal L-strut • Septorhinoplasty • Low-Level Laser Therapy • Tumor ablation • Laser ablation and nanoparticles

Skills

Applications: COMSOL Multiphysics, Ansys, SOLIDWORKS, CATIA V5, AutoCAD, Scientific illustration (Adobe Illustrator, CANVA)

Academic Experiences

- **Invited Reviewer** of International Journal of Heat and Mass Transfer (1 review) 2025
  Impact Factor: 5, Q1
- **Invited Reviewer** of Scientific Reports (1 review) Impact Factor: 4.6, Q1 2024
- **Invited Reviewer** of Thermal Science and Engineering Progress, Elsevier (1 review) 2024
  Impact Factor: 4.9, Q1
- **Invited Reviewer** of International Communications in Heat and Mass Transfer (5 reviews) 2022-2023
  Impact Factor: 6.782, Q1
- **Invited Reviewer** of International Journal of Thermal Sciences, Elsevier (3 reviews) 2020
  Impact Factor: 3.707, Q1.
- **Invited Speaker** of The Special Semester on Mathematical Methods in Medicine: 2023
  Modeling and simulation of ablation treatments
  at the Johann Radon Institute for Computational and Applied Mathematics (RICAM), Austria

Honors and Achievements

- **Thailand Science Research and Innovation Fundamental Fund** the Granting for 2022-2024
  accomplish researches in biomedical engineering.
- **Royal Thai Government Scholar Granted** the Granting to perform post-doctoral research. 2019-2021
- **The Thailand Government Research Granted** the Funding for accomplish research. 2019-2021

- **The Thammasat University PhD Scholar Granted** the scholarship to pursue a Ph.D. 2014-2017
- **Won the 1th National Dissertation** awarded for outstanding Ph.D. Dissertation in Thailand. 2019
- **Won the 1th University Dissertation** awarded for excellent PhD Dissertation in university 2018
- **Honors medal from princess of Thailand** for contributing high reputation for the institute. 2019
- **Honors certificate from National Research Council of Thailand** for excellent reputation for the country. 2018
- **The International Exchange Program Scholarship** Kobe University, Japan. 2015
- **Gold Prize and Special Prize from China** Focused Ultrasound Ablation for the Treatment of Patients with Localized Breast Cancer: Computer Simulation, 45th International Exhibition and Invention of Geneva, Switzerland. 2017
- **Silver Prize** the Liver Cancer Treatment Using Microwave Coaxial Antenna: Computer Simulation Based on FEM and Experiment, 44th International Exhibition and Invention of Geneva, Switzerland. 2016
- **Bronze Prize and Best Invention Award** Computer Simulation Based on FEM of Laser-induced Thermotherapy in Human Layered Skin-Tissue, 44th International Exhibition and Invention of Geneva, Switzerland. 2016
- **Best Invention in Biotechnology and Gold Award** Modeling of Cancer Treatment by Laser, ASCOJA Invention Exhibition, Malaysia. 2016
- **Gold Prize** Computer Simulation of Cancer Treatment by Laser, Seoul International Invention Fair, Korea. 2016

Publications and Conferences

Publications

- 2024 -

1) **Patcharaporn Wongchadakul**, Apram Jyot, Kongkrit Chaiyasate, and Suphalerk Lohasammakul "Optimum anastomosis angle of end-to-side microsurgical anastomosis for preventing future shear-related risk of thrombosis by computational modeling" *Scientific Reports*, Springer Nature, 2024, 14, 25759. **Impact Factor: 3.8, Q1** https://doi.org/10.1038/s41598-024-77390-x

2) **Patcharaporn Wongchadakul**, Phadungsak Rattanadecho and krit jiamjiroch "Experimental Analysis of Thermal Transport in Low-Level Laser Therapy on Skin Tissue: The Influence on Therapeutic Efficacy, Pain Sensation and Dry Skin Wound" *International Journal of Thermal Sciences*, Elsevier, 2024, 199, 108886. **Impact Factor: 4.779, Q1** https://doi.org/10.1016/j.ijthermalsci.2024.108886

3) **Patcharaporn Wongchadakul**, Suphalerk Lohasammakul and Phadungsak Rattanadecho "Comparative analysis of RADAR vs. conventional techniques for AVF maturation in patients with blood viscosity and vessel elasticity-related diseases by finite element analysis: anemia, hypertension, and diabetes" *PLOS one,* 2024,19(1), e0296631. **Impact Factor: 3.752, Q1** https://doi.org/10.1371/journal.pone.0296631

- 2023 -

4) **Patcharaporn Wongchadakul**, Ashim K. Datta and Phadungsak Rattanadecho "Tissue poromechanical deformation effects on steam pop likelihood in 3-D Radiofrequency Cardiac Ablation" *Journal of Biological Engineering*, Springer Nature, 2023, 17(52), 1-18. **Impact Factor: 7.9, Q1** https://doi.org/10.1186/s13036-023-00365-5

5) **Patcharaporn Wongchadakul**, Ashim K. Datta and Phadungsak Rattanadecho "Natural convection effects on heat transfer in a porous tissue in 3-D radiofrequency cardiac ablation" *Journal of Heat and Mass Transfer*, Elsevier, 2023, 204, 123832. **Impact Factor: 5.431, Q1** https://doi.org/10.1016/j.ijheatmasstransfer.2022.123832

6) **Patcharaporn Wongchadakul,** Suphalerk Lohasammakul, Phadungsak Rattanadecho, and Sorawuth Chu-Ongsakul "The Advanced Concepts for Septal L-strut Re-designing in Septorhinoplasty for Better Strength and Stability by Considering of Center of Gravity" *PLOS one*, 2023, 18(7), e0288607. **Impact Factor: 3.752, Q1** https://doi.org/10.1371/journal.pone.0288607

- 2021 -

7) **Patcharaporn Wongchadakul** and Phadungsak Rattanadecho “Mathematical modeling of multilayered skin with embedded tumor through combining laser ablation and nanoparticles: Effects of laser beam area, wavelength, intensity, tumor absorption coefficient and its position” *International Journal of Heat and Technology*, 2021, 39(1), 89-100. **Impact Factor: 1.26, Q3** https://doi.org/10.18280/ijht.390109

- 2019 -

8) **Wongchadakul P.**, Rattanadecho P., Wessapan T. “Simulation of temperature distribution in different human skin types exposed to laser irradiation with different wavelengths and laser irradiation intensities” *Songklanakarin Journal of Science and Technology*, 2019, 41(3), 529-538. **Impact Factor: 0.9, Q3** https://doi.org/10.14456/sjst-psu.2019.89

- 2018 -

9) **Patcharaporn Wongchadakul**, Phadungsak Rattanadecho and Teerapot Wessapan “Implementation of a thermomechanical model to simulate laser heating in shrinkage tissue (effects of wavelength, laser irradiation intensity, and irradiation beam area)” *International Journal of Thermal Sciences*, Elsevier, 2018, 134, 321–336. **Impact Factor: 4.779, Q1** https://doi.org/10.1016/j.ijthermalsci.2018.08.008

10) Satiraporn Koksungnoen, Phadungsak Rattanadecho and **Patcharaporn Wongchadakul** “3D numerical model of blood flow in the coronary artery bypass graft during no pulse and pulse situations: Effects of an anastomotic angle and characteristics of fluid” *Journal of Mechanical Science and Technology*, Springer Nature, 2018, 32(9), 4545-4552. **Impact Factor: 1.81, Q1** https://doi.org/10.1007/s12206-018-0851-z

- 2016 -

11) Wessapan, T., Rattanadecho, P. and **Wongchadakul, P.** "Effect of body position on natural convection within anterior of the human eye during exposure to electromagnetic fields" *Numerical Heat Transfer; Part A: Applications*, Taylor&Francis, 2016, 69(9), 1014-1028. **Impact Factor: 2.569, Q1** https://doi.org/10.1080/10407782.2015.1109352

Conference Publications

- **Wongchadakul P.**, Rattanadecho P. and Wessapan T. “Numerical Investigation of Laser-Induced Thermotherapy in Human Tissue” The 7th TSME International Conference on Mechanical Engineering, 2016.
- Satiraporn Koksungnoen**, Patcharaporn Wongchadakul** and Phadungsak Rattanadecho “3D Computer Model of Blood flow in the Coronary Artery Bypass Graft with Different Anastomotic Angles” The 7th TSME International Conference on Mechanical Engineering, 2016.

Index and Citations

Citations: 106, h-index: 6, i-10-index: 4
Google Scholar: https://scholar.google.co.th/citations?hl=en&user=liBI1eYAAAAJ
Scopus: https://www.scopus.com/authid/detail.uri?authorId=57188537463