

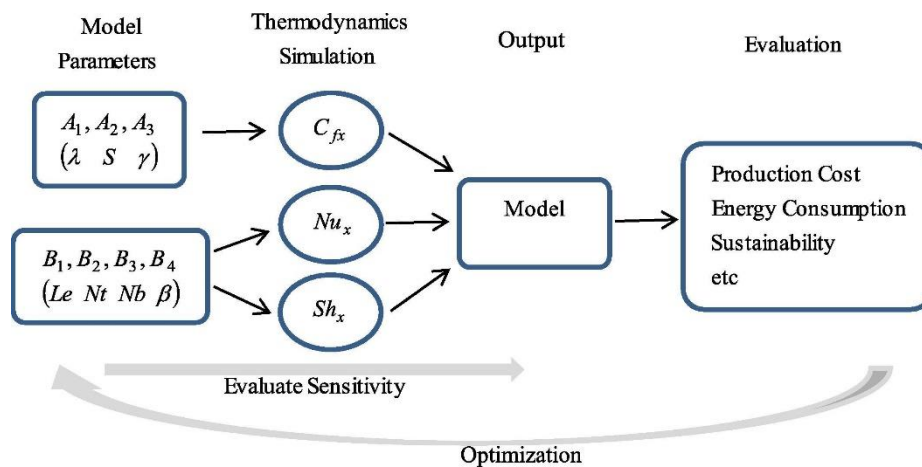
Dr. Chan Sze Qi Publishes Novel Numerical Studies for Boundary Layer Problems in SCI Q1 Journal as First Author

Assistant Professor Dr. Chan Sze Qi from the Department of Mathematics and Applied Mathematics, along with co-authors Senior Lecturer Dr. Fazlina Aman and Senior Lecturer Dr. Syahira Mansur from Universiti Tun Hussein Onn recently published a journal article titled “Stagnation point bionanofluid slip flow model: Sensitivity analysis” in the Alexandria Engineering Journal (SCIE-Tier 1, ranked 21/91 in Engineering, Multidisciplinary, 2020 impact factor: 3.732).

The paper is a study on thermophysical properties of bionanofluid flow over a stagnation point on a shrinking surface. While there are extensive numerical studies on boundary layer problems, this is the first study discussing sensitivity of parameters of interest to the input thermophysical parameters using sensitivity analysis under the principle of Response Surface Methodology (RSM).

Thermophysical properties of bionanofluid require careful consideration for practical applications. As the problem gets more complex and realistic, more model parameters are involved in numerical algorithms. Consequently, valuable insights to the core of the problem may be lost as it becomes harder to interpret the multivariate numerical solutions obtained from such algorithms.

Sensitivity analysis under the principle of RSM is able to provide understanding on the inherent properties reflected from numerical solutions. Sensitivity analysis is required for various reasons. Firstly, sensitivity analysis refines the multivariate numerical solutions by categorizing the pertinent model parameters with respect to the skin friction coefficient, local Nusselt number, and local Sherwood number based on their degree of significance. Secondly, such analysis determines parameters that are more influential or have a greater impact on the output yield. This helps identify the key driver parameters. Finally, it provides clues for academics and industrialists in decision making by concerning which variables should be altered to achieve the desirable solution on the designs model. For example, results from sensitivity analysis would provide a comprehensive elementary protocol for future biomedical device fabrication such as biosensors. The importance of the highly sensitivity parameters influencing model simulation and further optimization objectives can be illustrated graphically as below. The paper can be found at <https://doi.org/10.1016/j.aej.2021.03.067>.



Assistant Professor Dr. Chan Sze Qi received her PhD from Universiti Tun Hussein Onn Malaysia in September 2020 after which she was appointed as a visiting researcher at the Center of Research for Computational Applied Mathematics (CERCOM). Her research interests are sensitivity analysis, computational fluid dynamic, and mathematical modelling.