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Numerical simulation, a branch of modern computation, has widespread applications in engineering and life sciences. It aids in designing and optimizing systems such as buildings, cars, and aircraft. By predicting system behavior under various conditions, simulation models allow researchers to test theories and explore new ideas without costly and time-consuming experiments. Additionally, they enable the study of systems that are otherwise difficult or impossible to examine experimentally. Modeling can be performed even by those unaware of the intricate simulations involved. Numerical simulations possess an impressive ability to predict real-world phenomena, making them indispensable in modern life.

Our research group has made significant contributions in the areas of microfluidics, phase change materials, porous media, metal foams, battery thermal management, nanofluids, biomedical engineering, chip cooling, roll coating, and complex building design. Our focus extends to addressing sustainable development goals such as good health and well-being (Goal 3), affordable and clean energy (Goal 7), industry innovation and infrastructure (Goal 9), responsible consumption and production (Goal 12), climate action (Goal 13), and partnerships for the goals (Goal 17).

Furthermore, Machine learning and artificial intelligence are opening up new opportunities in numerical simulation more efficiently and accurately. From ancient times to the present, numerical simulations have proven invaluable to humanity and will continue to drive progress in the future.



**Dr.D.Arumuga Perumal –World Top 2% Scientists Awardee – Stanford University (USA) & Elsevier  
(2024) Rank in the Subfield: Mechanical Engineering & Transports - 4524 out of 143311**