

NSE LAGOS BRANCH

AUGUST 2023 ENEWSLETTER

Lagos Branch Exco members held an Executive meeting on Tuesday 8th August, 2023.



NSE Lagos Branch held the August General meeting and Technical Session on Tuesday 15th August, 2023 on the topic: ” Constructal Theory and Design: It is about Size and Shape” by Dr. Olabode Thomas Olakoyejo

The facilitator explained that constructal theory is mental view that indicate that generation of flow structures in nature is based on scientific principle, and also for finite-size system to persist in time, it must evolve in such a way that provides easier access to the imposed (global) currents that flow through it. Similarly, in thermodynamic system there exist some level of imperfection due to entrophy generation which leads to degradation of performance, however a system must adjust itself to operate maximally by optimizing the process and geometric configuration of the system. The technical lecture focused specifically on engineering application of the constructal law, involving shape and structure (or size) for heat transfer and fluid flow. He enumerated

advantages of the theory as, flow architecture is not assumed in advance but it's the consequence of allowing the structure to morph (ie, effect that change one image to another through seamless transition). He further expressed that the development of heat exchangers and multi-scale architectural by constructal theory was reviewed by Fan and Law (2008), and that heat generating devices are designed in such a way as to optimize the structural geometry by arrangement of array of cooling channels into given volume constraint without exceeding the allowable temperature limit, which translates to maximization of heat transfer density or minimization of overall global thermal resistance, also that geometric design affects thermal performance of heat transfer including computer simulation and numerical modeling of various shapes and sizes, with the objective function of minimizing global thermal resistance. Numerical solution of continuity, momentum and energy equations with the boundary conditions were obtained using a three dimensional commercial package FLUENT which employs Finite Volume Method. He concluded that size and shapes have significant effect on thermal performance of heat-generating devices and also the cooling effect was achieved best at higher aspect ratio in rectangular channels, with the cylindrical channel possessing poorest performance than other shape sizes.



The Executive Committee members and Spouses of Lagos Branch paid a courtesy visit to the Permanent Secretary, Lagos State Ministry of Women Affairs and Poverty Alleviation in her office on Tuesday 15th August, 2023.

