Albany State University

# Faculty Capabilities and Interests


**Name:** **Anilkumar Devarapu, PhD**

**Email:** anilkumar.devarapu@asurams.edu

**http://anil.asurams.edu**


**Discipline:** Mathematics

**Subdiscipline(s):** Applied Mathematics and Scientific Computing

**Areas of Research Interests:** Computational Fluid Dynamics; Numerical Simulations; Computational Biology; Differential Equations and Biometrics.

**Skills:** Computational Methods to find the solutions of real-world problems; Statistical Methods to System Biology; Nano-fluid Modeling.

**Research Summary** ***(current, performed in the past 5 year; 300 words or less)***

My main scientific research interest lie in developing , analyzing and applying mathematical and statistical tools to the models that arise in Engineering , Ecology/Environmental and Material Science. In the past five years, I published four research papers in the peer-reviewed highly impact international journals in the areas of Applied Mathematics, Engineering. Also, couple of my papers on nano-fluid modeling and simulations are communicated to the peer reviewed journals. My current research will focus on developing mathematical modeling and analysis of nanofluid in axisymmetic flows. We shall (i) obtain a new self-similar solutions for the unsteady mixed convection nanofluid flow in axisymmetric bodies. A solution is called self-similar if a system of partial differential equations can be reduced to a system of ordinary differential equations. We use the quasilinearization method to obtain the solutions of nonlinear system of differential equations. We already have some preliminary results of unsteady nanofluid flow, which were presented at the first international conference on Dynamics of Differential Equation held at Georgia Institute of Technology, Atlanta, GA. (ii) however, the application of similarity transformations to two dimensional and axisymmetric flows does not always ensure the reduction of the

system of partial differential equations to a set of ordinary differential equations. In those situations finding an explicit mathematical solution is difficult, so we use highly accurate Fast Immersed Boundary Projection Method to simulate the complex unsteady mixed convection nanofluid flow. (iii) we will also study the nonlinear stability analysis of the axisymmetric flow of nanofluid. This project results will provide the fundamental understanding of unsteady convective heat and mass transfer phenomena in complex nanofluids to the Aerospace applications.. Transfer of thermal energy through heat exchangers is present in all NASA missions, whether it is the Orion vehicle for the space station and lunar exploration or vehicles for mission to Mars.

I also developed an online web based software for modeling and simulations for system biology and it is freely available in my website **http://anil.asurams.edu/soft/**

**Keywords** ***(5 maximum)*** Fluid Dynamics, Numerical Methods, Bio-statistics, Nano-fluids,
Mathematical Modeling and Simulation.