Sethupathy S

Department of Electrical Engineering, IIT (ISM) Dhanbad | sethupathy@iitism.ac.in

WORK

Indian Institute of Technology (ISM) — Dhanbad, India
Assistant Professor — 2024 - current

University of Notre Dame — IN, USA
Research Associate — 2023 - 2024
Research/Teaching Assistant — 2017 - 2023

Indian Institute of Science — Bangalore, India
Research Associate — 2016 - 2017

EDUCATION

Ph.D. Physics, **University of Notre Dame,** IN, USA
Ph.D. Electrical Engineering, **Indian Institute of Science**, Bangalore, India
M.E. Electrical Engineering, **Indian Institute of Science**, Bangalore, India
B.E. Electrical and Electronics Engineering, **Anna University**, Chennai, India

RESEARCH AREAS

○ **Electromagnetism** ○ **Electric Machines** ○ **Computational Methods** ○ **High-Performance Computing**

JOURNAL PUBLICATIONS

- **Sethupathy Subramanian**, Dinshaw S. Balsara, Deepak Bhoriya and Harish Kumar, "Techniques, Tricks and Algorithms for Efficient GPU-Based Processing of Higher Order Hyperbolic PDEs" in *Communications on Applied Mathematics and Computation,* 2023.
- Sujata Bhowmick and **Sethupathy Subramanian**, "The Source Stabilized Galerkin Formulation for Linear Moving Conductor Problems with Edge Elements" in *IEEE Transactions on Magnetics,* vol. 59, no. 9, pp. 1-10, Sept. 2023.
- **Sethupathy Subramanian** and Sujata Bhowmick, "A Stable Weighted Residual Finite Element Formulation for the Simulation of Linear Moving Conductor Problems" in *IEEE Journal on Multiscale and Multiphysics Computational Techniques,* vol. 7, pp. 220-227, 2022.
- **Sethupathy Subramanian**, Dinshaw S. Balsara, Asif Ud-Doula, and Marc Gagné, "Modelling magnetically channeled winds in 3D–I. Isothermal simulations of a magnetic O supergiant" in *Monthly Notices of the Royal Astronomical Society* 515, no. 1 (2022): 237-255.
- Dinshaw S. Balsara, Saurav Samantaray and **Sethupathy Subramanian**, "Efficient WENO-Based Prolongation Strategies for Divergence-Preserving Vector Fields" in *Communications on Applied Mathematics and Computation,* (2022): 1-57.
- **Sethupathy Subramanian**, Udaya Kumar and Sujata Bhowmick, "On overcoming the Transverse Boundary Error of the SU/PG Scheme for Moving Conductor problems" in *IEEE Transactions on Magnetics,* vol. 58, no. 1, pp. 1-8, Jan. 2022.
- Dinshaw S. Balsara, Vladimir Florinski, Sudip Garain, **Sethupathy Subramanian** and Katharine F. Gurski, "Efficient, Divergence-free, High Order MHD on 3D Spherical Meshes with Optimal Geodesic Meshing" in *Monthly Notices of the Royal Astronomical Society,* vol. 487 no. 1, pp 1283-1314, Jul. 2019.
- **Sethupathy Subramanian** and Udaya Kumar, "Stable Galerkin finite-element scheme for the simulation of problems involving conductors moving rectilinearly in magnetic fields" in *IET Science, Measurement & Technology,* vol. 10, no. 8, pp. 952-962, Nov. 2016.
- **Sethupathy Subramanian** and Udaya Kumar, "Augmenting numerical stability of the Galerkin finite element formulation for electromagnetic flowmeter analysis" in *IET Science, Measurement & Technology,* vol. 10, no. 4, pp. 288-295, July 2016.

TALKS AND CONFERENCE PRESENTATIONS

- "High Performance Computational Astrophysics on GPUs with Applications", Tata Institute of Fundmental Research - Center for Applicable Mathematics (TIFR-CAM), Bangalore, India, 2023.
- "Use of Control System Principles in the Numerical Simulation of Motion-Induced Magnetic Fields", Department of Electrical, Electronics and Communications, IIT Dharwad, India, 2023 (*Invited*).
- "Magnetized Winds Around Massive Stars; Comparison with Chandra Observations", Midwest Magnetic Fields Workshop, University of Wisconsin-Madison, USA, 2023 (*Invited*).
- "Existence of boundary error transverse to the velocity in SU/PG solution of moving conductor problem", IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization, Beijing, China, 2016.
- "Stable Galerkin Finite Element Formulation for the Simulation of Electromagnetic Flowmeter", EECS Research Students Symposium, IISc, Bangalore, India, 2016.
- "Efficacy of SUPG Scheme in Simple Moving Conductor Problems", Indo-Swedish Colloquium on Electrotechnology, IIT Madras, India, 2015.
- "Efficacy of SUPG Scheme in Simple Moving Conductor Problems", National Conference on Recent Trends in Power Engineering, IIT Madras, India, 2015.
- "Numerical Problems in the Simulation of Electromagnetic Flowmeter", Electrical Engineering Seminar Series, Indian Institute of Science (IISc), Bangalore, India, 2015.

ACADEMIC ACHIEVEMENTS AND AWARDS

- **All India Rank - 5** in GATE Electrical Engineering 2009.
- **CRC Graduate Award - 2022 for Computational Science and Visualization**, from CRC, Notre Dame.
- **Outstanding Graduate Teaching Award - 2021** from Kaneb Center, Notre Dame.
- Awarded IISc research fellowship (July 2016 - July 2017) served as Research Associate at IISc.
- Awarded GARP funding of INR 100,000 for IEEE MTT-S Conference held in Beijing, China, 2016.

JOURNAL REVIEWER

- IEEE Transactions on Power Delivery
- IET High Voltage
- IET Science, Measurement & Technology
- Monthly Notices Royal Astronomical Society
- Measurement Science Review

COMPUTATIONAL SKILLS

GPU Computing: Developed and worked on a supercomputer ready 3D MHD Finite Volume Code with MPI and GPU parallelization for the simulation of spherical systems in Fortran using MPI and OpenACC.

FEA Code: Developed a Generic 3D Finite Element Analysis code, capable of handling both node elements and edge elements, for solving Vector PDEs in C.

Programming Langauges: C, Fortran, Matlab, C++, Python, Mathematica, and Bash Script

Parallel Computing Paradigms: MPI, OpenMP, and OpenACC

Softwares and Libraries: VisIt, Gmsh, Simulink, LAPACK, BLAS, and SuperLU