

Roshan Samuel

PERSONAL INFORMATION

Postdoctoral Researcher
Fluid Mechanics Group
Technische Universität Ilmenau
Ilmenau, Germany

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GitHub: <https://github.com/roshansamuel>

Google Scholar: <https://scholar.google.co.in/citations?user=LLwzMe8AAAAJ>

EDUCATION

- | | |
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| 2017–2023 | Ph.D. Mechanical Engineering
Indian Institute of Technology - Kanpur, Kanpur, India
Thesis: Simulations of Rayleigh-Bénard Convection at Extreme Rayleigh Numbers
CGPA: 9.5/10.0 |
| 2011–2013 | M.E. Mechanical Engineering
Indian Institute of Science - Bangalore, Bangalore, India
Thesis: Development of Vortex Particle Method for Flexing Bodies
CGPA: 5.9/8.0 |
| 2007–2011 | B.Tech. Mechanical Engineering
National Institute of Technology - Tiruchirapalli, Tamil Nadu, India
Project: Design and Analysis of Multi-link Suspension
CGPA: 8.4/10.0 |

PROFESSIONAL EXPERIENCE

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| 2023–Now | Fluid Mechanics Group
Affiliation: Department of Mechanical Engineering, TU-Ilmenau
Supervisor: Prof Jörg Schumacher |
| 2016–2017 | Simulation and Modeling Lab
Affiliation: Department of Physics, IIT-Kanpur
Project: Development of finite-difference solver in Python
Supervisor: Prof Mahendra K. Verma |
| 2014–2016 | High Performance Computing Lab
Affiliation: Department of Aerospace Engineering, IIT-Kanpur
Project: Development of compressible flow code with compact schemes
Supervisor: Prof Tapan K. Sengupta |
| 2013–2014 | General Motors Technical Center - India
Position: Thermal CFD Engineer
Responsibilities: CFD Analysis of automotive cabins and under-hood systems |

PUBLICATIONS

Journal Publications

1. **SAMUEL, R.** AND VERMA, M. K. Bolgiano-obukhov scaling in two-dimensional rayleigh-bénard convection at extreme rayleigh numbers. *Phys. Rev. Fluids* 9 (2024), 023502

2. **SAMUEL, R.**, SAMTANEY, R., AND VERMA, M. K. Large-eddy simulation of Rayleigh-Bénard convection at extreme Rayleigh numbers. *Phys. Fluids* 34, 7 (2022), 075133
3. SENGUPTA, A., **SAMUEL, R. J.**, SUNDARAM, P., AND SENGUPTA, T. K. Role of non-zero bulk viscosity in three-dimensional Rayleigh-Taylor instability: Beyond Stokes' hypothesis. *Comput. Fluids* 225 (2021), 104995
4. **SAMUEL, R.**, BHATTACHARYA, S., ASAD, A., CHATTERJEE, S., VERMA, M. K., SAMTANEY, R., AND ANWER, S. F. SARAS: A general-purpose PDE solver for fluid dynamics. *J. Open Source Softw.* 6, 64 (2021), 2095
5. VERMA, M. K., **SAMUEL, R.**, CHATTERJEE, S., BHATTACHARYA, S., AND ASAD, A. Challenges in fluid flow simulations using exascale computing. *SN Comput. Sci.* 1, 3 (2020), 178
6. SADHUKHAN, S., **SAMUEL, R.**, PLUNIAN, F., STEPANOV, R., SAMTANEY, R., AND VERMA, M. K. Enstrophy transfers in helical turbulence. *Phys. Rev. Fluids* 4 (2019), 084607
7. VASHISHTHA, S., **SAMUEL, R.**, CHATTERJEE, A. G., SAMTANEY, R., AND VERMA, M. K. Large eddy simulation of hydrodynamic turbulence using renormalized viscosity. *Phys. Fluids* 31, 6 (2019), 065102
8. VASHISHTHA, S., VERMA, M. K., AND **SAMUEL, R.** Large-eddy simulations of turbulent thermal convection using renormalized viscosity and thermal diffusivity. *Phys. Rev. E* 98 (2018), 043109
9. SHARMA, N., SENGUPTA, A., RAJPOOT, M., **SAMUEL, R. J.**, AND SENGUPTA, T. K. Hybrid sixth order spatial discretization scheme for non-uniform cartesian grids. *Comput. Fluids* 157 (2017), 208–231

Conference Presentations

1. **SAMUEL, R.**, BODE, M., SREENIVASAN, K. R., AND SCHUMACHER, J. Analysis of boundary layers by high-resolution DNS of Rayleigh-Bénard convection. 14th Workshop on Direct and Large-Eddy Simulation, Erlangen, 10-12 April, 2024
2. **SAMUEL, R.**, SCHEEL, J. D., BODE, M., WITZLER, C., GÖBBERT, J. H., SREENIVASAN, K. R., AND SCHUMACHER, J. High-resolution simulation boundary layer studies in Rayleigh-Bénard convection. 76th Annual Meeting of the Division of Fluid Dynamics, Washington DC, 19-21 November, 2023
3. **SAMUEL, R.**, VERMA, M. K., AND SCHUMACHER, J. Bolgiano-Obukhov Scaling in Two-Dimensional Rayleigh-Bénard Convection. 18th European Turbulence Conference, Valencia, 4-8 September, 2023
4. **SAMUEL, R.**, SAMTANEY, R., AND VERMA, M. K. Large-eddy simulation of Rayleigh-Bénard convection at extreme Rayleigh numbers up to 10^{15} . Euromech Colloquium 619, Vienna, 6-9 July, 2022

Thesis

1. **SAMUEL, R.** *Simulations of Rayleigh-Bénard Convection at Extreme Rayleigh Numbers*. PhD thesis, IIT Kanpur, 2024
2. **SAMUEL, R.** Development of Vortex Particle Method for Flexing Bodies. Master's thesis, IISc Bangalore, 2013

SCHOOLS AND WORKSHOPS ATTENDED

2021	GPU Application Hackathon organized by CDAC and nVidia
2018	Turbulence from Angstroms to Lightyears organized by ICTS

SOFTWARE DEVELOPED/CONTRIBUTED

- 2019 [blitz++](#): Contributed to development of Blitz library.
- 2020 [SARAS](#): Developed the open-source finite-difference solver.

HONORS, AWARDS & SCHOLARSHIPS

- 2014 Green Belt in Design for Six-Sigma (DFSS) awarded at General Motors
- 2014 Individual Excellence Award by General Motors for design synthesis using CFD thermal simulations
- 2014 Individual Excellence Award by General Motors for developing scripts to automate CFD analysis
- 2010 Summer Undergraduate Research Grant for Excellence (SURGE) awarded by IIT-Kanpur

CERTIFICATIONS

- 2013 Training Certificate in Introduction of ANSYS Design, ANSYS Meshing and FLUENT awarded by ANSYS
- 2010 Attendance Certificate in A1 - Elementary Level 1 German by Goethe Institut/Max Mueller Bhavan Chennai
- 2009 Certificate in Foundation Course on CATIA V5R15 awarded by CADD Center

PERSONAL INTERESTS

Hobby Programming, Astronomy

LANGUAGES

English, Malayalam (native)

Hindi (basic)

French, German (beginner)

June 20, 2024