Nithin Panicker, Ph.D.

CFD Applications Engineer Nuclear Energy and Fuel Cycles Division Oak Ridge National Laboratory Oak Ridge, Tennessee, 37831, United States ☑ panickerns@ornl.gov



Highlights

2009 - 2023	14 years of experience in the field of Computational Fluid Dynamics (CFD) in both modeling and simulation of devices employed in Mechanical and Chemical engineering industries for understanding the underlying physical mechanisms, to generate high fidelity data and to improve design and operational efficiency using: OpenFOAM, StarCCM+ and FLUENT.
	Biography press release by Marquis Who is Who In America: click link https://www.24- 7pressrelease.com/press-release-service/498954
	17 publications all first author (6 journals + 1 under-preparation, 2 conference proceedings, 6 technical ORNL DOE reports, 2 thesis) in the field of CFD.
	United States Patent application filed on invention "Nozzles for enhanced entrainment" (application ID: 18371993 under review)
	Recipient of three grants as National Laboratory Principal Investigator (1) and co-Principal investigator (2) from United States Government's Department of Energy's High Performance Computing for Energy Innovation program (total amount > \$ 1 million) for advancing renewable energy and carbon capture technologies using massively parallel simulations announcement of the awards click link: https://hpc4energyinnovation.llnl.gov/projects
	> 30 manuscripts reviewed , Reviewer of more than 10 CFD fluid/thermal/mass transfer related journals
	Several email invitations to deliver technical talks, 10 conference presentations, 1 poster, member of various CFD related professional organizations
	Several email invitations to publish papers in the special issue of various journals
	Cited in the book chapter: Advanced Approaches in Turbulence, 2021, a significant portion of Chapter 7 is based on the journal paper published during my PhD.
	journal papers in journals with impact factors 4.3 and above
	Student mentor Mentored Undergraduate student recruited through Energy Efficiency Renewable Energy Program Office for High Performance Computing program, Oak Ridge National Laboratory

Education

2012 - 2017	Ph.D., Iowa State University Mechanical Engineering. Thesis title: <i>Computational Models for Turbulent Bubble Columns.</i>
2009 – 2011	M.S., University of Cincinnati Mechanical Engineering Thesis title: <i>Numerical Study of Flow and Deformations in Droplet flows Subjected to Alter-</i> <i>nating Electric Fields.</i>
2005 – 2009	B.Tech., National Institute of Technology, Surathkal Chemical Engineering

Work Experience

2020 – present	CFD Applications Engineer, Oak Ridge National Laboratory
	Role: Main Technical Contributor, "High performance simulations to predict process maps for Additiviely Manufactured parts of high temperature withstanding refractory metal alloys". Project in collaboration with Common Wealth Center for Advanced Manufacturing.
	Role: Co-Principal Investigator, "High performance computing to optimize an induced flow power generator device for waste heat recovery applications in data centers". Project in collaboration with Spar Energy LLC funded by United States Department of Energy High Performance Computing for Energy Innovation program.
	Role: Main Technical Contributor, "High performance computing to optimize Aluminum Smelters to reduce CO2 emission". Project in collaboration with Alcoa USA.
	Role: Main Technical Contributor, "High performance computing to predict ox- idation zones and reduce materials cost in a Heat Recovery Steam Generator ". Project in collaboration with Electric Power Research Institute.
	Role: Main Technical contributor, "Simulation of boiling in Nuclear Canister in a geological repository flooded by water ". Project in collaboration with various National Labs, funded by Nuclear Regulatory Commission United States.
	Role: co-Technical contributor, "Scalable Coarse Mesh CFD Solver for Large Scale Nuclear System Simulations ". Project funded by Laboratory Directed Research and Development.
2019 – 2020	Research Engineer, FORD motor company
	Develop CFD models for water management applications using StarCCM+ and Pre- onLab
	Perform multiphase simulations for water ingress into the engine bay, water ingress into the luggage compartment during lift gate opening/closing
	Develop analytical models for droplet dynamics on the lens/lidar of autonomous vehicle to couple it with CFD
	Secure field test data on water management for automobiles for CFD validation
	Python scripting to automate processes in the Particle based software PreonLAB
	Interact with cross-functional teams (Design Engineers, Program Engineers) to under- stand the design requirements
2017 – 2019	CFD Engineer, Tenneco Inc
	Proposed design suggestions by performing CFD simulations of both system level and component level exhaust aftertreatment systems (Diesel Oxidation Catalyst, Selective Catalytic Reduction, Muffler, y-pipe) for various automotive clients (John Deere, GM and Isuzu)
	Performed conjugate heat transfer analysis for various designs of exhaust systems to understand and control the skin temperature
	Performed flow noise predictions exhaust tail pipes to aid acoustic Engineers
2012 - 2017	Research Assistant, Iowa State University
	Role: Main Technical contributor, "A fundamental investigation of turbulence in multiphase gas-particle flows". Project funded by American Chemical Society

Petroleum Research fund.

Work Experience (continued)

Role: Main Technical contributor, "Simulation of boiling on mixed wettability surfaces for enhanced heat transfer". project funded by Defense Advanced Research Projects Agency.

Press release

Media Press release by Marquis Who is Who In America: https://www.24-7pressrelease.com/press-release-service/498954

Research Publications (*corresponding author 69 google scholar citations)

Journal Articles



- ***Panicker, Nithin**, Chudhary, R., Rao, V., Delchini, M., & Jain, P. (2021). Computational modeling and simulation of aluminium smelting process using openfoam. In *5th thermal and fluids engineering conference (tfec)* (pp. 789–802). *O* doi:10.1615/TFEC2021.mpm.036670
- *Panicker, Nithin, Delchini, M., Sambor, T., Sabau, A., & Jain, P. (2021). Advanced thermal-hydraulic model of heat recovery steam generators. In *5th thermal and fluids engineering conference (tfec)* (pp. 647–656). *I* doi:10.1615/TFEC2021.fip.036547

Department of Energy Technical reports

***Panicker, Nithin**, Rao, V., Bazaz, G., & Jain, P. K. (2023). Design and development of a waste heat to power device using computational fluid dynamics simulations. *O* doi:10.2172/1844874

*Panicker, Nithin, Chaudhary, R., Delchini, M., Rao, V., & Jain, P. K. (2021). Computational fluid dynamics simulations to support efficiency improvements in aluminum smelting process. 🔗 doi:10.2172/1844874



*Panicker, Nithin, Delchini, M., Sambor, T., & Sabau, A. S. (2021). Computational fluid dynamics simulations to predict oxidation in heat recovery steam generator tubes. 8 doi:10.2172/1844874

Mathew, S., Santhosh, B., Panicker, Nithin, Davidson, G., Nicholas, K., Nole, M., ... Gonzalez, E. (2021). Steady-state and time-dependent coupled simulations of a critical dual-purpose canister in a saturated repository.

5 Panicker, Nithin, Nicholas, K., Mathew, S., & Davidson, G. (2021). Dual purpose canister thermal simulations in sub-cooled regime: Relap vs. cfd comparison.

Pointer, D., Santhosh, B., Delchini, M., Kwitae, C., Panicker, Nithin, & Turckson, B. (2021). Scalable coarse mesh cfd solver for large scale nuclear system simulations.

Patent (pending)

United States Patent Application (ID-18371993)

Bazaz, G., Panicker, Nithin, Rao, V. M., & Jain, P. K. (2023). Nozzles for entrainment flows. US patent application filed.

Conference presentations

Conference

- Panicker, Nithin, Chaudhary, R., Delchini, M., Rao, V., & Jain, P. (2022). Large eddy simulation of aluminum smelting process using openFOAM, 7th Thermal Fluids Engineering Conference meeting, las vegas, nevada, may 16-18 2022. Virtual Conference.
- Panicker, Nithin, Chaudhary, R., Delchini, M., Rao, V., & Jain, P. (2021). OpenFOAM based modeling and simulation of aluminum smelting process, 16th united states national congress on computational mechanics, 2021. Virtual Conference.

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Panicker, Nithin. (2020). Aluminum smelting modeling and simulation, Oak Ridge National Lab CFD day meeting 2020. Virtual Conference.

Panicker, Nithin, Chaudhary, R., Delchini, M., Rao, V., & Jain, P. (2020). Computational modeling and simulation of aluminum smelting process using openFOAM, 5th Thermal Fluids Engineering Conference meeting, 2020. Virtual Conference.

Panicker, Nithin, Delchini, M., Sambor, T., Sabau, A., & Jain, P. (2020). Advanced thermal hydraulic model of heat recovery steam generator, 5th Thermal Fluids Engineering Conference meeting, 2020. Virtual Conference.

Panicker, Nithin, Passalacqua, A., & Fox, R. (2016). Computational study of turbulent bubbly flows, AIChE Annual meeting 2016. O doi:https://www.aiche.org/proceedings/people/nithin-s-panicker-3





Panicker, Nithin. (2007a). Economical chemical engineering techniques to perform solar water desalination,, Annual Technical symposium manipal institute of technology, 2007.

Panicker, Nithin. (2007b). Modeling and simulation of quenching of steel, Annual Technical symposium indian institute of technology, 2007.



Panicker, Nithin. (2007c). Numerical study of nucleate pool boiling: Effect of surface wettability, American Society of mechanical engineers imece, 2013.

Proposal and grant activities as PI and co-PI

- Alternative paths for carbon dioxide removal (CDR) through salt water utilization and venturi scrubber capture systems (**DOE High Performance Computing for Energy Innovation (HPC4EI) program granted** \$400,000) **Role: Principal Investigator (PI)**
- High Performance Optimization of Liquid Piston Compression for Long-Duration Energy Storage (DOE HPC4EI program granted \$400,000) Role: co-Principal Investigator (co-PI)
- HPC4EI High Performance Computing to Optimize an Induced Flow Power Generator Device for Waste Heat recovery (**DOE HPC4EI program granted** \$300,000) Role: co-PI
- Induced Flow Generator System for Waste Heat Recovery from Drying Processes, \$500,000 (accepted for first round, unsuccessful) Role: National lab PI
- Alternative paths for carbon dioxide removal (CDR) through salt water utilization and venturi scrubber capture systems, \$400,000 (accepted for first round by DOE HPC4EI, review in progress) Role: National lab PI
- Aerothermal Optimization and Reduced-Order Model Development for an Induced Flow Generator for Low-Temperature Waste Heat Recovery, \$400, 000 (accepted for first round by DOE HPC4EI, review in progress) Role: National lab PI
- High Performance Optimization of Liquid Piston Compression for Long-Duration Energy Storage, \$400,000 (accepted for first round by DOE HPC4EI, review in progress) Role: National lab co-PI
- Performance certification of components of long-Duration Energy Storage, \$250,000 (DOE Energy-verx voucher program, review in progress) Role: National lab co-PI

Email invitations for technical speech (>20) few selected invitations are provided

- Aerospace expo 2021, talk on the advancements of CFD techniques in multiphase flows
- Global Summit and Expo on Aerospace and Mechanical Engineering, 2021 https://www.thescientistt.com/aerospace-mechanical-engineering/
- Aerospace expo 2020, talk on advancements in multiphase flows
- High Performance Computing manufacturing day organized by Lawrence Livermore National Lab Optimization of Alumina and Aluminum Fluoride Feeding in Advanced Aluminum Smelting Cells using Large Eddy Simulation Alcoa

Professional services

REVIEWER JOURNALS

- Powder Technology
- Applied Mathematical Modeling
- American Institute of Chemical Engineering
- Journal of Fluids Engineering
- Heat Transfer Research

Professional services (continued)



Achievements

- **3** US Department of Energy, High Performance Computing for Energy Innovation Grants as PI and co-PI (> \$1 million in funds).
- **Press release**, Marquis Whos Who in America.
- **Cited in the book: Advanced Approaches in Turbulence**, a significant portion of Chapter 6 is based on my PhD work
- University Graduate Scholarship, Granted by University of Cincinnati to perform Master of Science in Mechanical Engineering.

Professional Membership

- American Society for Fluid and Thermals Engineering.
- American Nuclear Society (Alternate chair conference session: Advances in thermal hydraulics).
- USCACM
- American Society for Mechanical Engineers
- American Institute of Chemical Engineers

Teaching

- **Teaching assistant, 2014**, Fluid flow lab. Mechanical Engineering, Iowa State University
- **Teaching assistant, 2013**, Heat transfer lab. Mechanical Engineering, Iowa State University

Mentorship

Student mentor Mentored Undergraduate student recruited through Energy Efficiency Renewable Energy Program Office for High Performance Computing program, Oak Ridge National Laboratory