Exponent®
Engineering & Scientific Consulting

Imran Naved, Ph.D., CEng

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Professional Profile

Dr. Naved specializes in aerospace, mechanical, and thermal engineering. He has extensive experience in experimentally characterizing thermal systems, and high-fidelity computational modeling. He also has specialized expertise in high-speed flows and heat exchanger design. He specializes in solving problems involving aircraft, satellites, gas turbines, medical devices, data centers, HVAC equipment as well as residential and industrial fires and explosions.

He holds both a Ph.D. and an MEng in Engineering Science from the University of Oxford. His graduate research focused on the development of reusable thermal protection systems for hypersonic vehicles. His work combined both experimental and numerical methodologies for rapidly evaluating thermal protection for aerospace vehicles. He has conducted detailed experiments exploring the heat transfer on transpiration cooled surfaces in hypersonic flow at the University of Oxford Hypersonic wind tunnels. He has setup high-speed data acquisition systems with fast response thin film gauges and thermocouples to obtain highly resolved measurements of heat flux on a hypersonic vehicle. Additionally, he designed and commissioned a novel high-speed infrared system for these investigations.

Prior to joining Exponent, Dr. Naved worked as an Aerothermal Engineer at Reaction Engines Ltd., where he led experimental and numerical work packages for a Ministry of Defence-funded hypersonic vehicle project. He designed and oversaw experiments related to the vehicle's intake and precooler systems. Dr. Naved also worked as a computational physicist at Fluid Gravity Engineering, where he conducted numerical simulations to model satellite reentry scenarios.

Academic Credentials & Professional Honors

Ph.D., Engineering Science, University of Oxford, UK, 2022

Best Student Paper Award, 2nd International Conference on High-Speed Vehicle Science and Technology, 2022

The Institution of Engineering and Technology Diamond Jubilee Scholarship, 2013

Licenses and Certifications

Chartered Engineer, Royal Aeronautical Society, , #727780

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER) (FL)

Academic Appointments

Graduate Teaching Assistant, Department of Engineering Science, University of Oxford, 2018 - 2020

Prior Experience

Aerothermal Engineer, Reaction Engines, 2022-2024

Aerospace Engineer, Fluid Gravity Engineering, 2022

Professional Affiliations

Member of the Royal Aeronautical Society (MRAeS) – 2025-present

Member, American Institute of Aeronautics and Astronautics – 2018-present

Publications

Naved I, Hermann, H, Hambidge C, McGilvray M. Experimental Studies of Hypersonic Shock Impingement on a Transpiration-Cooled Flat Plate. Journal of Spacecraft and Rockets 2023 60:3, 873-883.

Naved I, Hermann H, Hambidge C, Ifti Saad H, Falsetti C, McGilvray M, Tirichenko I, Vandeperre L. Transpiration-Cooling Heat Transfer Experiments in Laminar and Turbulent Hypersonic Flows. Journal of Thermophysics and Heat Transfer 2023 37:2, 281-295.

Naved I, Hermann T, McGilvray M, Ewenz Rocher M, Hambidge C, Doherty L, Le Page L, Grossman M, Vandeperre L. Heat Transfer Measurements of a Transpiration-Cooled Stagnation Point in Transient Hypersonic Flow Journal of Thermophysics and Heat Transfer 2023 37:2, 296-308.

Naved I, Hermann T, McGilvray M. Numerical Simulation of Transpiration Cooling for a High-Speed Vehicle with Substructure. AIAA Journal 2021 59:8, 3043-3053.

Naved I, Gillespie D. Pressure loss and heat transfer characterisation of intersecting hole heat exchangers. International Journal of Thermal Sciences 2020; 153.

Hermann T, Naved I, McGilvray M. Tool for Rapid Transient Transpiration-Cooled Reentry Simulation. AIAA Journal 2020 58:2, 842-853.

Hermann T, McGilvray M, Naved I. Performance of Transpiration-Cooled Heat Shields for Reentry Vehicles. AIAA Journal 2020 58:2, 830-841.

Presentations

Naved I, Hermann H, Hambidge C, Ifti Saad H, McGilvray M, Tirichenko I, Vandeperre L. Quantifying the Surface Heat Transfer on Transpiration Cooled Porous Materials in Laminar and Turbulent Hypersonic Boundary Layers. HISST, Bruges 2022.

Naved I, Hermann T, McGilvray M. Numerical Simulation of Transpiration Cooling with a Two-Dimensional Substructure. FAR conference Monopoli 2019

Naved I, Gillespie D. Pressure Loss and Heat Transfer Characterisation of Intersecting Hole Heat Exchangers. AIAA Scitech 2019 Forum.

Project Experience

Gas Turbines

- Investigated the root cause of gas turbine compressor blade liberation, including the use of computational modelling to predict such events.
- Assessed the operation of compressors in a process plant that were not meeting contractual performance requirements.
- Evaluated and quantified gas turbine performance under hypersonic operating conditions.

Data Centers

- Investigated data center cooling performance to determine whether sufficient cooling capacity was provided.

Aircraft Cabin Air Quality Investigation

- Investigated allegations of poor air quality in aircraft cabins. This work included reviewing relevant literature, prior studies, and design documentation, as well as inspecting aircraft and developing contaminant quantification models.

Fires and Explosions

- Investigated fires and explosions arising from gas leaks, using model-based calculations to estimate airborne fuel concentrations.
- Conducted computational analysis of propane leak dispersion within a residential property and estimated the time to explosion.

Peer Reviews

Journal of Thermophysics and Heat Transfer, AIAA