HYPERSONICS SCIENCE ENGINEERING TECHNOLOGY

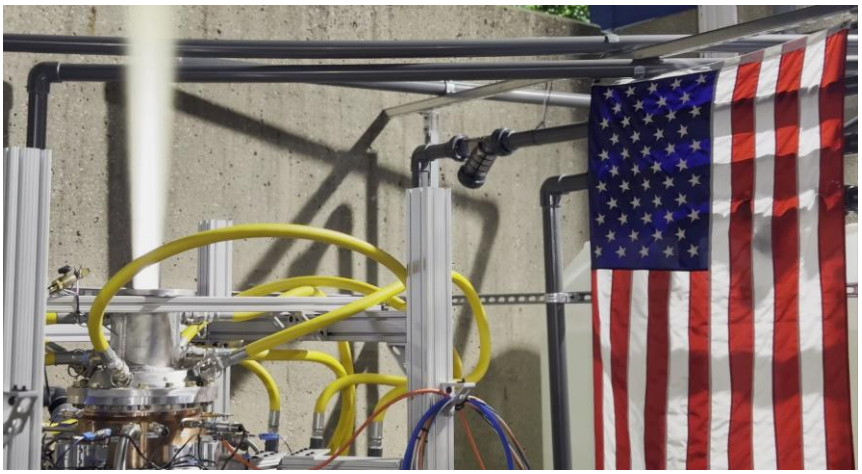
HY-SET LLC

RESEARCH SCIENTIST

Location	Arlington, TX	**Position Type**	Full-Time, Exempt
Work Model	On-Site	**Travel**	Up to 10–20%, as required

ABOUT THE COMPANY

HY-SET LLC is an aerospace engineering firm based in Arlington, TX. HY-SET specializes in providing unique commercial solutions to hypersonics and space-related problems that best fit customer needs including customized ground-testing facilities, advanced laser-based diagnostics, hypersonic propulsion system development, and more. HY-SET's facilities are internationally-recognized for their unique capabilities in hypersonics and space-related ground-testing [Aerospace America 2025].



POSITION SUMMARY

HY-SET LLC is seeking a Research Scientist to join our team working on hypersonics and space-related projects including scramjets, rotating detonation engines, and thermal protection system testing. The successful candidate will perform and lead applied research supporting advanced hypersonic systems, propulsion concepts, and ground test programs. The role combines fundamental fluid-mechanics research with high-fidelity modeling, simulation, validation, and technical leadership for challenging problems in compressible and high-enthalpy flow. The role will have aspects of applying theory, developing and utilizing computational models of all fidelity levels, and hands-on hypersonic ground testing experimental platform design and operation.

This position is intended for a scientist who can independently formulate research questions, develop credible computational approaches, interpret complex flow physics, handle on-site experimental work, and communicate defensible technical conclusions to multidisciplinary teams, program leadership, customers, and research sponsors. The position may support U.S. Government programs and may involve export-controlled, proprietary, or classified work.

LIST OF PRIMARY RESPONSIBILITIES AND/OR DESIRED SKILL SETS

- Conduct advanced theoretical and/or computational research in hypersonic and high-speed aerodynamics, including viscous and inviscid flow phenomena, shock interactions, separated flows, heating, wake/plume interactions, and high-enthalpy and reacting flow modeling and analysis.
- If computational: develop, apply, and assess high-fidelity CFD methodologies for compressible flows such as using Reynolds-averaged Navier–Stokes (RANS), large-eddy simulation (LES), detached-eddy/hybrid approaches, or, where appropriate, direct numerical simulation (DNS) or reduced-order methods.

- Investigate boundary-layer receptivity, stability, transition, and turbulence in high-speed flows, including the effects of surface roughness, geometry discontinuities, pressure gradients, shock interactions, wall temperature, real-gas effects, and freestream disturbances.
- Perform or support aeroacoustic analysis of high-speed external and internal flows, including continuous broadband and discrete tonal source mechanisms, acoustic propagation, jet/plume noise, shock-associated noise, and fluid–acoustic coupling.
- Analyze propulsion-related flow physics for ramjet, scramjet, rocket, rotating-detonation engine, combined-cycle, or other advanced propulsion concepts, including inlet/isolator behavior, combustor interactions, and nozzle/plume flows.
- Develop or extend physics-based models, numerical algorithms, scripts, and analysis workflows that improve predictive capability, repeatability, and research productivity.
- Document methods and results in technical reports, peer-reviewed publications, conference papers, design reviews, and presentations to internal and external stakeholders.
- Contribute to research strategy, proposal development, white papers, statements of work, technical volumes, program reviews, and customer engagements for government- and industry-sponsored R&D.
- Provide technical mentorship to junior engineers, interns, or project team members and help establish rigorous modeling and research practices.
- Experimental test facility design, set-up, and operation.

REQUIRED QUALIFICATIONS

- Ph.D. in Aerospace Engineering, Mechanical Engineering, Applied Physics, or a closely related technical discipline; a master's degree with substantial directly relevant research and professional experience may be considered.
- Demonstrated expertise in compressible fluid dynamics and hypersonic or high-speed aerodynamics.
- Substantial experience applying CFD and/or theoretical modeling to complex aerospace flows, moving boundary conditions, including geometry preparation, mesh generation, solver setup, numerical-method selection, convergence assessment, post-processing, and interpretation of results.
- Demonstrated ability to conduct independent technical research, identify the governing physics of a problem, and develop a defensible analysis approach.
- Strong technical writing and oral communication skills, including the ability to communicate complex results to both subject-matter experts and multidisciplinary program teams.
- Record of technical accomplishment demonstrated through peer-reviewed publications, conference presentations, technical reports, patents, software development, or equivalent research contributions.
- Ability to work effectively both independently and as part of multidisciplinary research and program teams.

RESEARCH & TECHNICAL LEADERSHIP EXPECTATIONS

The Research Scientist will be expected to operate beyond routine analysis execution. Successful performance includes identifying technically consequential gaps, selecting appropriate levels of model fidelity, defining verification and validation evidence, and translating research results into usable engineering insight. Depending on experience, the individual may serve as a technical lead or principal investigator for sponsored research and may help shape future capabilities in hypersonics, aeroacoustics, transition prediction, and propulsion-integrated aerodynamics.

SECURITY, CITIZENSHIP & EXPORT-CONTROL ELIGIBILITY

This position may support contracts or research programs subject to U.S. export-control regulations, International Traffic in Arms Regulations (ITAR), Export Administration Regulations (EAR), or U.S. Government security requirements. U.S. citizenship is required and depending on assigned programs, the ability to obtain and maintain a

security clearance may be required. Final eligibility requirements will be identified for the specific requisition and work assignment.

EMPLOYMENT CONDITIONS

- Full-time, exempt research position.
- Primary work location: Arlington, TX. On-site presence required for proprietary work, laboratory activities, secure computing, or customer/program interactions.
- Limited travel may be required to customer sites, government laboratories, test facilities, technical reviews, and professional conferences.
- The position may involve periods of computer-intensive work and access to laboratory, wind-tunnel, propulsion, or test environments in accordance with site-specific safety requirements.

COMPENSATION

Competitive salary commensurate on candidate's experience.

APPLICATION REQUIREMENTS

- Curriculum vitae or résumé.
- Brief cover letter describing relevant research expertise and interest in the position.
- Publication list or selected technical publications, if applicable.
- Optional research statement (1–2 pages) describing current expertise.
- Names and contact information for professional references may be requested later in the selection process.
- **Send all Applications to Dr. Daniel Palmquist: daniel.palmquist@hy-set.com**

EQUAL EMPLOYMENT OPPORTUNITY

HY-SET LLC is an equal opportunity employer and evaluates qualified applicants without regard to race, color, religion, sex, national origin, age, disability, protected veteran status, genetic information, or any other characteristic protected by applicable law. Reasonable accommodations are available to qualified individuals with disabilities during the application and employment process.