Dear Hiring Manager:

I am writing to express my sincere interest in Airflow Sciences Fluids Dynamics and Test Engineer Intern position. As an aerospace engineering student from the University of Michigan Ann Arbor, with hundreds of hours spent in ANSYS and Star CCM+, and personal experience in leading a complex engineering project, I know I would make a valuable addition to your team.

Being a project lead at the University of Michigan rocketry team, I led a group of 4 to design, analyze, and manufacture the fins for a hypersonic, spacefaring rocket. A hypersonic rocket presents a few unique challenges rarely seen anywhere else in the aerospace field. These include lowering weight, high aerodynamic load, and potentially destructive aeroelastic flutter.

Thankfully, as a team, we were able to provide a few creative solutions to these problems. The main achievements that I made in my design teams are:

* I lowered the overall rocket mass by 10% while maintaining the same safety factor under identical loading conditions (2-degree AoA at Mach 2.77) through consistent optimization via CAE software (ANSYS Structural and Fluent).
* I self-learned FEA and CFD and am the first person on the team to transiently couple the two to investigate the aeroelastic behaviors of the fins. We were able to eliminate fin fluttering by moving the elastic axis rearward behind the center of gravity.
* I am also the first person on the team to transiently couple ANSYS Thermal and Fluent to analyze the fins' thermal behaviors during hypersonic flight. I was the first person on the team to converge such a high-fidelity simulation using the university's Great Lakes HPC Cluster.

I spent a total of God-knows how many hours in the computer lab to figure out how to simulate the above tasks to a high degree of accuracy, which only gets more complicated as documentation on the internet regarding ANSYS is already scarce.

To add to my passion for aerodynamics and numerical modeling, I single-handedly coded a CFD solver using MATLAB that employs the famous SIMPLE method to solve the incompressible Navier-Stokes equations. Furthermore, I was able to verify the solver using the classic lid-driven cavity test case. I also fully support renewable energy and am a loyal fan of Tesla and other new generations of EVs.

A passionate aerospace engineer and an independent worker, I believe my skill sets align perfectly with your listed opening. Thank you so much for your consideration, and don't hesitate to contact me if you have any questions.

Sincerely

Andi Zhou