

## **What Do the Internet, Computer Games, Social Media, Cloud, and Artificial Intelligence Teach Us About Hardware Innovation?**

Qiqi Wang

Associate Professor of Aeronautics and Astronautics, Massachusetts Institute of Technology

Co-Founder, Flexcompute Inc.

In the past decades, rapid feedback and iteration have revolutionized industries from software and gaming to social media and AI. Yet in aerospace, hardware innovation remains hindered by slow, expensive, and risk-averse development cycles. In this keynote, Dr. Qiqi Wang, Co-Founder of Flexcompute and Professor of Aeronautics and Astronautics at MIT, will explore how lessons from the digital world are now being applied to unlock a new era of rapid, simulation-driven hardware innovation in aerospace.

Central to this shift is the emergence of fast high-fidelity computational simulation. Just as software code can be tested and deployed within minutes, aerospace designs can now be evaluated and optimized at unprecedented speed and accuracy. Flexcompute's Flow360 solver, powered by GPU-accelerated computing, enables simulations of complex aerodynamic and aeroacoustic phenomena in a matter of minutes and hours. This capability is further enhanced by Intelligent Geometry, Flexcompute's recent breakthrough in automated mesh generation and robust geometry preprocessing, removing the traditional bottlenecks between CAD and simulation.

Dr. Wang will share compelling examples, from simulating the purely aerodynamic sound generation of a flute to uncovering nonlinear aerodynamic phenomena in unconventional aircraft. These case studies reveal flow behaviors, such as bifurcation, hysteresis, and turbulent multi-body interactions, that are critical for designing high-performance, next-generation aerospace systems.

The talk will also spotlight collaborative work with leading aerospace innovators, where Flow360 supports the aerodynamic design of a revolutionary Blended Wing Body (BWB) airliner, the understanding and reduction of propeller aeroacoustic noise, and the understanding of complex multi-rotor interactions in ground effect. Flexcompute's strategic partner in Asia, VINAS, is bringing these real-time high-fidelity simulation capabilities to Japan's aerospace and industrial sectors. Together, these collaborations highlight how fast, reliable simulation is enabling agile hardware development, making aerospace innovation as iterative, scalable, and collaborative as software innovation.

This talk will conclude with a vision for the future of aerospace: one where simulation-driven rapid feedback makes hardware innovation as agile, scalable, and creative as software.