# Motivation for the KIVI EngD Award 2026

As an Engineering Doctorate (EngD) graduate in Software Technology from Eindhoven University of Technology, conducted in close collaboration with ASML, my work bridges rigorous scientific inquiry and mission-critical industrial design. I believe my graduation project, "Introducing Data Streaming System Interface for Twinscans", strongly exemplifies the core mission of an EngD designer: delivering high-impact technological innovation and sustainable engineering solutions for the high-tech sector.

### A Complex Industrial Challenge with Global Impact

Lithography systems manufactured by ASML are fundamental to the global semiconductor supply chain and digital progress. As machine complexity grows, Twinscan systems generate escalating volumes of diagnostic and operational telemetry. The incumbent batch-and-persist pipeline, relying on in-memory accumulation and local disk storage, was rapidly approaching physical hardware limits across CPU, memory, and disk I/O, threatening overarching lithography operations if unaddressed.

### Disciplined Engineering and Architectural Innovation

Faced with broad architectural scope and technical ambiguity, I took full ownership of a systematic two-phase methodology:

- **Empirical Benchmarking:** I designed an extensible, decoupled C++ benchmarking framework to evaluate six high-performance messaging systems under identical machine conditions, identifying Apache Arrow Flight as the optimal foundational technology.
- **Production-Indicative Prototyping:** I engineered a containerized C++ prototype implementing zero-copy columnar data transport and a custom lock-free burst-buffer queuing topology. The design converts a heavy, disk-bound pipeline into a scalable, network-bound streaming plane that completely bypasses local disk persistence.

### Validated Industrial and Business Value

The prototype empirically verified that high-throughput telemetry broadcasting is achievable while adhering strictly to severe hardware constraints: capping CPU usage below 50% and memory footprint below 32 GB. During a dedicated User Testing Day, the software was independently built, deployed, and validated on target devbench environments by senior ASML engineers, ensuring seamless knowledge transfer and immediate adoption.

## Why I Deserve This Award

This project embodies the defining qualities of an EngD engineer: translating complex architectural trade-offs into practical software solutions, aligning heterogeneous stakeholder goals across academia and industry, and delivering a thoroughly validated reference architecture that directly guides next-generation product development.

Demonstrating the highest level of engineering excellence, this project achieved a final grade of 9.0 with Cum Laude distinction. Notably, the primary stakeholder evaluations awarded perfect scores (10/10) across both critical dimensions: Quantity of Delivered Work (products and activities) and Quality of Work (design, implementation, and technical documentation).

Receiving the KIVI EngD Award would serve as meaningful recognition of this dedication to disciplined systems engineering and practical high-tech innovation.

**I would like to express my sincere gratitude to the evaluation committee for their time, dedication, and thoughtful consideration of my application. Whatever the final outcome, it is a true honor to be considered for the KIVI EngD Award 2026.**