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AI in Simulation: Turning Physics-aware AI Into Business Advantage

9 Apr 2026 – Tuomas Eerola

Let's connect!

Outline

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- Why I am excited about AI?
- Applying AI in engineering – What is the Quanscient innovation?
- Translating physics-aware AI into measurable business advantages.

Download e-book
https://quanscient.com/white-papers/multiphysics-ai

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Why I am excited about AI? - Let’s look at my journey

Why did I want to join Quanscient?

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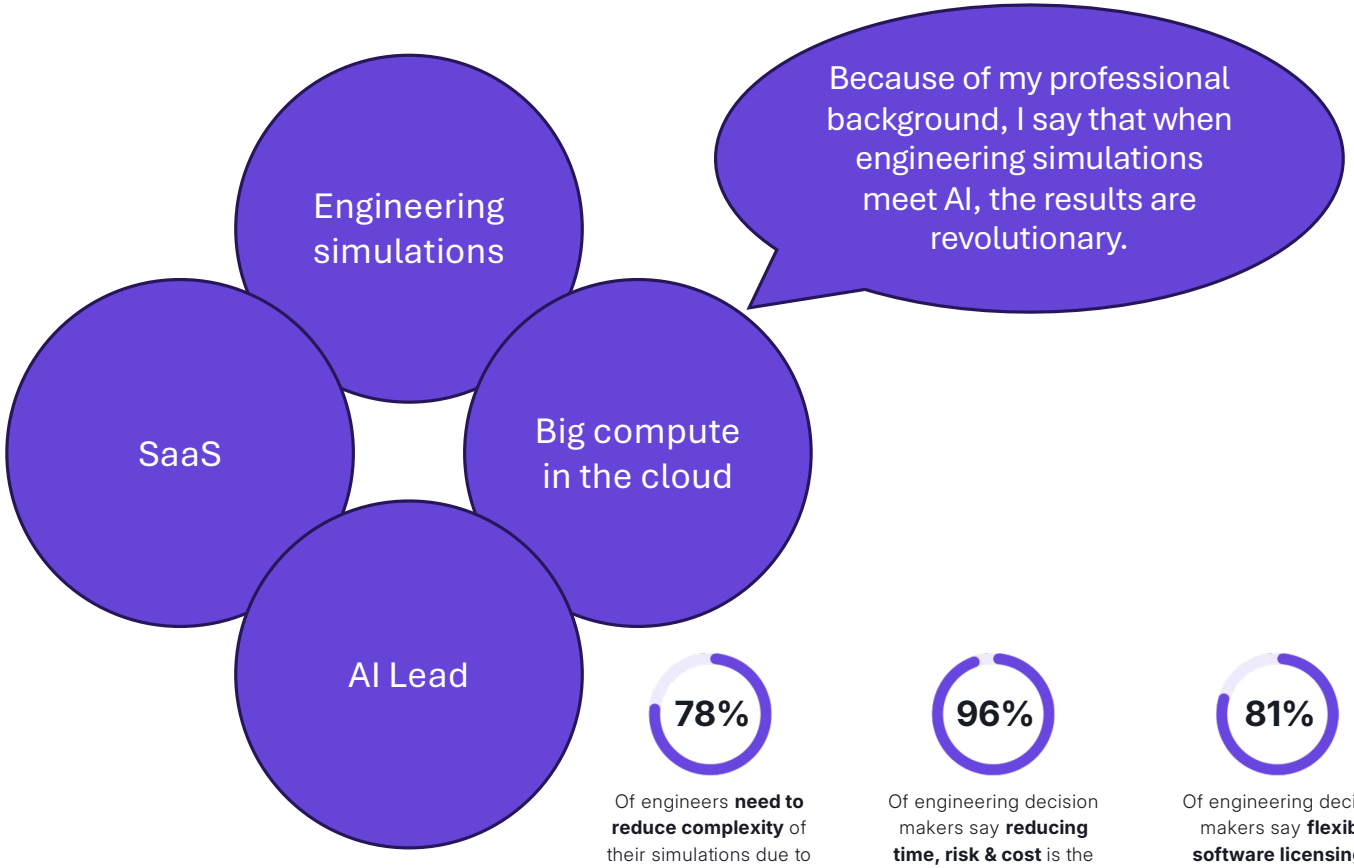
Genuine demand for something new: Engineering timelines are compressing across industries

Electronics: ”We're releasing 2x more products per year than 5 years ago to maintain growth”

Medical Devices: ”First to market wins - we're looking to progress our R&D pipeline faster”

Transportation: ”We used to have 4 months for RFP responses. Now we're lucky to get 4 weeks”



Of engineers **need to reduce complexity** of their simulations due to lack of computational capacity.

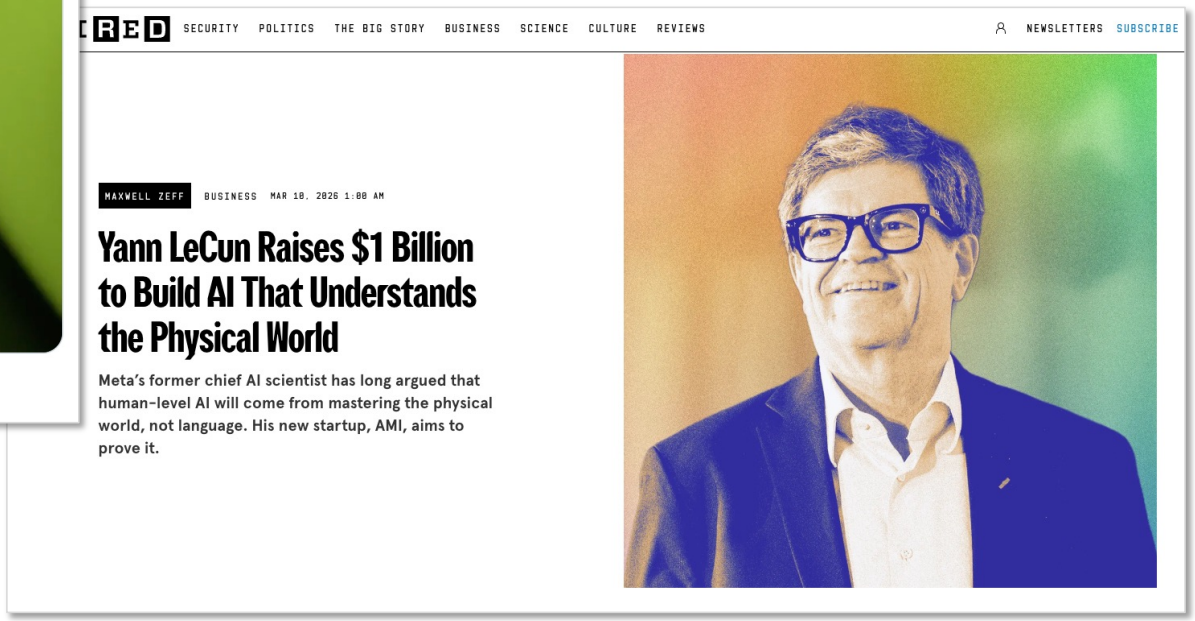
Of engineering decision makers say **reducing time, risk & cost** is the most valuable thing in their R&D.

Of engineering decision makers say **flexible software licensing** is important to increase simulation capabilities.

https://www.linkedin.com/pulse/top-5-ai-trends-transforming-engineering-simulation-finocchiaro-lvage/

Bridging the gap between digital and physical: Physics-aware AI QUANSCIENT

https://x.com/victor_explore/status/1910978633000157201?s=20



https://www.wired.com/story/yann-lecun-raises-dollar1-billion-to-build-ai-that-understands-the-physical-world/

The Challenge: How to turn a falling Apple into Data

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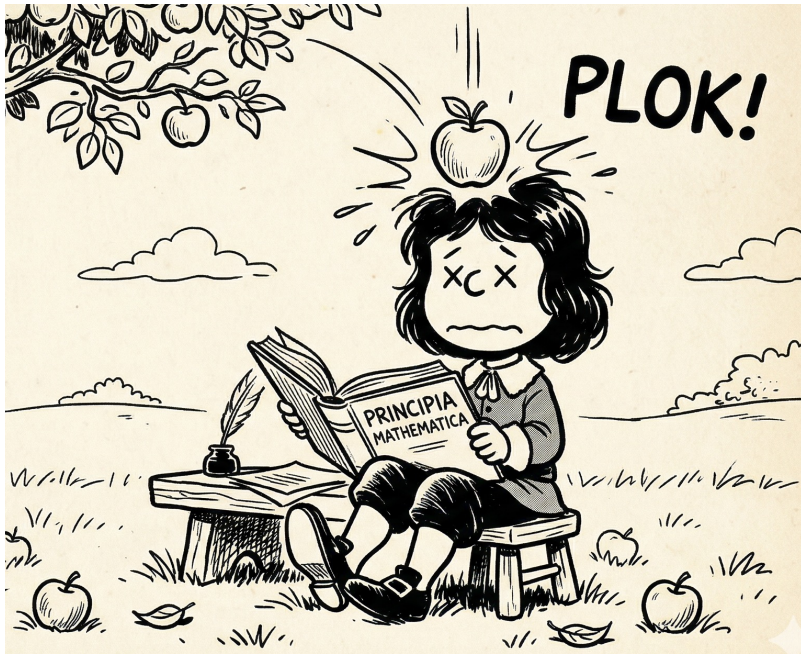

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Applying AI in engineering – What is the Quanscient innovation?

Download e-book

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What excited me about Quanscient's technology?

The right architecture, no legacy burden

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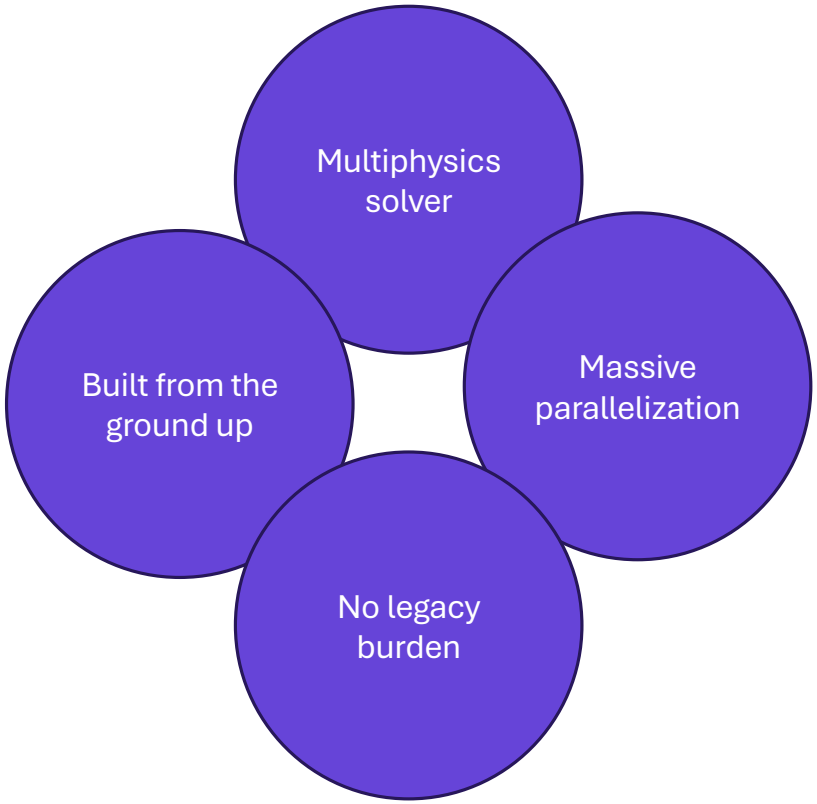

What excited me about Quanscient's technology?

Performance with cloud-era scalability

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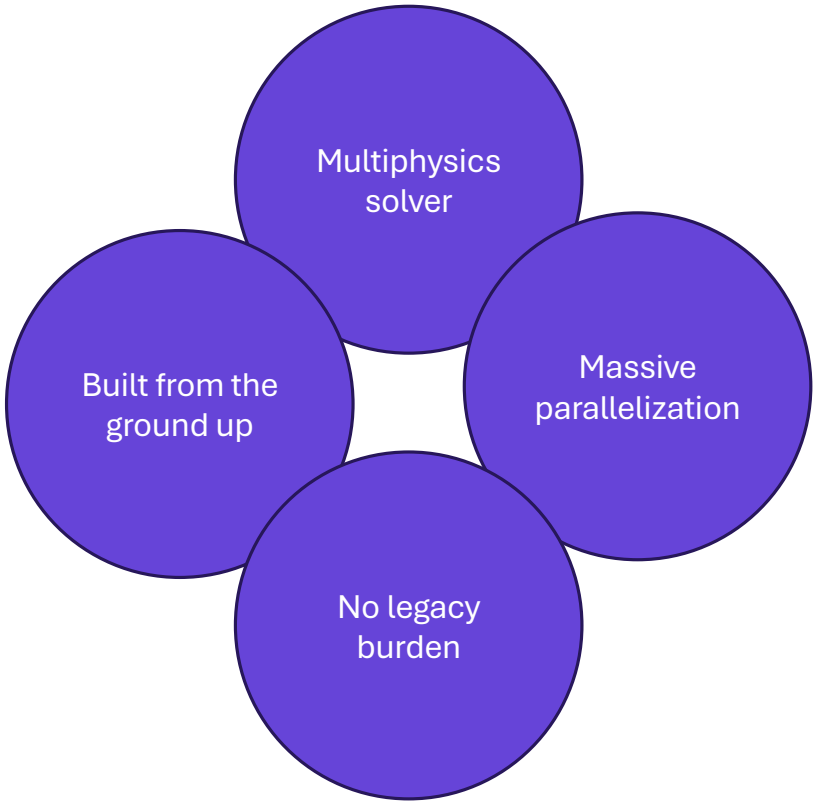

The ability to run engineering simulations with great efficiency and validate designs before a single prototype is built.

What excited me about Quanscient's technology?

Ready to respond to the challenge: Turning an Apple into Data

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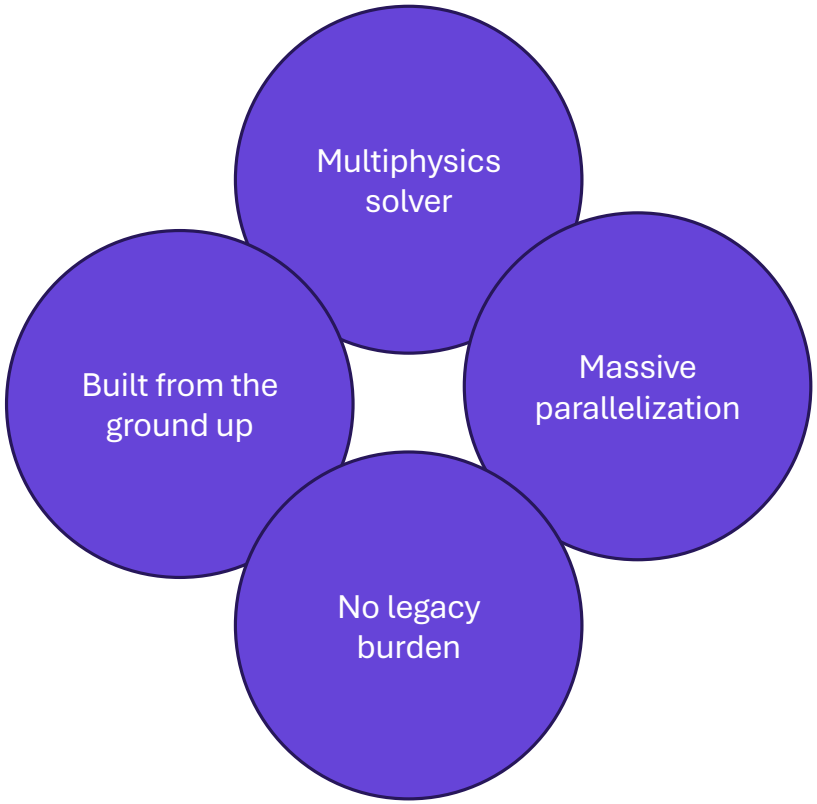

The ability to run engineering simulations with great efficiency and validate designs before a single prototype is built.

Generating AI training data within realistic timeframes and at a viable cost.

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What is the Quanscient innovation?
- When is MultiphysicsAI available?

Behind the Scenes: A Normal Day at Quanscient

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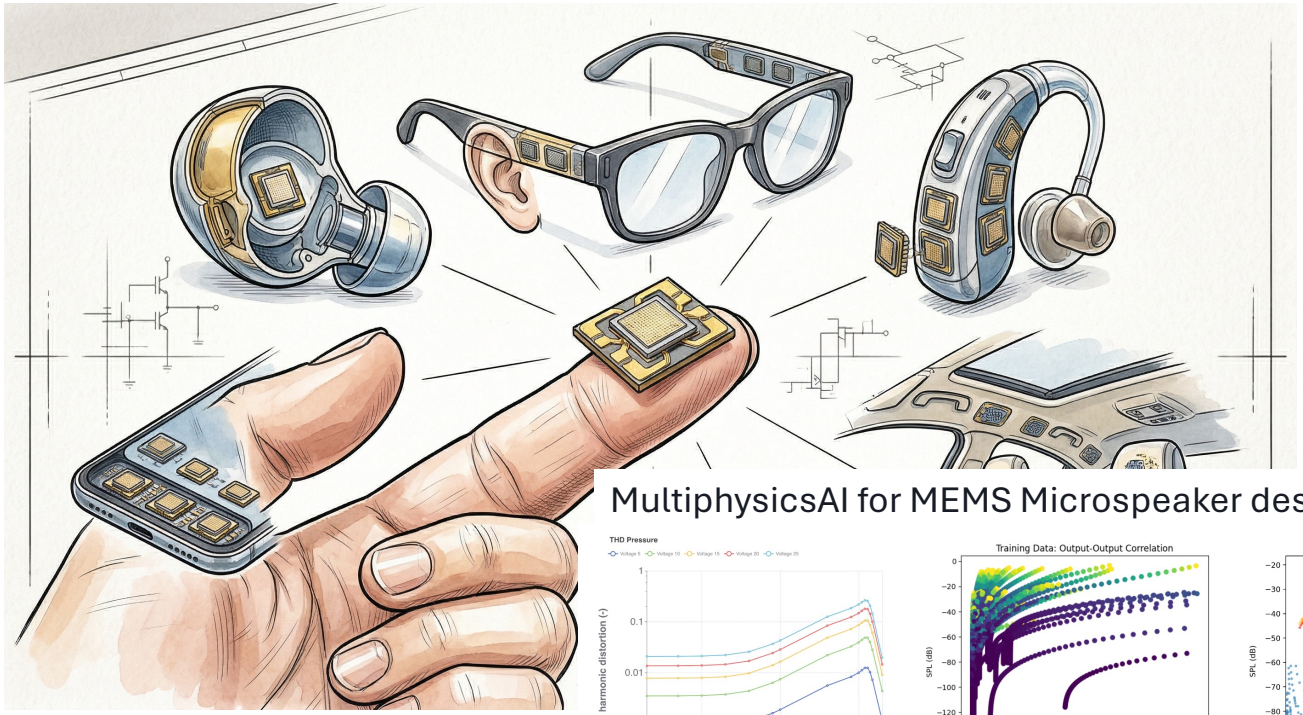
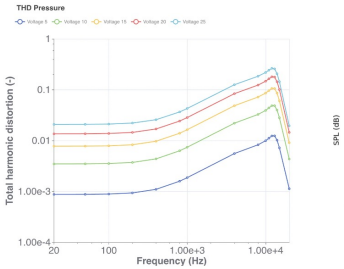
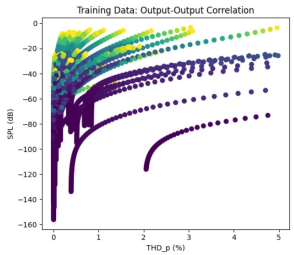


- Physics-aware AI is not a future vision – **we are delivering it today**.
- Our solution is already deployed and creating real-world value.
- Proven applications in fields such as MEMS microelectronics.

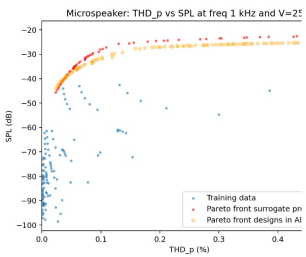
MultiphysicsAI for MEMS Microspeaker design



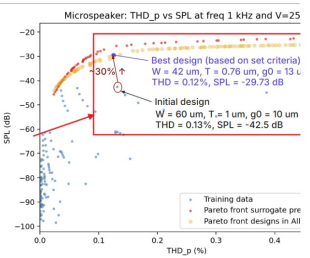
1. Dataset in minutes
Allsolve generated a dataset of 12 500 nonlinear simulations in less than 20 minutes.



2. Train a fast AI model
That dataset was turned into an instant “what-if” engine for new design ideas.



3. See the best options and trade-offs
The strongest trade-off (louder sound with lower distortion) were surfaced, making shortlisting easy.



4. Verify the winners
Top picks were re-simulated in Allsolve: ~30% more loudness with the distortion kept the same.

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What is the Quanscient innovation?
- Strategy recommendations and what to expect?

Tuomas' recommended fast track to benefits:
Targeted ROI vs. World Model

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- Quanscient's scalability and performance are equipped to deliver even more complex scenarios than the ones described on the previous slide.

- **ROI is critical in business.** Therefore, my recommendation is to narrowing the initial scope to a instantly business-relevant product:

Loudspeaker, parking sensor, exhaust system...

→Less training data required
→Costs are reasonable
→Instant ROI

Get your own Multiphysics AI model

How does it work? Example: Generative design of PMUT sensors
https://quanscient.com/examples/pmut-generative-design-ai

Andy's example shows flipping the script:
Which designs meet my target specifications?

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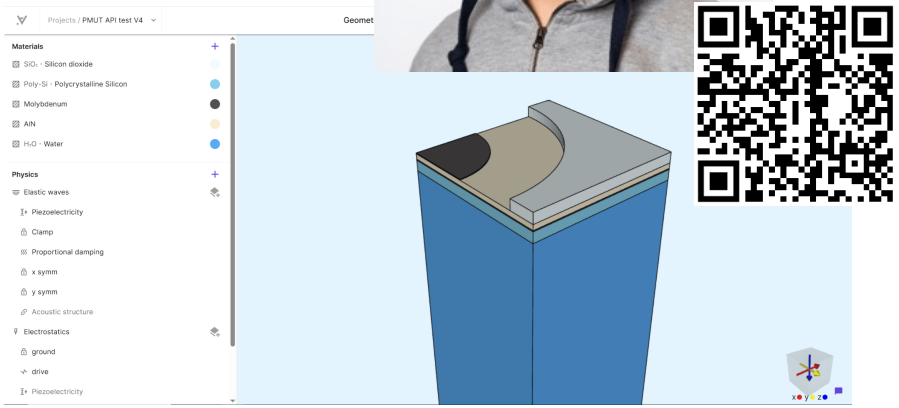
- PMUTs are critical components in biomedical imaging, and a variety of other sensing applications. Two key performance metrics are their sensitivity and bandwidth, which govern image quality, and resolution.

Inverse design gap:

- Conventional solvers answer the forward problem, "what does this design do?", rather than the inverse problem, **"which designs meet the target specification?"**
- MultiphysicsAI bridges this gap.



https://quanscient.com/webinars/multiphysicsai-launch-event-quanscient

Quanscient's Secret Sauce

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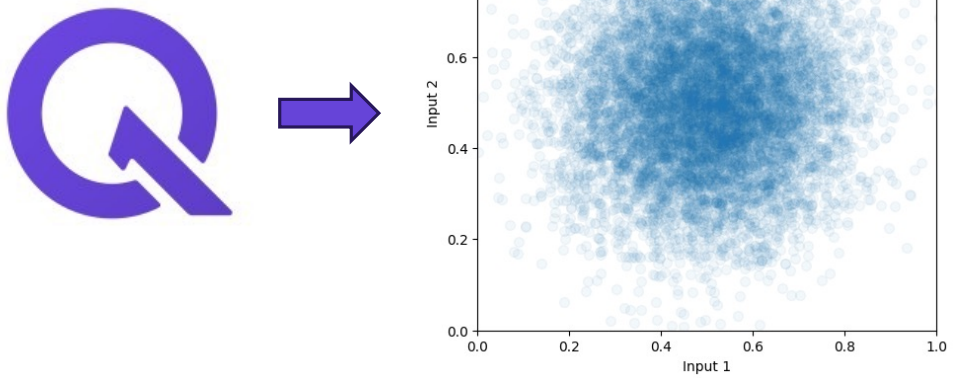

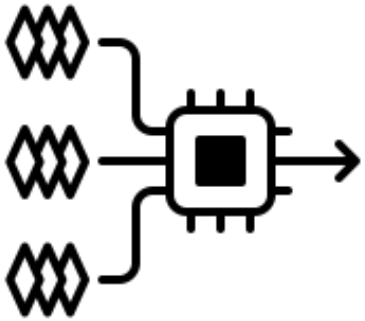

Trained ML model which can predict product performance

https://quanscient.com/webinars/multiphysicsai-launch-event-quanscient

What can I expect?

AI is a modern engineer's best productivity assistant

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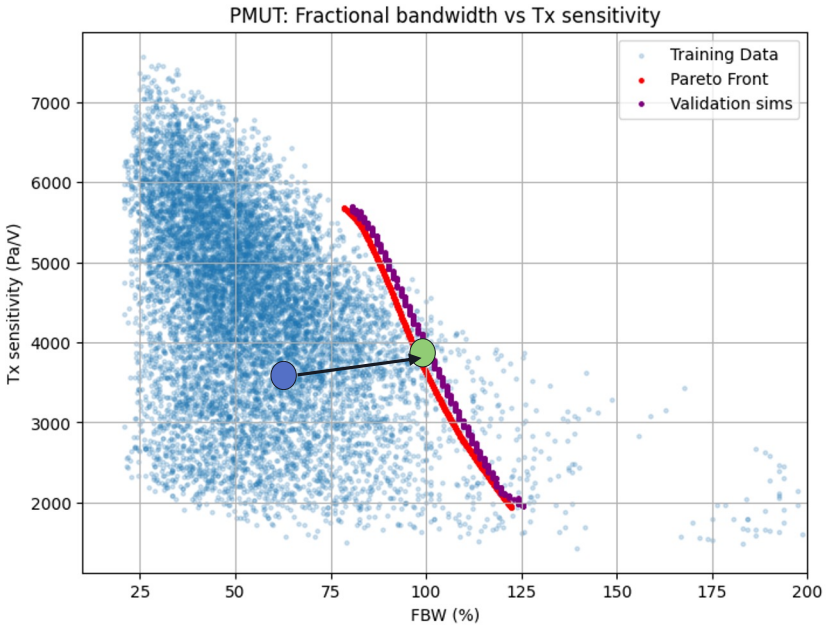

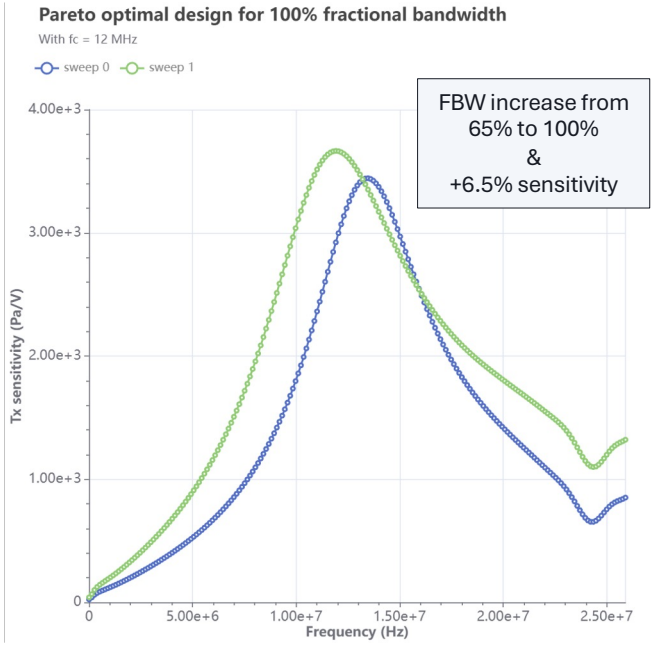

What can I expect?
AI helps optimize yield

- Once we select a design it's useful to analyse how robust it is to manufacturing tolerances
  - Does our wonderful performance drop off sharply with even a slight change?
  - Given our known process variation, what might the yield be?

- Monte Carlo analysis can be used for this, and we have demonstrated it in the past using Allsolve's solver capability

- However, using our trained AI model we can run the Monte Carlo analysis in a matter of seconds. Take this example:
  - Vary each of the 4 design variables by +/-5%
  - Each with a normal distribution
  - 1,000,000 simulations….
  - … executed in 1.8 s

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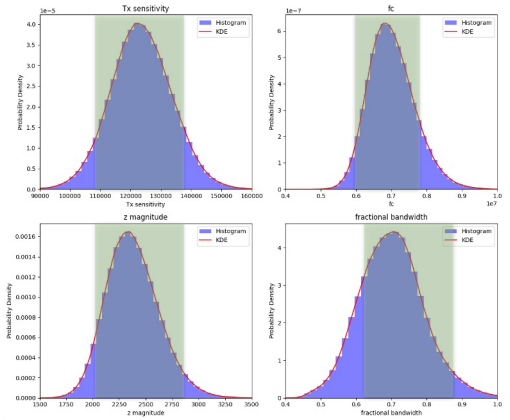

Add pass fail criteria to get a picture of yield

Resulting yield:

+12 %

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What is the Quanscient innovation?
- One more thing why I wanted to join Quanscient

One more thing why I wanted to join Quanscient: Quantum

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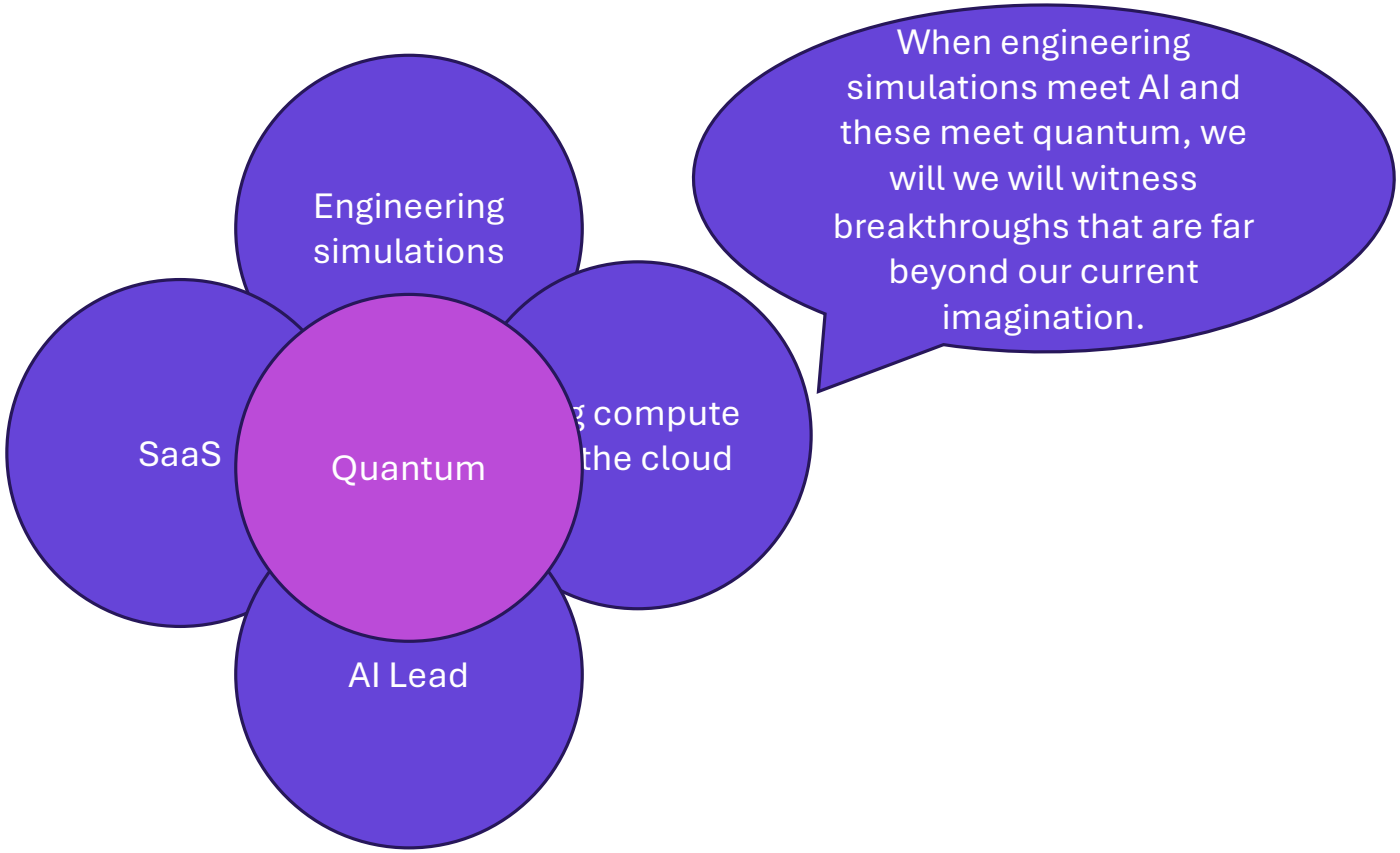

One more thing why I wanted to join Quanscient: Quantum

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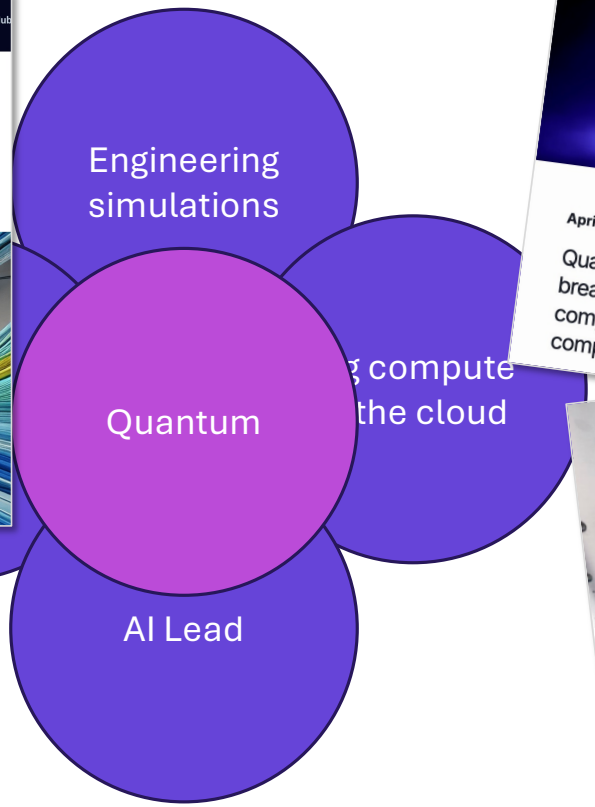

https://thequantuminsider.com/2024/12/06/oxford-ionics-and-quanscient-partner-with-airbus-to-develop-quantum-computing-applications-for-fluid-dynamics-modeling/
https://quanscient.com/quanscient-news/vtt-iqm-50-qubit-launch-event
https://quanscient.com/quanscient-news/quanscient-and-haiqu-announce-breakthrough-algorithm-for-scalable-computational-fluid-simulations-on-quantum-computers

Be the first to benefit from quantum-powered simulation in CFD

Build algorithms with us today to make quantum-CFD your competitive advantage.

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Organizations we work with

IBM · IQM · AIRBUS · QUANTINUUM · IONQ · atom computing · UK National Quantum Computing Centre · Q-CTRL · oxford ionics · HAIQU · aws · AQT

Partner with us to start developing quantum algorithms for physics simulations today

https://quanscient.com/quantum

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Translating physics-aware AI into measurable business advantages

We are in the midst of a "Claude Moment"

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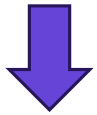
- Core enablers:
  - Integration-readiness
  - Agentic Architecture

- Today, business processes are defined as code.
- Quanscient's cloud-native foundation, open APIs, and SDK allow physics intelligence to be coded into existing business logic.



- **Democratization:** Bringing physics-aware intelligence to support also the work of non-simulation experts in Sales, Sourcing, Quality and more.

Tuomas' AI vision – built with AI

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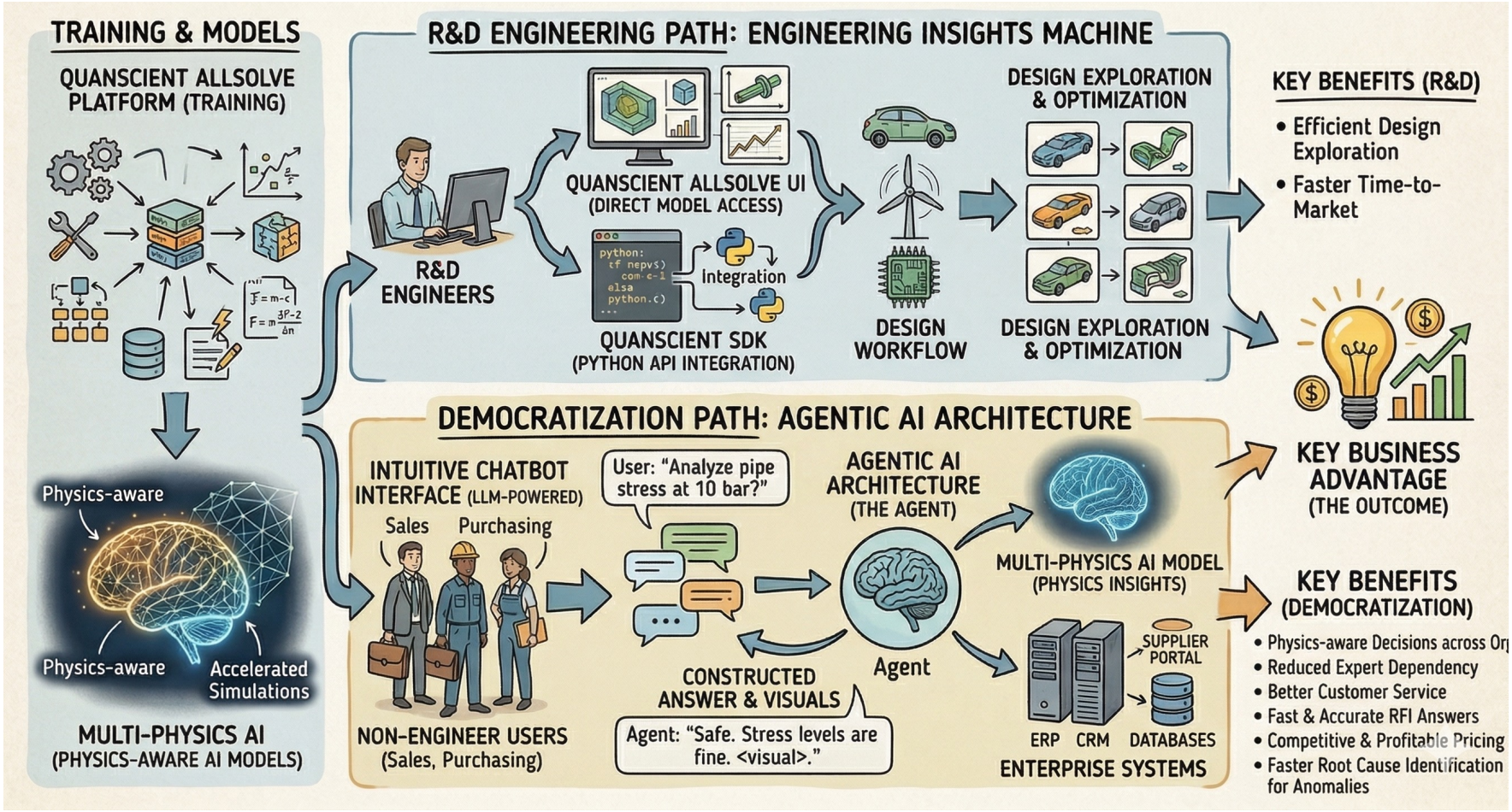

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Ready to turn physics-aware AI into your advantage? -Let’s continue the discussion!

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Let’s connect!