



May 17, 2025

Accelerating R&D with Quality-Checked Simulation Modeling

Discovery Deck

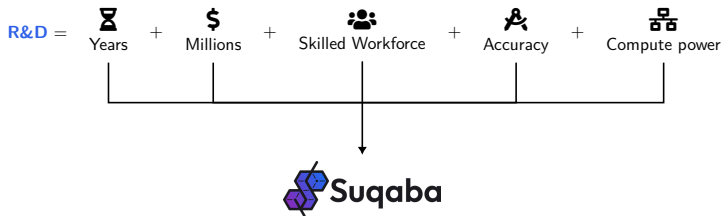
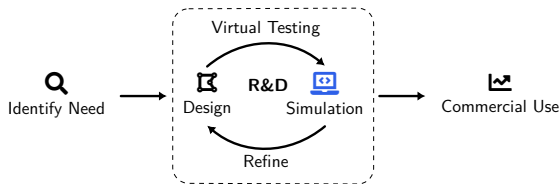
R&D represents

- › 60% of the time
- › 75% of the committed costs

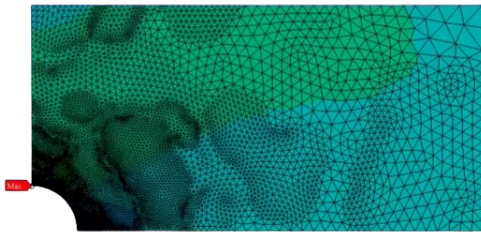
in the Product Design Lifecycle

R&D from an Engineer standpoint

- › **Slow** iteration cycles: high number of touch-points, manual meshing, convergence studies and guesswork
- › **No Digital Quality Control:** increased **risk**, slow **decision-making** and **delayed** delivery



A Simple Case Study

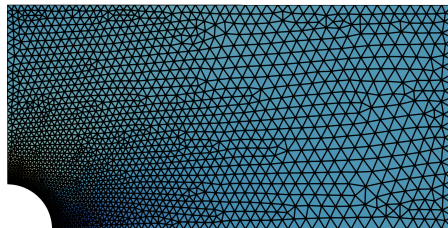


Without Suqaba

- 7 simulations
- 3 minutes
- Heuristic-dependent **pseudo**-error^a
- **Time-consuming** guesswork

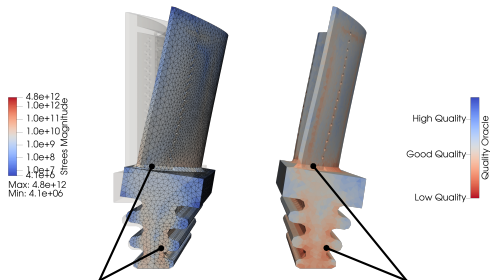
^a Relative change at a single sample point: $\left| \frac{\sigma_{i+1}^{max} - \sigma_i^{max}}{\sigma_i^{max}} \right|$, a.k.a. "**broken** lens"

^b Constitutive Relation Error: $\|\sigma - \mathcal{K} : \varepsilon(u)\|_{\mathcal{K}-1}$, a.k.a. "**top-notch** lens"



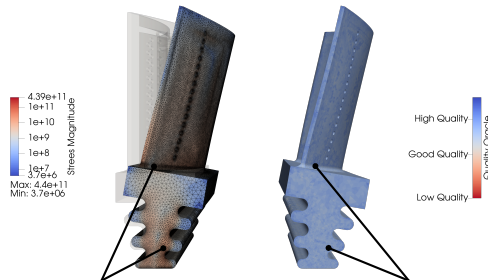
- 1 simulation
- 10 seconds
- **Certified** error^b
- **Automated, Quality-Checked** results

Industrial-Scale Simulation: Turbofan Turbine Blade



The Engineer's Problem:
"Can I **trust** the colors?"

Suqaba's *Quality Oracle*:
"No, you **can't**"



The Engineer's Wonderland:
"Can I **trust** the colors?"

Suqaba's *Quality Oracle*:
"Yes, you **can**"

Error Detection

Error Correction

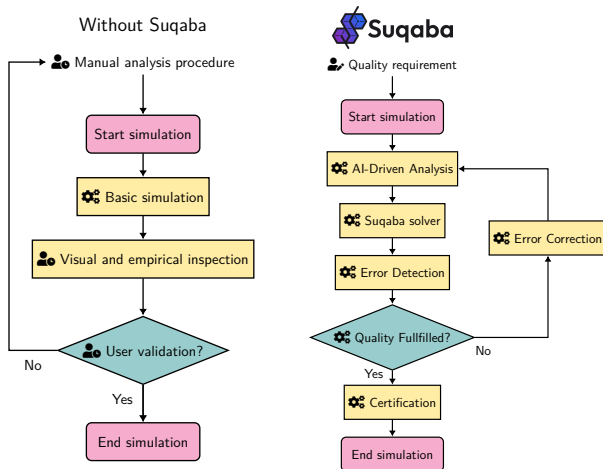
Weeks of work in a matter of hours

The Proprietary Technology Under the Hood

Key takeaways

- **Automated Mesh Generation**
No manual meshing. No convergence studies. Seamless decision-making.
- **Error-Driven Adaptive Meshing**
Certified error bounds ensure simulation accuracy and effectively mitigate risks
- **Cloud-Native Architecture**
Scalable. Accessible anywhere, anytime.

One simulation is all you need



Process requiring manual user intervention vs. Automated process

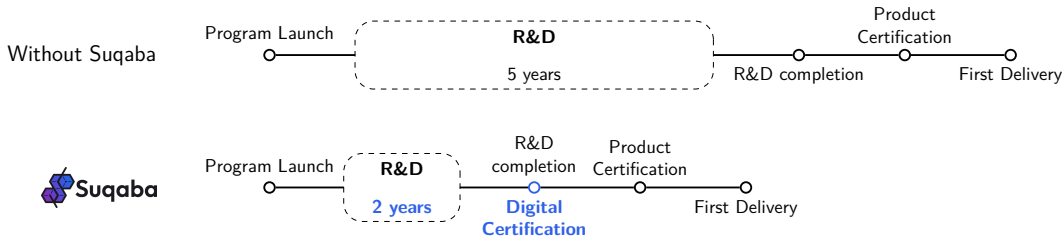
Speed – More in Less Time

- Achieve **faster time-to-market** with reduced simulation cycles
- Adaptive **automation** eliminates manual delays
- High **Performance** Cloud Computing

Trust – Confidence in Every Design

- **Error-driven** simulation removes uncertainties
- **Quality Oracle** to stay on track, every time
- **Quality certificate** issuance to meet the toughest standards

Example of Product Design Lifecycle: From Launch to Delivery



Our Team



Clément Vella

Co-founder & CEO

- › PhD in Computational Science and Engineering
- › 5 years industry experience both as a user & developer of simulation software



Hugo Ginestet

Co-founder & CTO

- › MSc in Computational Science and Engineering
- › 3 years as a Research Engineer crafting the first Certified Error-Driven simulation software



Sasha Bogojevic

Ch. Operating Officer

- › Entrepreneurship major at TMU
- › 4 years of practical entrepreneurial experience



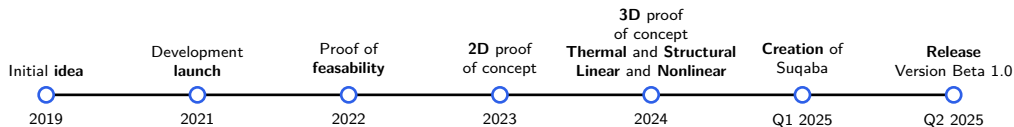
Jhen Shankara

Ch. Development Officer

- › PhD in Neuroscience
- › Award-Winning presenter
- › 10+ years in scientific dissemination & proposal and grant writing



Current Status and Roadmap



Our **lifetime goal** is to tap into every single aspect of the **Digital Design** cycle. Our **feature roadmap** includes

- › Goal-Oriented Computations
- › Digital Twinning & Multi-parametric Optimization
- › Topology Optimization / Generative Design

Forbes

TECH

Why The Future Of Innovation Is Simulation



Computer Methods in Applied Mechanics and Engineering



Research directions in computational mechanics

J. Tinsley Oden^a, Ted Belytschko^b, Ivo Babusko^c, T.J.R. Hughes^d



Hans Reichenbach (1891 – 1953)

Summary of our Vision

“We’re increasingly moving towards a **simulation economy**, testing hypotheses and learning in a **virtual environment** built by real world data at much **lower** levels of **cost** and **risk**.”

“**Error estimation** and **adaptivity** will become a **common ingredient** in all significant computer simulations during the next decade. The calculation of **estimates of error** in simulations will be as **natural** a feature of the simulation as **any other estimate** of physical quantities of interest.”

“If **error** is corrected whenever it is recognized as such, the path to error is the path of **truth**.”

The Rise of Scientific Philosophy, 1951