



**Accelerating electronics cooling design**

December 2025

# Electronics cooling is getting harder

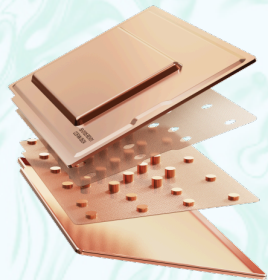
## Latest generation chips are generating more heat

The thermal flux of high-end chips is 20% of the surface of the Sun

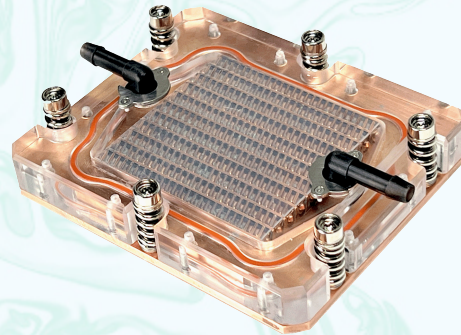
## Constrained form factors limit design options

The demand for high-powered chips in cars, phones and smart devices is increasing

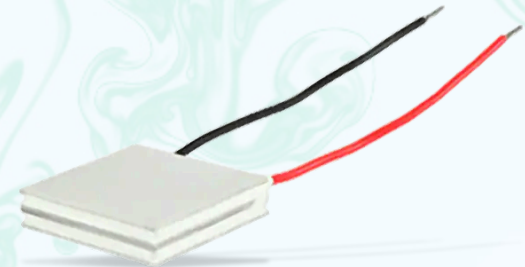
**These factors necessitate the use of more expensive and complex thermal solutions:**



Vapor chambers



Direct to chip liquid cooling



Peltier coolers

## Thermal design errors are expensive

- Increased risk of catastrophic failure
- Reduced component lifespan
- Overspecification of thermal components

These can lead to increased unit costs and product recalls.

**Therefore, thermal design optimization with experimental and simulation tools is more crucial than ever.**



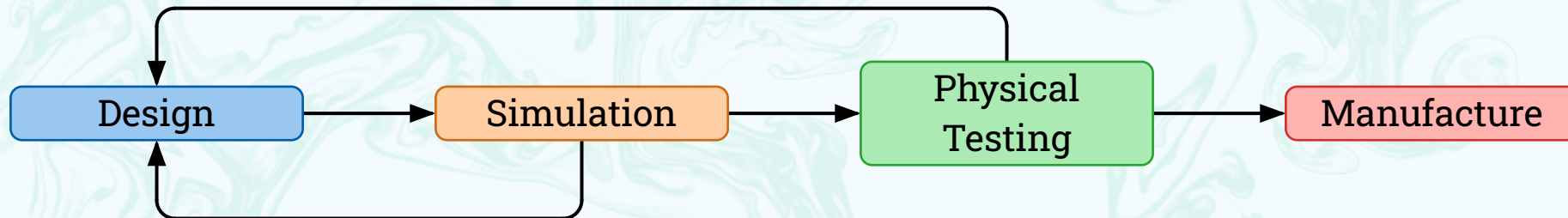
Burning electrical vehicle

## Experiment driven design is expensive

- Experiments are vital for design validation.
- However, relying entirely on experiments for design iteration is expensive and slow.

### Utilizing simulations in the design process means:

- Iteration cycles are faster and less expensive
- More design iterations  $\Rightarrow$  Higher product performance
- Decreased chance of project over runs



## CPU-bound simulations cannot keep up

Leading electronics cooling simulation tools (such as Flotherm) are typically constrained to run with on-premises CPU hardware.

This constrains thermal design optimization:

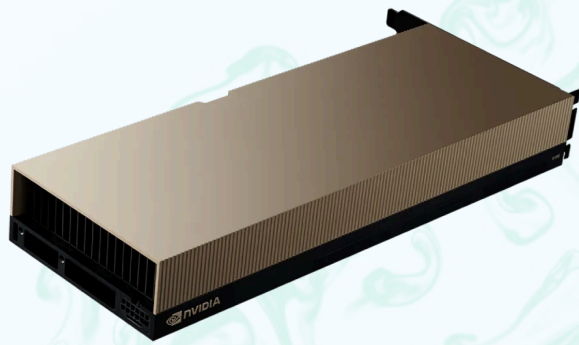
- The large simulations required for complex designs have extreme runtimes
- Reliance on locally available compute limits the scale and number of simulations that can be carried out
- Simulation speed scales poorly with number of CPU cores

**“Flotherm is not able to compute accurate chip die temperatures for our GPU server rack designs, and we have given up on using it for design candidate screening.”**

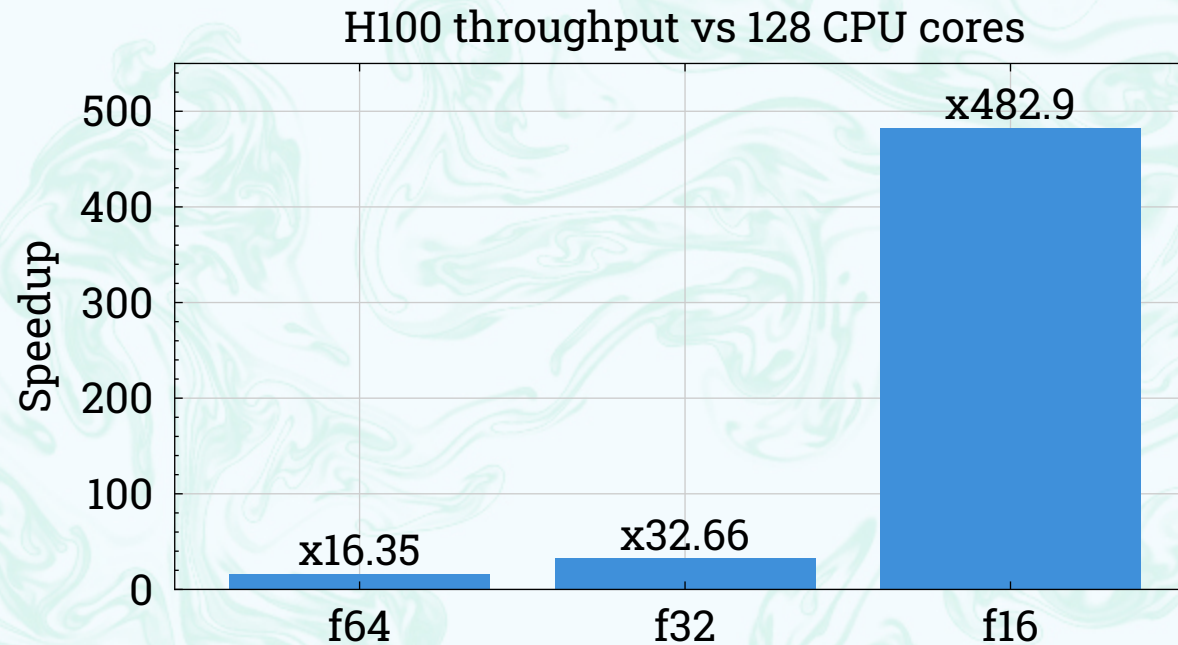
– **GIGABYTE™** Thermal R&D team



## Server GPUs offer order-of-magnitude speedups



NVIDIA H100 GPU



Researchers have developed [techniques](#) to run simulations in lower precision taking advantages of GPU low precision throughput. The new ceiling of simulation performance depends on utilization of GPU throughput.

Source: [H100](#), [i7-13700TE](#)

# Vanellus Product features

## Accelerated solver

- Finite-volume CFD and thermal solver
- Built to run on high-performance cloud GPUs
- Validated against academic benchmarks

## Geometry engine

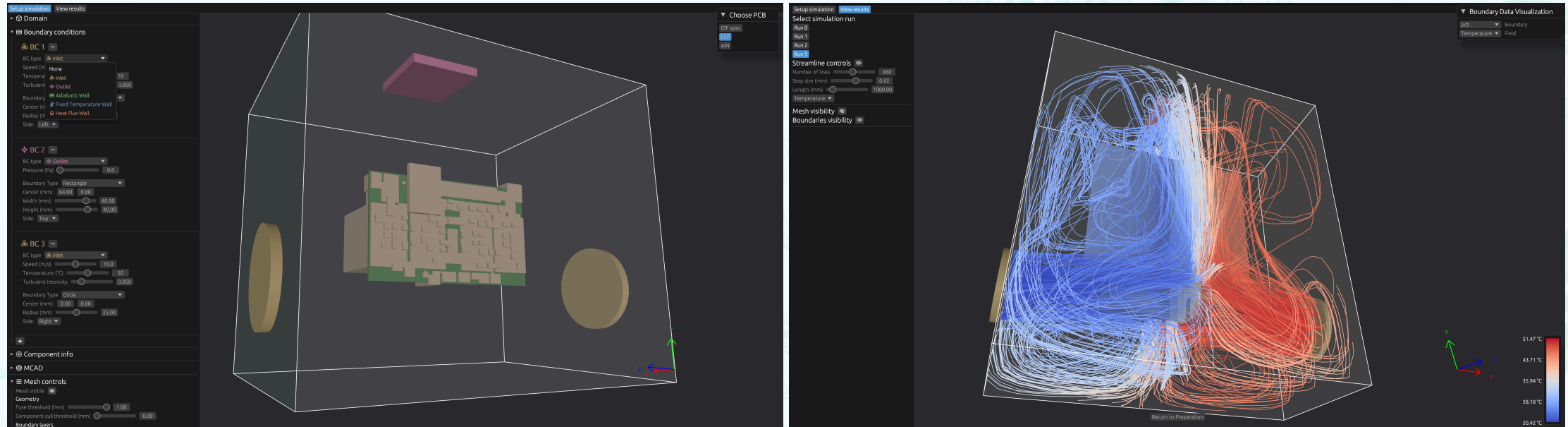
- Automatic rectilinear meshing, reducing simulation setup time
- Instantaneous re-meshing in response to geometry changes
- Seamless composition of PCB design and CAD files (e.g. IDF, STEP)

## High-performance UI

Use of cutting edge game engine technology supports:

- Efficient rendering of geometry, flow fields and temperature
- Deployment to web browser and all major operating systems

# App preview

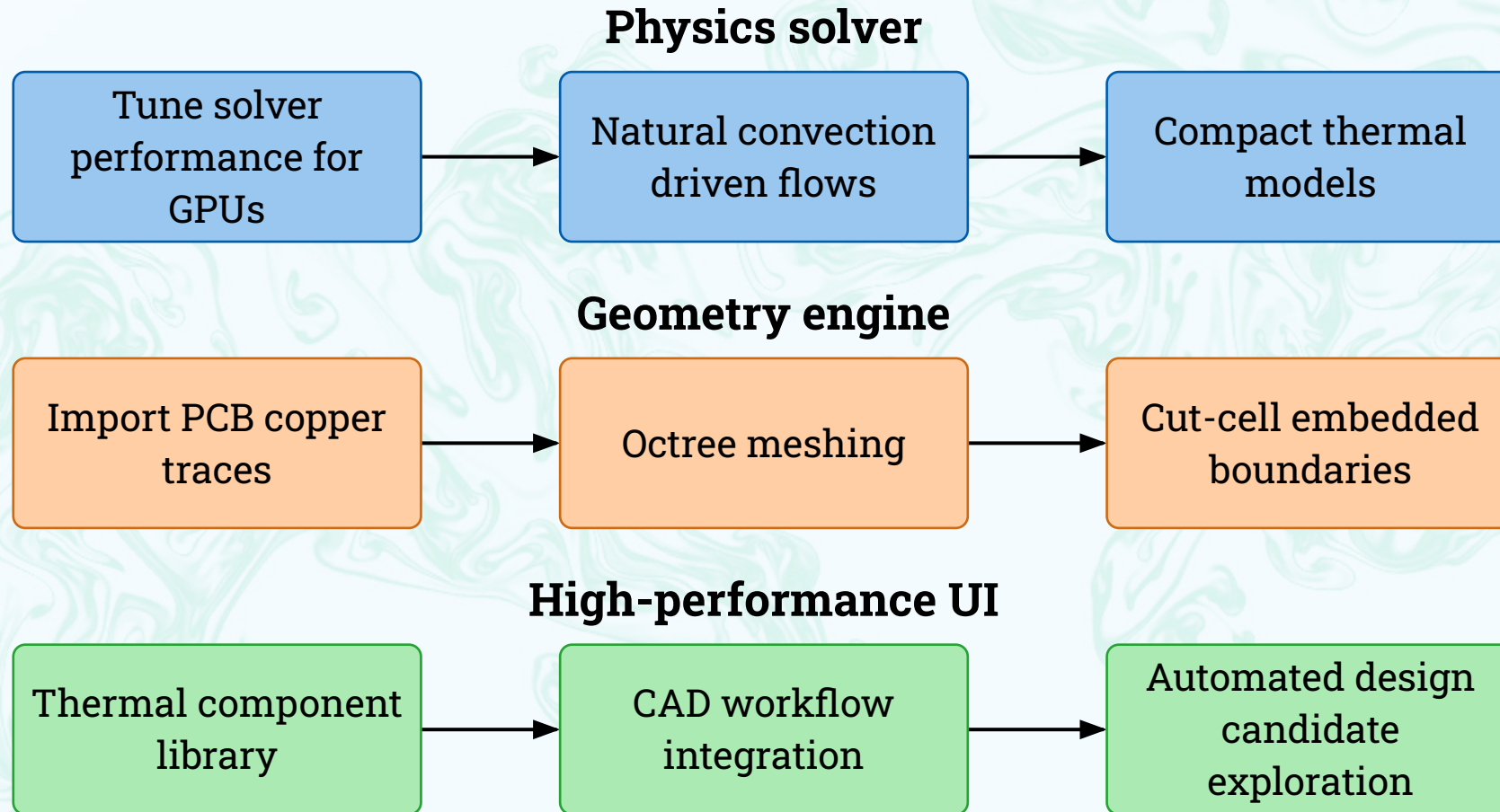


App interface showing PCB enclosure simulation setup

Temperature field visualization with streamlines

[View our latest demo](#)

# R&D Roadmap



# Reliability focused approach

## Industry trusted solver algorithms

- **Finite-volume method:** The gold-standard for computational fluid dynamics, used by leading-software such as Ansys Fluent, Flotherm and OpenFOAM.
- **k-omega SST turbulence modeling:** Accurately captures the turbulent flow conditions encountered in electronics cooling.

## Proactive validation

- Solver results checked against standard literature cases including lid driven cavity, channel flow and backward facing step.
- Functional and integration based software testing approach ensures correctness of individual modules.

## Exceptional scientific computing expertise



**Laurence Cullen**, CEO

Previously: [ARM](#), [Sensity](#)

Experienced generalist software engineer building out the application, meshing and cloud deployed infrastructure.



**Dr Michael Negus**, CTO

PhD: [University of Oxford](#)

Built the core Vanellus CFD solver, now extending the range of supported physics. Research background in two phase flow.



**Dr Oscar Holroyd**, CSO

PhD: [University of Warwick](#)

Optimizing the performance of the physics solver with his GPU programming expertise. Research background in control theory applied to fluid dynamics.

# Pilot opportunity

As part of a pilot relationship, Vanellus can assist with:

## **Solver tuning**

Physics solver tuned to accurately model your challenging electronics designs

## **Workflow automation**

Identify opportunities to automate your simulation and design workflows

## **Component library**

Build library of internally required components

## **UI optimization**

Adapt our application to reflect the needs of your engineers' workflows

## **GPU access**

Discounted access to latest generation server-GPU computing



Reach out to our CEO:

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