Vaire, a new kind of near-zero energy computing company

As part of our quick founder questions series – or QFQs – we spoke to Hannah Earley, CTO of Vaire Computing about Near-Zero Energy Chips, Moore's law and why the AI revolution needs a better architecture.

Temps de lecture : minute

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The story of *Vaire Computing* was one of good timing. I was a Cambridge University scientist and recent graduate, trying to figure out how best to translate my ideas about the future of computing to the real world. Rodolfo Rosini was a serial entrepreneur, also obsessed with the future of computing. A mutual friend introduced us and, within maybe a week of meeting, we realised that together we had a chance at changing the way we build chips and computers.

Today's chips generate significant amounts of heat in everything they do, creating unsustainable energy demands. We have now run out of tricks to push these limits, and can no longer keep improving performance by packing more transistors onto chips. Simplifying, we're hitting the end of Moore's Law. Rodolfo and I both realised that the only way forward is a fundamentally different architecture, and we're both determined to build this future.

Tell us about the business – what it is, what it aims to achieve, who you work with, how you

reach customers and so on?

Vaire's mission is to build Near-Zero Energy Chips. It's perhaps ironic that, just as we are starting to see the possibilities of the AI era, Moore's law is coming to an end. If we want to keep seeing the kinds of developments that come with exponential increases in computing (without exponential increases in energy production and water usage) then we need a new scaling law. Near-Zero Energy Chips provide this law, promising at least several decades' more growth.

Conventional chips turn all their energy into heat. We use Reversible Computing and related technologies to instead recycle a large part of the energy at each step, instead of converting it to heat. While we can never recover all the energy, we can continue to get better over time and this underlies our future scaling. Ultimately this reduces energy consumption while simultaneously improving performance.

Today, we've built a team of experts in Reversible Computing, experienced chip-makers, engineers, and product designers. Our current focus is building the first prototype Near-Zero Energy Chip, which should be ready the first half of next year, and building relationships with partners who want to be at the vanguard.

How has the business evolved since its launch?

We started out in 2021 and the first couple years were really tough. We were in stealth, had only a small amount of pre-seed funding, and experienced a lot of scepticism. Nevertheless, we were convinced that the future we saw was inevitable. This determination carried us through the dead ends. Over time we built out a viable path to our vision and this year things accelerated dramatically. We were joined by world leading talent,

including Mike Frank — the very mutual friend who introduced me to Rodolfo, and who did a lot of the foundational work on Reversible Computing at MIT in the 1990s (in fact, his thesis inspired my PhD) — as well as Andrew Sloss — an early engineer at ARM who knows what it takes to make and ship chips.

Tell us about the working culture at Vaire

I feel very lucky with the team we've been able to assemble. Working on this new computing architecture requires a very special kind of person: People who have a lot of experience in their respective fields, but who are also willing to revisit all the implicit assumptions and break their intuition. People who are both creative enough to figure out solutions to problems people haven't worked on before, while also being pragmatic so that it doesn't take 20 years to reach our goal. People who believe that there is a better way of doing things.

The other aspect, particularly crucial for an early stage startup, is resilience. There's a lot to do and the road is bumpy. Rodolfo, having experienced this numerous times before building startups, knows how hard it is and what it takes. He keeps going, and this sets the tone for the team.

How are you funded?

Vaire raised a $4.5M Seed round co-led by 7Percent Ventures and entrepreneur Jude Gomila, alongside Seedcamp and strategic angel investors earlier this year.

What has been your biggest challenge so far

and how have you overcome this?

I think the biggest challenge for me has been adjusting to the growth of the company and how that comes with less involvement in the day-to-day. I care deeply about our technology and how things are done, but (as I am learning!) this is simply not possible or beneficial as a startup matures. I feel incredibly fortunate that I can trust and rely on our team and their expertise, and this has given me the confidence to step away from the detailed engineering, and up as a leader. I still find excuses to do a little bit now and then though!

How does Vaire answer an unmet need?

Every founder out there building an AI company, every consumer excited about how tech can improve their lives, every Big Tech company serving tens of millions of people - every one of these dreams depends on high performance, sustainable compute, and yet we're about to hit a brick wall when it comes to performance and energy consumption. The AI revolution is going to need a better architecture, and Vaire's Near-Zero Energy Chips can deliver that.

What's in store for the future?

We're aiming to have our first prototype chip next year. There are several metrics that matter when it comes to evaluating not just the heat generated by a chip but its performance. We're laser focused on those and excited to show our partners and collaborators what we can deliver.

What one piece of advice would you give other founders or future founders?

Focus on talent. You need to find both the world experts in your niche and

people who are open, curious and collaborative. One of the things that gives us enormous confidence in what we're building is the calibre of the people who've joined us on the Vaire journey.

And finally, a more personal question! What's your daily routine and the rules you're living by at the moment?

I've been spending a lot of time split between the UK and the US at the moment as we have teems in both — so right now, there's no such thing as a consistent daily routine (not that I've ever really had one)! If there is one consistency it is my morning coffee... Things have been moving very quickly this year which has been exciting, but I am looking forward to the prospect of more 'normalcy' in the future and making time for things like reading and travelling to new places again.

Hannah Earley is the CTO at *Vaire Computing*.

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