

Trending: Microsoft shares new data center design featuring a closed-loop water system for cooling (<https://www.geekwire.com/2024/microsoft-shares-new-data-center-design-featuring-a-closed-loop-water-system-for-cooling/>)

As the AI era heats up, this startup has generated a novel way to cool data center microprocessors

BY TODD BISHOP (<https://www.geekwire.com/author/todd/>) on November 8, 2024 at 7:25 am



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Maurizio Miozza, GemaTEG's co-founder and chief creative officer, left, and Manfred Markevitch, co-founder and CEO. (GemaTEG Photos)

The founders of GemaTEG (<https://www.gemateg.com/>) Inc., a startup based in Bellevue, Wash., didn't intend to make a system for precisely controlling the temperature of data center microprocessors when they started dreaming up ideas five years ago.

When they landed on the approach — a novel micro heat-pump architecture that operates at the level of individual chips — they didn't foresee the generative AI boom that would turn the challenges of computing performance and energy efficiency into even bigger issues for the future of technology.

As it turns out, their technology is positioned to help supercomputer operators and AI platforms address these challenges.

But they began with a broader goal.

"We started in a very crazy way, because we didn't have any specific project in mind," explained Maurizio Miozza (<https://www.linkedin.com/in/maurizio-miozza-8985b517/overlay/about-this-profile/>), GemaTEG's co-founder and chief creative officer. "It was more like, how do we demonstrate to the world that you can do sustainability while you're actually growing, and profit from it, and not see that as an adversarial relationship?"

Their latest proof point: A recently announced partnership (<https://www.gemateg.com/news/a-milestone-partnership-gemateg-joins-forces-with-leonardo-to-revolutionize-ai-infrastructure>) between GemaTEG and the Italian aerospace and defense giant Leonardo, to improve the performance of the Italian company's Davinci-1 supercomputer (<https://www.leonardo.com/en/innovation-technology/davinci-1>).

A nuclear physicist, Miozza worked for nearly 22 years with Italian aeronautics and industrial manufacturer UmbraGroup Exh. LL ultimately as vice president of business development and strategic planning. The company has its U.S. offices in the Seattle area, due in part to the close proximity to Boeing.

That's how Miozza met Manfred Markevitch (<https://www.linkedin.com/in/manfredmarkevitch/overlay/about-this-profile/>), the business and finance leader who would ultimately become GemaTEG's co-founder and CEO. Markevitch who was an UmbraGroup board member from 2016 to 2018.

Both were immigrants from Europe who had become U.S. citizens. After working together and getting to know one another, they decided to start their own venture.



The DaTEG micro heat pump can be situated either inside or outside the server, working in conjunction with micro heat exchanger that is placed on the chip. (GemaTEG Photo)

"We just hit it off," Markevitch said. "We decided to put our entire lives and livelihood at stake."

Founded in 2019, GemaTEG has raised about \$10 million in funding from various sources, including equity investments, grants, and bank loans. The company won the Flywheel Investment Conference in 2023 (<https://www.flywheelconference.com/2023>),

including a \$150,000 investor share (<https://www.flywheelconference.com/2023>) and a \$250,000 investor share (<https://www.flywheelconference.com/2023>).

Privately held, GemaTEG doesn't disclose its specific financial results, but it's generating revenue and the founders expect the company to grow significantly in the coming years.

GemaTEG has about 15 employees, part of an overall team of 30 people that includes advisors, contractors, and others. It has offices in the U.S., Switzerland, and Italy.

The company's leadership team (<https://www.gemateg.com/team>) includes Paul Warburg (<https://www.linkedin.com/in/paul-warburg-b3a6479/>), chief strategy officer, former CEO of Xenon Arc; Bruno Lorenzi (<https://www.linkedin.com/in/bruno-lorenzi-28930875/>), head of engineering; and Nathaniel "Buster" Brown (<https://www.linkedin.com/in/nathanielbusterbrown/>), a GemaTEG board member, former CFO for Vulcan, Inc.

GemaTEG's thermal management system aims to improve the way data centers regulate energy-hungry microprocessors. A micro heat exchanger is placed on the chip, with the DaTEG micro heat pump either inside or outside the server. The devices have a unique shape and design that facilitates a highly efficient heat exchange.

Each chip in a server or data center can have its own dedicated micro heat pump, independently controlling the cooling of each chip, adjusting it based on the specific workload and heat output of that processor.

The patent-pending approach (<https://patents.google.com/patent/US20210356180A1/>) contrasts with conventional cooling systems, which tend to cool everything uniformly. GemaTEG says its approach to localized cooling can boost chip performance by more than 30% while reducing overall energy consumption.

"You actually go faster and consume less power, which is totally counterintuitive," Miozza said.

Many other companies in the market use a server-level direct liquid cooling (DLC) solution rather than the specific chip-level thermal management approach that GemaTEG has developed.

Markevitch said the partnership with Leonardo goes beyond a simple vendor-customer relationship. GemaTEG and Leonardo have been collaborating closely for nearly two years, with the startup embedded as an extension of the aerospace company's own organization. He said this integration allows GemaTEG to understand Leonardo's needs and challenges, tailoring its approach accordingly.

On their radar now is Leonardo's upgrade of its flagship Da Vinci supercomputer to a new Da Vinci 2 system. GemaTEG hopes to play a role in this upgrade, leveraging its technology to boost the performance and efficiency of Leonardo's high-performance computing infrastructure.

GemaTEG also collaborates with EPFL-EcoCloud (<https://ecocloud.epfl.ch/>), a research center at the Swiss Federal Institute of Technology Lausanne, to develop next-generation thermal management solutions. This partnership is focused on increasing computing power while minimizing the environmental impact of AI technologies.

The company recently won the renewal of its Efficient Solution Label from the Solar Impulse Foundation (<https://solarimpulse.com/>), which recognizes approaches that are sustainable from both a business and environmental perspective.

GemaTEG says it's in talks with other major high-performance computing companies and tech platforms about using its technology in their operations, as well. The technology is chip-agnostic and can be customized for different chip types and workloads.

The company's name is, in part, an acronym for the first names of the founders' respective children: Giulia, Elisa, Matteo (each has a child by this name) and Alessandro. In addition, as Miozza notes, *gemma* in Italian means "gem."

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