Inside the minds of innovators Discover how data center and telecom professionals are driving their industries forward.



Vol 1

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Henkel Adhesive Technologies

ABOUT UNIQUELY WIRED

Welcome to the inaugural edition of Uniquely Wired, where we explore the dynamic and expansive world of data and telecom and the innovative minds driving the industry forward.

In this first issue, we delve into the growing challenges posed by AI, and the cutting-edge technologies being developed to tackle those challenges.

The data and telecom industry is experiencing significant growth and transformation, driven by several key trends.

Worldwide spending on AI is expected to grow at a CAGR of 29% by 2028.¹ With that, 80% of people anticipate significant increases in capacity requirements due to AI workloads.²

As a result, the number of data centers is expected to increase over the next three years, with a sixfold increase in construction for many operators.³ This, in turn, is expected to bring about major security concerns as infrastructure grows and entry points multiply.⁴

But perceptions are evolving governments and the public all over the world are increasingly recognizing data centers and telecom networks as critical infrastructure. This awareness is expected to grow in 2025, with data centers seen as essential services that keep the economy moving.⁵ Our stories feature insightful interviews that tackle these challenges, with industry leaders like Google's Andrés Lagar-Cavilla, who shares his expertise on the transformative impact of Al on the critical cybersecurity of data centers and telecom networks. We also highlight the incredible career journey of Google's Angie Garza, a trailblazer in supply chain management, who is redefining the norms and pushing the boundaries of what's possible.

Sustainability is and will always remain a core focus, and we are thrilled to present Molex's Victor Zaderej's pioneering work in sustainable electronics. His innovative approach to manufacturing and unwavering commitment to eco-friendly practices offer a glimpse into a more sustainable future for our industry.

And as we look to the future, we are inspired by the next generation of engineers, like Lumentum's Chi Chi Huynh, who are stepping up to meet the challenges of Al and data center innovation. Stories of curiosity, collaboration, and resilience remind us that the future is bright and full of potential.

Thank you for joining us on this journey. We hope you find this first ever edition of Uniquely Wired both informative and inspiring.

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DATA AND TELECOM SECURITY

KEEPING UPINITH



Andrés Lagar-Cavilla Distinguished Engineer at Google

Andrés' career is a testament to relentless curiosity and the power of embracing 'impatience syndrome' as a driving force for innovation. He launched his career specializing in virtualization, operating systems, and computer architecture—authoring numerous publications and holding several patents in the field. Since working at Google, he's spearheaded multiple projects around the mitigation of critical system vulnerabilities. Now, Andrés thrives on solving complex, high-stakes challenges, constantly redefining the boundaries of AI, security, and infrastructure technology.

What the surging demand for compute means for data centers.

The demand for AI is almost outpacing the availability of compute and the capabilities of cybersecurity—more power, faster threats, higher stakes. We spoke with Andrés Lagar-Cavilla about how he's tackling the challenges posed by the ever-growing demand for larger data center and telecom infrastructure.

How is Al transforming the work of engineers in the data and telecom industry?

Al is radically changing everything we do in the industry—it requires engineers to continuously change and innovate more than ever before. There was a huge watershed moment in 2022 when we discovered that large language models (LLMs) could achieve an unprecedented set of capabilities. Now, engineers are setting their sights on even bigger multimodal frontier models, the likes of which require an extraordinary amount of storage, networking, and compute capacity to create.

What infrastructure challenges come with building frontier AI models?

Traditionally, compute systems operated in parallel, meaning the individual pieces work together to continue making forward progress. But that's not always the case; frontier model training operates in vastly distributed systems that advance in lockstep—if something fails, everything stops until the training can recover from a checkpoint. The ability to churn out one of these models is the new industry differentiator, and it's incredibly challenging. Businesses that decide they want (or need) to play in this space to stay relevant have turned computation into a capital-intensive business.

What are the biggest security risks emerging from AI-driven infrastructure growth?

Specializing in privacy and security, I see several issues arising as a direct result of the surging demand for larger data center and telecom infrastructure. The real danger with the vulnerabilities introduced by Al is that bugs unlock doors for cybercriminals to gain accessand these problems percolate up, magnifying as they do so. In 2024, the Linux compression library attack highlighted the long-term organized efforts of security adversaries. And although large companies have been facing highly organized and resourceful adversaries for a while, this was an awakening moment for many that cybercrime operates within an ecosystem. Adversaries have an incentive to make a profit, and if the defenses are not outpacing the incentive, we'll continue to face the large-scale attacks we've already been seeing.

How is AI being used to enhance security, and what are the risks?

People have found a lot of great use cases in Al for example, many leaders are using LLMs to write protective code. Unfortunately, Al-written code isn't immune to bugs, and we need to prepare for that. We need to acknowledge the fact that systems are ingesting bugs everywhere, all the time, and to deal with this in stride by organizing offensive teams to proactively find those bugs before others do. I'm hoping that this message has landed with the broader industry and that they're reacting, because the stakes are incredibly high.

How do you tackle these challenges in your work?

When value is derived from being at the forefront and creating bigger, faster, better systems, it's important to build scalable foundations that continuously flex to meet requirements. There's always been two modes of doing things in this industry. One, throw people at the problem and hope to deal with it that way. Two (my preferred method), build strong foundations and fix the problem long-term. The methods we use at Google to administer and manage large system deployments underpins everything we do, allowing us to keep delivering despite all the many challenges that could otherwise weaken our defenses. We build scalable, reliable systems that help us weather any challenges that come our way—security or otherwise. By investing long-term in developing generations of machine learning chips, we've gained a technological edge, with mature products that are the result of consistent and sustained innovation. Of course, we live in a state of heightened alert and there's a lot of heavy-duty day-to-day work being done around deployment and reacting to emergencies. But we can bank on our strong foundations to allow us to continue to thrive.

How has your experience shaped your approach to continuously innovating in such a challenging landscape?

I heard the saying once that 'coding is comfort food.' And I've understood this to mean people recoil from difficult scenarios. When there are periods of extreme urgency, it's easy to give in to cutting corners, but you earn experience through exposure to (and working through) difficult situations. Developing calmness in the face of crisis is like building a callus; it takes consistent exposure to discomfort and gradually you foster resilience and strength over time.

Consistent with what I call 'impatience syndrome', good leaders understand the need to help from crisis to crisis, throwing themselves into highstakes, high-pressure situations—this is what I believe has refined my approach to innovation.

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SUPPLY CHAIN MANAGEMENT

CHALLENGING THE STATUS QUO



Angie Garza Director, Data Center Infrastructure and Advanced Technology Sourcing at Google

Angie's journey to the top of the data center world was unconventional. She started in logistics, moving knives and meat grinders globally, before shifting to electronics and then data centers. Rising quickly, she became the Head of Global Data Center Infrastructure Procurement and Supply Chain at AWS. After nearly a decade, she joined Twitter (now X), leading its largest data center migration and first Al cluster deployment. Now at Google, she heads Advanced Technology & Infrastructure for Google's data centers.

- 2023: Received the Infrastructure Masons IM100 Award for contributions to the Data Center Industry.
- 2024: Won the Technology All-Star Achievement and HITEC100 Awards for leadership in technology.

How Angie Garza brings innovation to the data center supply chain.

Angie's story is one of defying expectations, challenging norms, and making bold decisions to reshape the digital world—one data center at a time.

A defining philosophy: Challenge expectations

Angie's drive to challenge expectations began early. Growing up in Mexico as the youngest of four, she learned to see every doubt as an opportunity. She recalls her father's encouragement, saying, "I would tell my dad, 'My brothers don't let me play soccer because they say I'm terrible at it.' And my dad would say, 'Well, are you? Are you going to prove them right, or are you going to prove them wrong?'"

This lesson became Angie's lifelong philosophy, one she has carried into every stage of her career.

Entering the world of engineering and data centers, Angie encountered preconceived notions about her abilities and expertise. However, rather than being discouraged, she thrived on the challenge: "I've always found that when others underestimate me, the resulting impact is all the more significant and the satisfaction of exceeding those expectations is incredibly rewarding for me."

HOM GAN WE DO IT?

For Angie, success has only ever been about making a difference. "I wanted to do something that matters, and to make an impact," she says. "I have a talent for navigating challenges and finding efficient solutions and a knack for removing obstacles to get things done," she explains. "Combine that with the fact that I'm super curious, competitive and determined—it's a recipe for making a real difference in the data center space."

Angie sees every challenge as an opportunity for growth and innovation. This mindset has shaped her unique approach to problem solving, encouraging her to question established norms and explore new possibilities. She believes in understanding the 'why' behind existing practices, constantly seeking ways to improve and optimize, while always returning to fundamental engineering principles for guidance.

Learning to lead in a fast-moving industry

Angie's career is defined by a powerful combination of her own drive and the unwavering support of her network. "I'm incredibly fortunate to have a network of peers and leaders who empower me to challenge conventions every day, and have my back when I do," she says. "Together, we're finding creative solutions to challenges around lead times, costs, and the capacity to move faster in this whole AI revolution."

In an industry evolving at breakneck speed, leadership demands adaptability, resourcefulness, and the courage to challenge convention with tenacity.

"The most effective leaders aren't seeking validation, but constantly push boundaries, question assumptions, and drive progress. They possess the moral courage to do what's right, even when no one is watching, and inspire others to do the same. They cultivate an environment where curiosity thrives and diverse perspectives are embraced, fostering a culture of continuous learning and improvement." She believes that the most effective leaders create environments where failure is embraced as a part of innovation. "Legend has it that Edison discovered thousands of ways not to make a lightbulb before finally achieving success. His famous quote, 'I have not failed. I've just found 10,000 ways that won't work' speaks to this."

She continues: "The best leaders I've encountered embrace this same spirit of trial and error, recognizing that true breakthroughs emerge from a willingness to learn from mistakes."

A focus on the collective

Angie has taken these learnings into her own leadership roles, empowering those around her. She actively seeks out individuals who bring unique perspectives and challenge her own thinking. "I want people who can approach challenges with fresh perspectives. Give me someone with a spark of grit and curiosity to keep learning and improving over a perfectly polished resume any day."

With the right people in place, Angie attributes success to creative collaboration. "In my space, coming up with innovative solutions doesn't happen individually, it's a result of open collaboration, where ideas flow freely, and challenges are tackled collectively."

She emphasizes the importance of creating a culture where transparency, openness and honesty are the guiding principles, building an environment where every contribution is valued. "Take the development of the Internet," Angie suggests, "it wasn't invented by a single person, but rather it was the culmination of collaboration by countless engineers, programmers and researchers across the globe, each building upon the work of others."

Driving change with one simple question

In Angie's mind, setting the stage for collaborative problem solving begins with a powerful belief: Everything is possible. She encourages her team to approach challenges by starting with one fundamental question, "What would need to be true?"

"Imagine we need to build a data center in just three months. Forget the perceived constraints," Angie urges, "instead of asking, 'Can we do it?', let's ask ourselves, 'How can we do it?'" This shift in perspective enables the team to break free from conventional thinking, embrace audacious goals and discover unique ways to solve a problem that were previously unimaginable.

It's this mindset and approach to collaboration that empowers Angie's team to search for small changes that can make a big difference—allowing them to rethink existing challenges, identify new opportunities and deliver results at the pace demanded of them by the industry.

All or nothing: Bringing sustainability into focus

Angie's drive for innovation extends beyond the technicalities of supply chain management and into her passion for sustainability. She has spoken frequently online and at live events on the topic—banging the drum for water- and energyefficiency in data centers. It's something she views as imperative to her work, and third-party partnerships. "Everything we do in the supply chain has to account for sustainability from the very beginning. Google has an ambitious goal to achieve netzero emissions across all of its operations and value chain by 2030, and achieving that isn't just about us, it has to include sustainable practices throughout our entire supply chain."

These goals require radical transparency and open collaboration with suppliers. "We're upfront about our goals and we ask our partners to work with us to make them a reality."

It's this approach that Angie maintains will empower suppliers and their networks to build their own sustainable practices—adamant that sustainability is a shared responsibility, she believes in empowering suppliers to become agents of change in their space.

"It's not enough for us to be sustainable as a company," she insists. "We need that same passion for sustainability throughout the entire network, extending to tier-two, tier-three suppliers, and beyond. It's all or nothing. That's why we work together with our suppliers, inviting them to join us in this journey. When we show our commitment and collaborate with our suppliers, they become invested in the process and sustainability becomes an integral part of their own operations."

Through rigorous questioning and creative problem solving, Angie Garza is redefining what's possible in the data center supply chain. And as AI, compute demand and sustainability pressures mount, one thing remains certain: the future belongs to those willing to ask, "How can we do it?"



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A SUSTAINABILITY **BREAKING POINT** For High-Performance Engineers

Sustainability is no longer optional for engineers working in this space, customers expect data centers and telecom operators to take action on their carbon emissions. And the industry is reacting.

Engineers are now under pressure to deliver reliable, high-performing compute solutions while also adhering to ambitious ESG targets.

Reducing emissions and improving sustainability in data centers and networks will come down to implementing efficiencies in every component of hyperscaler infrastructure—no matter how small.

OVER 50

global operators pledged to reduce their carbon footprint over the next decade—up from 19 pledges in 2021.⁸

Operators making up

44%

of global telecom revenue have committed to net-zero targets by 2050.⁹ A single hyperscale data center can use as much electricity as

80,000 US households.⁶

The telecom sector already accounts for up to

3% of global emissions.⁷

57%

of data centers have a set target for achieving net-zero emissions by a certain date.¹⁰

40%

of organizations are actively working on developing a data center sustainability plan.¹¹

SUSTAINABILITY SPOTLIGHT

PROVING INHAT'S POSSIBLE

In sustainable electronics with Victor Zaderej.



Victor Zaderej Manager of Advanced <u>Electronics Packaging at Molex</u>

Very few people can truly claim to have transformed the way highly technical industries adopt sustainable practices, but Victor Zaderej is certainly one of them. An MIT-trained engineer with a passion for sustainability, Victor specializes in lighting and electronics technologies—playing a pivotal role in shaping groundbreaking innovations throughout his career. Perhaps <u>the most influential of which is his</u> development of ASEP—a unique circuit board technology now embraced across many high-performance industries. Together with his wife, Polly, Victor founded Happy Leaf LED to provide super-efficient grow lights for indoor horticulturalists. Now, as Manager of Advanced Electronics Packaging at Molex, Victor leads a team of engineers pioneering next-gen solutions.

From growing lettuce in the living room to developing the new standard in sustainable circuit boards and everything in-between meet the engineer pioneering the meaning behind 'proving what's possible.'

The catalyst:

A practical path to 'doing things better'

Victor's sustainability journey almost never began—originally set on studying nuclear fusion, until a professor steered him towards energy as a "more practical application" of his time.

Nuclear fusion's loss was energy's gain, as this advice led Victor to take a graduate class on designing energy efficient homes, which sparked his passion for sustainability.

"We looked at how much extra it would cost to build a superefficient home versus how much energy you would save over the lifetime of the home," he explains. The findings were compelling: "What I learned is that it's 10 times cheaper and easier to save on energy (and natural resources) than it is to purchase that energy and use that energy over the life of a product. That was the real catalyst to my interest in figuring out how to do things better." Victor's home in Illinois reflects the philosophy he developed in his formative educational years. Built to an American passive standard (based on the German Passivhaus methodology), the house is effectively net zero. "We use a windmill and solar panels to provide power, the windows to provide heat, and the earth to provide cooling," he says.

"Trying new things... it's how we innovate."

Victor's passion for eco-friendly living doesn't stop there. Together with his wife, Polly, he started a horticultural lighting company that helps people grow food at home using super-efficient lights.

"I'm growing cucumbers, tomatoes, eggplant, lettuce and herbs indoors all year long, and it uses a fraction of the amount of water and energy typically needed to grow your own food," Victor says.

His book, Grow Lettuce in Your Living Room, teaches readers how to grow vegetables in canning jars, a technique developed by another good friend of Victor's, Dr. Bernard Kratke.

In his professional life, Victor's commitment to doing things "better" has driven transformative projects over the years. "For 38 years now, I've been coming up with better ways of manufacturing electronics," he says.

In the 1980s, Victor was one of the first engineers to champion the use of plated plastics in computer design. "Before, it was all about building computers out of sheet metal and die castings-which are expensive and heavy. The plated plastic was much lighter, and it delivered all the advantages of being able to automate the process, because it had such a high tolerance."





This led Victor to explore printing electronics directly onto plastic, a concept that would go on to become a cornerstone in his career.

ASEP: Revolutionizing electronics manufacturing

"If we're already plating the plastic, I got to thinking: why not print the electronics directly onto the plastic?"

In 2015, Victor developed ASEP (Application Specific Electronics Package)—a technology that is now widely used across industrial applications globally-integrating connectors, circuit boards, heat management and power into a single device.

Unlike traditional circuit board manufacturing, "which uses around 1,500 litres of water per square meter and generates chemical waste, ASEP uses 99% less water and no chemicals." Victor explains, "It's a completely additive process."

Victor's groundbreaking work on ASEP isn't just about electronics manufacturing-"the technology has a lot of potential opportunities in many different industries," says Victor. And it's a concept with enormous potential for industries like data centers, which are notoriously energy- and water-intensive.

"We are using the ASEP process to make much smaller, more accurate, higher current capable sensors and solid-state relays that are used to measure the power being used and controlled not only within data centers, but also within all of the products that are being electrified."



Initially, the concept was funded by Molex thanks to a bi-yearly internal innovation challenge. Of all the innovations submitted to Molex over the years, Victor's was the only idea that was subsequently fully funded. It's now being applied to create the world's smallest current sensor.

Thriving on doing what nobody's done before

Today, Victor holds around 85 patents in solid-state lighting and printed electronics. And this commitment doesn't end with his purely professional pursuits. Through his volunteer work with the non-profit organization, Watts of Love, he designed a solar-powered device that would provide remote communities access to light. "The company gives away tens of thousands of these lights every year," Victor explains, "and in a community just outside of Kathmandu, the team delivering these lights came across a woman there who couldn't use the light as she didn't have hands. So, my colleagues came back and told me I needed to figure out a way to make it accessible."

After Victor amended the design to accommodate, he was able to travel to Nepal himself to distribute the updated device to the woman and her community, in what he describes as "a truly eye-opening experience."

Victor's career is defined by his determination to tackle the perceived impossible. He says, "I can tell you that with anything new like this, there's always doubters. But I thrive on doing the things people have never done before."

And for Victor, sustainability and technology innovation are not mutually exclusive—together, they create opportunities for expertise, creativity and resourcefulness to converge.

"Sure, the wind doesn't always blow, and the sun doesn't always shine. But by using less energy, by using less water, and by using no chemicals, then there are really no question marks."

For Victor, building a better world isn't just possible—it's imperative.

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LOOKING TO THE FUTURE

BREET FUE



Chi Chi Huynh Principle Mechanical Engineer at Lumentum

Chi Chi Huynh holds a bachelor's degree in biomedical mechanical engineering from the University of Ottawa. With over a decade of experience in the telecom and networking industry, he was drawn to its multidisciplinary nature and complex challenges. He is currently part of the mechanical R&D group at Lumentum, a global leader in photonics technology, where he specializes in mechanical analysis and simulation for next-generation optical modules. Beyond his professional pursuits, Chi Chi enjoys cooking, exploring new cuisines, and traveling.

How the next generation of engineers are stepping up to drive innovation

The AI boom is celebrated the world over. Rightly so, it's ushered in a new era of innovation, productivity, and efficiency. But that's not to say it doesn't have its fair share of challenges, either.

One field, in particular, that's directly experiencing added pressures is engineering. The scaling requirements of Al and the cloud are having a huge impact on how engineers design and manufacture things.

To find out how today's engineers are rising to the challenge, we spoke to Chi Chi Huynh, Principal Mechanical Engineer at Lumentum—a global leader in designing and manufacturing innovative optical and photonic solutions for cloud, optical networking, and laser applications. See what he had to say below.

The future of data centers is changing at "cloud speed"

Training and delivering AI models, Chi Chi explains, "requires enormous amounts of computing power and data storage." As a result, the race is on to build data center capacity. In fact, McKinsey estimates that the power demand for data center capacity could rise at an annual rate of up to 22% over the next five years.¹² But for optical companies like Lumentum, the focus is on developing the hardware used in these data centers-more specifically, connecting some of the hardware with light rather than electricallyand this too is also a race against time. "The pace of AI is so fast that you have to design things much more quickly while maintaining the same reliability as before ... we're meeting the growing demand for AI by advancing optical networking technology, enabling our cloud customers to scale and interconnect their data centers efficiently. Our advanced optical transceivers, photonic integration, and wavelength selective switches play a crucial role in Al data center interconnect and expansion, delivering lower latency and greater energy efficiency compared to traditional electrical interconnects," observes Chi Chi.

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Take the design cycle. For the R&D team at Lumentum, this is now half as long as it was before. That's a significant reduction by any measure, but especially when you think about all the work that goes into developing optical modules, from the lab tests to software simulations to design reviews.

MORDS OF MISDOM

Building the next generation of problem solvers

The number of staff needed to run the world's data centers will grow from around two million to nearly 2.3 million by the end of 2025.¹³ So, how do we get around 300,000 people up to speed?

"It all starts with communication, learning enough about the other disciplines you're working with, asking questions where you need to, sharing understanding, and often being patient with your colleagues." He continues: "You want to be curious about your own domain, curious about other people's domains, both technically and personally."

In his view, these are the foundations that build trust and respect and enable teams to deliver projects successfully. And fortunately, curiosity is something that comes naturally to many engineers. "It's true—we all like to play with new toys, and it's really fun to see where these techniques might take us. Right now, Al is driving a massive shift in networking technology, and engineers at Lumentum are at the forefront of shaping that future. Whether it's pushing the limits of optical module design or accelerating innovation in photonic integration, it's an exciting time to be solving these challenges."

Adopting a cross-disciplinary approach

Moreover, Chi Chi suggests that this type of inquisitive mindset can bring benefits for all. Throughout his career, he's seen numerous examples where "even the smartest and most experienced people in the room recognize that they don't have all the answers, and everyone is actively asking questions." But why do they do this? He believes it's because this approach stimulates different ways of thinking about the problem and allows everyone to come on the journey. A mixture of opinions is key to innovative thinking and problem solving. "Internally, we have heavyweights in each particular domain—optical, electrical, mechanical, process, algorithms, and software. We all work together and tackle the problem as one team." Al is pushing data center engineering to its limits, with Chi Chi explaining that "Our ability to innovate across disciplines is what enables Lumentum to deliver next-generation networking solutions that power Al workloads at scale."

Stepping up to drive innovation

Arguably, this is not so much a technology problem—it's a human one.

To get the right results within the ultra-tight timelines requires not only the right people but also a strong commitment to working together as a unit. Here, having a mix of perspectives and experiences to call on can help unlock different ways of thinking, and in relation to problem solving, that can only be a good thing. Besides, if our conversation with Chi Chi is anything to go by, it seems the next generation is already stepping up to the plate.

"Al and cloud computing are evolving faster than ever, and the networking industry is moving right alongside them. The most effective engineers aren't the ones who know everything—they're the ones who ask the best questions, stay curious, and collaborate across disciplines. That's what leads to real breakthroughs in Al infrastructure"

Chi Chi reflects that it's mentorship and inclusivity that truly help shape the next generation of engineers. "Through sessions hosted by Lumentum's Next-Gen Luminaries employee resource group—an employee-led initiative supporting early-career professionals—I've seen firsthand how mentorship, diverse perspectives, and an inclusive environment can accelerate growth. Never stop learning and surround yourself with people who challenge you to think differently."

FROM THE MAKERS OF UNIQUEEY NIRED

From the transformative impact of AI on cybersecurity to the trailblazing efforts in supply chain management and sustainable electronics, these stories highlight the incredible work being done to meet the challenges of today and tomorrow.

Henkel created Uniquely Wired as a platform for championing the data and telecom engineers who are truly driving innovation forward in their fast-paced, ever-evolving industries.

The future is not something that just happens—it's something we create.

Our people and partners are Uniquely Wired to see the world differently, to anticipate change, and to deliver fresh solutions.

Thank you for joining us on this journey – we hope you found this edition inspiring. Stay tuned for more insights and stories on **uniquelywired.henkel-adhesives.com**

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Henkel operates globally with a well-balanced and diversified portfolio. The company holds leading positions in both industrial and consumer businesses through its two business units, thanks to strong brands, innovations and technologies. Founded in 1876, Henkel looks back on almost 150 years of success. Henkel's preferred shares are listed in the German stock index DAX. The DAX-40 company is headquartered in Düsseldorf, Germany. Henkel employs around 47,000 people worldwide, around 83 percent of whom work outside of Germany. As a recognized leader in sustainability, Henkel holds top positions in many international ratings and rankings.