Different is better

ThinkPad 25

Stories of ingenuity and innovation
from ThinkPad users across the globe

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first step of
innovation is
having
the right
tools.

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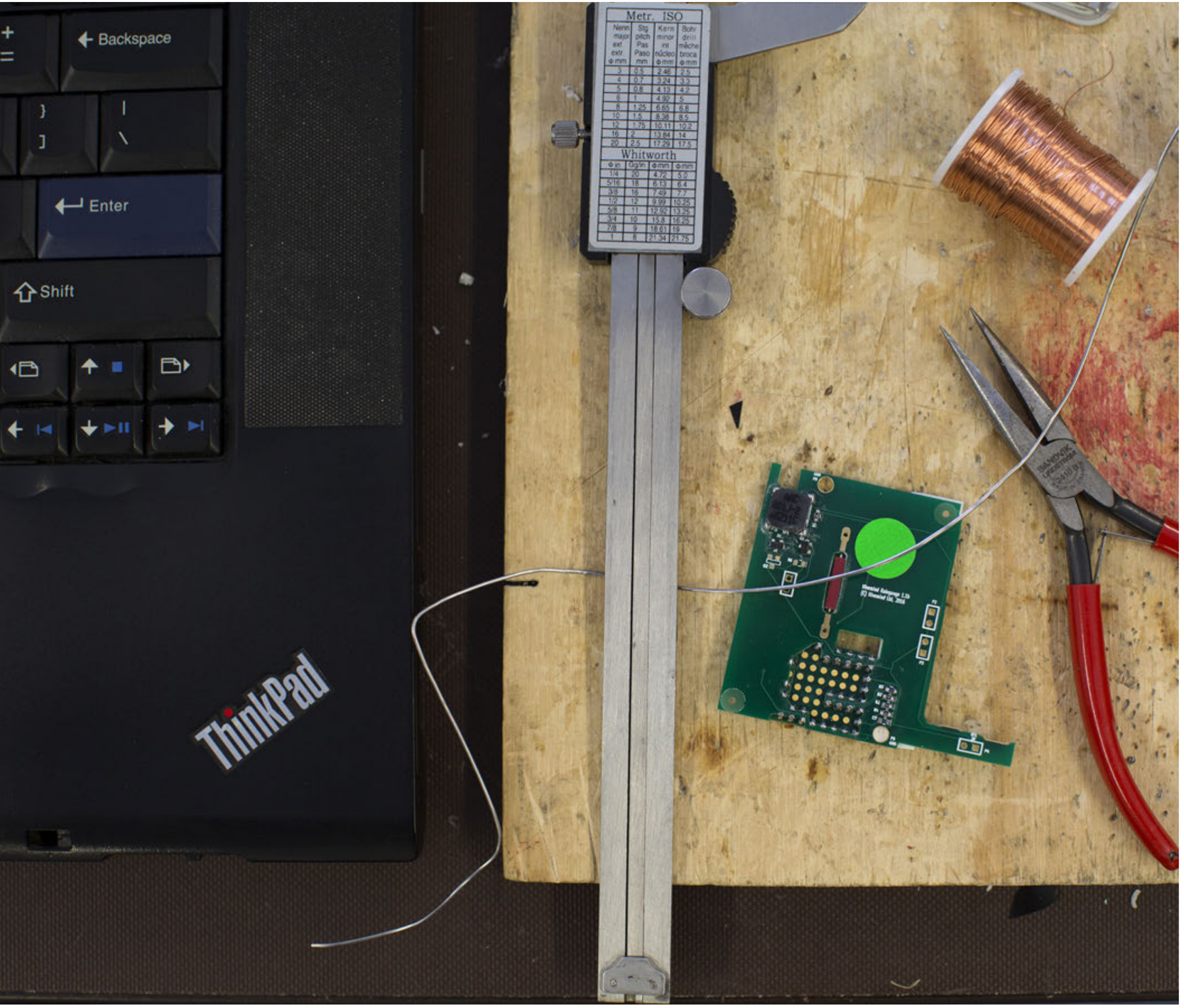


Different is better

Many inventors can tell you about how they went from zero to one. With great excitement, they can detail those late nights in the lab, the trash can full of discarded sketches, and the euphoria of finally bringing their concept to fruition. Yet, as the people profiled inside of this magazine will tell you, the real challenge is going from one to many. How can a design transcend from being an idea in the lab to making an impact in the world? And even more daunting than execution, there's one question that picks at the brain of all restless creators — *what's next?*

These are the stories of 14 diverse, driven innovators who never stopped pushing the limits of technology. Though their projects are entirely unique, from 3D printing artificial limbs to racing wind-powered cars in the Netherlands, a common thread connects them all. Each and every person herein has a knack for finding inspiration in unexpected places, and a wholehearted dedication to making tomorrow better than today.

We at Lenovo are incredibly proud to feature such powerful examples of ingenuity and creativity.

In honor of the 25th anniversary of ThinkPad, we wanted to take a moment to celebrate the stories of ordinary people doing extraordinary things through our robust technology. We've always strived to be at the forefront of innovation, and for us that means delivering the best tech to the best minds in the world.

These creators, many of them armed with nothing more than an idea and a ThinkPad, have left us feeling inspired to tackle new challenges with different perspectives — and we think you'll feel the same.

Lenovo ThinkPad

Listening to the sea to build a better ecosystem

Marine biologist Tammy Silva analyzes ocean noise to understand human impact on the environment.

What noise does a dolphin make? Marine biologist Tammy Silva has built her budding scientific career around this question. When she's not teaching ballet to her students or playing with her Husky-Golden Retriever mix, Tobey, she's climbing aboard sea vessels, tracking and analyzing the trills and whistles of the majestic toothed whales of Massachusetts Bay. To this scientist, the high-pitched squeals, rattles, and clicks of ocean-dwellers aren't an annoyance; it's music to her ears.

The goal of Silva's research, which comprises her PhD project at the University of Massachusetts, is to uncover how dolphins and whales use the Bay as a habitat, and how they might be impacted by human activities. Ever since she was a child, Silva has had a passion for protecting animals and their surrounding environment. Throughout her undergraduate studies, she volunteered for six years at the Buttonwood Park Zoo, a decision which she said "jump-started a deep interest and journey into conservation." From boomboxes in ballet class to the chatter of monkeys at the zoo, Silva is constantly thinking of sound as content to dissect and study.

For decades, researchers have long presumed that ocean noise probably doesn't impact toothed whales because they vocalize at a much higher pitch. However, Silva's recordings demonstrate, perhaps, that the scientists who have gone before her weren't listening hard enough. "There's substantial ship noise in the same range that dolphins communicate, which could directly affect their ability to communicate," she said.

"By constructing quieter ships or closing off certain areas to activities like shipping, drilling, and sonar use, we could keep human interference to a minimum and protect the

This is where my trusty ThinkPad comes into play — so far, it's been great at meeting all my research needs.

Assessing the vocal behavior of ocean animals requires unique software, such as Raven Pro and MATLAB — but with her ThinkPad, Silva said it's totally easy. From generating complex graphs to editing massive audio files, Silva's ThinkPad makes her research easy so she can focus on the tones in the tide — instead of technical issues.

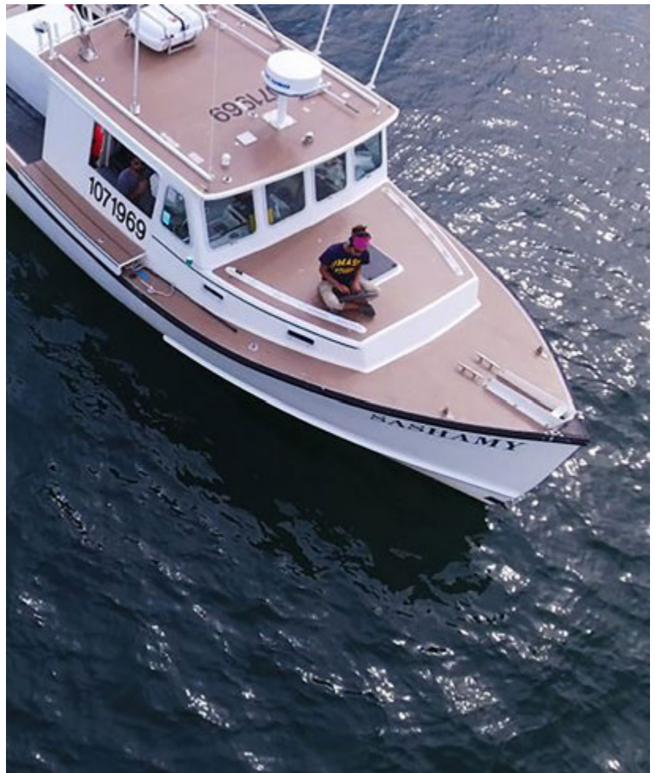
habitat of these animals."

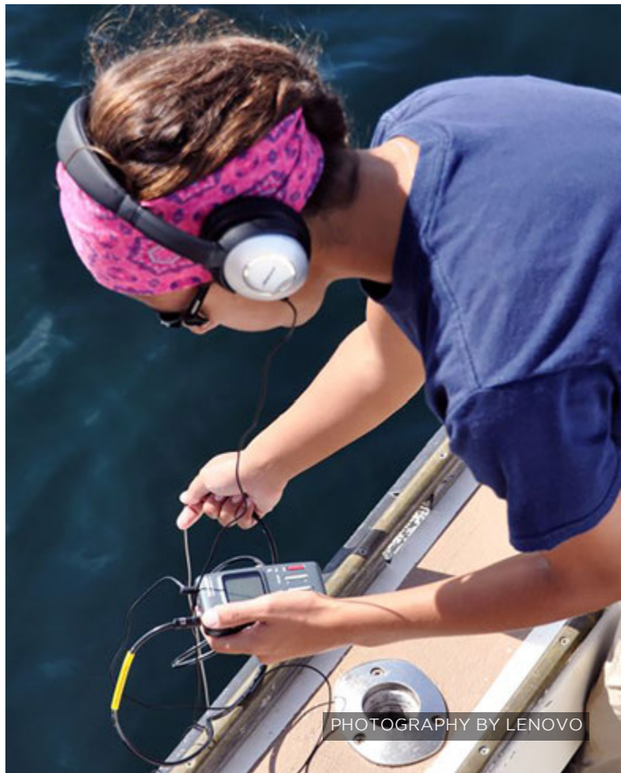
By now, the 30-year-old Massachusetts native is accustomed to disrupting the norm and exploring uncharted territory. Not only is her work groundbreaking, but she's leading the path in a field predominantly run by men. Drawing inspiration from her mother, who she claims as her most influential mentor, Silva said, "As women, we can be scientists and engineers. We can go out to sea and build stuff, use technology, write code and we deserve to be just as respected — and well-paid — as men."

Working as a marine biologist, Silva occupies a unique space between an incredibly active life on the sea, and hours of solitude behind her computer screen. For the past nine months, she has traded ocean waves for sound waves to work on her research using her ThinkPad, which she explains has the robust processing power and functionality to analyze bioacoustics.

Even though she loves the nitty-gritty details of audio analysis, it's not long before she gets the itch to get back on the ship, or take Tobey on a seaside run along the water. And of course, she's always on the lookout for interesting stories to tell her students in ballet class. "They've invented 'Whale Fact Wednesday,' where I have to teach them something new each week," laughed Silva. "Maybe there's a future marine biologist in the class? Who knows?"

Juggling the whistles of dolphins, the toe-tapping tunes of dance, and the bustle of daily life is a lot of noise for any one person to handle, but Silva has shown she's a master DJ when it comes to getting the mix just right. "My mother always told me when I was young that I could do anything I put my mind to, and she lives as an example of that everyday," she said. "My larger goal in life is to reach people and share messages about the importance of conservation. Scientists can collect data and write papers, but it only matters if we get the message out to people and make it important to them."





PHOTOGRAPHY BY LENOVO

Saving lives with Design That Matters

Design That Matters, a social impact design company, creates affordable and easy to use products in healthcare.

“The big question for us is: how do you design a fantastic piece of equipment and make it hard to use incorrectly in the context of a developing country?” asked Timothy Prestero, founder and CEO of Design that Matters. For him and his team of innovators, it’s not enough to build something great — it has to be built in context.

“The solutions to so many great global health problems already exist, they are just poorly adapted to the context — and context is king,” said Prestero.

Design that Matters doesn’t accept a world in which countless newborns are at risk of lifelong disability and death from easily treatable conditions like jaundice, hypothermia, and pneumonia. By pushing the limits of technology in rapid prototyping and low-volume manufacturing, Prestero and his team are setting the standard for best design practices in the developing world.

Their mission begins with FireFly, the world’s most effective newborn phototherapy device for low-resource hospitals. With a simple bassinet and overhead light, it’s designed specifically to allow rural clinics with limited resources and inexperienced staff to successfully treat babies with jaundice.

“Much of our success comes from the plummeting cost of innovation,” said Prestero. “A sketch pad used to be this baroque fantasy object that only movie studios could afford. With our ThinkPads, we can go from 3D

Lenovo ThinkPad

Not only is my ThinkPad awesome and indestructible, but it also shares my philosophy that design should be pragmatic and utilitarian.

Prestero bought his first ThinkPad as a grad student in 2001, and in one iteration or another, has had the same computer for 15 years. Back then, he was working on robotics and environmental science in West Africa, and he fell in love with the robust quality of ThinkPads. Traveling internationally — by foot, boat, or rickshaw — he can focus on making the world a better place instead of worrying about repairing his technology.

drawing, to photorealistic rendering, to a 3D printed part, all on the road."

As of May 2017, the Firefly phototherapy device has reached 23 countries, from Afghanistan to Zimbabwe, and treated more than 100,000 newborns. Products that Design that Matters has helped design and launch have reached a total of 330,000 people worldwide. Building off of this success, Design that Matters is developing a complementary device they call Otter, a conductive warmer designed to treat premature babies vulnerable to hypothermia.

"Working in developing countries, there's a narrative gap," said Prestero. "We're dealing with translators, cultural differences, and a finite amount of time. We don't get the feedback we need unless we bring a prototype. Our ThinkPads combined with desktop manufacturing tools allow us to quickly generate the physical prototypes we need to tell the story and solve problems."

Echoing Prestero's sentiments, the World Health Organization reports that up to 80% of donated medical equipment in the developing world is never even turned on, because the devices are not explained or designed in a useful way for locals. Unused and broken medical equipment amounts to $250 million a year in unacceptable waste and serve as a mounting barrier to improved health outcomes. So in addition to building new things, Design that Matters is tackling the issue of defunct existing technology.

One of their latest projects, Echo, is an open-source internet-of-things module that seeks to create and collect data for medical devices. Once completed, it will quickly communicate what devices are being used, which need repairs, and how many were even used in the first place.

"In prolonging the lifespan of these devices, we can save more lives, make our products more cost-effective for users, and protect the environment," said Prestero.

With so many amazing projects under their belt, one wonders how Design that Matters picks what they are going to work on next. For Prestero, it's all about finding things that meet at the perfect intersection of social impact, company capabilities, and market demand. No matter what they work on next, it's guaranteed to be affordable, impactful — and as is their slogan — hard to use wrong.

PHOTOGRAPHY BY TIMOTHY PRESTERO

Lenovo ThinkPad

A wind-powered car race hints at a green future

Chinook, an engineering club from Montreal, builds and races wind-powered cars in the Netherlands.

Every school has its own clubs, ranging from the pensive calm of chess league to the aggressive sprints of track and field. Yet few universities have anything close to Chinook, an innovative engineering team based in Montreal that designs, builds, and races wind-powered cars in the Netherlands. Much more than fast, these cars could completely reinvent the clean energy industry.

“From the first time I heard about them, the team seemed like an amazing group of people,” said Patrice Rolland, a 25-year-old student at Ecole de technologie superieure University and the team’s current software engineer.

The word “chinook” comes from the wind that blows at intervals down the eastern slopes of the Rocky Mountains, and just like those powerful gusts, Rolland is striving to design something that is beautiful, lightning-fast, and completely sustainable. In the global context of climate change and the ever-increasing demand for green energy, Chinook is racing for more than just a gold medal.

“What we make falls into the perfect intersection between art, technology, and the environment,” said Rolland. “We’re committed to pushing the boundaries of energy efficiency.”

Though Chinook is completely run by students, the real world impact of their work extends far beyond the classroom. They have already been approached by the Royal Netherlands Navy regarding technologies used on their vehicle. Not bad for a bunch of students “just building stuff on the weekends,” joked Rolland.

When the school week ends, that’s when the real work begins for Rolland and his team. Piling into a team member’s garage, their work space looks exactly like one would imagine: circuit boards lie on the table, technicolor wires line the floor, ThinkPads light up the room, and the sounds of the Dropkick Murphys fill the air. It’s the fun and frenetic energy of young creatives following their passions.

If there’s an organizing tool for the team — besides indulging in a post-engineering happy hour at the pub — it’s their shared love of technology. “Our ThinkPads serve as

Lenovo ThinkPad

All of our vehicles are completely designed, produced, and controlled through ThinkPads.

Boasting a bevy of ThinkPads, Rolland and his team said the machines have all-day battery life, tons of storage, easy docking options, and when racing day comes around, they can handle the unforgiving wind of the seaside racetrack. Plus, Rolland added that they are excellent for running 3D CAD design software, like SOLIDWORKS and Alchemy programming languages.

the brain of the cars," said Rolland. "We've installed various sensors throughout the car, which sends data in real time to our computers so we can make adjustments."

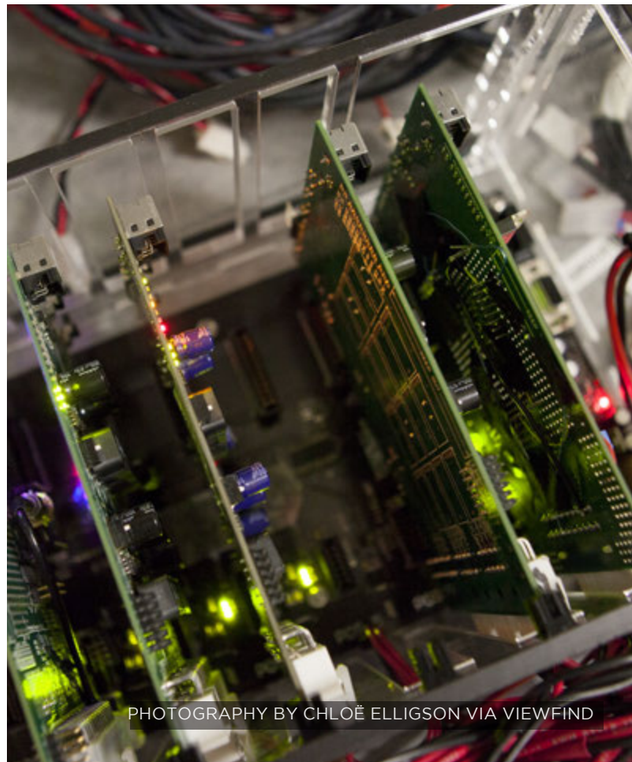
With the push of a button, the Chinook team can orchestrate a myriad of controls in the cars, such as the rotation of the wind turbines, the pitch of the blades, and changes in speed to obtain the best performance.

Racing Aeolus, organized by the Dutch Foundation of Wind Energy Events, is held in Den Helder on the shore of the North Sea. The goal is simple: achieve the greatest possible efficiency in terms of average speed ratio in relation to the wind speed.

In 2014, Rolland's team set a world record with an efficiency rating of 96.9 percent. But since then, Denmark has usurped their coveted position on the throne. In addition to pushing the boundaries of design, regaining their reputation as "Best in the World" is one of the key factors motivating Chinook.

This year, nothing will stand in the way of Rolland's pursuit to claim the Grand Cup. Completely reinventing their designs, they are starting from scratch with an all new mechanical system and electronic components. "It's sleek; it looks like an amazing sportscar," said Rolland. "The aerodynamics have been streamlined, the code has been updated. We're going to connect Raspberry Pi to our existing systems to facilitate future improvements, such as bluetooth integration and the addition of a web server to get live data on the systems, like gears and wind speed."

Regardless of the outcome of the race, Chinook's pathbreaking ideas are reshaping how manufacturers are thinking about efficient design, both on and off the racetrack. "These designs could be used on boats to recharge batteries and supply heating, as well in turbine fields," said Rolland. "Right now we're focused on the race, but there are no restrictions to how this technology could be applied."



PHOTOGRAPHY BY CHLOË ELLIGSON VIA VIEWFIND

Keeping harmony in the hive

How Hivemind, an agricultural startup from New Zealand, is tracking bees and redefining agriculture.

Genius can strike at any time, but it seems especially appropriate that the idea for Bryan Hoyt's company came to them mid-flight. Making idle chit-chat on a plane back to his hometown of Christchurch, New Zealand, a friend of his happened to be seated next to a seasoned beekeeper. What started as friendly small talk quickly turned into a big idea, with even bigger implications for the global agricultural industry.

"As a beekeeper, you need to know exactly what's going on in your colony, but many of these hives are in remote locations, hundreds of miles apart," said Hoyt. "Though the work of bees has an incredible impact on our modern world, the practices used to monitor their activity are still quite antiquated."

Not long after the plane landed, Hoyt's mind was already buzzing with possible solutions. As the founder of Brush Technology, an internet-of-things design company, he's well-versed in thinking about how technology can improve the functionality of everyday objects. After a few late nights of market research, and talking it over with his brothers and business partners, Ben and Berwyn, the Hoyt team founded Hivemind, a satellite-connected beehive monitoring system.

Outside of hobbyists and beekeepers, this technology could have a tremendous global impact. Over one-third of the world's food is pollination dependent. At a glance, bees pollinate over 70 types of crops, make 6,000 tons of honey and contribute over $350 billion — yes, billion — to the world economy. Yet for reasons that researchers are still trying to figure out, bee colonies are in grave decline.

For a team of creative problem solvers, nothing spurs innovation quite like unique

Lenovo ThinkPad

My ThinkPad can survive the rural elements and has a replaceable keyboard, which is key when you spend hours working outside.

Beyond its rugged strength, Hoyt said his ThinkPad embodies the “it just works” mentality that he strives to create in his own technology. Especially when he’s working with beekeepers and other agricultural workers that may not be as tech savvy, he said the ThinkPad is simple, intuitive, and durable.

constraints. And in the weather-worn and electricity-deprived rural farmland of New Zealand, there are more than a few design challenges.

“It had to be waterproof, incredibly durable, and easy to use for people who are traditionally unfamiliar with technology,” said Hoyt. “You know you’re designing a good product when you start asking questions like, ‘What if a cow steps on this? Can we make this cow-proof?’”

The technology that Hoyt uses to run Hivemind must be just as strong and responsive as his products. Whether he’s designing in the field or developing at the office, his ThinkPad acts as a reliable research assistant. “There have been multiple times I’ve been sitting in the rain with my ThinkPad, gathering data in a field while connected via satellite to a series of beehives — which admittedly, is a funny looking scenario,” he laughed.

After many iterations, and several conversations with local beekeepers, Hoyt and his team designed wireless scales and sensors that can be placed underneath a hive. In communication with a satellite hub, the machines are able to detect nearly every metric imaginable — then send up-to-the-minute updates straight to one’s phone or computer.

“In the beginning, we mainly tracked the weight of the hive, which illustrated how much honey was being produced,” said Hoyt. “But over time, we’ve added new sensors to record humidity, rainfall, bee population, and activity inside the hive.”

Pollination is a harder metric to measure than honey, but if Hivemind’s track record shows anything, it’s the ability to evolve and adapt over time. “We must learn to develop more sustainable agricultural practices, and a key factor in assessing these alternative methods will be the ability to accurately monitor and control hive health,” said Hoyt. “More than from a sales perspective, this will become an environmental issue for all.”

The intersection of agriculture and technology is still relatively untilled territory, and Hivemind is among the first pathbreakers in this fertile space. Already, they are thinking about new ways to improve their technology, supplementing their satellite-based systems with wifi capability, as well as adding waterproof speakers that announce the hive’s weight. Given that Hivemind was conceived at 40,000 feet in the air, the sky is truly the limit for the Hoyt brothers.

PHOTOGRAPHY BY LOTTIE HEDLEY VIA VIEWFIND

Lenovo ThinkPad

The big impact of the impact group

At California State University, Long Beach, Dr. Daniel Whisler tests the properties of materials by shooting them out of a cannon.

“For some reason, I’m just really good at breaking things,” said Dr. Daniel Whisler, as he loaded his specially-designed ballistic cannon in the laboratory at California State University, Long Beach. Goggles in place, the countdown begins and the fated materials fly, sometimes at speeds approaching 650 miles per hour (290 m/s), before smashing into a metallic bar.

Working in the university’s department of mechanical and aerospace engineering, the joyous act of destruction is all in a day’s work for The Impact Group — a collection of students and professors working to develop stronger materials, from shock-proof armor to consumer products.

In the Long Beach lab, the group tests the properties of materials by launching them from a 20-foot-long cannon they built last summer, known as a Hopkinson pressure bar. A series of ThinkPads connected to high-speed cameras capture every second of the action, then begin to collect valuable data. “We only get one shot to record, so we have to use machines that we trust,” said Whisler. His labs these days are pure Lenovo, having purchased two ThinkPads, six ThinkStations, and four ThinkCentres for his workspace.

On a basic level, Whisler and his team study the motion-induced pressure limits of materials found in everyday products. By testing the behavior of objects under impact, they provide essential data to experts in a variety of fields, from military defense to healthcare.

Lenovo ThinkPad

The school gives us other computers, but I buy my own Lenovo products. I can't trust anything else to be 100% reliable.

Ever since buying his first ThinkPad, Whisler was converted. The engineer in him appreciated how easy it was to upgrade and customize, and the economic side of him appreciated the price. Working with cannons, Whisler can't take any chances on machine malfunctions during his experiments — it's why he only uses ThinkPad products.

PHOTOGRAPHY BY DAN WHISLER

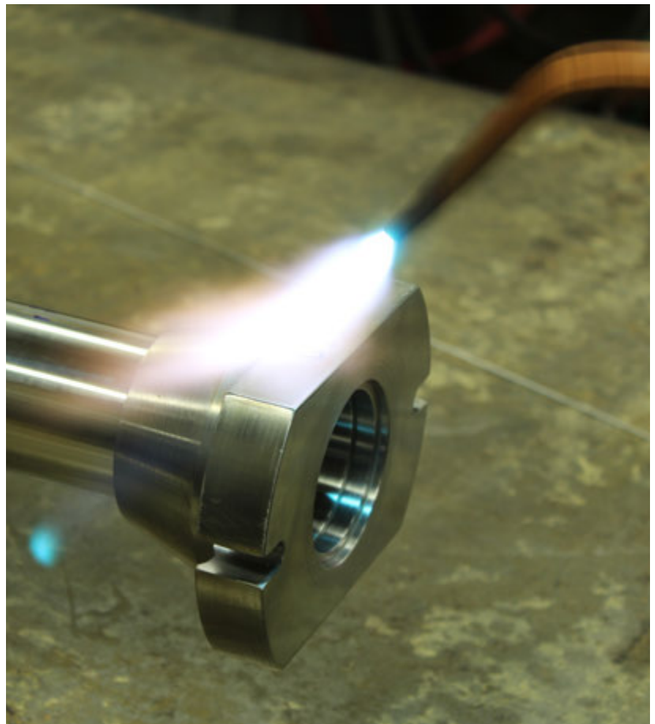
"We know what happens to a dummy in a car crash," said Whisler, "but we don't know exactly how a person survives the injuries from that crash." Creating a material that simulates skin tissue, the team can examine the real world consequences of car accidents on human anatomy. Or, in the world of sports, develop validated models that replicate baseball bats to reduce wrist injuries upon contact with the ball. "Anytime two forces come together at high speed, that's what we're interested in," said Whisler.

Beyond simple experiments, Whisler and his team are also testing the clash of less predictable forces, like an uprooted fence post during a tornado. With research results in-hand, he hopes to update building codes for residents living in areas prone to natural disasters — and ultimately eliminate the likelihood of a two-by-four flying through an unsuspecting house.

"At high speeds, it's nice to know that everything is designed properly," said Whisler. "It could be airbags, helmets, seat belts, bumpers, or bulletproof vests."

In the future, The Impact Group will continue to test new material systems, especially composites and other organic specimens for use in the military, construction, and safety sectors. Right now, they are designing a ballistic skeleton of human tissue to test armor that can absorb shockwaves.

While the university has yet to receive the international recognition it deserves, Whisler is confident his team will be able to get there. He explained, "If my students can build a gas gun, Hopkinson bar, and essentially a research lab from scratch, there's no doubt they can do the work that goes with it."



PHOTOGRAPHY BY DAN WHISLER

Lenovo ThinkPad

Solving big problems with microstructures

Dr. Hendrik Holscher, a researcher from Germany, is using a microstructure called Nanofur to clean up oil spills in the ocean.

Sometimes the answers to big questions hide in microscopic places. Say, on the foot of a gecko, the ridge of a lotus leaf, or even the technicolor wing of a butterfly. Dr. Hendrik Holscher is a researcher at the Karlsruhe Institute of Technology (KIT) in Germany, and for a large portion of his career, he's looked to nature to solve some of mankind's biggest problems.

"In thinking about how best to address human problems like pollution and oil spills, we have turned our lens to the diverse world of flora and fauna," he explained. Holscher is the project lead behind Nanofur, a substance that mimics the hairy microstructures found on various plant and animal life. It is produced with a highly scalable and competitive fabrication model. The result is a water-repellent, highly oil-absorbent material that eliminates pollutants without damaging the surrounding ecosystem.

Lenovo ThinkPad

I've been a longtime user of Lenovo. It's a great tool for me, and to inspire others to begin their own innovative projects.

When giving lectures at KIT, the ThinkPad's mobility and high performance makes teaching easy for Holscher. When looking for an engaging way to interact with his students, Holscher said his ThinkPad is an inspiring teaching tool and an essential all-in-one device.

"Various creatures contain multifunctional surfaces that are covered with dense nano-hairs," said Holscher. "This type of material is incredibly fascinating to the scientific community, as it has the potential for real world applications like self-cleaning, air retention, and oil-water separation."

Traditional methods to clean up oil, such as using sawdust or plant fibers, are ineffective because they also absorb large amounts of water. It may capture the pollutants, but it also captures everything else with little-to-no control. With Nanofur, only the oil is skimmed from the surface.

Without getting too deep into the hairy details, Nanofur has such a strong repellency that it is still covered by air when pressed underwater. "This effect is called air-retention," said Holscher, "because items coated with this substance can be submerged underwater and do not get wet."

The technology is so game-changing, researchers are hustling just to imagine the potential uses of this miraculous material. It reduces the drag in fluidics, waterproofs anything, and can syphon oil with pinpoint accuracy.

Holscher and his team are stationed in Karlsruhe and are excited to bridge the gap between experimenting in the lab and implementing in the real world. A video on their website shows the researchers using Salvinia — a type of aquatic fern with particularly hairy leaves — to extract a blot of oil from a petri dish. Instantly, the oil clings to the leaf like a magnet and the bowl is left sparkling clean.

In Holscher's line of work, he isn't exactly behind a desk. It's one of the reasons he needs to be able to take his technology on the go. "Most of the time, I'm in the field, or pacing around the lab. With my ThinkPad, I'm able to take notes, render 3D sketches, and quickly send my findings to my associates."

The Nanofur team is working on a commercial prototype, and while they certainly have a myriad of ideas about how the product could be used, they want to hear from the public. "As we connect with partners for product development, we hope that people begin to send us their own weird and wonderful concepts, because we truly believe the possibilities are endless."

PHOTOGRAPHY BY KARLSRUHE INSTITUTE OF TECHNOLOGY

Lenovo ThinkPad

Fast tech, faster meds

Stanford sophomore Anvita Gupta uses machine learning and AI to speed up medical advances.

Anvita Gupta, a sophomore at Stanford University, said she was “only a little nervous” when meeting President Obama at last year’s White House Science Fair. If one watches their meeting on YouTube, the 19-year-old biocomputation major and Arizona native certainly doesn’t seem unsure relaying the challenges surrounding new medical discoveries to the president. “We can use machine learning and artificial intelligence to make drug discovery faster and more cost-effective,” she said, surrounded by paintings of former presidents and ornate chandeliers.

The budding scientist only has a few years of research under her belt, but she’s already making big waves in the community. With several notable awards behind her, a planned internship at ETH Zurich — a world-renowned tech university — and one of her drug discoveries being considered for preclinical trials in China, Gupta is well on her way to making innovative changes at the crossroads of healthcare and technology.

Advancing through the rounds of finalists during the Intel Science Talent Search in 2015, she was selected as one of eight students to meet the president and discuss her work with leading professors at Harvard Medical School. Simply put, her goal was to utilize advanced algorithms in the hope of cutting down the time and cost involved in identifying new medicines.

“It currently takes one billion dollars and ten years to develop a single drug,” said Gupta. “Hopefully, using these new techniques will make the process faster and the drugs cheaper for patients.” Her time at Harvard paid off, to say the least, as she already identified promising new drugs for cancer, tuberculosis, and Ebola — with several TB patents moving to preclinical trials in China.

Gupta has been kindling her passion for biology and

Lenovo ThinkPad

It’s always been Lenovo for me. It just works. It’s easy — runs without a problem.

For this biocomputation major, ThinkPads have always been the most reliable machines to get her work done and run the finicky open-source operating system she prefers. Ubuntu, her platform of choice, is notoriously difficult on most machines. But on her ThinkPad, it’s never a problem.

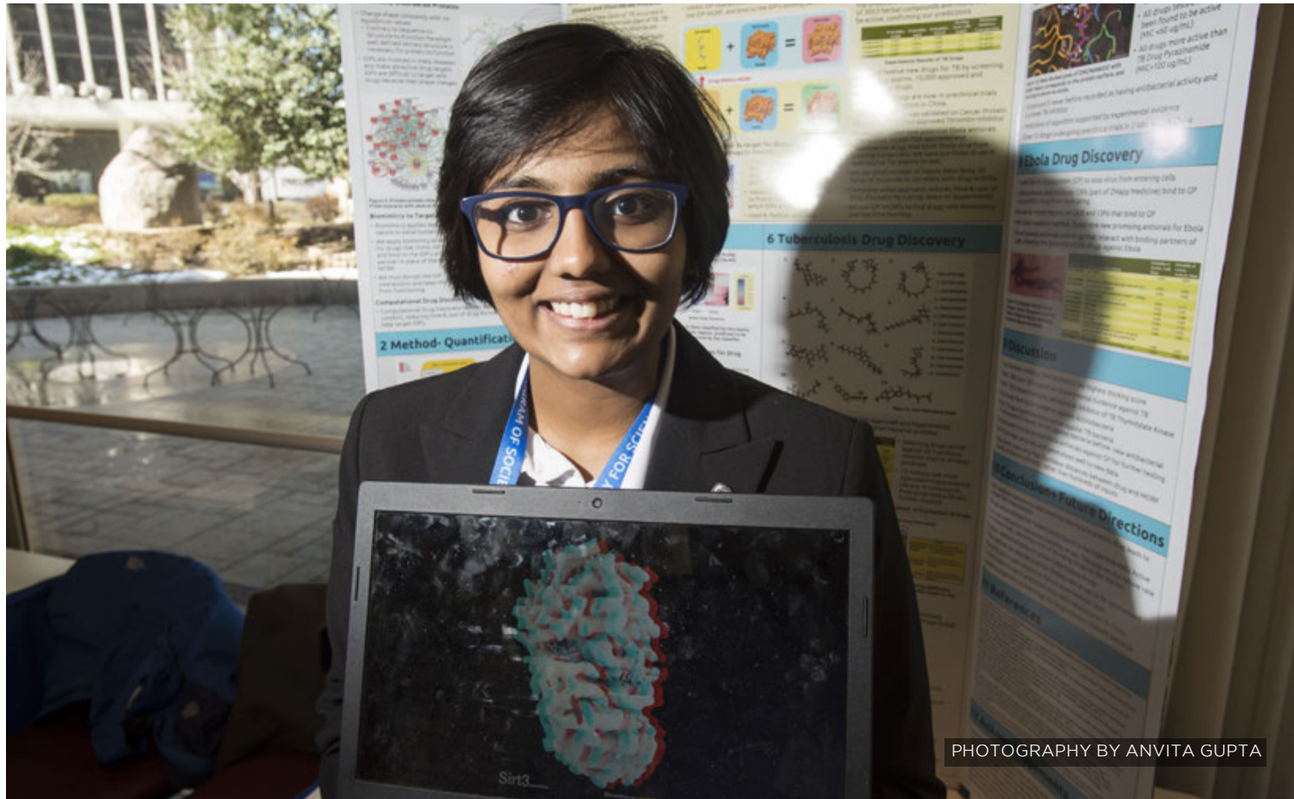
computing since her second year of high school, which sparked after enrolling last-minute in the school science fair. Partnering with Professor Sangeeta Agrawal of Wright State University — with nothing more than a light background in robotics clubs and her ThinkPad — Gupta unknowingly was taking the first step in a long and illustrious career in science.

“The experience of presenting my findings is always the same for me, whether it’s just school or in the White House,” said Gupta. “I’m always nervous at first — but then my excitement and passion just take over.” After completing her first project on protein mapping in pancreatic cancer, she became a published researcher at ripe age of 14.

What followed next was only a logical conclusion for this budding biocomputation expert. “I got hooked on the idea of using technology to make meaningful changes in healthcare,” she said. Currently, she’s working with Stanford’s Kundaje and Zou Groups, which use artificial intelligence to develop gene editing technologies and personalized medicine. Meaning, potentially dangerous mutations like cystic fibrosis and pancreatic cancer can be “cut out of our DNA” before they develop.

When she’s not editing papers — or genetic codes — on her ThinkPad, the busy student is flexing her finesse for leadership. She’s the founder of the growing nonprofit Learning IT, Applications and Software (LITAS). What began as a local club in her hometown of Scottsdale, AZ has quickly grown into a national organization which teaches young girls how to code, and encourages them to pursue tech careers.

Still only a sophomore, Gupta’s not exactly sure where her work will take her in the next few years. But regardless of where the future takes her, she smiles thinking back on her first childhood whimsies of becoming a pediatrician. While that specific dream has shifted, the spirit remains the same. “My passion is to lead a life that’s useful for others,” she said, “to lead a life bigger than myself.”



PHOTOGRAPHY BY ANVITA GUPTA

Lenovo ThinkPad

A helping hand to those in need

Jeff Powell uses a 3D printer to provide artificial limbs for children with disabilities.

Summer is usually the time students take a mental vacation from their studies; maybe go on a road trip, or pick up a new hobby. Jeff Powell, a recent biomedical engineering grad from the University of North Carolina at Chapel Hill (UNC), obviously never got the memo about taking a break. In the course of one summer, he taught himself the ins-and-outs of 3D printing, began sketching ideas for an affordable prosthetic hand, and had a working prototype before the summer ended.

This story may have developed in the basement of Phillips Hall — where Powell spent countless hours connecting his ThinkPad to the university's 3D printer — but it really begins with Holden Mora, a 7-year-old boy in Chapel Hill who was born without fully formed fingers on his left hand.

"I had been looking for ways to do something that would help others, as I have always been appreciative and grateful of the help I've received from family and professors," said Powell. "In learning about Holden's situation, and how expensive prosthetics cost, I started thinking about ways to solve the problem through technology."

The exorbitant cost of prosthetics is a high enough hurdle for most parents, but then there's the fact that children are constantly growing, meaning the artificial limbs must be frequently replaced. So Powell not only needed to find an innovative workaround, he needed an answer that would work in the long term. That's when he turned to additive manufacturing.

"3D printing has come a long way in a short time," said Powell. "The printers used to be these massive, expensive things, used mainly in car manufacturing. But now, it's an incredibly quick and affordable form of production — we can design a

Lenovo ThinkPad

I only use Lenovo products, they're incredibly reliable and easy to use.

When you're working on an eight hour 3D print, all it takes is a split-second malfunction to completely ruin your model. That's why Powell trusts his ThinkPad to get the job done. Plus, it's fantastic for running all of the open-source programs Powell has used to educate himself on the diverse and ever-evolving world of 3D printing.

full prosthetic hand for about $20 worth of materials."

After many hours in the lab, numerous failed experiments, and countless hours on his ThinkPad educating himself on open-source community forums, Powell had a working model for Holden. But the issue remained: how can he move this technology from a temporary fix to a permanent solution?

"To solve that problem, I realized I could start a student group at UNC," said Powell. "It would give students community service hours, great technological experience, and most importantly, provide a steady stream of new devices for those who need them."

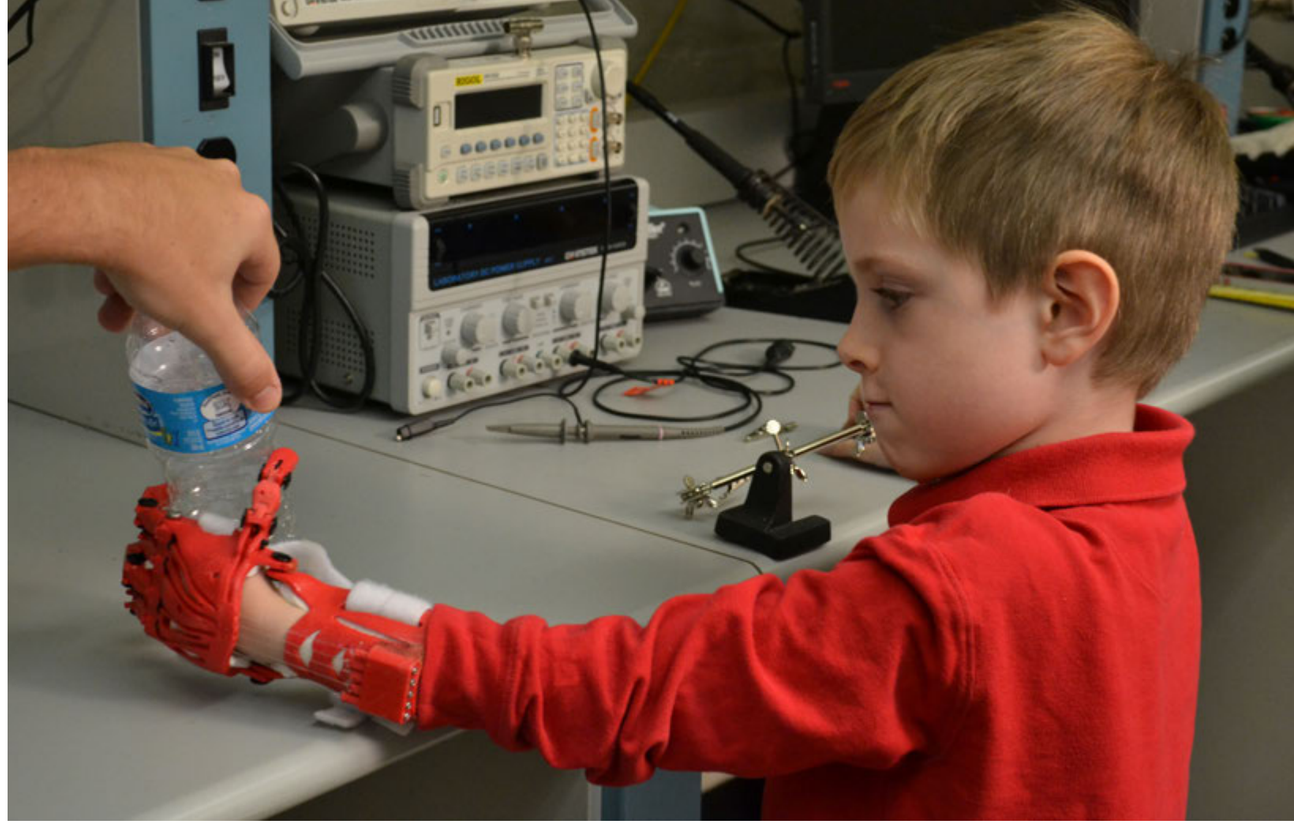
Since its inception, the program has evolved into a self-sustaining club, with two other chapters opening at North Carolina State and Durham Technical Community College, as well as a nonprofit called The Helping Hand Project that Powell manages with other board members. By establishing a nonprofit outside of the school, he's able to raise funds for the programs, and accommodate people who aren't students but still want to help out or volunteer their time to the project.

Though Powell has moved from designing to a more administrative role, he can't help himself from getting his hands dirty once in a while. "We're working on more personality and customization for the kids — we've even made a prosthetic that glows in the dark," said Powell.

Beyond the aesthetics, Powell is designing job-specific devices. Meaning, if a child wanted to ride a bike or play the trumpet, he or she could swap in components depending on the task. In building all of these unique devices and getting them out to the community, Powell quickly realized he was unintentionally building a support group. As a wonderful side-effect, his efforts have spawned into an organic social work and therapy group, for parents and children alike.

"While it wasn't initially in our minds, our support side has grown to be as valuable as the hands we provide," said Powell.

Whether it's through innovative technology, mentoring in class, or simply providing a safe space to talk, Powell has found an amazing and sustainable way to offer a helping hand to those in need.



PHOTOGRAPHY BY JEFFREY POWELL

Lenovo ThinkPad

The venom is the cure

Biomedical scientist and National Geographic explorer Dr. Zoltan Takacs travels the world studying venom to produce new medicines.

“As a young kid, I wasn’t thinking about being a medical researcher,” began Dr. Zoltan Takacs, reflecting on the early days of his childhood in Budapest, Hungary. Like many other spirited youngsters, he was diving head-first into nature without too much thought: taking home toads, lizards, and venomous snakes whenever he could get his eager hands on them.

“Despite the inherent dangers, I was completely captivated by venomous snakes,” he continued. “This drew my interest further to study pharmacology.”

Flash forward to the present, and Takacs’ childlike sense of adventure and wholehearted embrace of the environment’s wild side has only intensified. After studying pharmaceutical sciences in Hungary, as well as obtaining a PhD in pharmacology from Columbia, Takacs has embedded himself in the jungles and canopies of the Amazon rainforest.

Specializing in venom research, he’s become a world-renowned scientist and explorer, discovering innovative cures for life-threatening diseases from unlikely sources. For instance, from inside tiny scorpions, marine snails, or the 5 cm long fangs of a Gaboon viper.

“The very same power that can kill can be used to treat high blood pressure, heart attacks, diabetes, cancer, and HIV pain,” explained Takacs. “Venom can save your life- it’s a paradox only till you discover a pure toxin.”

Venom toxins, though often carried in a frightening package, have some of the most potent and selective molecules in the

Lenovo ThinkPad

We designed the largest toxin libraries on a ThinkPad. It is my office while I'm in the field.

From the bottom of the ocean to the heart of the Amazon rainforest, Takacs' work takes him all across the globe — often to places where technology doesn't fare well. Nonetheless, his ThinkPad can withstand the weather and the terrain. No matter the environment, he has the tools he needs to innovate.

world. Moreover, they are one of the best templates for designing new therapeutic agents. Presently, there are about 20 mainstream medications made from animal venoms, which are taken by 40 million patients around the world. The challenge is that there are still 20 million toxins left in the world that are completely unexplored. That's where Takacs comes in.

"I co-invented 'Designer Toxins' technology, a platform that starts with natural animal toxins from around the world, creates millions of combinatorial variants, then screens for those with the highest promise to treat diseases," he said. "We are innovating on nature's already powerful toxins to push them ahead for drug development and other biotech solutions."

To see Takacs in his element is truly an exercise in extreme contrasts. Illuminated by the glow of a small bonfire on the rainforest floor, he types away at his ThinkPad with a flashlight headband strapped on. And even though he's been bitten by so many venomous creatures he's actually become allergic to both, the venom and the antivenom, there's no way he plans on slowing down.

"I'm extremely passionate about my work — others would call it crazy!" laughed Takacs. "For me, it is an intellectual challenge and satisfaction that is particularly rewarding to be engaged in."

In his travels across 158 countries, Takacs has learned to dredge water from forest plants, outrun elephants, and how to find snakes by simply listening to the chirps of birds. But with 150,000 venomous animal species in the world, he still has many more daring adventures ahead of him.

PHOTOGRAPHY BY DR. ZOLTAN TAKACS

Lenovo ThinkPad

From storage container to state-of-the-art classroom

University of Houston students Jorge Osorio and Isaac Garay are retrofitting a 20-foot storage container into a mobile classroom in West Africa.

For most class projects, the main concerns are getting a passable grade and making sure everyone holds up their fair share of the work. For 23-year-old Jorge Osorio and his classmates at the University of Houston, their senior thesis evolved far beyond the classroom into a groundbreaking opportunity to bring educational technology to West Africa.

It doesn't happen often, but sometimes life will drop the perfect opportunity into your lap. It came in the form of a guest lecturer, Dr. Richard Jackson, who had spent some time volunteering in Mali. He was looking for a team to work with him on retrofitting a 20-foot storage container into a classroom, while Osorio was looking for a research topic.

"And everything after that is a blur," laughed Osorio. After listening to Dr. Jackson's lecture, Osorio and his fellow classmates — Issac Garay, Chris Abad, Stillwell Pan, and Justin Sanchez — drafted what they referred to as a "crazy 12-page proposal" detailing their big ideas for the project. This was no ordinary assignment; they had unique constraints: the classroom needed to stand alone, it couldn't be repaired or resupplied for years at a time, and on top of everything else, Mali has spotty-to-no-internet.

"Immediately, we decided we were going to use ThinkPads, to eliminate stationary that would break or run out," said Osorio. "The next question became, 'Okay, how do we make this work?'"

What came next was a lightning-fast series of trial and error, creative problem solving, and many, many late nights in the lab. Osorio and his team ventured to a shipping yard, found a makeshift workspace in an Active Water Solutions warehouse, and began the work of sanding, painting, and fireproofing the classroom.

"Continually, throughout this entire process, we have been amazed by the level of support

Lenovo ThinkPad

Very early on in the project we knew we were going with ThinkPads. It's simply the best computer to get stuff done.

In terms of build quality, durability, and their power usage goals, ThinkPads were the perfect choice for Osorio's team to retrofit their classroom container. With no downtime, strong construction, and the ability to easily replace parts, Osorio has ensured that the children of Mali will have access to technology for years to come.

and kindness from people inspired by our story," said Osorio. "We were given a free workspace, access to their tools — many people have donated their time and resources to get this project off the ground, and I think it's because they truly believe in the impact of what we're doing."

Don't let the classroom's humble architecture fool you — this container is positively tricked out with solar panels, air conditioning, battery banks, outlets, custom-made LED lightning, and thousands of tiny details of love and labor. Perhaps most impressively, the container is mobile, meaning multiple communities and villages throughout Mali can benefit from its resources.

While all of the nitty-gritty details were being solidified — including a nightmarish sequence in which after waiting two months for fireproof paint, the delivery man accidently spilled the entire can onto the ground — Osorio and the team started developing the technological side of the project. Inside the container, 14 ThinkPads are connected to a robust server, which run a myriad of educational games from math and physics to creative writing. What's more is that all of this is done without the internet.

"It's incredibly important to be able to bring standalone technology to remote places," said Osorio. "You don't necessarily need the internet to connect people with life changing resources."

As it stands right now, the container is nearly finished. Osorio and his team are in the fun part, that is, working with local ethnographers to make sure the colors are culturally appropriate and that the software is as intuitive as possible (even for people who have never used a computer before).

It's taken about a year, but Osorio and his team have learned a lot from their 20-foot container. Namely, that they are just getting started. In the future, they plan to design a 40-foot model, which could serve 40-to-60 students at a time. They are already working with the Mali government to place full fledged servers in strategic locations, which would grant them the ability to stream educational content despite an absence of the internet.

"Not everyone starts off equally, but everyone should have the same potential for opportunity," said Osorio. "I don't look at this as charity. We're not giving them things for free; we're giving them tools to better themselves."

PHOTOGRAPHY BY JORGE OSORIO

Lenovo ThinkPad

Computers, converters, and colliders

University of Texas at Austin student Ray Xu creates radiation-proof data sensors inside the Large Hadron Collider.

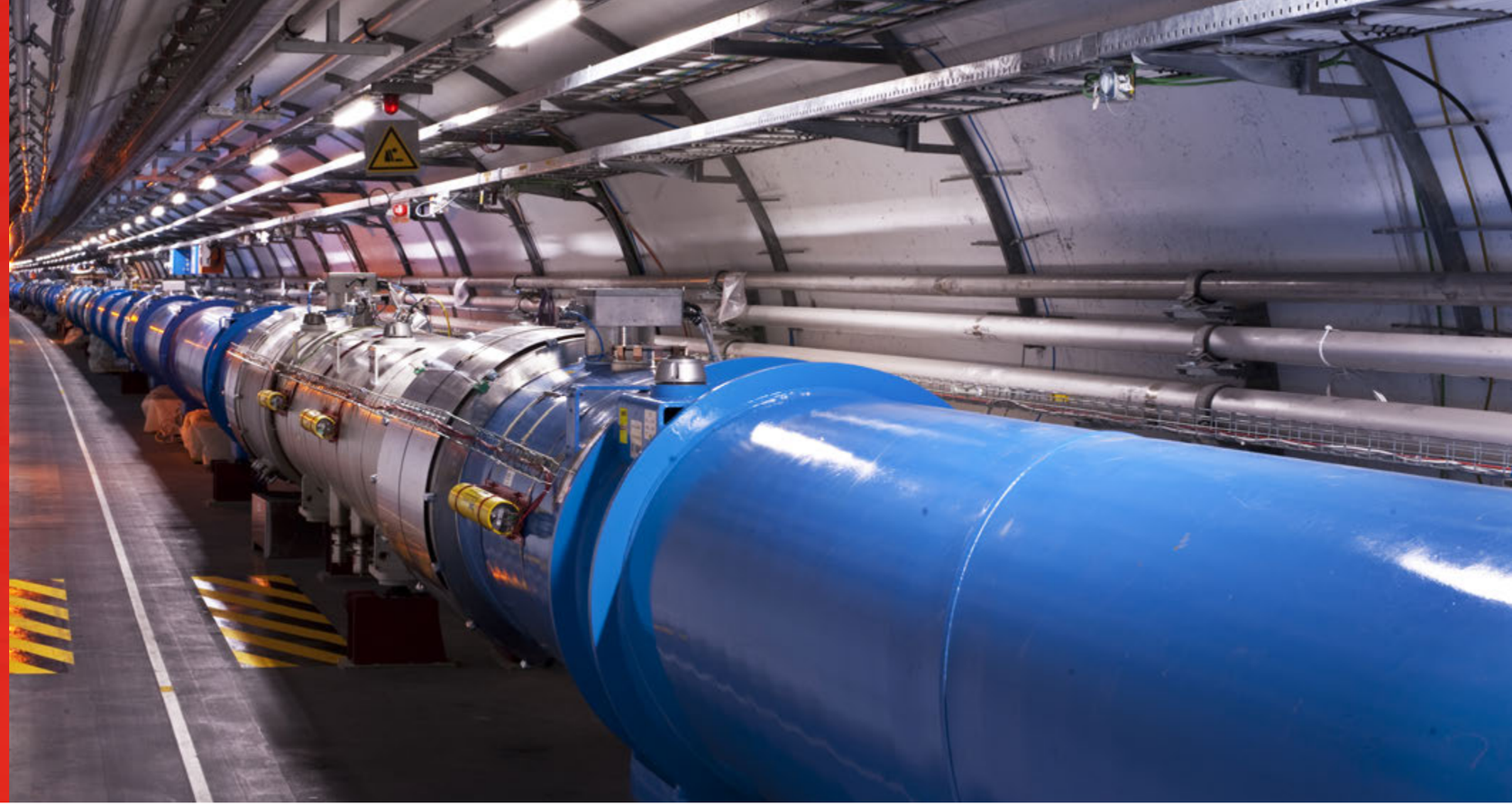
There's an amateur radio club outside of Dallas, Texas that still meets every month. Calling themselves the North Texas Microwave Society (NTMS), the members trade electronic equipment and share in the nostalgia of broadcasting days gone by. For Ray Xu, 21, the NTMS was much more than a monthly assembly — it was a formative moment for a novice electrical engineer who would go on to help study and advance the very limits of physics.

When NTMS member Kent Britain gifted a box of waveguides and other radio-frequency electronics to the then 15-year-old Xu, he thought "it was probably just a box of spare parts he didn't need." Yet, Xu created something that caught the eye of a UT Dallas professor, and earned himself a place on the research team at the Texas Analog Center of Excellence, what he now calls his "intellectual home." Partnering with scholars almost twice his age while still in high school to design an integrated circuit (what many think of as computer chips), Xu isn't shy to explain that it was something "many undergraduates, and perhaps even graduate students, don't have the opportunity to do."

Presently, Xu is a fourth-year double major studying physics and electrical engineering at the University of Texas at Austin. He's helping to design data converters for the Large Hadron Collider (LHC) — the world's largest and most powerful particle accelerator, located in Switzerland. Some 17 miles in diameter, the LHC is a circular super-magnet used to conduct high-energy

ThinkPads are as versatile as they are rugged.

In addition to its durability, Xu said that he loves the support system for Linux and the benefits of being a part of the open-source community. Given the technical requirements of studying and researching physics and electrical engineering, his ThinkPad helps to streamline his work.



physics experiments. At a depth between roughly 200-to-600 feet underground, the LHC's main function is to accelerate particles close to the speed of light and test the results.

Using a data converter, which translates analog voltages from the particle detectors into code that can be read by a computer, Xu and his team are developing a chip that is instrumental in recording what goes on inside the collider. Finding himself balanced between two majors, Xu noted, "On the one hand I want to continue pursuing my passion in analog circuit design, but on the physics side, I want to study how high-energy radiation can affect circuit performance."

As Xu explained, basic data converter chips can be bought for less than a dollar online. But in order to build something that can withstand the radiation-induced experiments of the LHC — that will take some work. His role in the group is to ensure that the prototype is radiation-hardened by the time it's sent off for manufacturing this May. It's a tough job, but luckily, Xu's ThinkPad is just as rugged.

"I'll admit I've accidently dropped my ThinkPad on a concrete floor once by accident, and the Thinkpad only suffered a minor scratch on the exterior," he laughed. "The thing is indestructible, and has much better driver and hardware support compared to other brands."

While the project he's working on is specific to the LHC, the technology can be applied elsewhere, and Xu is intrigued by its aerospace and medical applications down the road. His long-term goals are to continue on to a PhD program and stay in the field of research. Much like the experts operating the LHC, Xu is dedicated to advancing human understanding and helping to solve some of the big, unsolved questions by applying his passion for electrical engineering into the field of physics.

PHOTOGRAPHY BY RAY XU

Ten dimensions of data

Clinical research fellow Dr. Duncan Murray uses flow cytometry to help cure T-cell lymphoma.

It's 10 o'clock at night in the village of Bournville, located on the southside of Birmingham, United Kingdom. Instead of sleeping, reading, or any of the things a 33-year-old might be doing at this hour, clinical research fellow Dr. Duncan Murray is on his way to the lab. Although he's only been home a few hours, he has skin samples waiting to be processed. While his family sleeps, Murray will be recording important data needed for his research on cutaneous T-cell lymphoma.

After 14 years of rigorous study — and just one year away from becoming a licensed hematologist — Murray interrupted his studies to pursue a challenging new line of research. Working under the supervision of his now teammate, Professor Paul Moss, the focus of his research was first inspired by a patient from the burn victim wing of Queen Elizabeth Hospital Birmingham. "The chap was very young, in his twenties. And despite all of the treatments we gave him, there was nothing we could really do for him," Murray recalled. T-cell lymphoma is a rare form of blood cancer affecting roughly five Americans out of every million. The most common presentation of the disease is on the skin and is said to be like "living with a bad burn that never heals," he added.

Murray's work is focused within the field of immunology, the study of the interaction between the immune system and cancer. "Immune cells can target cancer, but this fact has been mostly ignored for decades," he explained. Now his team is taking a closer look at the surface molecules of cancer cells — the ones that block the immune system

Lenovo ThinkPad

My work constantly takes me back and forth from clinical settings to the lab, so I need technology that can take a hit. I've put my ThinkPad through a lot and it always survives.

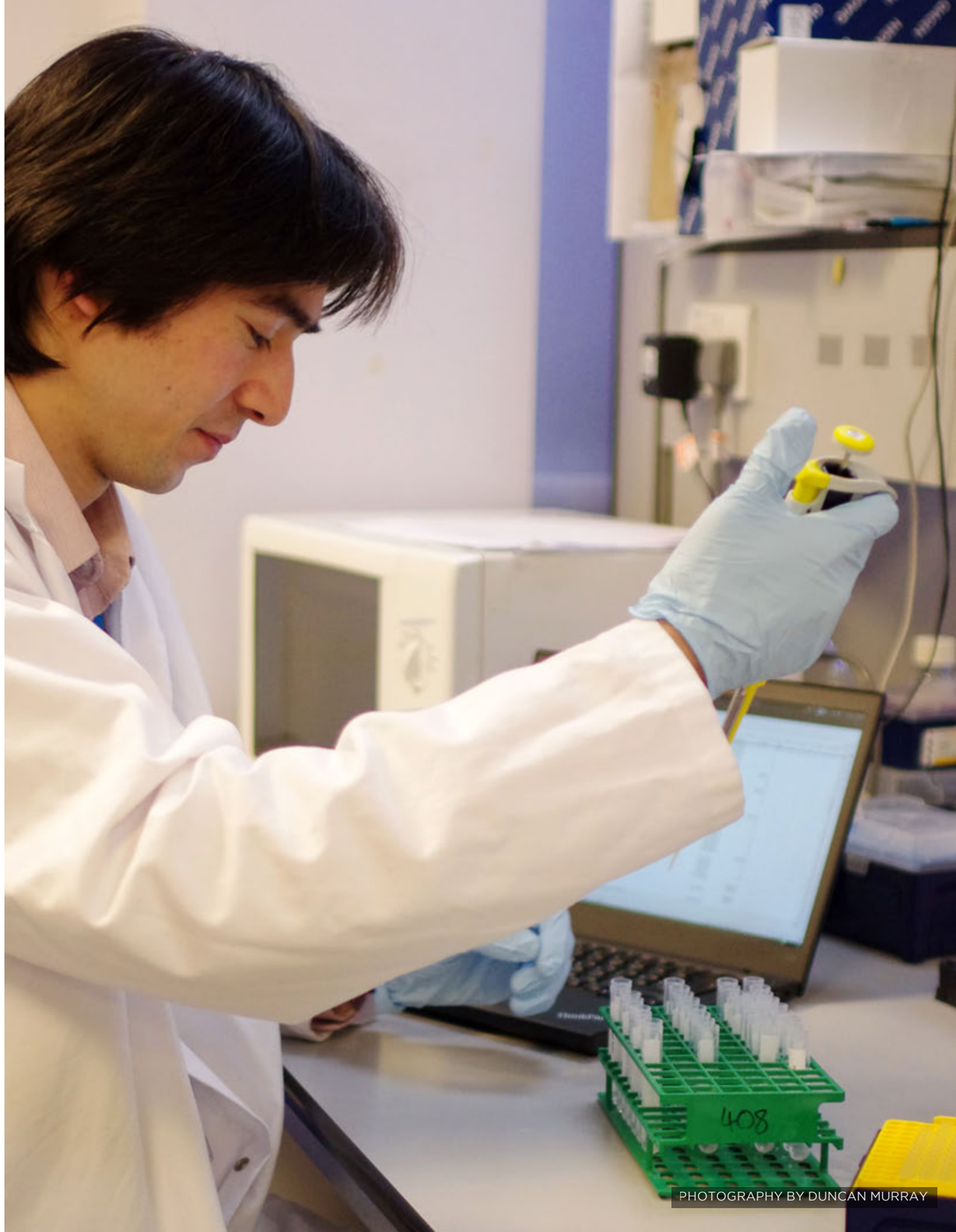
Pairing well with his array of flow cytometers, Murray admires both the portability and processing power of his ThinkPad. Jokingly referring to it as his "little assistant," his ThinkPad helps patients at every step of the way — checking them in, taking notes, and testing samples.

from recognizing them as a threat. Connecting his ThinkPad to a series of flow cytometers, his team can analyze up to 10,000 cells per second, and the combination of technology allows him to measure up to ten dimensions of data within a single cell.

The clinical fellow describes himself as someone who has a "fascination for understanding things." Despite the intensity of his schedule, Murray still makes time for the important things — like taking his three small children to the zoo. Some weekends he even manages to squeeze in shifts at the hospital, spending time with patients who have recently undergone bone marrow transplants. He does all of this in addition to teaching, completing his research, and practicing as a clinician.

Murray won't be able to stay in this vein of research forever. Having been granted leave to pursue the work for three years, he will then return to his studies to obtain a license as a practicing hematologist. It wouldn't be an exaggeration to say that Murray and his team are navigating uncharted territory in the field. Having studied 46 patients so far, they've also presented their findings at the World Congress of Cutaneous Lymphomas in New York City, and most recently, at the European Association of Demato Oncology (EADO) in Athens. "With the wealth of information we've collected through our ThinkPads, we've been able to identify promising molecular pathways to develop new agents for therapy and drug delivery," he said. "It's not often that you can say, 'No one else is doing this. We are working on a truly new idea.' It's very exciting."

When asked what drives him to maintain such a busy schedule, Murray's answer is simple. "Given a puzzle and a problem — if you work at it, you can actually help someone," he said. Thinking back on the young man who lost his battle to T-cell lymphoma years ago, his research is more than just a tribute to patients fighting this rare type of cancer — it's a new direction for oncological research and one that he hopes can be continued.



PHOTOGRAPHY BY DUNCAN MURRAY

Lenovo ThinkPad

Mapping a better future for Tanzania

Przemek Zientala, a student at the University of Southampton, locates clean drinking water in Tanzania through machine learning.

The women and children walk, sometimes two, and up to seven hours on the hot and dusty paths snaking through the arid Sub-Saharan landscape. Fine soil covers their feet and shoes, sitting thick on the worn buckets being carried many at a time. This is what residents living in water-deprived parts of Tanzania have to do daily just to have clean drinking water. And they are the lucky ones. Many people in Tanzania have no choice but to drink contaminated water — and 4,000 will die each year as a result.

Przemek Zientala wants to change that.

Combining his skills in machine learning — an up-and-coming branch of artificial intelligence — and physical geography was a natural choice for Zientala, a third-year student at the University of Southampton. Since physical geography — the study of natural landscape features — was always one of his interests, Zientala and his advisor decided that he should incorporate both of these fields into his dissertation. Ultimately, he settled on a problem he knew he could solve: finding clean water in one of the most barren regions of the world. Water-mapping is a technology as transparent as its name, in which researchers locate new water sources and confirm the capability of existing ones. “Tanzania has especially bad problems with clean water access,” said Zientala. “And many water-points still aren’t mapped.”

A typical day for Zientala begins at home, his ThinkPad illuminated with water-mapping data, various online engineering community forums, and lines upon lines of code. The work is complex, requiring him to have the best technology while staying within a student’s budget. Using predictions from trained sets of data, the budding scientist locates potential water points, such as springs or wells, while examining government plans for increasing water access for Tanzanians from 53% in 2005, to 90% in 2025.

For Zientala, his work is more than just a dissertation — it’s a way for him to create something that could have

Lenovo ThinkPad

When shopping for a computer, I focused on two things: power and build quality. I call my ThinkPad the ‘Little Beast’.

After months of comparison shopping, Zientala found that his ThinkPad can keep up with even the most RAM-hungry programs. During those late nights coding in R — an advanced program used by data scientists — Zientala knows his ‘Little Beast’ can handle the job.

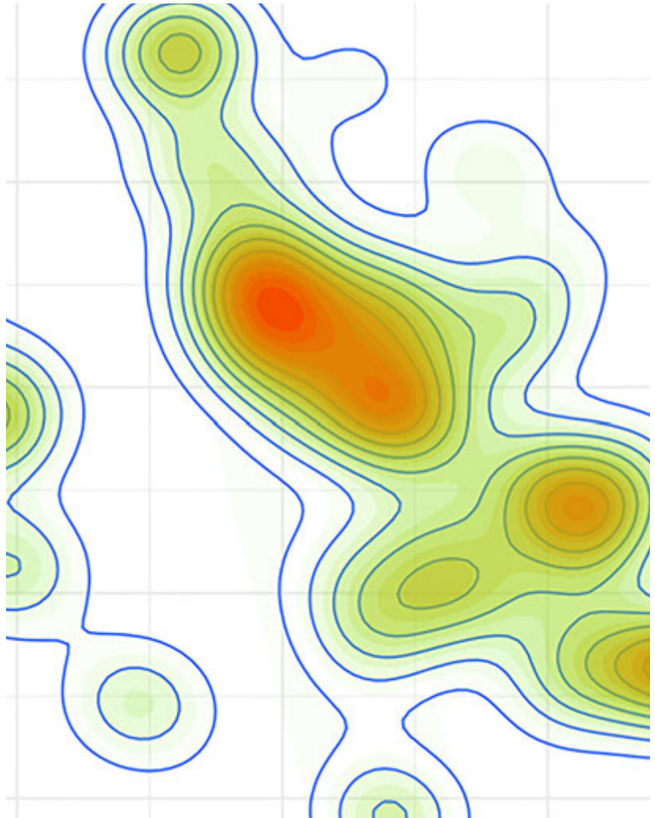
a real impact on people’s lives. “650 million people don’t have access to safe drinking water, perhaps with this technology we can shrink that number,” he explained. Ultimately, this is a tall order for a student who has never visited the place of the project’s origins, some 7,000 miles away from his Southampton apartment.

The undergraduate, 21, who hails from Poland, first arrived in the U.K. on September 19, 2014. He laughs while providing the exact date — just another example of his attention to detail — and doesn’t skip a beat as he goes on to talk about his research. Machine learning, as he explains, is a branch of artificial intelligence that allows computers to learn from data on their own and discover hidden patterns. By plugging in variables such as groundwater depth and previous water well locations obtained from organizations like WaterAid Tanzania and the British Geological Survey, Zientala has compiled data for his thesis, which is being presented in 2017.

When he’s not running algorithms or catching up on field literature, Zientala plays classical guitar and leads his university’s astronomy society. With his keen love for solving problems with real world impact, Zientala plans to complete a PhD program and one day hopes to receive enough public recognition to have his work published, and eventually implemented by the Tanzanian government.

In addition, he’s working at a startup called FuseMind, which utilizes Deep Learning and AI to evaluate academic search results — a fantastic tool for students, to say the least.

Zientala says he would love to see his work being used in the field — and he’s already on the right path. He just presented his work at the U.K.’s GIS Conference in Manchester last April. Hopefully, his work will continue to reach larger audiences, eventually leading to change the water crisis in countries like Tanzania and beyond. To Zientala, the whole point is to build “something practical that can impact everyday life,” and contributing his findings to the project is just the beginning for this young scientist.



PHOTOGRAPHY BY PRZEMEK ZIENTALA

A young star in astronomy

Munich University student Markus Reinert uses algorithms to study the stars, even in the big city.

“The vastness of the universe, what else is out there — how can it not capture you, right?” asked Gary Fildes, director of the Kielder Observatory in Northumberland, United Kingdom. Situated in the rolling green hills of North East England, Fildes has witnessed countless astrological phenomenons in his day — from breathtaking meteor showers to black holes — but he’s never quite seen anyone like Markus Reinert.

Only 19-years-old, Reinert is a student from Germany whose passion for computer programming and astronomy far exceeds his age. Though Fildes might have scientific equipment in his lab older than Reinert, he’s quick to point out Reinert’s incredible potential. “The idea of the observatory is to get ordinary members of the public to the eyepiece of big telescopes, and allowing them to access how our universe works,” he said. “This is precisely what Markus is doing.”

Using only a telescope, a camera, and his trusted ThinkPad, Reinert created a software program with enough power to analyze stars — even in heavily light-polluted environments like his hometown of Munich. His work, though comprised from simple parts, was ground-breaking enough to grant him Germany’s prestigious “Jugend forscht,” or Youth in Science Award. While he’s well on his way to a meteoric rise in the scientific

I just need my camera, my telescope, and my ThinkPad, and I can learn something about the universe.

As a budding astronomer, Reinert spends countless hours out in the fields of Munich observing the night sky. When he connects his laptop to his camera and telescope, he needs a powerful machine that can handle the elements. Not to mention the seemingly never-ending battery life, which he takes advantage of during extended shots.

community, Reinert's passion began rather humbly, firmly rooted on planet Earth with a simple school assignment.

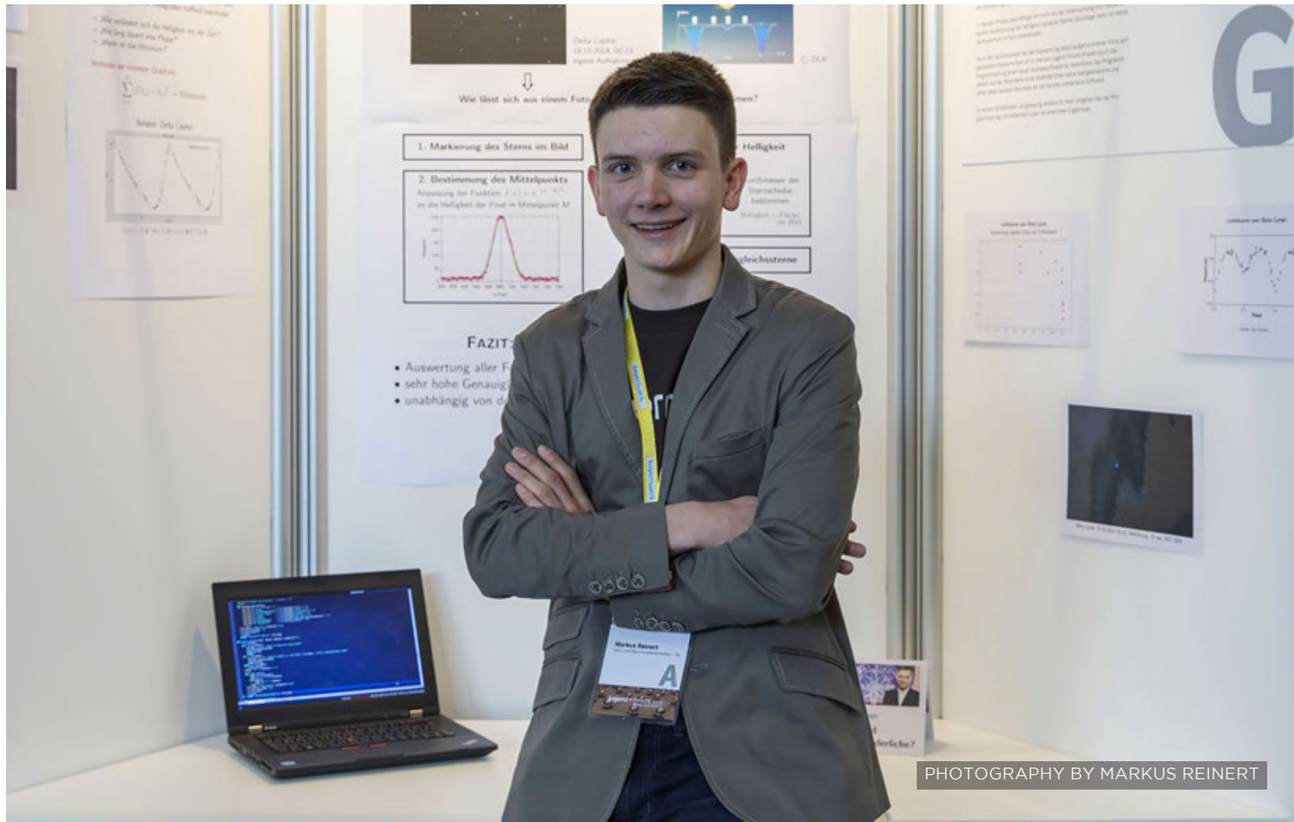
"It started at school when I was assigned to write a 15 page paper on the topic of applied math," explained Reinert. "Already having a passion for astrophysics, I decided to combine the two subjects." In the meantime, he was already nurturing a budding hobby in amatuer star gazing. Yet, like many city dwellers, Reinert ran into the problem of light pollution. Even a quick trip outside the metropolitan area of Munich was still yielding blurry photos, and ultimately, distorted results.

Over the course of a year, Reinert developed an algorithm that was able to photograph the stars, then adjust the brightness to compensate for light pollution. As Fildes stated, "If you know how bright an object is, you can calculate its distance."

Filtering through the static and background noise of big city lights, Reinert is able to render the universe into a refined, simple image on his ThinkPad. One might think that Reinert would develop a star-sized ego from his early accolades and advances, but the humble Youth in Science Award-winner is simply happy to be contributing to the scientific community at-large.

"What sets this contest apart is that we don't see each submission as rivals," he said. "We are much more collaborative and see each other as partners in science who all strive to learn more about our universe."

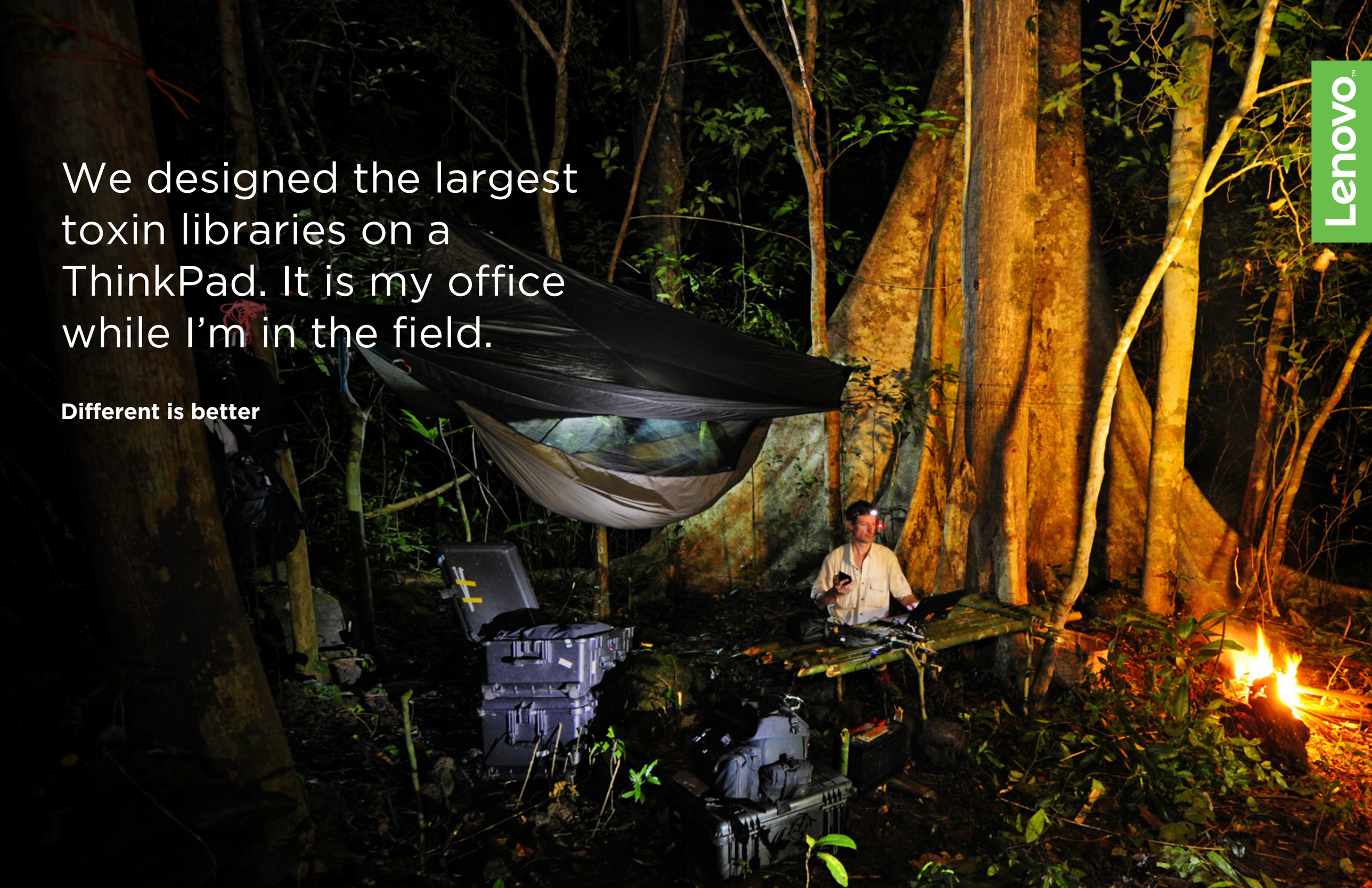
For now, Reinert is studying mathematics at Munich University with a minor in physics — a dual educational path that allows him to combine all of his divergent interests into one program. While each day he adds new tools and techniques to his arsenal of knowledge, he's already proven he can reach astronomical heights with relatively simple supplies.



PHOTOGRAPHY BY MARKUS REINERT

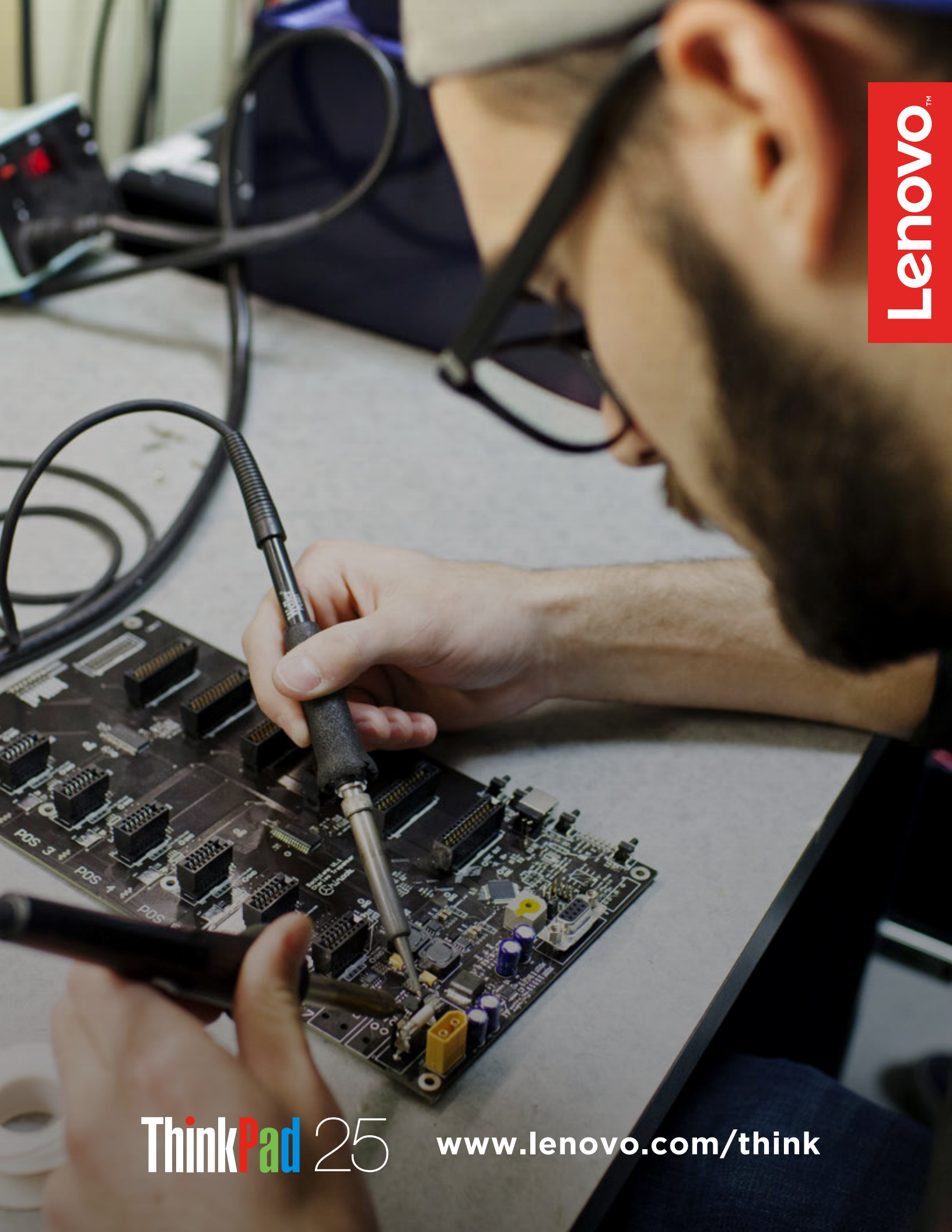
ThinkPad is not only an extension of your hand, it’s an extension of your brain.

Different is better


We designed the largest toxin libraries on a ThinkPad. It is my office while I’m in the field.
Different is better
Lenovo

My ThinkPad can survive the rural elements and has a replaceable keyboard, which is key when you spend hours working outside.

Different is better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