

**COLD**  
Super hot  
Arctic skills

**PEOPLE**  
For Reetta Kivelä vegan  
meat is not an oxymoron

**TECHNOLOGY**  
Now, this is  
rocket science

**HOT**  
The complete guide  
to cool saunas

# THIS IS FINLAND



## A NEW LEARNING PHASE

2017

ISSN 2343-3272



**SUOMI  
FINLAND**

By Hannele Tavi  
Photo Antti Kurola / Visit Finland



## AN ICE-BREAKING CRAFT

An icy open sea extends ahead. Underneath, 75 metres of steel is pushing its way through the cold ice, powered by a strong diesel engine.

**Icebreaker Sampo**, built in Helsinki in 1961, is cleaving the northern part of the Gulf of Bothnia. Sampo was on official duty as an icebreaker until 1987, assisting commercial vessels in navigating the wintry sea to their destinations. Today, the vessel braves the seas offering memorable experiences to 150 tourists at a time.

The four-hour cruise culminates in the passengers floating in the newly opened water. Moving about in orange floatation suits is as awkward as it must be for an astronaut to walk in space. The icy sea radiates coldness through the suit, but the passengers are overjoyed at the opportunity to play among blocks of ice in the water.

The Helsinki shipyard, nowadays Arctech Helsinki Shipyard, has built more icebreakers than any other shipyard in the world. That is also where icebreaker Sampo was built in the 1960s. The latest vessel manufactured at the shipyard is **Polaris**, the world's first icebreaker to run on liquefied natural gas (LNG). The goal of the 115-metre vessel is to offer more environmentally friendly service in the demanding conditions of the Baltic Sea for the next 50 years.

Finnish exports in the wintertime have relied on the tireless work of icebreakers since the beginning of the 20th century. Since 1971, icebreakers have made it possible for marine traffic to continue along the entire coast throughout the year. In the future, this expertise will be used even more around the globe, as the world turns to the Arctic waters! ●

[youtube.com/ArctechViestinta](https://www.youtube.com/ArctechViestinta)

### About the Magazine

This is FINLAND Magazine is available in English, Chinese, French, German, Russian and Spanish. To read the magazine online or order free paper copies, please visit [toolbox.finland.fi](http://toolbox.finland.fi). For paper copies you can also contact the nearest Finnish embassy.

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Finland  
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This magazine is printed on Finnish LumiSilk – a woodfree, multicoated silk paper. It is made of virgin wood fibre from Finnish woods and produced in StoraEnso's Oulu mill in northern Finland. LumiSilk has PEFC certificate and fulfils the Nordic Swan criteria.



\*



\* The Helsinki study chair was designed in 2014 by Wilhelmiina Kosonen as a study project. "My inspiration for the wooden chair was drawn from playful characters. The aim was to create visually soft lines and a strong form," Kosonen says. The designer is especially known for her series of wall-mounted acoustic panels.

### SHE MAKES IT WORK

### PICTURE THIS

The twisted world map on pages 12–13 was illustrated by Ilona Partanen (b. 1986), who creates her colourful illustrations with gouache, ink, and computer. Strong colour intensity, patterns, and powerful contrasts are the cornerstones for this Helsinki-based illustrator and graphic designer. In her works organic shapes, mischievous characters, scarves, dreams, and rhythmic lines weave into twisted humour and grinning double meanings. Partanen is a graduate of Lahti Institute of Design and she is finishing her MA in Visual Communication Design at Aalto University School of Arts.

[ilonainustrations.com](http://ilonainustrations.com)



## EDITORIAL

# HEAD FOR THE STARS

Jari Gustafsson  
Permanent Secretary,  
Ministry of Economic Affairs and Employment

In 2017 Finland will celebrate its centenary – a fact that is highlighted in this magazine. But we are also looking into the future.

In the beginning of the magazine, we tell the story of researcher Henna Tyynismaa, who is a true superstar in the field of genetics. Brilliant researchers, a thorough health-related data restored to biobanks, and good cooperation between public and private sector are attracting large medical corporations to our country.

Finland is joining the club of space nations as the first satellite Aalto-1 is waiting its launch. In this magazine you'll find an inspiring article of young entrepreneurs who believe that their business of combining Arctic know-how and space data is their main competition asset. The same confidence in Finnish skills can be found in the offer to start an Arctic space accelerator in Finland made by the European Space Agency ESA. The space accelerator will be a community of companies and researchers who will benefit from Arctic know-how and satellite expertise.

The magazine wraps up where all knowledge starts: in school. We'll go back to school together with 96-year-old Taito Vesala and his descendants. The four generations will tell the story of a school system that is constantly reaching for new galaxies of learning. The Finnish school system has made the right reforms at the right time. The new core curriculum is a step in the right direction but in the future we have to keep evolving as the surrounding world is changing. Another step ahead is the Reboot Finland project, which will take Finnish digital knowledge to a new level making Finland the world's largest open innovation platform. ●

# THIS IS FINLAND 2017

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# GENE GENIE

One of Finland's brightest young talents unlocking the mysteries of the human genome is Henna Tyynismaa, whose frontier research is making important new breakthroughs for personalised medicine.

S

omething potentially revolutionary is brewing in the Petri dishes on the fifth floor of Helsinki's Biomedicum research centre. Here **Henna Tyynismaa** and

her team are studying the genetic causes of a group of diseases characterised by progressive stiffness and spasticity of the lower limbs.

The Petri dishes contain patients' motor neurons that have been differentiated from skin cells that were first reprogrammed into stem cells.

"Motor neurons are much easier to study in a dish than in a patient's body!" quips Tyynismaa, a rising star in the research of genetics and molecular neurology.

Rapid advances are being made in this emerging field, including innovations in testing methods that enable scientists to pinpoint the genetic causes of medical disorders and –

eventually – develop precision treatments for individual patients.

"When we started this research four years ago, it was uncharted territory in Finland. Since then, we have found several mutations that are causing these axonal disorders. Some are triggered by as many as 70 different genes. We have even found new, previously unknown genes," Tyynismaa says.

## GETTING PERSONAL

Tyynismaa's work is part of a paradigm shift that is going on in the clinical world today.

"Thanks to next-generation gene technology and the shrinking cost of reading DNA, the next five years will bring major developments to our understanding of the mechanisms that cause diseases," the researcher states.

In the not-so-distant future, a routine visit to the physician could be radically different

from the one-size-fits-all approach of today.

"Tomorrow, when a patient comes to a clinic with certain symptoms, instead of performing the traditional run of expensive tests, we will simply use genome sequencing to identify the mutant genotypes responsible for the disorder," predicts Tynismaa.

This is what is called personalised medicine: an approach that emphasises the uniqueness of each patient's particular disease risks.

While genomic diagnostic methods are advancing rapidly, a vast amount of work still needs to be done before DNA sequencing can be applied routinely to deliver targeted cures for individual patients.

"But every time we identify a disease gene, we understand a little bit more about the underlying mechanisms. This doesn't translate directly into treatments yet, but there have been cases where we have been able to offer suggestions – for instance we can target a known pathway with an

existing drug. These cases are rare, but it's a promising start," she says.

#### DNA TREASURE TROVE

Tynismaa believes Finland has the potential to become a global leader in genomic diagnostics.

"But we have to convince policymakers that it's a cost-effective option," she says.

A clear advantage for Finland – in addition to being an established forerunner in genetic research – is its well-organised healthcare system.

"Luckily people in Finland are very willing to participate in genetic studies," says Tynismaa.

Another goldmine for medical researchers is Finland's unique gene pool.

"It's very limited, and we have specific diseases that aren't present anywhere else, which is excellent for research. There has been lots of overseas interest in Finnish biobanks," she says.

#### GENETIC DESTINY

With quiet determination, Tynismaa has steadily risen to the forefront of her field. After publishing an award-winning PhD, she secured a position at Helsinki University as post-doctoral research fellow, followed by tenure as academy research fellow, being the first ever to hold the two positions simultaneously – and all before turning 40.

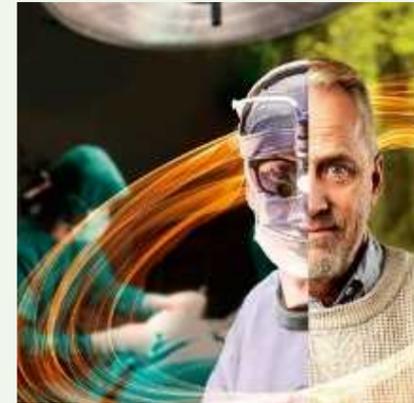
#### HENNA TYNISMAA

- Specialist in molecular neurology, human genetics and mitochondrial biology
- Director of Research Program Unit, University of Helsinki, 2015-
- European Research Council grant recipient, 2014-
- University of Helsinki Biomedical Thesis Award for an exceptional biomedical thesis, 2007
- Married, two children aged three and ten
- "I don't really have time for hobbies. Science is so much fun that it's enough."

"OUR EXPERIENCE WITH RARE DISEASES WILL HELP US SOLVE THE MYSTERIES OF THE COMMON ONES."



THIS IS HOW WE DO IT



#### EXCELLENT TECHNOLOGY

Hospitals in over 120 countries rely on Merivaara, a Finnish health tech veteran with over 100 years' experience designing hospital furniture and systems. Their user-friendly surgical tables, medical lights and integrated Operating Room (OR) systems are designed to enhance comfort, helping the surgical team focus on what they do best. Their latest innovation, Merivaara Fluent™, brings sweet simplicity to the OR by integrating a variety of devices and panels in a logical, easy-to-use smart interface.

[merivaara.com](http://merivaara.com)

#### SUPPORT FOR CANCER PATIENTS

After cancer treatment, many patients are left feeling alone and abandoned – at the very moment in their lives when they need more support than ever. Netmedi is a Finnish startup that has developed an intelligent digital application to support cancer patients. The solution "speaks" with the patient, asking relevant questions and providing personalised guidance in each therapy phase. It provides medical staff with valuable data on treatment outcomes and gives the patient something vital to the healing process: a voice that is heard.

[kaikuhealth.com](http://kaikuhealth.com)



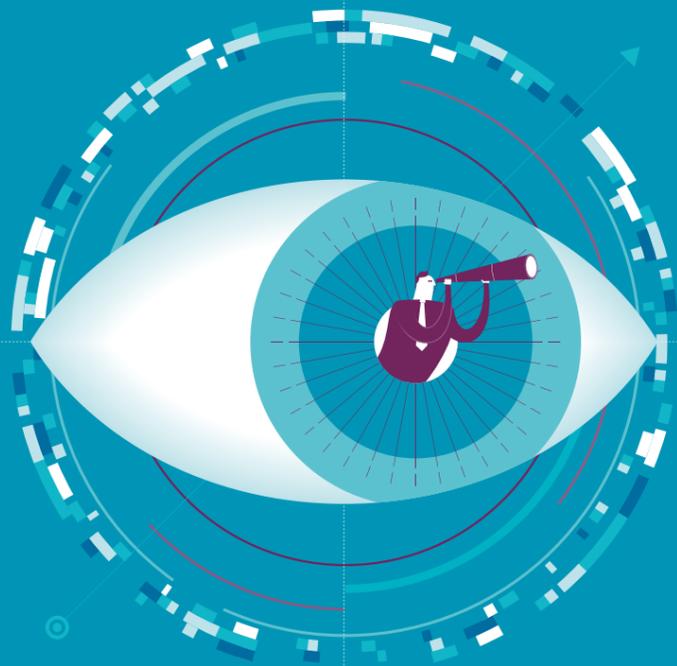
#### 50 TIMES MORE DATA

Brainshake is a Finnish startup that aims to revolutionise the prevention of chronic diseases by bringing extensive biological data to routine blood testing. Based on the analysis of 220 biomarkers, their new blood test provides data predicting individual risk, enabling diseases to be

prevented before onset. The test offers 50 times more data than current lipid tests, at a similar cost – a mere micro-fraction of the 1.3 trillion dollars spent annually on the treatment of cardiovascular disease and diabetes.

[brainshake.fi](http://brainshake.fi)

By Christopher Ryan Jones  
Illustration Visit Finland and Istock



# A GREAT VISION REQUIRES BIG DATA

While some of Finland's more media-friendly digital health tech products garner publicity around the globe, perhaps its greatest asset is its extensive network of biobanks and research centres.

**E**ight major biobanks currently collect, analyse, and store Finnish data samples. When these biobanks are linked with the single-payer healthcare system, in which every Finnish citizen is

registered under one national programme, virtually the entire population structure can be mapped, grouped, and analysed. And because Finland has historically had a largely isolated and homogenous population, it provides exceptional opportunities for targeting genomic variations that underlie diseases.

Such a combination is invaluable to medical companies both domestic and global.

"What the modern medical vision needs is big data," says Dr. **Aarno Palotie**, faculty member at the Center for Human Genome Research in Boston and at the Broad Institute of MIT and Harvard.

"Biobank samples, per se, are worthless unless they are linked with data. We have a healthcare system linked with social security numbers, which provides access to longitudinal healthcare over decades, something that isn't possible in many places."

## ACCESS AND OPPORTUNITIES

In Finland there is a close cooperation between both public and private organisations and enterprises. The country has also been instrumental in the development of Europe's legislation for the implementation and security of health-related data, as well as in refining domestic legislation – both of which are key for creating new methods and opportunities for research and innovation.

Thus, measures are being taken to bolster the country's reputation as the premiere destination for medical research and business.

"There is a lot of governmental support," says Palotie. "I would especially praise what the ministries have done to ease the regulatory burden here, especially for health-related studies."

One example is that the Ministry of Social Affairs and Health has appointed a working group to prepare the setting up of a genome centre. The centre's tasks would include taking responsibility for the creation and development of a national genome database.

Also Sitra, the state-based Finnish Innovation Fund, spearheaded the implementation of the recently completed Medical Research Map, which aims to increase the transparency of the collaboration potential between global pharmaceutical companies and Finnish medical faculties. Support for the report has been high, with five Finnish medical faculties and 16 of the world's largest pharmaceutical corporations contributing to it.

THIS IS HOW WE DO IT

## GET A GRIP OF MEDICAL DATA

BC Platforms offers data management and analysis software solutions integrating and analysing large amounts of genomic data together with sample and clinical data. Its customers consist of top-tier research groups, biobanks and major pharmaceutical companies collecting and analysing medical data. Recently BC Platforms extended its research partnership with Center for Molecular Medicine at the Karolinska Institute, Sweden, to add capacity for large-scale next-generation sequencing.

[bcplatforms.com](http://bcplatforms.com)



## A DIAGNOSIS BEFORE ANY SYMPTOMS

LS CancerDiag's DiagMMR technology also stems from academic research, in this case from that performed at the University of Helsinki. There researchers realised that most current Lynch syndrome (e.g., colorectal cancer) diagnoses rely on tumour studies, whereas the DiagMMR method enables diagnosis based on a non-invasive tissue sample before a person has developed any signs of cancer.

[lscancerdiag.com](http://lscancerdiag.com)

## FASTER, BETTER, CHEAPER

DNA sequencing method developed by Blueprint Genetics helps in analysing genes fast, with good quality and affordable price. The company founded in 2012 is based on a technological innovation renewing a targeted sequencing method. The method is used to analyse genetic factors that cause a predisposition to disease. At the moment clinics around the world are utilising the company's targeted gene tests in the diagnosis of hereditary diseases.

[blueprintgenetics.com](http://blueprintgenetics.com)

The report will be used to implement Finland's health sector growth strategy, which has become increasingly important. Recent surveys indicate that the greatest area for potential cooperation between multinational pharmaceutical companies and domestic medical faculties is that of research related to cancer and cardiovascular diseases.

The healthcare sector in Finland is ripe for growth. Tekes, the Finnish Funding Agency for Innovation, estimates that investments into Finnish companies working in the wellbeing and healthcare sectors will reach into hundreds of millions of euros over the next five years.

## COMPETITION AND QUALITY

The competition, however, is serious. The U.K., for example, operates a biobank comprising half a million samples, and China is gathering samples from five to ten million individuals over the next decade.

## "OUR DATA QUALITY IS SUPERB."

Still, Finland's data is unrivalled in quality and depth, and the studies are longitudinal, which means that they observe the same variables over periods as long as multiple decades. That, along with the isolated population structure, will be key for variety of study designs essential for drug development.

"Finland has a tradition for doing this type of research," says Palotie. "Our data quality is superb, our health register data that provides longitudinal follow-up is unique, our infrastructure is top-class, and our legal and ethical and regulatory systems are more in sync with countries where big pharma headquarters are located." ●

[finlandhealth.fi](http://finlandhealth.fi)

By Hannele Tavi  
Illustration Ilona Partanen



# SWEAT, TECH, AND ENERGY

This year Finland celebrates the centenary of its independence with a wide range of events. Pick one and meet and greet Finns and Finland.

LAHTI, FINLAND  
22 FEBRUARY–3 MARCH

### Nordic World Ski Championships

Finland doesn't freeze even though there is snowfall and sub-zero temperatures. The power of snow-how is on display at the Nordic World Ski Championships organised in the city of Lahti. Guaranteed winter fun!

[lahti2017.fi](http://lahti2017.fi)

TAMPERE, FINLAND  
8 MARCH 2017

### WOW – Women of the World

Gender equality is one of the greatest success stories Finland has achieved in the course of its independence. Women of the World will take place on International Women's Day in Tampere, Finland. This feminist festival will highlight the capacity and creativity of women and girls.

## EUROPE THE WHOLE YEAR

### Mobile Home 2017

What is home? Mobile Home 2017 is a joint venture of Finnish cultural institutes in Paris, Berlin, the Benelux, and London. The project explores and interprets different meanings of home through experiences, architecture, art, science and sociology. Check the latest locations and details.

[mobilehome2017.com](http://mobilehome2017.com)

TURKU, FINLAND  
10–14 MAY

### European Heritage Congress 2017

Do you know your cultural heritage? Around 400 heritage players from all over Europe will gather to city of Turku in June to discuss how cultural heritage could be mainstreamed. The Congress will provide a unique platform for exchanging of views on the latest EU policy developments related to heritage. And of course the chance to experience the fantastic city of Turku.

[europanostra.fi/european-heritage-congress-2017](http://europanostra.fi/european-heritage-congress-2017)

ASTANA, KAZAKHSTAN  
10 JUNE–10 SEPTEMBER

### Astana EXPO 2017

Kazakhstan's capital city Astana hosts EXPO 2017, with the theme of future energy solutions. Finland is one of the world's leading countries in energy sector expertise, energy efficiency, and clean tech – all of which will be showcased in the Finnish pavilion.

[expo2017astana.com](http://expo2017astana.com)

HELSINKI, FINLAND  
9–13 AUGUST

### Worldcon 75

Sci-Fi fans around the world will time travel to Helsinki this summer. The 75th World Science Fiction Convention will bring science fiction stars such as Nalo Hopkinson and Claire Wendling to the Helsinki Expo and Convention Centre. But watch out for the worm holes!

[worldcon.fi](http://worldcon.fi)

ALL AROUND THE  
WORLD  
25–27 AUGUST

### Finnish Your Dinner!

Nordic food has been a trend for some time now. Simple, healthy food originating from Finnish forests, fields and waters will be highlighted also at The World's Greatest Village Celebration. Hundreds of organisations all across Finland will create their own village festivals. Among these are celebrations in national parks, under the open sky, in garrisons, schools, and restaurants. Finns also serve up Finnish meals to strangers all over the world. Book yourself into one or offer up a meal yourself!

[finnishyourdinner.fi](http://finnishyourdinner.fi)  
[syodaanyhdessa.fi](http://syodaanyhdessa.fi)

HELSINKI, FINLAND  
30 NOVEMBER –  
1 DECEMBER

### Slush

Nobody in their right mind would come to Helsinki in November. Well, except for 15,000 techheads who come to celebrate Slush, Europe's leading startup event. Come and experience the Finnish weather first hand, or just watch the live stream with a million other people.

[slush.org](http://slush.org)

By Hanna Ojanpää  
Photo Kreetta Järvenpää



Asked whether she only approves of Finnish food on her plate, Reetta Kivelä replies: "I'm a fan of local food – when I'm in Finland, it's Finnish, and when I'm in France, it's French."

*Reetta Kivelä was photographed in Unique Lapland Helsinki Winter World wearing accessories by Papu.*

# ALL ABOUT OATS

How do you develop vegan protein that will be easy to cook and feel as chewy as meat to eat? This is the question Reetta Kivelä, Gold&Green Foods' co-founder set her mind to when she started her work with pulled oats.

**W**e want to provide a genuine alternative to meat and in our own way help to reduce the unsustainable mass production of meat. We firmly believe that we as a company – like each individual – can have an impact on global phenomena such as climate change," says Dr. **Reetta Kivelä**, 39, co-founder and chief technology officer of Gold&Green Foods, and one of the developers of the startup's hit product, pulled oats.

Climate change is a driving force behind Gold&Green Foods' values. Reetta Kivelä admits that she has a weakness for trying to save the world. She became a vegetarian in high school, but as a young adult and active athlete, had to consider whether her diet was providing her with enough protein.

"Since then, I've eaten based on who I'm with and what's served. I don't want to

be difficult when people have gone to the effort of preparing food," Kivelä says.

## MAKING OAT MEAT

Kivelä's doctoral dissertation on processing oats was accepted with honours by the University of Helsinki's Faculty of Agriculture and Forestry in 2011. When she took job-alternation leave from Finland's largest sweets and bakery company, Fazer, she was ready for new ideas. She met up with **Maija Itkonen**, a high school friend who was already an acclaimed startup entrepreneur and co-founder of Aalto University's Design Factory. Itkonen suggested they should team up to create "oat meat."

"At first the idea sounded rather unappealing," Kivelä recalls with a laugh. "But soon we started to move forward with the idea of 'perfect protein'."

Their research work led to a vegan product made of oats, fava beans, and peas. The natural taste of the product is



**REETTA KIVELÄ'S  
CAREER HIGHLIGHTS:**

**1. Working in product development at food-processing company Atria:** "I'm still grateful that I was given so much responsibility straight out of school, and for all that I learned there."

**2. Discovering food technology by chance:** "We lived in the Viikki neighbourhood of Helsinki, near the Faculty of Agriculture and Forestry campus, and I happened to see their brochure. Later, writing articles that led to my dissertation also affected my thinking and who I am today."

**3. Taking a job-alternation sabbatical from Fazer:** "Detaching myself from work gave me an opportunity to grasp everything, including entrepreneurship."

**"OAT FIBRE IS UNIQUE. IT HAS A LOT OF PROTEIN AND HEALTHY FATS."**

smooth and fits naturally in many dishes being perfect for busy families. The manufacturing process of pulled oats is a secret Kivelä and her business associates adapted from China. It includes only mechanical processing such as mixing, pressing and heating.

Kivelä says that at first the name "pulled oats" was a joke, but early customer focus groups liked it.

"So our 'working title' became the official name," she says.

The entrepreneurs obtained startup funds from Tekes, the Finnish Funding Agency for Innovation, and facilities for product development at Aalto University. Kivelä says it's great that there have been people who believed in the fledgling firm from the beginning.

"We set up the company in 2015 under the name Oat Kitchen, but changed it to Gold&Green Foods that autumn. I'm

amazed that we've been able to achieve so much in such a short time – though it has required some sleepless nights," she says.

**THE GENTLE GRAIN**

Earlier Kivelä didn't have a particular passion for oats, but she does now.

"Oats are a gentle grain compared to rye, for instance. And oat fibre is unique. It has a lot of protein, healthy fats, and antioxidants, so its health benefits are incomparable," says Kivelä.

Finland is a significant producer of oats in global terms. Most of its crop is exported, with only one-tenth used in domestic food production. Kivelä notes that Nordic growth conditions are particularly favourable for oats.

"Oats simply love the Finnish growing season conditions, which include plenty of sun and water. Oats are also one of the world's ecological crops," says Kivelä.

Kivelä is confident that Finland has other Arctic raw materials to offer the world besides oats.

"But the competition is stiff, so no more about that for now," she says, with a smile.

**EYES ON BIGGER MARKETS**

In June 2016 the University of Helsinki's Faculty of Agriculture and Forestry honoured Kivelä as the Influencer of the Year, and in 2015 she was named Young Researcher Entrepreneur of the Year. There's plenty of interest and demand focused on her. Kivelä does not see her past as a career path leading up to her present situation, but says that things have progressed quickly since the company was formed.

In the spring of 2016, when the product was launched, the company had just five employees, whereas now only Kivelä has a staff of 25 working under her at the factory in Järvenpää, just north of Helsinki.

"In the near future, we plan to set up a production facility in Sweden to serve the local market," Kivelä says.

"Some people say that there's a grim economic atmosphere in Finland at the moment, but we don't see it that way. Maybe it comes from the joy of success," she adds.

Gold&Green's entrepreneurs have their sights set on ambitious internationalisation. The company's first product has already been noted for example by news agency Reuters and in autumn 2016 earned the "Best New Protein Product of the Year" title in France.

The startup is gaining some muscle for the worldwide launch of pulled oats from its partnership with the large Finnish coffee and food group Paulig, which bought a majority stake in Gold&Green in autumn 2016.

"Pulled oats has basically been sold out in Finland since its market breakthrough," says Kivelä. "Paulig provides us with extra resources for production, sales and marketing, but also to expand our product family." ●

THIS IS HOW WE DO IT

**GLUTEN-FREE  
GUARANTEED**

Gluto is a brand of fresh pasta that suits virtually everyone, regardless of dietary restrictions. Its fresh pastas are made from naturally gluten-free rice and corn flour, without dairy products, eggs, or additives. Gluto fresh pasta is made in Finland with pure raw materials and Italian culinary know-how. The products bring together the best of two countries: Finland's exacting food standards and Italian gastronomical delights.

[glutzero.com](http://glutzero.com)



**RYE-BASED  
WHISKY**

Kyrö Distillery started up in 2014 in Isokyrö, Ostrobothnia, western Finland, with a focus on producing rye whisky. It also produces Napue gin, which in 2015 won the Gin & Tonic series of the International Wine and Spirits Competition in the UK out of 150 competitors. Within 20 years, Kyrö Distillery aims to be the world's best-known distiller of rye-based single malt whisky, with an annual output target of 20,000 litres of whisky and 30,000 litres of gin.

[kyrodistillery.com](http://kyrodistillery.com)



**ARCTIC POWERS FOR  
EVERYONE**

The natural products company Arctic Warriors was born out of a desire to bring the power of Lapland's herbs within everyone's reach. These Warriors' mission is to fight for a good life, natural well-being, and a vibrant Lapland. The company sources its raw materials from local small farmers and wild herb harvesters. Arctic Warriors earned an award as the Most Innovative Rural Startup of 2015.

[arcticwarriors.fi](http://arcticwarriors.fi)

By Leena Koskenlaakso  
Photo Markus Pentikäinen

# COLD IS THE NEW HOT

Owing to the cold winters, Finns know how to cope with ice and snow. In today's Arctic boom there is strong demand for Finnish Arctic know-how.

**F**inns spend their winters in freezing temperatures and darkness but they have learnt to make the most of it. Everyone knows how to drive a car on an icy road, and Finns know how to test cars in Arctic conditions. Thanks to fundamental low-temperature research, there is know-how and infrastructure to build quantum technology and nanotechnology solutions. ●

## 1. BREAKING ICE IN AALTO ICE TANK

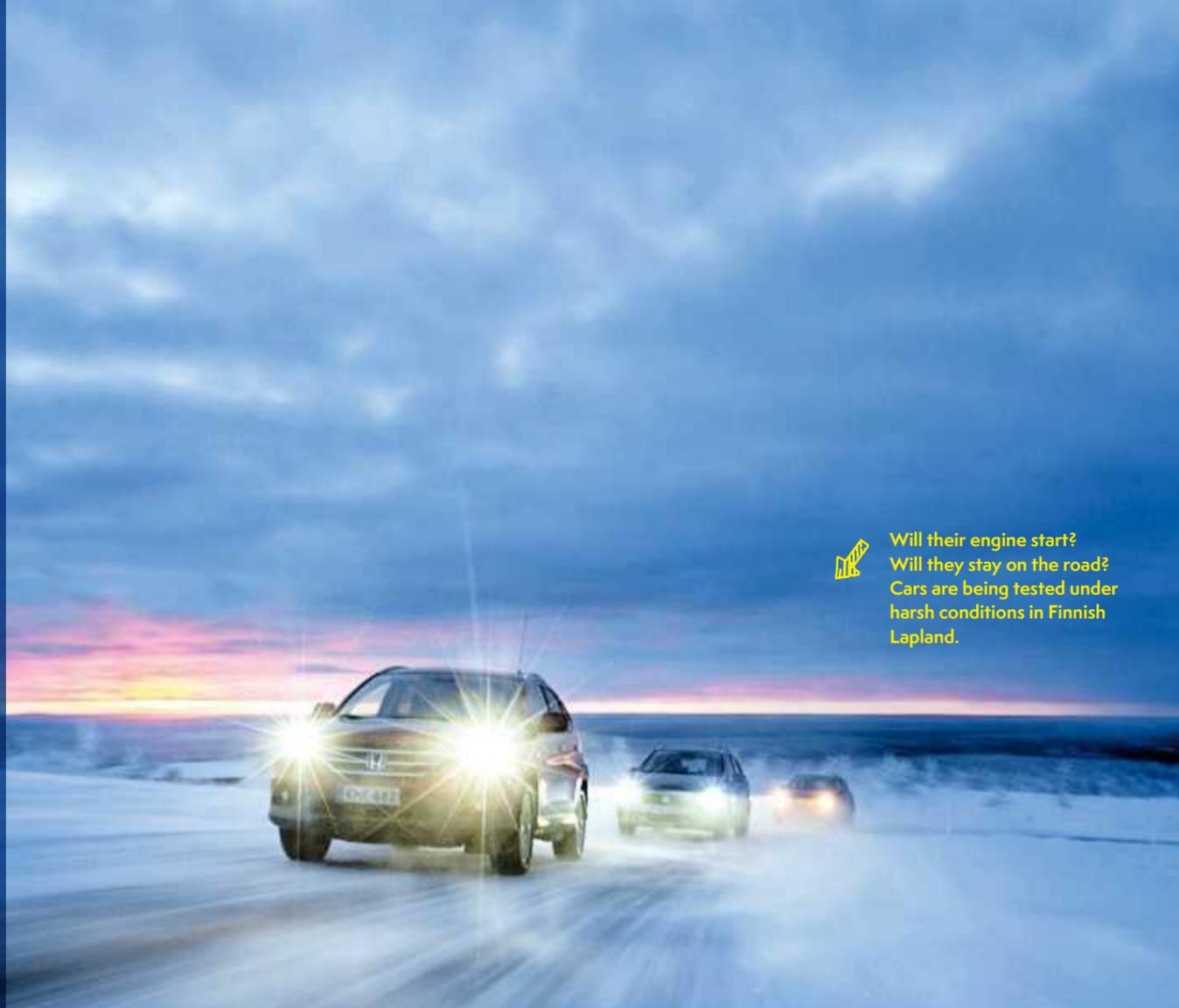
In the Helsinki metropolitan region there is an Arctic marine technology ecosystem with three separate water basin facilities for testing Arctic vessels and offshore structures. One of them, the Aalto Ice Tank, is located in the premises of Aalto University Department of Mechanical Engineering in Espoo. The facility can be used by academic professionals and industrial experts alike.

"The Aalto Ice Tank, which was throughly renovated during 2015 and 2016, is unique in Europe because of its dimensions, particularly its large width. The 40-metre-wide and 40-metre-long water basin is equipped with a cooling system and equipment that produces model-scale sea ice. The ice is fine-grained and generated via a spraying process," says **Jukka Tuhkuri**, solid mechanics professor at Aalto University.

"The scaled ship models being tested are typically 5 to 6 metres long. The wide basin makes it possible to study turning of ships in ice, and ice failure against wide offshore structures, such as harbours and windmill farms, attached to the sea bottom. You can test Arctic offshore structures by building scaled models of them and then pushing ice against them," Tuhkuri explains.

Typical experiments in the 2.8-metre-deep ice tank include resistance, propulsion and manoeuvring tests of scaled-down ship models in ice, ice load tests on offshore structures, as well as modelling of natural ice formations such as ice ridges.

Professor Tuhkuri is a member of the Arctic Marine Technology research team, one of the foremost research groups in this field in the world. Apart from the Aalto Ice Tank, they also carry out field experiments and measurements in the Antarctica, in Arctic waters, on board vessels, and in other laboratories.



Will their engine start?  
Will they stay on the road?  
Cars are being tested under harsh conditions in Finnish Lapland.

"MANY PHYSICS PHENOMENA MANIFEST THEMSELVES MORE CLEARLY IN LOW TEMPERATURES."

## 2. ARCTIC TESTING GROUND FOR VEHICLES

A new testing area designed for testing self-driving vehicles in a cold climate has been opened in Muonio, about 200 kilometres north of the Arctic Circle. The 5,000-square-metre testing area, which is open to all automotive industry manufacturers, is called Lapland Proving Ground.

Muonio is one of the coldest municipalities in Finland, which makes it an ideal place for vehicle testing in extreme Arctic conditions – chilling cold, snow, ice and darkness.

The proving ground provides 20 kilometres of different land test tracks, up to 10 kilometres of ice tracks on the local lake, plus a large workshop

and office building. There are also cold chambers available that can be cooled down to a minimum of minus 45 degrees.

Additional research and development facilities are located close to the testing ground, in the Arctic Research Centre. The centre facilities can be used by R&D organisations, universities and technology or service providers working for the automotive testing industry. The Lapland Proving Ground is a part of the Aurora project, aimed at building a world-class Arctic testing ecosystem for intelligent transport systems and automated driving in Finnish Lapland.

## 3. WORLD RECORD IN LOW TEMPERATURES

"Many physics phenomena manifest themselves more clearly in low temperatures, where thermal noise doesn't interfere with them. The field of science researching these phenomena is called low temperature physics," says academy professor **Jukka Pekola**. He heads the Centre of Excellence on Low Temperature Quantum Phenomena and Devices at Aalto University.

"Our research takes place in the temperature range close to the absolute zero that is -273.15 degrees Celsius. Especially interesting are quantum phenomena, such as superconductivity, superfluids and nanoelectronics," he says.

Pekola and his team develop various refrigeration techniques at temperatures close to absolute zero.

"In 2000, our low temperature laboratory reached the low temperature world record of 0.000 000 000 1 Kelvin," Pekola says.

In a sense, low temperature physics is thus an enabling technology, and the research being carried out in the low temperature laboratory is fundamental research, without which practical applications would not be possible.

"Ten to 20 years from now, quantum computers might not exist yet, but quantum simulators will. They will be used for simulating molecules, and the applications can be used, for example, in the development of new medicines."

By Leena Koskenlaakso  
Photos Jari Kokkonen/Vastavalo and Iceye



# UP, UP AND AWAY

**Iceye is an ambitious Finnish startup that wants to disrupt traditional earth imaging with its radar-carrying microsattellites. The radar images transmitted from space can be received in minutes or hours, not days.**

**S**ometimes your life can be changed by a single event. That's what happened in 2010 to **Pekka Laurila**, an Aalto University engineering student in his early 20s. Browsing online, he spotted a notification saying Aalto University Department of Radio Science and Engineering was running a new type of satellite course, aimed at building the first Finnish satellite.

Little did he know that he would become the CFO and co-founder of Iceye, a startup with 20-plus employees. It's meant for developing real-time radar imaging services delivered straight from space via

microsatellites launched into orbit in a carrier rocket.

## INNOVATIVE SPACE TECHNOLOGY

Yes, it's partly rocket science. And from a wider perspective, it's innovative commercial space technology that could change the way shipping lines monitor the sea ice and iceberg situation in Arctic seas, the way rescue crews get timely information on flood and storm damages and oil spills. Ultimately, this satellite-based radar imaging technology could even help us map other planets for resources.

But let's not get ahead of things. Let's go back to the days when Laurila was attending the university satellite course.



**Pekka Laurila,**  
CFO and co-founder of Iceye

**“WE REALISED YOU DON'T NEED A LOT OF PEOPLE AND MONEY TO BUILD A SATELLITE.”**

How did he end up establishing a business of his own with two other students in 2012?

“In the student satellite project we realised you don't need a lot of people and money to build a satellite. Later we started looking for ways to utilise this new satellite technology commercially, and came up with various ideas. There was big demand for services where our earth imaging expertise could be put to use,” Laurila says.

“One particular application area – Arctic seas and monitoring of the ice situation – stood out from the rest. There was strong demand for this from potential customers.”

Having completed the business course, Laurila and his mates embarked on a two-year validation project. It was aimed at building a prototype to demonstrate the technology required for providing the envisioned radar imaging service.

“Iceye is a spin-off of this prototype project. Since we made the original prototype at Aalto University, they are one of the owners of our company. Aalto University has good and transparent technology transfer rules, and everything worked out really well,” he says.

Iceye offices are still located on Aalto University campus, allowing Iceye staff to work in close collaboration with the University's Space Technology group.

## IT'S ALL ABOUT UPDATING SPEED

Arctic seas are vast areas where infrastructure is sparse and little real-time information is available on the environment.

If an oil rig is drilling for oil, the owners need to know in real time how sea ice moves. If shipping lines and oil companies want to see the location of ice and cracks in real time, they have to send out a helicopter or an airplane, which is costly. But the risk involved in a vessel and its cargo getting stuck in ice is so big that the owners are willing to invest in getting ice information quickly.

Few governmental radar satellites exist, but their updating speed for ice information is low. In an operation, one image per day is not enough.

Small satellites are the answer because they are made of ordinary off-the-shelf components that can make them up to hundred times cheaper than governmental weather satellites. With lower unit cost,

they can be operated in a swarm that delivers good quality images more often.

## GROWTH IS THE ONLY OPTION

When the technology and business plan started taking shape, it turned out the system could do a lot more than serve only the Arctic seas. It was time to shift the focus into doing more global business.

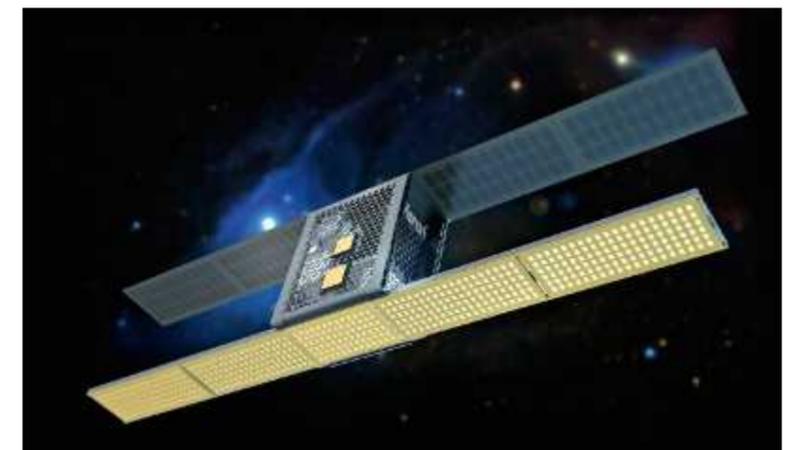
“It's still early days. So far we have made a Proof of Concept satellite, and later in 2017 we hope to be able to demonstrate it in orbit,” Laurila says.

“The best benefit we offer is speed. When you need images from a flooded area, you must get information fast. Our timescale is hours, not days,” he says.

To get the update speed, several satellites are needed. A swarm of approximately six satellites is required to cover arctic sea areas.

Iceye manufactures the satellites and delivers them to a commercial launching firm that loads them into a carrier rocket which takes them into orbit.

“Our business is growing continuously. For us, big-scale global business is the only option. In five years' time, we must have at least 20 satellites in the sky. That's a realistic goal.” ●



**Iceye's founder Pekka Laurila is ardently in love with satellites.**

## KEEP IT SHORT

By Monika Winqvist

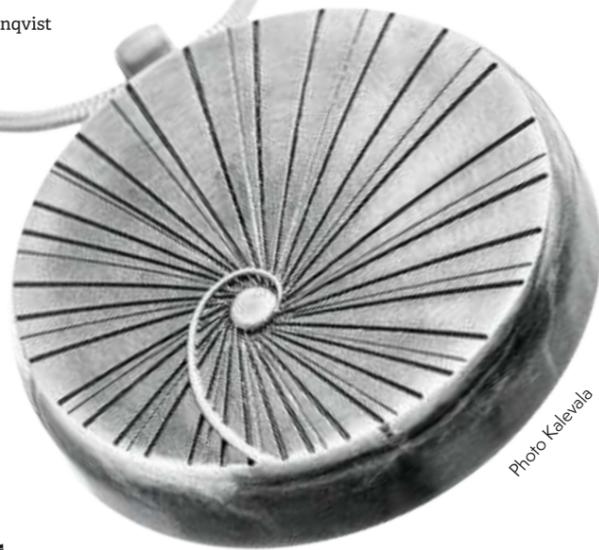


Photo Kalevala

### SMART JEWELRY

Kalevala Buddies are smart jewels that combine Kalevala's signature Silver Design and BiiSafe's Bluetooth powered technology. Kalevala Buddy is a silver necklace, which offers many application possibilities. Buddy can be connected to a social circle with the loved ones of the user, and it offers communication and alerting opportunities. Buddy improves safety, as it can be used to share location information or, if needed, to ask for help. ●

[biisafe.com](http://biisafe.com)

### HI-FI WITH HIGH DESIGN

High quality studio monitors and active speaker systems can be combined with high-quality design. Genelec R&D team's technical ambition has led to several innovative technologies and revolutionary designs. Genelec products are designed for demanding professional, home, and AV installation use. They reveal the original nuances of the sound, without leaving anything out nor adding anything to the signal in any stage of the production. ●

[genelec.fi](http://genelec.fi)



Photo Genelec

### WEARABLE OHR MONITORING

PulseOn offers highest quality wearable Optical Heart Rate (OHR) monitoring solutions for sports, fitness, wellness, and healthcare. PulseOn patented sensor solution and advanced algorithms provide scientifically validated continuous OHR detection in a wide range of conditions, with beat-to-beat resolution, allowing heart rate variability analysis. ●

[euro.pulseon.com](http://euro.pulseon.com)



### MEANWHILE IN FINLAND

Finland is set to become the first country in the world to have its own country-themed emojis added to the Unicode Standard. A sauna emoji and woolly socks from Finland are a part of the Finland emoji collection which contains 49 tongue-in-cheek emotions. Those emojis were created to explain some hard-to-describe Finnish emotions, Finnish words and customs. Download your own emojis from App Store or Google Play. ●

[finland.fi/emoji](http://finland.fi/emoji)



### SLEEPING WELL?

Waking up tired can be due to many reasons. Beddit 3 is the most comprehensive and accurate sleep tracker so you always know what's happening during the night. "Beddit goes beyond just measuring sleep to actually help solve sleep difficulties in a totally ambient and automatic way," says CEO Lasse Leppäkorpi from Beddit. "We have begun connecting our users with sleep professionals across the globe through the two-week Beddit Sleep Report, a unique tool for bridging the divide between bedrooms and sleep labs." Unlike apps or wearable activity trackers, Beddit is made for the bedroom. There is nothing to wear and nothing that need to be remembered daily. All you need to do is sleep. ●

[beddit.com](http://beddit.com)



Photo iStock



Photo Ouraring



### THE ONE E-RING

To keep up with your performance and well-being, it is important to understand how your body responds to the demands of your daily life. OURA is a ring-top wellness computer which measures the quality of sleep, activity level, and recovery, and it includes a companion mobile app. The ring automatically transfers the analysed data to the smartphone app via Bluetooth, offering the user an individual and comprehensive overview of his or her health. ●

[ouraring.com](http://ouraring.com)

By Hannele Tavi  
Photos Interviewees

# HOT OR NOT?

Five people give their honest opinion on whether Finnish punctuality is hot or cold.



HELEN BEKELE

**Originally from Ethiopia**  
Web programmer

"Finnish punctuality is hot. It is one of the Finnish customs and traditions I like most. Punctuality gives ample time to prepare, be calm and collected before any intended meeting. It also allows people to manage their time efficiently. I believe social or business meetings are more fruitful when people are punctual. Most importantly, it shows how one value others' time."



JUSTIN GONEY

**Originally from United States**  
Software engineer

"Finnish punctuality is like in Goldilocks and the Three Bears: not hot, not cold, but just right. In my experience, Finns tend to be very punctual for important things, but they usually fall within the 'acceptable window of tardiness' regarding social engagements. It's refreshing after having lived in a few places where an agreed-upon time is more of a suggestion than anything else."



KSENIYA KAVERINA

**Originally from Russia**  
Graduate student

"It is dangerously contagious. Now I'm almost always in time. I find it cute how Finns are conscious about their punctuality and sometimes feel bad about it before foreigners. I used to have a Finnish friend who would leave after seven minutes if you're late; now she would wait for ten minutes. Being punctual is hot."



PEDRO DÍAZ

**Originally from Spain**  
Senior service operations engineer

"It is cold in a sense that it is almost too perfect. We Spaniards sometimes have 'issues' with punctuality so it is very refreshing to see that if you agree on a day or time, Finns will appear in time."



JUNGSOO MIN

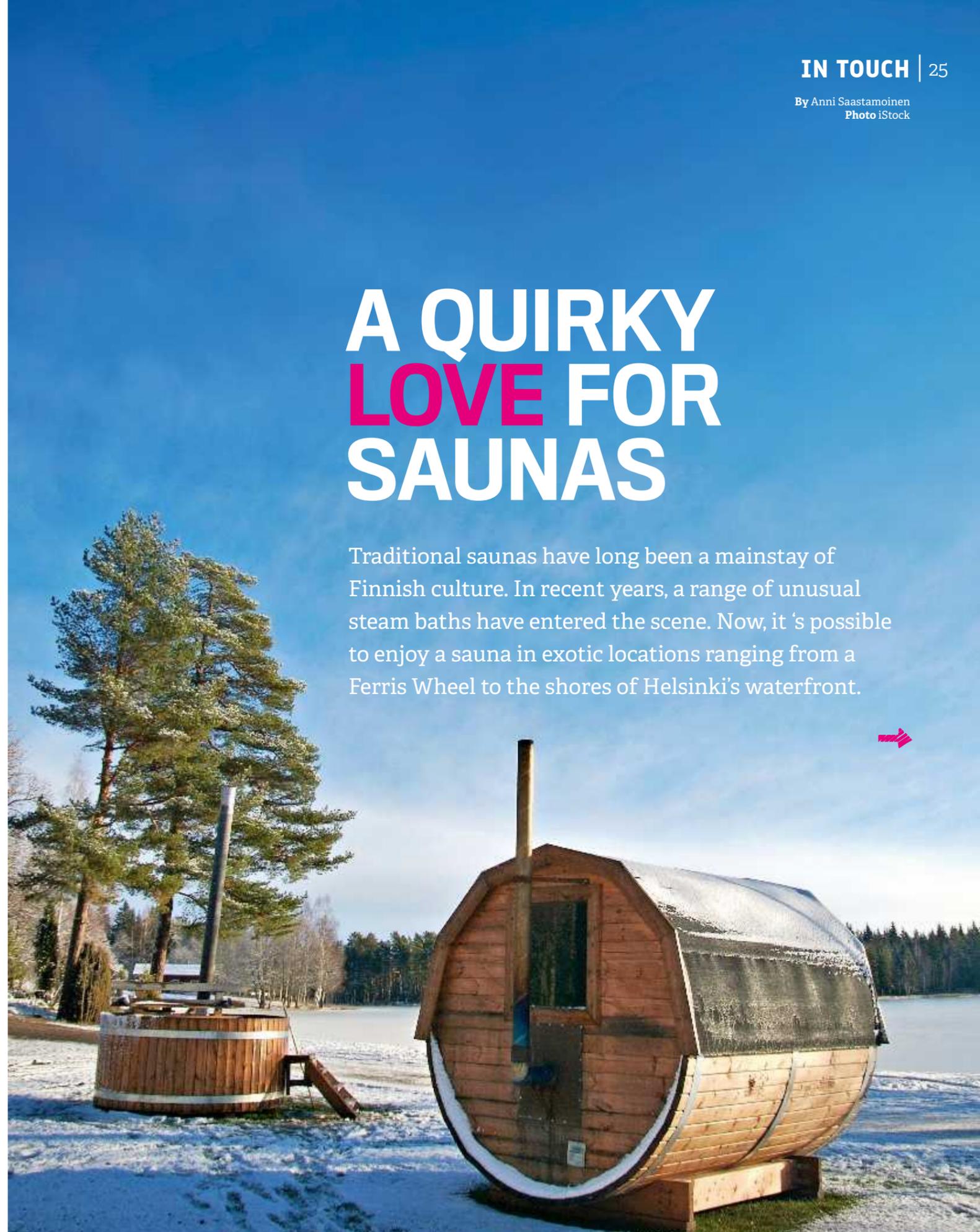
**Originally from South Korea**  
Interactive media student

"It is definitely hot. Finnish people just can't stand bothering other people so they want to be everywhere in time."

By Anni Saastamoinen  
Photo iStock

# A QUIRKY LOVE FOR SAUNAS

Traditional saunas have long been a mainstay of Finnish culture. In recent years, a range of unusual steam baths have entered the scene. Now, it's possible to enjoy a sauna in exotic locations ranging from a Ferris Wheel to the shores of Helsinki's waterfront.



Photos Harvia, Touko Hujanen, LuinSpa and iStock



### SWIMMING YOUR WORRIES AWAY

Finland is a land of thousands of lakes and millions of saunas, so it is only natural to combine these two elements. The ideal Finnish sauna experience includes a refreshing swim in natural waters, no matter what time of the year it is.



### FREEZING HOT

Ice swimming is a big part of a Finnish winter bathing experience. While it may sound scary, in fact it is good for you – and nothing can be more refreshing.

Finnish docent Pirkko Huttunen from University of Oulu has found that the

refreshing effect of winter swimming is good for the body: It improves blood circulation and boosts the metabolism. According to Huttunen's findings frequent ice swimming will also lower blood pressure.



### A MINDFUL SWEAT

In Finnish culture sauna has always been thought of as a place that keeps people healthy. There is a proverb that says: "If liquor, tar, and sauna won't help, the illness is fatal." Nowadays it is proven to be true: sauna can actually heal, or at least keep people healthier. JAMA Internal Medicine medical journal published research conducted by the Eastern University of Finland, proving the health benefits of sauna. According to the research, frequent sauna bathing reduces risks of cardiac arrest.



### LUXURY IN SAUNAS

Sauna scents, sauna hats, and sauna stove decorations have taken their share of the sauna market. Sauna scents have various options from the scent of smoke to the scent of birch leaves, and sauna hats come in many designs.

Sauna seems like a regular part of the Finnish culture, but it is also considered as a luxury. This luxury is a strong message of Finnish towel brand LuinSpa.

LuinSpa wanted to bring the luxurious feeling of spas to every sauna and started to make good-quality towels, bath robes, and such for sauna-lovers.



### BUSINESS OF SAUNA

There are some 30 commercial sauna stove brands in Finland and that is totally normal for a sauna crazy country. According to the executive director of the Sauna from Finland network Carita Harju, the sauna-loving Finns know their way around different sauna stoves.

"There are so many different kinds of saunas in Finland, that many types of sauna stoves are necessary," Harju says.

The biggest sauna stove brands in Finland are Harvia and Helo, and approximately 50 percent of their sauna stoves are sold abroad.





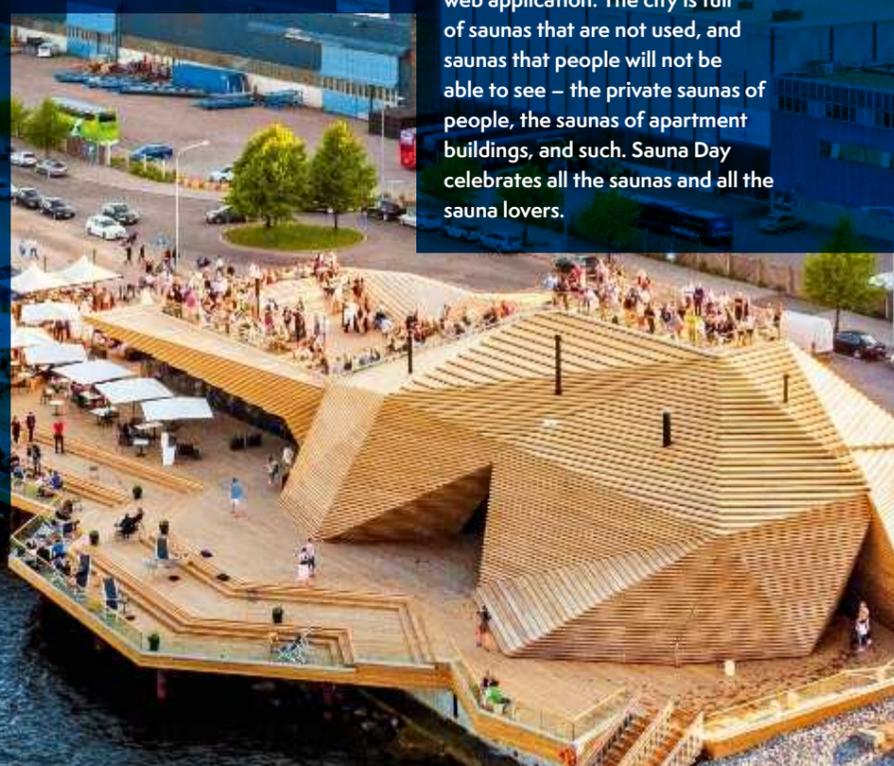
**FINLAND'S OLDEST PUBLIC SAUNA**

The heart of the oldest Finnish public sauna still in use lies in Pispala, Tampere. Its large sauna stove, or *kiuas*, is heated by steam stones weighing over a 1,000 kilos in all. It is a challenging task to heat up this sauna, as it has to be heated with one metre logs. Though the heating process takes time, the steam stones are heated only once – and are large enough to hold the heat for the whole day. In Finnish culture, sauna is a place where the mind and the body rest as well as cleanse, so at this sauna you will have to silence your mobile phones. It is enough to listen to the calming hiss of the steam stones.

**HELSINKI'S TRENDIEST SAUNA ON THE SEAFRONT**

Löyly is a monument to the development of modern sauna. It is an impressive building located in a beautiful spot in Helsinki's waterfront. The building is a rectangular, sculptural structure made of heat-treated pine. The "cloak-like" wooden structure forms intimate terraces, on which people can also sit. The building consists of two parts: public saunas and a restaurant. Traditionally men and women bathe separately, but the owners and architects of Löyly wanted the sauna be a place where people can spend time with their friends, regardless of gender. As such, bathing suits are worn in the sauna. The architects who designed Löyly, Anu Puustinen and Ville Hara of Avanto Architects, believe that in the future there will be more unisex saunas.

"Finnish saunas will become more interesting and gain more global popularity, and they will be regarded for their curative properties as well as a luxurious place of cleansing. Nowadays people see sauna bathing as a social event, so we believe there will be more Löyly-like public bath houses in cities."



**FROM PRIVATE TO PUBLIC**

There are approximately three million saunas in Finland – and there are only about 5.5 million people living in Finland. This equation means, that there are saunas that are not in use as often as they could be. This was the thought that created Helsinki Sauna Day. The idea of Helsinki Sauna Day is that everyone who has access to a sauna can invite people to come to their sauna through web application. The city is full of saunas that are not used, and saunas that people will not be able to see – the private saunas of people, the saunas of apartment buildings, and such. Sauna Day celebrates all the saunas and all the sauna lovers.



**GET SPECIAL!**

There are always some new, exotic saunas popping up as the sauna culture evolves. In Finnish Lapland, at Ylläs, you can steam your muscles after skiing in the Sauna Gondola. Sauna Gondola starts from the top of Ylläs hill and takes four people in its gondola lift. Located in Helsinki with a marvellous view of the sea you can

find a sauna 40 metres off the ground – in a Ferris Wheel. Sky Sauna's unique sauna cabin above the ground fits five people, and is probably the hottest way to enjoy the view of Helsinki. The sauna experience is perfected with a hot tub, located safely on the ground so you can enjoy the sauna steam in the air and then come down and relax in the hot tub.

Close to the Ferris wheel is also a newcomer, Allas Sea Pool. The unique complex brings together swimming in sea water pools, urban culture, and of course saunas. As most of the bigger cities, Helsinki has got its own Burger King, but with a twist: there is a sauna in this one. The sauna is located downstairs of the restaurant, and fits 15 burger and sauna loving people. Yes – you can order food and enjoy it in the sauna.

Rauhaniemi Public Sauna at Tampere was built in 1929; the beach and the buildings retain almost their original appearance.



Photos Seppo Saarentola, Kari Savolainen, Jorma Marstio, Kuvio.com, Sport Resort Ylläs, Tommi Haapaniemi / Allas Sea Pool

**A compact guide to Finnish sauna etiquette and more!**  
To be naked or not, should you go for a swim, and so on... Do not worry – find the compact guide to Finnish sauna etiquette and other sauna facts on:  
[finland.fi/life-society/compact-guide-to-sauna-etiquette](http://finland.fi/life-society/compact-guide-to-sauna-etiquette)

By Tiia Rask  
Photos Hugo & Marie and illustrators



Kustaa Saksi design for Marimekko

## THE BUSINESS OF ILLUSTRATION

**F**inland is known to many as a design nation – anywhere you go, you are surrounded by Iittala, Arabia, and the iconic, bold Unikko floral prints. But gone are the days when Finnish design only meant Marimekko and smart tableware. Now, gifted Finnish illustrators and graphic designers are putting Finland on the map one illustration at a time.

**Kustaa Saksi** is one of Finland's internationally best-known illustrators. The artist has recently added textile arts to his already impressive portfolio, and is now taking New York by storm with his modern take on tapestry.

"Creating an international career nowadays is surely a lot easier when the Internet makes spreading works more democratic. Anyone, from anywhere can in principle start an 'international' career by putting their work portfolio online,"

"THE DARK NORDIC SENSE OF HUMOUR IS CHARACTERISTIC FOR FINNISH DESIGN."

Saksi points out. "But in addition to that you'll need hard work and a pinch of good luck."

Saksi, whose work has been exhibited all around the world, and commissioned by clients such as Nike and the New York Times, is wowing people with his experimental material usage, psychedelic atmospheres, and daunting imaginary.

Finnish graphic designers are technically skilful and they have an ability to adapt different styles and to filter them in their own way.

"Also the dark Nordic sense of humour and worldview are characteristics for Finnish designers," says Saksi.

"Finnish designers are known for their courage to commit so wholeheartedly to a concept," says **Teemu Suviala**. As the executive creative director of the New York-based brand and design consultancy Collins, Suviala really knows the ins and outs of the international world of design. And as the unifying characteristic of great Finnish designers, Suviala names the courage to commit.

"No matter whether the concept is minimalist or maximalist, Finnish designers approach it with similar fearlessness," says Suviala.

Saksi doesn't think it is important that a designer should represent a certain country. He has lived outside Finland for 12 years.

"I am, of course, a Finn and have grown up in Finland, so impressions for my works come from there. But designers should keep their eyes open and live in a moment," Saksi says.

For the courageous approach, we have our educational system partly to thank.

"Our education aims to spur fearless, open-minded, and curious approaches to design," Teemu Suviala says. And this leads in his opinion to a style that is both original and unique. Just the kind that has put artists such as Saksi on the design map.

Illustration agencies play a key role when it comes to opening international doors, says Suviala. They partner talented artists with clients, and take care of the business end of things – everything from marketing to contracts to international property rights issues, freeing the designer's time solely for creative work.

"A good, holistic design is the best way for a brand to stand out," says Suviala, and quotes **Thomas J. Watson**: "Good design is good business." ●

## FINNISH DESIGNERS TO CHECK OUT



### Lotta Nieminen

**Lotta Nieminen** is a New York-based illustrator and graphic designer who, among other things, is behind the illustrations for Facebook's event and Google's calendar. Nieminen is the creator of strikingly coloured, nuanced illustrations for clients such as IBM, Hermes, and the New York Times, and she has even made it onto Forbes magazine's 30 under 30 list. The Aalto University graduate has designed everything from window display illustrations to children's books. The most recent work of Lotta Nieminen is her illustrated children's book *Pancakes! An Interactive Recipe Book*. ●

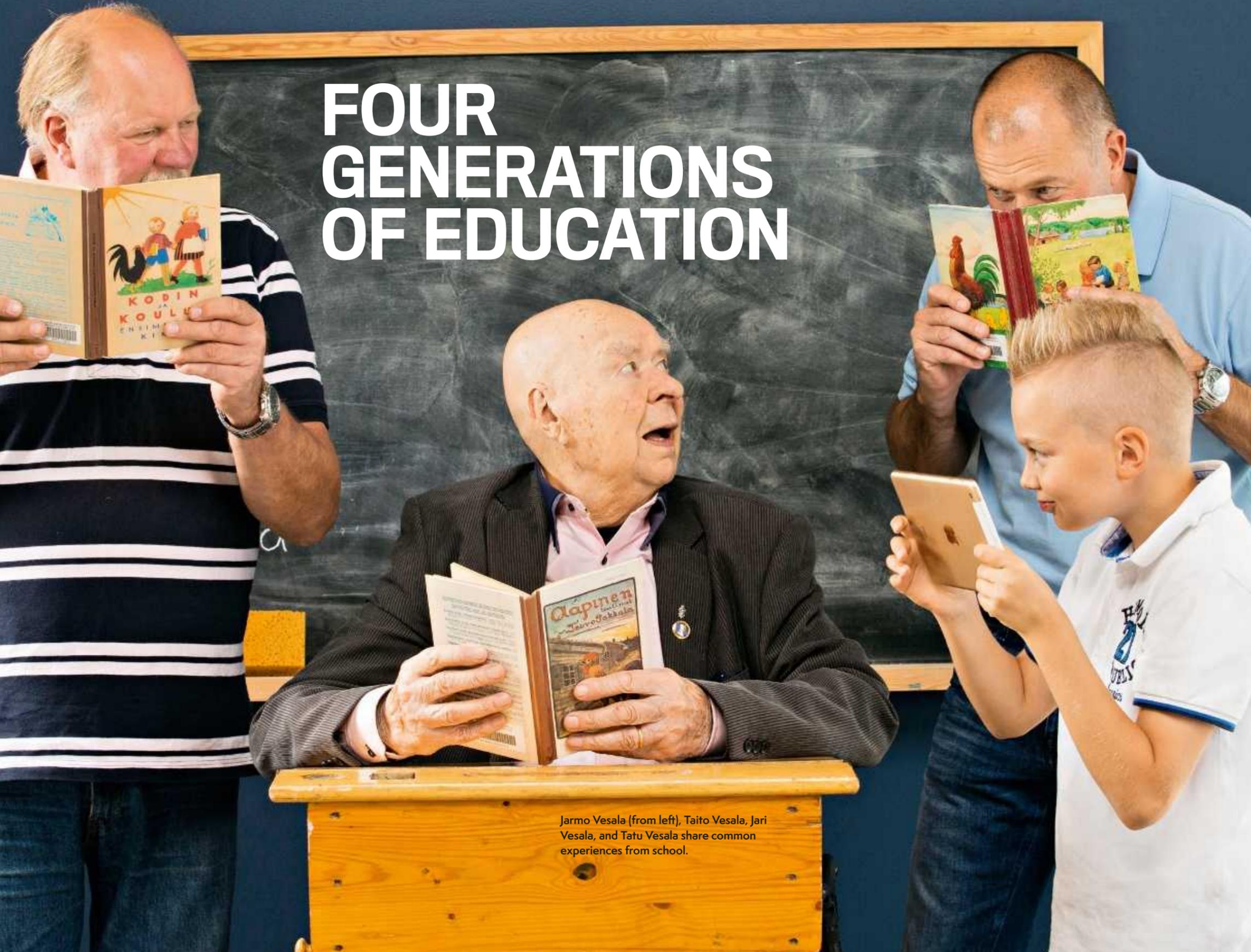


### Klaus Haapaniemi

Inspired by folklore and nature, **Klaus Haapaniemi** is a London-based designer and the co-founder of the design and lifestyle brand Klaus Haapaniemi & Co. His impressive resume includes work for global brands such as Christian Louboutin and Established & Sons, and his designs that draw from mythological elements can also be found on Iittala's tableware and even on the opera stage. Since 2010, he has had his own shop on popular Redchurch Street in London. ●

By Hannele Tavi  
Photos Arto Wiikari and Lehtikuva

# FOUR GENERATIONS OF EDUCATION



Jarmo Vesala (from left), Taito Vesala, Jari Vesala, and Tatu Vesala share common experiences from school.

Taito Vesala, 96, has seen how blackboards have been replaced by tablet computers in Finnish classrooms. The skills of Taito's descendants never cease to amaze him.



When **Taito Vesala**, 96, started school at the age of six in 1926, in the first year he had two weeks of school in the autumn and another two weeks in the spring in an ambulatory school. After that, he had four years of primary school, and there his education ended.

"Before we were given our school-leaving certificates, the teacher's niece and I competed on who had the best grades in the class. The teacher very much wanted me to continue to grammar school, since my grades were actually quite good. But my family was poor, so I had to go to work and give the money I earned to my parents," Taito recalls.

"So that was the end of my formal education, and the rest of my learning took place in the school of life," says Taito.

In the 1920s, Finland was a poor, predominantly agricultural country, which had just recently become independent. Taito was the first one in his family to receive formal education.

When Taito's great-grandson **Tatu Vesala**, 10, started school in 2013, he had a minimum of nine years of schooling ahead of him. Tatu, now in the fifth grade, enjoys going to school and dreams of becoming an actor.

The development of the Finnish school system has coincided with the growing up of Taito's descendants. Each generation has received more education than their predecessors. The Finnish education system has received recognition worldwide. In the PISA study, or the joint research programme of the OECD member states, the skills of Finnish schoolchildren have frequently been ranked high.

International comparison of schools is difficult, but Finland's good performance in tests is based on a few cornerstones. In Finland, the attitude towards education is positive and education is valued.

**A JOURNEY OF 100 YEARS**

During the first years of the 20th century, only a third of rural children went to school. In the 1921 act on compulsory education, the objective was for all children to learn the primary school syllabus. After the fourth grade, the children who had the financial means and sufficient grades could apply to grammar school.

Despite his good grades, this opportunity was not within Taito's reach. Thus, at the beginning of his career, he worked in a variety of jobs, ranging from a police officer to a real estate broker. The career path of his son **Jarmo Vesala**, 66, has been similar: he just retired from his job as a service station entrepreneur.

Jarmo's education began in Helsinki in 1956. The Primary Schools Act was enacted two years after he started school, adding two compulsory study years. Thus, Jarmo's education was that much longer than his father's had been.

The Finnish school system was reformed almost completely in the 1970s, when the comprehensive school reform ended the era of the primary and grammar school system. The reform replaced the primary and grammar school system with

the nine-year comprehensive school, which consisted of a six-year lower level and a three-year upper level.

The comprehensive school system was implemented in Finland gradually starting in 1972. This coincided with Jarmo's son **Jari Vesala**, 47, starting school.

The comprehensive school reform was a hot topic at the time, but for Jari, the new school system was the way of learning.

"For me, the comprehensive school was the only option to receive education," says Jari.

**THERE IS SUCH A THING AS A FREE LUNCH**

One of the recipes for success in the Finnish school system is the school

lunch. In 1948, the act on school meals was enacted, obligating municipalities to provide a free-of-charge lunch in schools on each of the then six school days.

"In the 1950s, the school meal service was very much like it is today. At a certain time, we all got together to have lunch. I was taught at home that you had to finish all food on your plate," Taito's son Jarmo recalls.

"A dish with a bad reputation in my school was meat stew with dill. I was the only one in my class who was ever able to eat all of it," Jarmo says, with a smirk.

The years have gone by and meat stew with dill is no longer on the school menu, which has kept up with the changing



Today, a free meal is served to all preschoolers and comprehensive school pupils as well as upper secondary level pupils on each of the five school days.

"I CAN'T HELP BUT ADMIRE HOW THE SCHOOL LUNCH ROOM SERVES MEALS TO 700 PUPILS ON EACH SCHOOL DAY."

times and nutritional recommendations. Today, a free meal is served to all pupils on each of the five school days.

Tatu, a school-goer in the 2010s, is happy with the meals served in school.

"Usually the food is quite OK. For example, I like ham and potato casserole. The food is tasty and good," says Tatu.

Jari, who is an earth-moving contractor, is also among those who praise school meals.

"I have good memories of school meals. The food served in schools is still good – in fact, my father Jarmo and I go to a school located near our current earth-moving site to have lunch. The food is reasonably priced, healthy, and really tasty," Jari says.

"I can't help but admire how the school lunch room serves meals to 700 pupils on each school day," says Jarmo.

**ASSESSMENT WITHOUT GRADES**

Ever since the day when Taito was in school, the Finnish school system has used a grading scale of 4–10, with 10 being the highest grade, to assess pupils' performance twice per year.

"I used to be a solid 7," Jarmo describes his own school years.

The grades were given based on tests and classroom performance. The only oral test in the 1950s was the singing test, where each student had to stand in front of the class.

In the recent years, the grading system changed from numeric grading towards written assessments. Tatu's assessment was given in letters up until now.

"For example, I got an A in the big German test last spring. My classroom conduct was a B, but proactiveness an A+," the quick-witted boy explains.

Grandfather Jarmo admires Tatu's aptitude for foreign languages. He himself did not learn any foreign languages in school.

"And here we have a ten-year-old who speaks both English and German!" exclaims Jarmo.

Tatu started learning German in the fourth grade, and English started when he was halfway through the second grade. The new core curriculum enables Tatu to start learning Swedish in the sixth grade next year, so after six years in school, he will have studied three languages.

**VERSATILE LEARNING**

The stories of four generations illustrate that while the basic principle of school has remained unchanged for nearly a century, the school system is also being constantly renewed. A big reform that will shuffle the Finnish school system in the coming years is the new core curriculum. In elementary school it took effect in autumn 2016.



**1920**

Taito is born



**1921**

The act on compulsory education is enacted, covering all children aged 7–13



**1948**

The act on school meals brings free-of-charge lunches to schools



**1950**

Jarmo is born



**1958**

Compulsory education is extended by two years



**1969**

Jari is born



**1971**

A five-day school week is implemented



**1972**

The comprehensive school reform begins from Lapland

## “THE PEDAGOGIC FOCUS IS SHIFTING FROM COLLECTING INFORMATION TO LEARNING STUDY SKILLS.”

In the recent years, phenomenon-based learning extending across different subjects has been introduced in schools, among others. Tatu comes to the interview directly from school, from a class-organised travel fair. In the lessons, pupils plan and organise a travel fair, in which they present destinations and cultures of different countries to other classmates.

“This morning, Tatu left for school carrying our old suitcase, which is bigger than he is,” Jari says and explains that the old suitcase will be included in the props of the travel fair.

### NO MORE BLACKBOARDS

New learning methods also have an impact on the school premises. As the pedagogic focus is shifting from collecting information to learning study skills, classrooms are transformed as well. Previously, the teacher's desk

sat between the pupils and a blackboard, and the pupils were seated in rows of desks. Today, school rooms are open and transformable. The teacher no longer lectures from a podium, due to the use of wireless computers and digitalisation.

Tatu's classrooms no longer have blackboards or chalks. There is a digital camera on the teacher's desk in the classroom for displaying materials on a smart board. The teacher may also show videos from their computer. At times, the pupils also get to use tablets or computers.

“For example, when we colour or draw, we can use the tablet to look at models,” Tatu says.

Information retrieval skills are practised in connection with presentations, which are given frequently in pairs or in a group.

Some of the textbooks are now completely electronic. Tatu's elder brother **Leevi Vesala**, 14, has been assigned a tablet from school. The majority of learning materials are already electronic.

“The young people today are quite something,” says 96-year-old Taito.

“They receive so much information that I can't help but admire their skills!” ●



Jari Vesala and his son Tatu Vesala



2004

The core curriculum is reformed the previous time



2016

The first stage of the new core curriculum becomes effective



2005

Tatu is born



## 3 X 100 IDEAS TO DEVELOP EDUCATION

**On 18 January 2017 at 6 p.m., every school in Finland will hold a parent-teacher meeting where parents receive information on the school world and have an opportunity to discuss and influence it.**

Since parents have an important role in the transformation of the school, the world's largest parent-teacher meeting will cover the challenges the changing schools are facing and present various inspiring operating models.

This meeting is a part of the HundrED project which is to discover educational innovations from around the world and to share them with others.

“To celebrate Finland's 100 years of independence, we came up with the idea of involving Finland in a project that is extensive and useful on an international scale as well and focuses on the future of education,” says **Saku Tuominen**, the producer responsible for the project.

[hundred.fi](http://hundred.fi)

The non-profit HundrED project is the outcome of cooperation between several players consisting of three sub-projects, each of which aims to find a 100 innovations. The world's largest parent-teacher meeting is part of the 100 Finland project, which aims to find a 100 projects or experiments, which will be followed up on in schools. In the second project world-class innovations will be sought and in the third one 100 experts will be interviewed in different fields of education and on different continents.

“We wanted to find people who are passionate about the direction in which schools are headed and should be heading,” Tuominen says. “We have participation from an enormous number of top experts in the field. The interviews will be shared with the world both on video and in written format.” ●



### NEW GUIDELINES FOR EDUCATION

The national core curriculum undergoes a reform approximately every ten years in Finland. The new core curriculum, which took effect in the autumn 2016, is a publication of almost 500 pages. The new core curriculum defines seven areas of broad, contemporary competence. Such areas include ICT competence, working life skills and entrepreneurship, as well as building a sustainable future. For example, pupils will start learning programming as part of mathematics in the first grade. ●

[finland.fi/life-society/the-truth-about-finnish-schools](http://finland.fi/life-society/the-truth-about-finnish-schools)

## STOP RIGHT THERE!

**Helsinki Airport is the leading long-haul airport in Northern Europe, serving over 16 million passengers annually. Each year more passengers travelling to or from Asia stop over for just five hours or a couple of nights to investigate what Finland has to offer them.**

And there are many things to explore. Lonely Planet – the number one travel guide publisher in the world – nominated Finland as the third best travel destination for year 2017. Lonely Planet promises that with the centenary celebrations the country will be filled with interesting events happening in every region.

If your path crosses Helsinki Airport take some extra time and stop for some overnighting designed by the StopOver Finland programme.

“Highlights from the programme include jogging between flights, where travellers are invited to stretch their legs, enjoy some fresh air and see Helsinki’s main sites all at once, with an English-speaking running guide”, says **Kaisa Kosonen**, programme manager for StopOver Finland.

Kosonen also recommends Northern Lights in winter, which is a three-night stopover, providing the once-in-a-lifetime opportunity to explore the natural phenomenon of Aurora Borealis, nature’s spectacular light snow. Another fascinating way to spend your stop is live like a local option, which offers visitors the opportunity to enjoy life like a genuine Finn. The package includes a compact introduction to the Finnish way of life with a dinner at a local home, amongst many other unique experiences.

**Further information on StopOver Finland can be found via:**

 [www.visitfinland.com/stopover](http://www.visitfinland.com/stopover)



# FINNISH SUMMER IS...

**Green.** It is the greenest country in the world, when you look at the Environmental Performance Index.

**Cultural.** The Most Literate Nation, do we need to say more?

**Safe.** Finland is the safest country, says the World Economic Forum.

**Dialogic.** Finland is ranked first in freedom of the press according to the World Press Freedom Index.

**Perky.** Finns are number one in the International Coffee Trade Statistics. Time for coffee?

**More facts about Finland:**  
[thisisfinland.fi](http://thisisfinland.fi)