

LIFE IN ■ Estonia

WINTER | 2009 / 2010

Setomaa -
A Kingdom
Without A
State

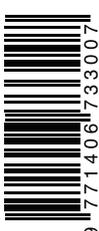
New Estonian
eHealth Projects

The Age of
**Personalised
Medicine**

Riin Ehin: Co-operation
Is The Keyword In Cancer
Research

Euro –
Still A Dream Or Near Future?

ISSN 1406-7331



Price:
75 EEK | 50

land & people | state & society | education & science | culture & entertainment | tourism

Photo by Hindrek "Masa" Maasik



Evelin Ilves

First Lady of Estonia

Innovation or hocus-pocus?

When Margaret Chan, Director General of the WHO, visited Tallinn last year, our conversation as a matter course came to the issue of epidemics. As a MD, Dr Chan admitted the enormous responsibility the WHO bears when it declares an outbreak of disease to be an epidemic. Indeed, should the contagion potential of some devious disease goes unnoticed, the consequences are suffering and human loss of life. On the other hand, there is no denying that the pharmaceutical industry has an interest in the billions in revenues from mass vaccinations. Balancing between billions and deaths is like tightrope walking without the safety net, which is something people don't usually give a thought to.

In June 2008, the WHO Conference of European ministers adopted the Tallinn Charter, which emphasises the importance of prevention in health management and stresses the close correlation between public health and a well-functioning health system on the one hand; and, on the other, social welfare, the direct impact on economies and the wealth of people and society as a whole, which hitherto often has been undervalued.

What does this tell me as a doctor and, more importantly, as a citizen? It tells me that I too bear responsibility for my health. This is a responsibility that in good times we consistently delegate to others. If there is a health problem it is a problem for the doctor and the solution is a prescription. To what extent, however, do I monitor what I eat on a daily basis? Aren't the contents of my shopping basket overly dictated by advertising? Including alcohol advertising that penetrates our homes through TV commercials.

As for epidemics, these too come in different forms. Some are contagious and a source of general anxiety. Others have entered public awareness only in the last decade and because know little about them, we do not fear them, although we should. Those are „lifestyle diseases“ that have developed into mass illnesses: diabetes, cancer, depression, obesity and cardiovascular- and joint diseases. All of these can be called chronic illnesses that always and noticeably decrease the quality of life. They too are contagious, not due to "bad bacteria" from the external environment, but surreptitiously, through imitation of both role models and habits. When my friend eats junk food, why shouldn't I? If people don't clean up or cook at home, how should a child know what cleanliness and good food are? If everyone you know has a husband who is overweight and likes to drink, it begins to seem normal...

These different, "life-style" epidemics have one thing in common. Faced with a sound body and mind, many of these illnesses are weak or even harmless. This is often up to the individual. Innovative medicine too draws its inspiration from "rediscovering" the balanced and healthy human being as a wonderfully effective and multifaceted mechanism.

It is time for all of us to recognise the extent of our own responsibility. Let the word "purity" in the widest sense have a symbolic meaning here. When we keep our inner selves and the outer environment pure, we will be better able to resist external influences. Exercise and avoidance of industrially processed, overly chemicalised, dyed and modified foodstuffs form an effective weapon against lifestyle diseases. Striving for production free of harmful by-products and the complete processing of waste are important steps towards minimising external poisons and damage to our health. The word CLEAN marks the newest and most innovative step in finding new energy resources. Centres of innovation, large and small throughout the world, from California to Estonia, are working on this issue.

In the middle of it all remains the clean and responsible human being: pure food, clean hands, a clear conscience and a tidy home and homeland. Is this something old? How very innovative!

LIFE IN Estonia



COVER

Riin Ehin

Photo by Sven Tupits

Executive publisher

Positive Projects
Pärnu mnt 69, 10134 Tallinn, Estonia
www.lifeinestonia.ee

Editor

Reet Grosberg
reet.grosberg@lifeinestonia.ee

Translation

Ambassador Translation Agency

Language editor

Richard Adang

Layout

Positive Design

Partner



WINTER_2009 / 2010

6 **Where to go this season?
Life in Estonia recommends**

8 **News**



12 **Seto culture: despised
yesterday, valued today**

Seto *leelo* was included on UNESCO's world cultural heritage list. But who are the Setos? Where do they live? What language do they speak? Read the story and get acquainted with the small nation living between Estonia and Russia.



20 **Rising tide**

Andres Sutt, Senior Advisor to the Nordic-Baltic Executive Director of the IMF, analyses Estonia's situation in the global economic and financial crisis, and evaluates Estonia's chances for Euro adoption in 2011.

24 **Tallinn University of
Technology begins to
train eHealth experts**

The Institute of Clinical Medicine of the Tallinn University of Technology has introduced a Masters degree in eHealth Technology for Health Institutions, which is a unique programme in Estonia and Europe.

25 **eAmbulance – an even better
ambulance service**

Boriss Gubaidulin, the eAmbulance project manager at the Estonian eHealth Foundation, introduces successful eAmbulance solutions applied in Estonia, and the example Estonia has set for others beyond its borders.

26 **Health Information System –
an innovation for doctors
and patients**

Margit Loikmaa, Communications Director of the Estonian eHealth Foundation, introduces the online patient portal which, on a large scale, is a step closer to a healthier society.

28 **Kalev Kask, CEO of EGeen:
Medicine prices will fall
considerably**

The biotechnology company EGeen, which mostly carries out clinical trials in Central and Eastern Europe, has demonstrated stable growth. CEO Kalev Kask says in the interview that, nowadays, the pharmaceutical industry has made progress and most illnesses are, to some extent, treatable. He predicts that the prices of medications will fall considerably in the future.



31 **The united front of Estonian
cancer research companies**

A good example of Estonian R&D companies coming together and joining their capabilities is the Competence Centre for Cancer Research. Riin Ehin, Chairwoman of the Board of the Competence Centre for Cancer Research (CCCR), sheds light on the activities of the Centre.

34 **Estonian science breeds
world-class researchers**

At first sight, it may seem that the Estonian chemical and biotechnology sector is experiencing obvious growth problems: a lack of bright scientists due to a small population, young state, shortage of money etc. However, on closer inspection, there are several valuable "gems" in this field currently being polished.

40 **The most ambitious
innovation project in Estonia**

Approximately 1.3 billion Estonian kroons will be invested in eight competence centres this year and over the next couple of years, resulting in new innovative products and services and an increase in the capabilities of researchers, stems and universities.





45 Estonian scientists scrutinise food habits

The Estonian Research Institute of Agriculture is going to be at the helm of an international three-year project, with the aim of making the food produced in Europe much healthier.



48 Innovation in food industry

Estonian food producers are not afraid of innovation. A four-year survey of an “invisible” bacterium led to the birth of a heart-friendly cheese – Sūdamejuust. Now the scientists are working on several other dairy products to be enriched with pro-biotic bacteria.

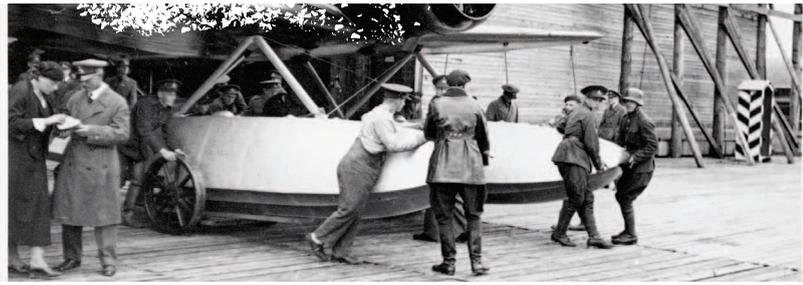
51 Portfolio – Studio 22

The group of artists called Studio 22 first came together in the early 1970s. The most active period of Studio 22 was from 1972-2002. During those years, and later on, hundreds of people had links with the Studio. In this edition, the four most active members of Studio 22 present their work.



60 Two-faced man

Recently, a new documentary, “The Spy Inside”, was screened in Estonian cinemas. It is the story of Herman Simm, the Estonian “keeper of secrets” who worked for Russian intelligence. Uncovering the identity of the biggest spy in Estonia’s history led to the greatest spy scandal in NATO since the end of the Cold War.



67 The unique maritime history of Tallinn will soon be seen at the grand Sea World at the Seaplane Harbour

In 2011, when Tallinn will be the European Cultural Capital, the Estonian Maritime Museum will exhibit the submarine ‘Lembit’ and many other objects of interest at Sea World, at the Seaplane Hangar.



71 50 Best Estonian Restaurants

In 2008, the first chart of top Estonian restaurants was compiled. There were surprises and disappointments, but also a lot of genuine joy. It became clear that there are many unique eating places in Estonia, even more than expected. Get acquainted with six of them, all situated in Tallinn.

77 Estonia in brief



78 Practical information for visitors



NEW YEAR'S EVE BALL

31 December 2009

Estonian National Opera invites you to spend the night in the magic atmosphere of the theatre – listen to the best soloists, watch a swashbuckling dance performance, and dance to the music by a big symphony orchestra! The hosts are Lady **Janne Ševtšenko** and Colonel **Priit Volmer**.

You can enjoy the merry melodies of the operetta revue "Vienna – City of My Dreams!" featuring **Anneli Peebo** and the soloists of the Estonian National Opera, and the sparkling dance and jazz

performance "**Raimond Valgre – Kiss in the Moonlight**" by Estonian National Opera ballet troupe, singer **Marko Matvere** and the **Swing Band of Villu Veski and Tiit Kalluste**.

In the concert hall, you can dance to the music by **Estonian National Opera Orchestra** and the **Police Orchestra's Bigband** featuring **Gerli Padar**.

Artistic Director: **Arne Mikk**



THE LOVE FOR THREE ORANGES

A four-act opera with a prologue by **Sergey Prokofiev**
Libretto by **Sergey Prokofiev**, based on **Carlo Gozzi's** comedy of the same name
World premiere on December 30, 1921 at Auditorium Theatre

Premiere at the Estonian National Opera on January 28, 2010

Music Director: **Arvo Volmer**
Conductor: **Mihhail Gerts**
Stage Director: **Dmitri Bertman**
Set Designer: **Igor Nezhnyi**
Costume Designer: **Tatyana Tulubeva**
Choreographer: **Edvald Smirnov**
Performed in Estonian with subtitles in Estonian and English

The Opera *The Love for Three Oranges* is an Italian style *commedia dell'arte* or improvised masque comedy through the perception of the 20th century Russian composer. Prokofiev wrote the libretto himself on the basis of the Russian adaptation of Carlo Gozzi's eponymous comedy (1761) by **Vsevolod Meierhold**, **Konstantin Vogak** and **Vladimir Solovyov**. The play mocks the writings of Gozzi's contemporary **Carlo Goldoni** whose sombre and superficial naturalistic melodramas were, in Gozzi's opinion, the reason for the decline of the Italian theatre.

Gozzi's surreal and fantasy-laden play inspired Prokofiev to create a masterpiece that mixes magic, comedy and satire. *The Love for Three Oranges* is a multi-layered

EESTI KUNSTMUSEUM

KUMU



2008 European Museum of the Year Award



HARRO!
A Classic of Finnish Pop Art
2.10.2009–28.3.2010

The painter **Harro Koskinen** has become famous for his socio-critical world of paintings, inspired by Pop Art, particularly for his pink and yellow pigs living their lives in pig reality.

H. Koskinen. The Pig Strikes. 1969
Turku Art Museum



POP ART FOREVER!
27.11.2009–11.4.2010

The exhibition focuses on the powerful arrival of Pop Art in the former Soviet cultural sphere and on the development and the ideology of Estonian Pop Art since the end of the 1960s.

L. Lapin. Becoming One with the Star III. 1970
Art Museum of Estonia

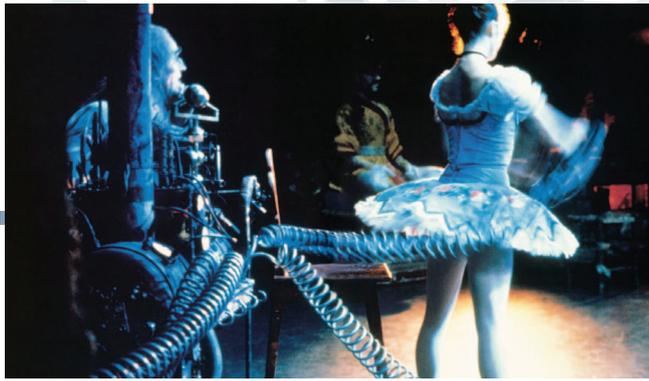
KUMU ART MUSEUM
Weizenbergi 34 / Valge 1, 10127 Tallinn
Phone (372) 602 6000, (372) 602 6001
museum@ekm.ee
www.ekm.ee/kumu

Open: Wed–Sun 11am–6pm
Closed: 23–26 December
On 31 December open until 3pm

Sponsor of the year:





play – it can be viewed as a play in a play, witty critique of the opera traditions of the 20th century or as a dispute on acute political problems by means of commedia dell'arte. The multitude of interpretation possibilities of both the opera and the play has made it a real treat for stage directors and artists. After the premiere

in the US, the opera was a huge success in Russia.

The Love for Three Oranges is a performance for the whole family, brought to the stage by Dmitri Bertman, a stage director with an unlimited imagination, whose vision of Wallenberg earned several awards.



COPPÉLIA

A ballet by Léo Delibes
Based on the story by Ernst Theodor Amadeus Hoffmann „The Sand-Man”
World premiere on May 2, 1870 in Opéra Paris
Premiere at the Estonian National Opera on March 4, 2010

Choreographer-Stage Director:
Ronald Hynd
Music Director and Conductor:
Arvo Volmer

Conductor: Mikhail Gerts, Risto Joost
Designer: Roberta Guidi di Bagno
Assistant Choreographer: Lyn Vella Gatte

After the premiere at Opéra Paris in 1870, Coppélia has been a huge success with audiences, and it has been in the repertoire of theatres for almost a century and a half.

The choreography by Ronald Hynd has enticed the audiences at the English National Ballet for several seasons. The choreography is based on the version originally composed by Marius Petipa and exudes classical beauty accompanied by wonderful melodies by Delibes.

Doctor Coppélius, a maker of toys, when it seems that it has eventually happened, Coppélius finds out that two young lovers Swanilda and Franz have fooled him. The story goes through mistakes and adventures, ending with a merry wedding party of Swanilda and Franz.

“There’s no prince and no princess in it. It’s peasants, it’s a boy and a girl in a village, and there are no overly romantic tones to it. It’s just a simple romance – no swan, no sleeping beauty. It’s life. And I think that’s why it’s really always been successful, because people can identify with the very simple, charming story.”
- Ronald Hynd



Thu 10 December at 19 00 Estonia Concert Hall
Fri 11 December at 19 00 Tartu St John's Church
Sat 12 December at 19 00 Pärnu Concert Hall
Sun 13 December at 17 00 Jõhvi Concert Hall

O Magnum Mysterium
Vocal ensemble

NORDIC VOICES (Norway)

Clemens non Papa, Ødegaard, Poulenc, Manchicour

Tue 15 December at 19 00 Estonia Concert Hall

RÃO KYAO (bamboo flute, Portugal)

Renato Jr (keyboards), Toni Pinto (guitars)
Ruca Rebordão (percussion)

Fri 18 December at 19 00 Vanemuine Concert Hall
Sat 19 December at 19 00 Estonia Concert Hall

Estonian National Symphony Orchestra
Estonian Philharmonic Chamber Choir

Soloists **IRINA ZAHARENKOVA** (piano)
Kädy Plaas (soprano)
Helen Lokuta (mezzo soprano)
Oliver Kuusik (tenor), **Uku Joller** (bass)
Conductor **DANIEL REUSS**
Haydn. “Te Deum”; *Piano concerto in D major*
Schubert. Missa in A flat major

Tue 15 December at 19 00 Vanemuine Concert Hall
Wed 16 December at 19 00 Jõhvi Concert Hall
Thu 17 December at 19 00 Pärnu Concert Hall
Tue 22 December at 19 00 Estonia Concert Hall

Ensemble EESTI KEELED 10

Riho Sibul (song, guitar)
Jaak Johanson (song, guitar)
Tuule Kann (song, Estonian zither)
Pille Karras (Estonian zither), Ain Agan (guitar)
Jaak Sooäär (electric guitar)



Estonian entrepreneurs get a new chance to find export partners

On 28 October, Enterprise Estonia opened a new portal - www.trade-withestonia.com – which is a new opportunity for Estonian enterprises to present themselves and to link up with other Estonian exporters and potential export partners.

Gert Stahl, Director of the International Division of Enterprise Estonia, said that they hope to offer added value to all companies and organisations promoting Estonian exports. "As Estonia is so small, we treat it as a whole and jointly sell products and services in foreign markets. The new portal is a contact point for the promotion of Estonian exports."

The portal is not just a website, but also a continuously developing specialised network which offers a great opportunity for companies to show

themselves to future foreign partners and other Estonian exporters. "These days it is more important for companies to cooperate, instead of competing, in order to be successful exporters. If an order is too large or does not fit a company's profile, the company does not have to give up but can call upon the help of other companies, thus helping everyone in the long run," said Stahl.

Membership in and use of Tradewithestonia.com is free and it is meant for all Estonian companies, even if they have no previous experience with exporting but wish to give it more serious thought. Social networking opportunities are created step by step on the portal, which will help Estonian companies that are interested in export to talk to each other and to advise and help each other.

Estonian project Kitarrikoole.ee is entering foreign markets

Kitarrikoole Publishing presented a unique collection titled "Guitar School – the Key to Practical Guitar Playing", which consists of a guitar textbook and a web school. It is apparently the first time the purchase of a textbook has included personal feedback via the Internet.

During a two-year testing period in Estonia, more than 3,500 people studied on the basis of this model, using the textbook, the web school or a combination of both. This method offers a solution to many problems linked to self-learning, because it provides feedback from a tutor.

The author Kristo Käo says, "In the field of music, a self-learner just getting started needs, in a sense, a completely different educational approach. It is important to bring the

first rung of the ladder as low as possible so that the self-learner can reach it."

But there is another aspect that is much less acknowledged. "A beginner may grab the first rung, but at first he or she needs constant reassurance that they are climbing the right ladder," says the author. "While the standard textbook format enables information to move in only one direction, studying with the Guitar School textbook ensures that information moves several times from the learner to the teacher and vice versa."

Having participated at the Helsinki Music Fair, Guitar School started to market its teaching and learning system in Scandinavia and is moving into the UK market.

Enterprise Estonia becomes a member of the International Astronautics Federation

At the 60th Assembly of the International Astronautics Federation (IAF), which took place in South Korea in the middle of October, Enterprise Estonia (EAS) was accepted as a member of the federation. This opens up new opportunities for Estonian enterprises, scientists and students in international cooperation.

"Becoming a member of IAF is a great new opportunity to create and enlarge the network of connections," explained Madis Võõras, Adviser of the Innovation Division at EAS. "For example, the organisation runs a programme for young professionals, which means that the best of our students and young specialists will be invited to apply for scholarships straight away. In addition, there are various opportunities for enterprises and researchers to participate in international space projects."

The membership of IAF is broad, including enterprises, state agencies and many NGOs and clubs. The organisation (www.iafastro.org) operates in the fields of international space legislation, research, space education and application of new

technologies. Many joint projects have been organised. The annual highlight, the astronautics convention IAC, took place for the sixtieth time, this time in Daejeon, South Korea, which has 1.5 million inhabitants. Enterprise Estonia participated with its own exhibition stall, representing around ten strong Estonian enterprises and research centres in the field of space.

Estonia began international cooperation in 2007, when EAS signed cooperation agreements with the European Space Agency (ESA). Since then EAS has become a contact point for enterprises in the field of space applications. "Joining IAF today is another step in the direction of the goal that Estonian entrepreneurs, students and researchers will be able to network, and develop and sell innovative solutions more easily," said Võõras.

Membership in the International Astronautics Federation, which was founded in 1951, includes 50 states. There are approximately 700 members, some of the best-known being ESA, NASA, Boeing and the United Nations.



Ülari Alamets, Chairman of the Board of Enterprise Estonia, and Madis Võõras, Director of Technological Development, hand over the membership documents to Berndt Feuerbacher, President of IAF, and Philippe Willekens, Executive Director of IAF.

IT Academy striving to reach an international level

On 26 August, the heads of Estonian institutions of higher education, the Estonian Development Fund and representatives of businessmen signed a co-operation agreement, forming the International Estonian IT Academy.

The agreement was digitally signed by Mr. Peep Sürje, Rector of the Tallinn University of Technology; Mr. Alar Karis, Rector of the University of Tartu; Mr. Rein Raud, Rector of Tallinn University; Mr. Kalle Tammemäe, Rector of the Estonian Information Technology College; Mr. Taavi Kotka, the Head of the Estonian Association of Information Technology and Telecommunications; and Mr. Ott Pärna, the Head of the Estonian Development Fund.

"Entrepreneurs say that we are lacking about one thousand IT experts," Mr. Pärna commented. Due to demographic development, the number of graduates in IT specialties will drop significantly over the next few years. In order to ensure the development of business, institutions of higher education have decided to choose the path of internationalization, bringing in foreign students and, consequently, a new workforce. They have also decided to pool their efforts to meet this goal.

Website dedicated to exciting Estonian companies has been revamped

TigerPrises.com is the most active innovation blog in Estonia. It was recently re-launched, with a significantly updated look and improved quality. In the blog, there is information about Estonian entrepreneurs, start-ups, technology companies and patents. The site was launched by Toivo Tänavsuu, who says that the blog is now much easier to navigate and offers more exciting reading material and videos than before.

One of the priorities of TigerPrises is to support start-up businesses that are trying to make their mark and that have a

great idea, technology or business model, but lack the funds for marketing.

"Our aim is to introduce the innovative side of the Estonian economy to the world, and thus contribute to the promotion of entrepreneurship, indirectly boosting economic growth. We try to highlight the best aspects of Estonian companies through our writings, as well as in videos," says Tänavsuu, adding, "if anyone identifies with our cause, wants to offer their support, or write or speak about their company, just let us know."

 **tigerprises.com** Estonian Technology Community



Eco-benches made of old mobile phones are unveiled in Tallinn

Everyone now has the opportunity to rest their tired feet by sitting on one of the first Estonian eco-benches, made of mobile phones, which were unveiled in front of the Solaris Centre in the centre of Tallinn.

During the green campaign organized jointly by Elisa, Nokia and Elektroonikaromu, 12,700 old mobile phones were collected. Ten park benches have been created from this formerly dust-collecting junk.

According to Andrus Hiiepuu, Board Member of Elisa, there are several important values emphasized by this joint action of three partners. "An eco-bench made of mobile phones is a special piece of park furniture, where anyone can rest, and it is a tourist attraction for Estonian people and visitors from abroad." "It is also a value in itself that we have taken a message to the people that you can create many things from mobile phones. Only a few knew before this campaign started that up to 80 per cent of a mobile phone can be reused," said Hiiepuu.

Jüri Teemant, Board Member of Nokia, added that mobile phones are no longer only for calling. Global research by Nokia demonstrates that 44% of old phones are just collecting dust in cupboards and only 3% are brought back to be recycled. Aivo Kangus, Chairman of the Board of MTÜ Elektroonikaromu, said that this cooperation is a good example of all partners giving their best and, hence, the result is something that even experts will appreciate. "Had we been careless, valuable material could have been left to pile up with household junk, and an important natural resource would have been wasted," he said. The metal construction of the eco-benches in front of the Solaris Centre was made in Riga, and the planks were made in Finland. In addition to park benches, old mobile phones can be reused to produce copper wind-instruments, jewellery, plastic children's playgrounds, medical products, fuel or new phones.



Tallinn's first creative incubator opens in the Baltika Quarter

Tallinn's creative incubator (Loomeinkubaator) opened in the newly renovated Baltika building on 22 September. By then, the incubator, which is intended for creative start-ups, had already seen its first tenants settle in – from a printing house, to jewellers and photographers.

"We are delighted to welcome Tallinn's creative incubator as the main tenant here in the Baltika Quarter," said Meelis Milder, Chairman of the Management Board of Baltika Group. According to Milder, the Baltika Quarter was created with the aim of offering the best possible working conditions for creative businesses that share the Group's values.

The creative incubator, with a total area of approx. 1,100 sq. metres, is located on the third and fourth floors of Baltika's former office building. It also has premises in a smaller back building that is suitable for workshops. The creative incubator can accommodate up to 23 businesses, providing 45 to 50 jobs.

"Our goal is to create favourable development conditions for creative businesses, for them to use their skills and talents and (re-)produce their creative ideas, so that they can create jobs," said Anu Lõhmus, Member of the Executive Board of the SA Tallinna Ettevõtlusinkubaatorid Foundation. "I am absolutely convinced that we will achieve this aim within the next few years."

The Tallinn creative incubator provides services to start-ups in the creative and artistic fields. These services are mainly related to starting a business (initial analysis of business ideas, business consultation, and basic training in entrepreneurship) and developing the business (specialised consultation and training, and help with finding business partners in Estonia and abroad). The incubator also offers the necessary physical infrastructure and jointly used facilities.

Since 2002, four business incubators have been set up in Tallinn: the Kopli, Ülemiste and Baltika incubators are operated by SA Tallinna Ettevõtlusinkubaatorid.

The virtual robot made by the Estonian company Massi Miliano won the competition of products and business plans in Silicon Valley

A competition for innovative products and business plans of start-up IT companies took place in the Plug&Play Techcenter in the Silicon Valley on Thursday, 29 October. The blog *Hea Eesti Idee (Good Estonian Idea - ed)* reported that 47 companies from Europe and Asia participated in the competition.

The winner was the Estonian company Massi Miliano, which presented the Fits.me solution, a virtual robot for clothing retailers. Fits.me received the most positive feedback from the jury, which consisted of venture capitalists, as well as the support of over two hundred spectators.

Together with co-investors, the Estonian Fund of Development has invested 9.6 million kroons in Massi Miliano.

The Manager of Massi Miliano is Heikki Haldre, who is also a founder of the

website Netikuller.ee. The creators of the robot model are Professor of Polymeric Materials Technology Alvo Aabloo from the Technology Institute of the University of Tartu, and Professor Maarja Kruusmaa from the Biorobotics Centre of the Tallinn University of Technology. The technical solution of the robot model of Estonian scientists is currently being patented in the United States and other developed countries.

A delegation of Estonian IT companies is present in the Silicon Valley, including BCS Infra, Elvior, Massi Miliano, Network Tomorrow, Telegrupp, Telema, United Dogs & Cats and Webmedia.

This study trip was jointly organised by the Tallinn Technopol, Estonian Chamber of Commerce and Industry and Enterprise Estonia Silicon Valley, in order to support the internationalization of the ideas and products created by Estonian entrepreneurs.

The role model of the Year of Innovation receives the Swedish Business Prize

This week the creator of 'national tennis shoes', Indrek Kaing, received the Swedish Business Prize, which was awarded by the Swedish Export Council, the Embassy of Sweden and Swedbank for outstanding innovation.

Kaing's company Reklaamilahenduste OÜ was praised for their creativity in bringing beautiful folk patterns out of the museum and into contemporary goods. The jury stated that the project drew inspiration from the past in order to promote a sense of culture and identity in a modern and innovative way.



Tilde brings out software for a terminology tool

The translation company Tilde released an additional module meant for EuroTermBank terminology, which was created for Microsoft Word.

This supplementary tool, which facilitates translation and terminology search, can be downloaded for free on www.eurotermbank.com/tools.

This additional module of the EuroTermBank provides access to approximately two million terms and more than a hundred EuroTermBank collections and databases on the Word term panel. The data bases provide help in translation, terminology search and studying.

Tilde hosts and is developing a multi-language terminology portal in cooperation with the international EuroTermBank consortium, which has the University of Tartu as one of its members. Many institutions have offered their term data bases for free for use on the terminology portal. Help is welcomed from all owners of terminology bases in order to make more Estonian language terminology bases accessible.

"We have received support from EU structural funds for the terminology tool of EuroTermBank, and we are currently in the first phase of development," comments Managing Director of Tilde OÜ, Margit Kurm. "We are working on versions which will work with other popular software used by translators and terminologists".



Estonian company develops home test kit for diagnosing STDs

The start-up company SelfDiagnostics is developing a rapid test which can be used easily to diagnose sexually transmitted diseases (STDs) in the home. This minilab, resembling a pregnancy test, could be available at pharmacies in the future.

The disposable test is predicted to cost around two to three hundred Estonian kroons and it would diagnose such STDs as herpes, syphilis, gonorrhoea and hepatitis. The testing device would identify pathogens of a specific disease from saliva, urine or perspiration. The final diagnosis would still remain the territory of doctors and the device is not meant to replace the diagnoses of health professionals.

The Managing Director of SelfDiagnostics, Marko Lehes, says that a patent application has

been submitted and there are plans to develop testing kits within the next three years. Nearly thirty million kroons will be spent on product development.

"There is great demand worldwide for a discreet and simple-to-use home testing kit for STDs. Research shows that a fourth of all 15-24-year olds would use such a test up to four times a year due to its discreet nature and fast results," explains Lehes.

SelfDiagnostics is a company belonging to the business incubator of the Estonian Development Fund and it also employs Indrek Tulp, a researcher at the Institute of Chemistry at the University of Tartu, and Ülo Langel, Professor of Neurochemistry at the University of Stockholm.

Estonian Modesat targets 100 per cent of World Market

One of the most interesting Estonian start-ups, Modesat Communications, will be able to gain 100% of the world market share if they are lucky. The company provides modem solutions for microwave radio, cable, fixed, mobile and satellite communications, and Gigabit Ethernet. The PilotSync technology allows more communication and at a higher speed between terminals.

Peep Põldsamm, CEO of Modesat, says that in their most important product group – 3G/4G radiolink Gigabit Ethernet - the company has received two business proposals from critical world market leaders. If they can do business, that will mean between 70 and 100 percent of the world market share for the Estonian start-up, depending

on whether one of the telecom giants succeeds in developing a similar product or not.

If Modesat's technology that provides transmission of more data at a higher speed becomes a standard in the telecom industry, that will evidently result in a dramatic reduction in mobile Internet prices for mobile users.

Currently you often pay a lot to use a mobile Internet, since networks have limits and operators have to restrict the volume of data.

Põldsamm hopes that the Modesat's ambitious vision will become a reality in three to five years. This also depends on whether the company manages to hire additional engineers (at least 10-15 people are needed) and if it manages to raise

additional capital for development units in Tallinn and in San Jose, California.

All of the major players in world telecom – Ericsson, the Nokia Siemens Networks, Alcatel Lucent, Huawei and others – have taken an interest in what Modesat has to offer. Thanks to a partner in Israel, a number of companies are already testing PilotSync technology there. One of the crucial players in Israeli's military industry has shown an interest and conducted a successful assessment last summer.

Põldsamm: "Unfortunately I can't reveal any of our clients' names, since all the contracts have strict confidentiality clauses and the majority of the customers are listed."

Seto culture



Ensemble "Zetod" at the anniversary concert in Tartu.



Text: **Rein Sikk** | Eesti Päevaleht
Photos: **Igor Taro, Merli Antsmaa** | Setomaa

Seto culture: despised yesterday, valued today

A triumphant message arrived, from Abu Dhabi in the Arab Emirates, on the coast of the Gulf of Finland on September 30, 2009 - the distinctive folk song leelo, which is a part of the cultural tradition of the ten thousand Seto people living in Estonia, was included on UNESCO's world cultural heritage list. There were congratulations, celebrations and a lot of leelo singing by Setos and Estonians. It was the top news on Internet portals and on national television, as recognition by UNESCO - the most important cultural organisation in the world - is significant.



Who are Setos?

Descendants of Finno-Ugric tribes living in north-east Europe, at the south-western corner of Lake Pskov, who declared themselves a nation in 2002. Today Setos live mostly in the territory of the Republic of Estonia. Their historical settlement area is currently administratively divided between Estonia and the Russian Federation. The Seto language, like Estonian, belongs to the Western Finnish group of the Finno-Ugric languages. Seto traditions have been shaped by agrarian village society and the Russian Orthodox Church. Most Setos today have a two-tiered Estonian-Seto identity. Being a Seto means primarily speaking the Seto language, knowing and appreciating the Seto singing style, and preserving old family and community customs.

A kingdom without a state

Traffic jams in south-eastern Estonia in August. Once more the Seto Kingdom is declared in Setomaa (Land of the Setos – *ed.*) near the borders of Russia and Latvia. Everyone seems to be here, from local Setos to Setos living abroad and all sorts of other interested folks.

Elderly ladies have polished their gigantic silver brooches and hung them around their necks, along with jewellery made of coins dating back a century. There can be up to six kilograms of wealth, accumulated through generations, hanging around grandma's neck. Such a load of silver makes the silver-headed ladies walk oh-so-straight, heads held high. The sound of *leelo* flows, softly at first and then more powerfully with each passing hour, from the farm gates and the edges of the greenery and from the centre of the song grounds. They sing ancient words, passed down from great grandparents, the lead singer first and then others following, always in several pitches, although most of the singers lack classical training. But they have the wisdom and singing memory of their elders, spiced up with a lot of improvisation. They sing of today's events in the form of the *regilaul* (*ancient folk tune – ed.*) song, which is a couple of centuries old. If *leelo* could be expressed in colour, it would be an impressionist painting, vivid and improvised with great lightness and forceful gloom.

Counters are piled high with CDs of Seto song recordings. Next to them other tables are stacked with delicacies of the Seto kitchen and more tables with local handicrafts. The men are already dancing and the women's *leelo* is getting wittier by the minute. The elections of *ülemsootska*, the representative on Earth of the Seto god Peko, are about to commence. Seto culture is alive and kicking.

But this has not always been the case. The tradition of Seto Kingdom Days dates back two decades and was borrowed from the forest Finns of Norway, who also have, but will never really have, their own state, and who yearn to express their unique identity.



Setos have not been counted

From the end of 19th century to 1934, the number of Setos was recorded as 15,000, according to the national Census. The census of 2000 did not distinguish them as a separate group.

It is estimated that there are about 10,000-13,000 Setos in Estonia, about 3,000-4,000 of them in the traditional settlement area.

In the population count of the Russian Federation in 2003, 167 people identified themselves as Seto.

People with a wooden God

While Estonians are mostly Lutherans, if religious at all, the Seto religion is a mix of the paganist cult of Peko and the Orthodox religion. In addition, religion is much more important to Setos than it is to Estonians.

God is usually seen as high and far away, but Setos keep the wooden sculpture of their fertility God Peko in the outbuilding or granary. This human-shaped wooden figure has always been kept away from the eyes of strangers. Some records maintain that smaller Peko figures were also made of wax.

Legends about Peko have also been recorded as a Seto epic. The legendary song mother Anne Vabarna recorded the story of Peko in rhyme. However, as she was illiterate, the verses were written down by her 19-year old son.

Today even a sports association carries the name 'Peko', and artists are creating more modern versions of the God. The tradition of celebrating Peko in the autumn has also been revived. The Pekoste family in Finland even considers this ancient figure to be its distant relative.

Setos were introduced to Orthodox Christianity in the 15th century, when a monastery was founded in Petseri. As most of the Seto lands were officially proclaimed to be the property of monasteries, the spread of the Orthodox religion was inevitable.



The elections of the *ülemsootska* at the Seto Kingdom Day. In front, the new *sootska* *Õie Sarv*; in the background, the previous *sootska* Silver *Hüdsi*.

Men's *lee/o* choir "Liinatsuraq" marching at the Seto Kingdom Day.



An undershirt is a part of Seto folk costumes. The red pattern is hand-woven and thus it is the most complicated part of the costume.



Poor weirdoes

Just two decades ago, many people in Estonia considered Setos to be weirdoes who were not really Estonian or Russian but seemed to stubbornly insist on their own culture, which was considered a bit strange and was unknown to most people.

Setos did speak Estonian, but they were Orthodox and the men wore their shirts outside their trousers, which was typical of the Eastern neighbour. When they spoke in their local dialect, an average Estonian needed an interpreter. At their parties, they used to drink *hansi*, distilled from rye. Hence, Setos were more interesting to folklore researchers and ethnographers than to average Estonians. Even more sadly, many Setos were actually embarrassed by their origin.

Ilme, a woman who has been singing in Seto folk choirs for more than thirty years, recalls, "My birthplace is on the other side of the border, in Petseri. As a child, when I was eleven, we moved near Tallinn, and I continued school

there. When I left Setomaa, I couldn't really speak proper Estonian and it made it very difficult to interact with other pupils, as a result of which I was often bullied. I had low self-esteem and I was ashamed of being a Seto." In 1973, when the first Seto *leelo* choir was founded in Tallinn, Ilme started to re-establish her belief in herself. "Today, attitudes have changed, and things are the other way around – even people who are not Seto want to be Seto," she says.

"It is my joy to see that what once used to be a swear word, has now become an honourable title," says the writer Olev Remsu. Of all the areas in Estonia, it is Setomaa, in the south-eastern corner of the country, which has seen the biggest rise in self-awareness.

"Setos are not worse off than their neighbours; quite the contrary. Many small nations could learn from their ability to preserve their traditional culture. With their recent activity and emphasis on their identity, Setos have proved that, with dignity," emphasises another writer, Arvo Valton, who is also President of the Finno-Ugric Literature Association.

Bitten by borders

The strong comeback of the Seto people into the Estonian cultural space started with the political activity after the restoration of independence, as the historical Seto lands are divided into three parts, situated in two Estonian counties and in the Russian Federation. Just as the border agreement between Finland and the Soviet Union cut a large piece of Karelia away, Setos lost Petseri, the area surrounding their former capital. This wound is still raw and not a single cultural event passes without criticism of the Estonian government for surrendering to Russia in this matter. The local politicians who demand the reunification of Seto lands serve as a continuing irritant to the Estonian government.

In 2002, Setos declared themselves to be a nation with their own language, ethnic identity and culture, equal to the indigenous people – the Estonians. Today Setos have their own flag and hymn, radio programmes in their own language and are included in the highest representative body of the Finno-Ugric peoples. The Seto Congress takes place on a regular basis and there is a Seto language newspaper, which is delivered free to all Seto people. Four counties of the Seto area created an association which works across county borders. Constant lobbying in cultural organisations has led to the creation of a national Seto programme, which has substantial financing. As the Seto lands do not have large natural resources or significant business activity, the emphasis has been placed on self-awareness and culture.

The success of Seto music is most well known. The renaissance of Seto culture among young people began thanks to the band Zetod. Although *leelo* had been considered the folkloric hobby of elderly ladies, this band, consisting of young and thoroughly Seto guys, has led half of Estonia to sing in the dialect.

In 2008, the pop group Zetod won all of the most important folk music prizes in Estonia and continuously topped the charts. Last summer the band had its largest ever audience at the legendary folk music festival in Viljandi, where they sang Seto songs together with one of the most well-known young pop artists in the country. Many young people say that Zetod has led them to find out about Seto culture. The leader of the band, Jalmar Vabarna, has admitted that the group was born almost by chance and out of jealousy. Kihnu Island, which is listed on the UNESCO cultural heritage list, had a youth band and Setos didn't. So Zetod had to be founded. Today Zetod has fans of all ages. Once somebody who was asking for an autograph mentioned that her 80-year old father and 7-year old daughter were both fans," recalls Vabarna, who is a descendant of famous Seto song mothers.



What is Seto *leelo*?

It is a folk singing tradition in which the lead singer and choir sing in turns, and it is characteristic of most Finno-Ugric peoples living on the coast of the Baltic Sea, such as Estonians, Votians, Izhorians, Karelians and Finns. *Leelo* has a unique way of using the voice, characterised by several pitches. It somewhat resembles the Russian singing tradition. In the Seto tradition, the lead singer is followed by a two- or three-voice choir, with the highest voice called *killõ* and the lowest, *torrõ*.

Leelo Days, where most Seto *leelo* choirs participate, have been held since the end of the 1970s. In 2008, there were 20 organised *leelo* choirs, with approximately ten singers in each one.

Helbi choir at their 25th birthday party in the gallery Hal'as Kunn in Obinitsa. On the wall, the painting of Hilana Taarka by Toomas Kuusing.



The statue of *Lauluema* (Mother of Song) and the Seto flag next to the Lake of Obinitsa.



A film in the Seto language

The figure of the best-known Seto song mother, Hilana Taarka (1856 – 1933), can be seen cut in granite next to a lake in the village of Obinitsa. She knew thousands of rhymes by heart and was able to improvise even more rhymes. Taarka was probably the first folk singer to perform for the Finnish President, and only after that performance did she find acclaim in Estonia. Her portrayal in a play and film is another important hallmark of Seto culture. When one of the best known theatres in Estonia, Vanemuine, included the play “Taarka” in its repertoire and staged it in a Seto village, many people just shrugged their shoulders. “Some village amateur art,” they guessed. But the play, written by Kauksi Ülle, who herself has Võru and Seto roots, sold out and, in addition to the ten shows planned for one summer, an additional summer season was booked. Leading theatre critics awarded several prizes and the title of “cult play” to this showcase of authentic Seto culture and strong ethnic identity. Soon the script was rewritten for a film and the first ever Seto language film, “Taarka”, premiered in 2008, marking another triumph for Seto culture.

“Here in Estonia, we have a uniquely complete, interesting and attractive culture: not just coming out of a coma, but really standing up with force to tell its story,” said the director of the movie, Ain Mäeots, who also has Seto roots.

Today, museums and pubs offering local food are mushrooming in Setomaa. A Seto language ABC book has been published, not to mention dozens of other pieces of Seto literature. Recently, the world’s first Leelo Conference took place. There is a Seto language Facebook page, with an increasing number of members. Other minorities in Estonia have something to model themselves on.





The cover page of the newspaper Setomaa, announcing the Seto leelo's inclusion on UNESCO's world cultural heritage list.

UNESCO world cultural heritage list

As of 2009, there are 166 entries from 76 countries.

In Estonia, the other entries include the Kihnu Island culture and the Estonian song- and dance festival traditions.

The applications this year were assessed by a sub-committee selected from 24 member states of the intergovernmental spiritual cultural heritage protection committee, which included representatives of the Arab Emirates, the Republic of Korea, Turkey, Estonia, Kenya and Mexico. The session was held on September 30 in Abu Dhabi, Arab Emirates.

What makes Setomaa special?

Definitely the Seto party, called *kirmask*, where many people come to sing and dance wearing folk costumes. Setos themselves are known for their ability to talk and be merry.

Enna 20, student

Seto *leelo*, with women wearing large brooches and typical headgear, embroidered blouses and dark skirts with aprons, standing in a semi-circle and singing. Seto women are tough and they have perhaps more feminist spirit than their northern Estonian counterparts. The self-assured spirit of the women can be seen when they sing. They stand in a semi-circle, swaying to the music and they produce a sound which makes the hairs stand up on the arms of people who have studied classical music, because they sing "on the throat". It is a miracle that their vocal chords can handle it up to quite an old age!

Ülle 42, student of cultural policy in the University of Jyväskylä, Finland

I consider Setomaa to be a unique cultural space, with an exciting history and a use of language with a lot of archaic charm. I admire the national rebirth of the Setos.

Anne-Ly 46, cultural civil servant

My plan is to sell my Ferrari and move with my family to Setomaa. Why does Obinitsa hold much more charm for me than Nice? When I hear the word Setomaa, I start to tingle all over and I tune into a completely different frequency. It is the kind of frequency I feel under a different sky, in bright forests smelling of chantarelles and around a different kind of people. There is no place like Estonia in the world, and no place like Setomaa. And I want to give the gift of this country and its spirit to my son, who has been named after the Seto god Peko.

Aivar, 45 – businessman

Laossina Celebration of Väike-Maarjapäev on 21 September next to the Laossina *tsässona* (chapel). The celebration was led by the priest Afrat.





Text: **Andres Sutt** | Senior Advisor
to the Nordic-Baltic Executive Director
of the IMF

Rising tide



About a year ago, Estonia and its two Baltic neighbours, Latvia and Lithuania, seemed to be in the eye of an economic and financial tornado. It seemed almost certain that the whole thing would blow up and shock waves from the Baltics would drag down Central and Eastern Europe, shake the financial stability in Sweden and, at worst, trigger a currency crisis well beyond the neighbourhood. To be fair, a gloomy outlook at the time was a reality for most of the developed world. We collectively faced the economic and financial crisis of a century.

In late November 2009, the world looks much better, not only in the Baltic region but globally. Unprecedented in scope and in coordination, the global policy response has averted the worst and a recovery is gradually emerging. However, the strength of the global recovery is uneven and uncertain; the fiscal costs and needed adjustment in the years to come are sizeable in most of the advanced world, and high and rising unemployment remains a major challenge.

How does Estonia stand in today's world? Now that the dust has settled, diversification is becoming more common. The Estonian economy has flexibly and swiftly adjusted to the global drop in demand. Likewise, its economic policy has responded to the crisis and adjusted, notably on the fiscal side. Increasingly, more observers outside Estonia and international institutions share that view. The adjustment surely came with a cost, particularly through a significant increase in unemployment. But this is not unique to Estonia; it is unfortunately a shared consequence in most advanced and many emerging economies.

Success factors

What helped Estonia to cope with the crisis and avoid the collapse many predicted? It had three intrinsic strengths – flexible markets, a strong foreign-owned banking system and a comfortable fiscal position.

Flexibility of markets, in particular the labour market in comparison with Estonia's peers, helped companies to respond promptly to changes in global and domestic demand and maintain competitiveness. The total wage costs of the economy were down by around one fifth in 2009. One could argue that, with less flexible wages and more rigid lay-off rules, unemployment would eventually have turned out to be higher and the recovery slower. That said, addressing unemployment will be the biggest and most urgent challenge.

The fact that Estonia did not, essentially, have domestic banks was another intrinsic strength during the world financial crisis. The strong capital and liquidity position of foreign banking groups and effective cross-border cooperation played instrumental roles here. Consistent with the turn in the credit cycle, banks' loan-loss provisions and non-performing loans have increased, but the level has stabilized in recent months at around 6-7%. Given the stabilization of the economy, it seems unlikely that overdue payments will exceed 10%, something that was forecast by many observers.

Sound public finances formed Estonia's third strength. Fiscal surpluses accumulated during the boom years helped to cushion the impact of the output drop and will position Estonia among the few countries in Europe to exit from the crisis without breaching the 3% deficit criterion and taking on a sizeable debt burden. Estonia will maintain the lowest public debt to GDP ratio in the EU, and the government remains a net creditor even in 2009.



At the cross-roads

Where is Estonia heading from here? Following the peak of an unusually long business cycle in the middle of 2007, the Estonian economy has been undergoing a sharp contraction. Estimates of GDP decline for 2009 are around 14%. While the economy is still contracting in 2009, both in year-to-year and quarter-to-quarter terms, several indicators hint that the bottom of the cycle has been reached or is very close. Nearly all high-frequency data and confidence indicators point to stabilization in volume terms in industrial production, merchandise exports and in private consumption. The improved outlook for the world economy and for Estonia's main trading partners has also improved the outlook for Estonia.

While many risks and challenges remain on the horizon, Estonia has a reasonably good chance of emerging from the recession. The forecast range for output growth in 2010 and 2011 is -1 to 1.5%, and 4 to 5%, respectively. Recovery will be relatively slow and export driven, underpinned by flexible labour and product markets and significant labour-cost advantage *vis-à-vis* the Scandinavian economies.

Contrary to the view of many, several studies confirm that Estonia's peg to the Euro has not resulted in a loss of competitiveness. It has been quite the opposite. Depreciation of the SEK, for example, which has improved the global competitiveness of Swedish companies, has also supported Estonian

exports. In most cases, it is not the Nordic domestic market but the global customer who is an end consumer of the products or services Estonian exporters generate being a part of the global value chain of Nordic companies.

High and rising unemployment will be the biggest challenge (estimated to peak in 2010 at around 15-16%) in the foreseeable future, and this requires action. However, with a slow recovery, improvement will take time.

Closer than ever

Euro adoption in 2011 is now an achievable target, provided the commitment to keep the fiscal deficit below 3% in 2009 and 2010 is honoured. The government's track record, illustrated by delivering a fiscal consolidation of around 8% GDP in 2009, when the economy was contracting by 14%, lends support to the government's ability to deliver on this important milestone.

The Euro adoption is parallel to the monetary reform in 1992 and EU accession in 2004. Will the Euro adoption solve all the problems? No. Should Estonia make an effort for a quick accession? Yes. While the Euro in itself will not reverse the need for restructuring of companies and for adjusting the fiscal framework, it will eliminate a perceived risk of devaluation and bolster investor confidence. "When do you devalue?" was a routine question I was asked over the last year and a half in Stockholm, Frankfurt, London, New York and Washington, not to mention Estonia. Eliminating this perceived risk will attract investors, while keeping it will deter them.



Adopting the Euro will give Estonia a unique advantage and send a positive signal to the region and to Europe. The significance of this event should not be underestimated.

Looking beyond the horizon

As the convergence continues, Estonia will offer, for the next 5-10 years, an attractive risk-return combination for investors.

Initial conditions are supportive. The Estonian economy has proven its resilience and flexibility. It lacks any dominant industry and its de facto SME economy, with a diversified export structure, provides flexibility to readjust to supply changes in global demand. A large pool of people willing to return to jobs will be an important source of growth. True, the match of skills and expectations will not be perfect but, with effort on both sides, the gap can be bridged. Availability of labour will also ensure that wage costs will grow hand-in-hand with productivity improvements in the future, thus supporting competitiveness.

To be competitive, Estonia needs investment. As in the early 1990s, the late 1990s and after Estonia joined the EU in 2004, conditions are conducive for Nordic investors to rediscover Estonia. The Euro is a significant positive factor here. To climb upward in any international value chain, Estonia needs much more investment per employee. Strong investment, and trade and financial ties with the Nordic economies, coupled with a 200-400% labour

cost advantage, will be Estonia's advantage. In the international division of labour, what matters is not the cost competitiveness of Estonian companies compared with low-cost countries, but an ability to deliver the same quality of goods or services as are produced today in Nordic countries or in other advanced economies.

Estonia will exit from the crisis without a hefty public debt burden: its public debt is a fraction of what is estimated to be the EU average after the crisis. It is also well placed to tackle the fiscal challenge of an ageing population. On balance, this will permit the development of public services without raising the tax burden, and will promote a stable and internationally competitive business climate.

Finally, to succeed Estonia needs more innovation from every company, regardless of its business, and likewise in the public sector. The fact that such companies as Skype, Regio and Hansapank were created and developed in Estonia is not a coincidence. It is a sign that Estonia has people with entrepreneurial spirit and talent. Estonia has made it possible to make their ideas a reality.

Create a tide and ride on it.

20 November 2009, Washington D.C

NB! The views expressed are those of the author only and do not necessarily represent those of the IMF or the Executive Board.

The Institute of Clinical Medicine of the Tallinn University of Technology introduced a Masters degree in eHealth Technology for Health Institutions, which is a unique programme in Estonia and Europe.

Tallinn University of Technology begins to train eHealth experts

Text: **Tiiu Oga** | Hei

INSTITUTE OF CLINICAL MEDICINE, TALLINN UNIVERSITY OF TECHNOLOGY

Homepage: www.kmi.ttu.ee

COURSES:

Quality Management

(Professor Andres Kiitam & Researcher Tiia Tammaru)

Basics of eHealth

(Dr Peeter Ross and Dr Madis Tiik)

Data Coding in Medicine

(Researcher Dr Kalev Karu)

Servicing at Healthcare Enterprise

(Professor Ruth Sepper and Visiting Lecturer Karita Ilvonen-Reijonsaari)

Theory and Ethics in Medicine

(Assistant Professor Andres Soosaar)

Innovation Management

(Visiting Lecturer Aleksandr Miina)

Principles of Human Anatomy and Physiology

(Assistant Professor Kaiu Prikk)

Principles of Diseases and Medical Aid

(Assistant Professor Toivo Laks)

Epidemiology

(Professor Mati Rahu)

The aim of the MA programme is to prepare eHealth technology specialists who, upon completion of the programme, will have the skills needed to work in health sector institutions, with knowledge of how to use and manage e-health based IT applications, how to process and standardise health data, and how to provide information to customers. A great emphasis in the curriculum is placed on innovation and on developing new ideas and approaches.

“Health technology was one of the first areas in which healthcare institutions wanted to cooperate with the Institute, which was founded in 2003. There was interest in cooperation in teaching as well as in research and development,” says Professor Ruth Sepper, Director of the MA Programme.

“This development was driven by the need for specialists in healthcare technology.” Organisations that participated in creating the curriculum include Medicum AS, the East Tallinn Central Hospital, the Estonian eHealth Foundation, the Helsinki University of Technology in Finland and the Karolinska Institute in Sweden, the latter having a longer-term working relationship with the Institute of Clinical Medicine.

Fifteen students began their studies in September. “There are students with educational backgrounds in economics, healthcare, medicine—including one doctor—psychology and gene technology. This was to be expected, as we had prepared the curriculum for

students with different basic educations,” explains Sepper. The majority of the students also have practical work experience.

In addition to lectures, the students will undertake practical assignments in partnership companies during their third year of study. This will provide them with the opportunity to put their know-how into practice and to create contacts with potential employers.

Although the students who commenced their studies this year are all from Estonia, the Institute is doing an active marketing and information campaign in order to find potential students for the international programme, which is planned to open next academic year.

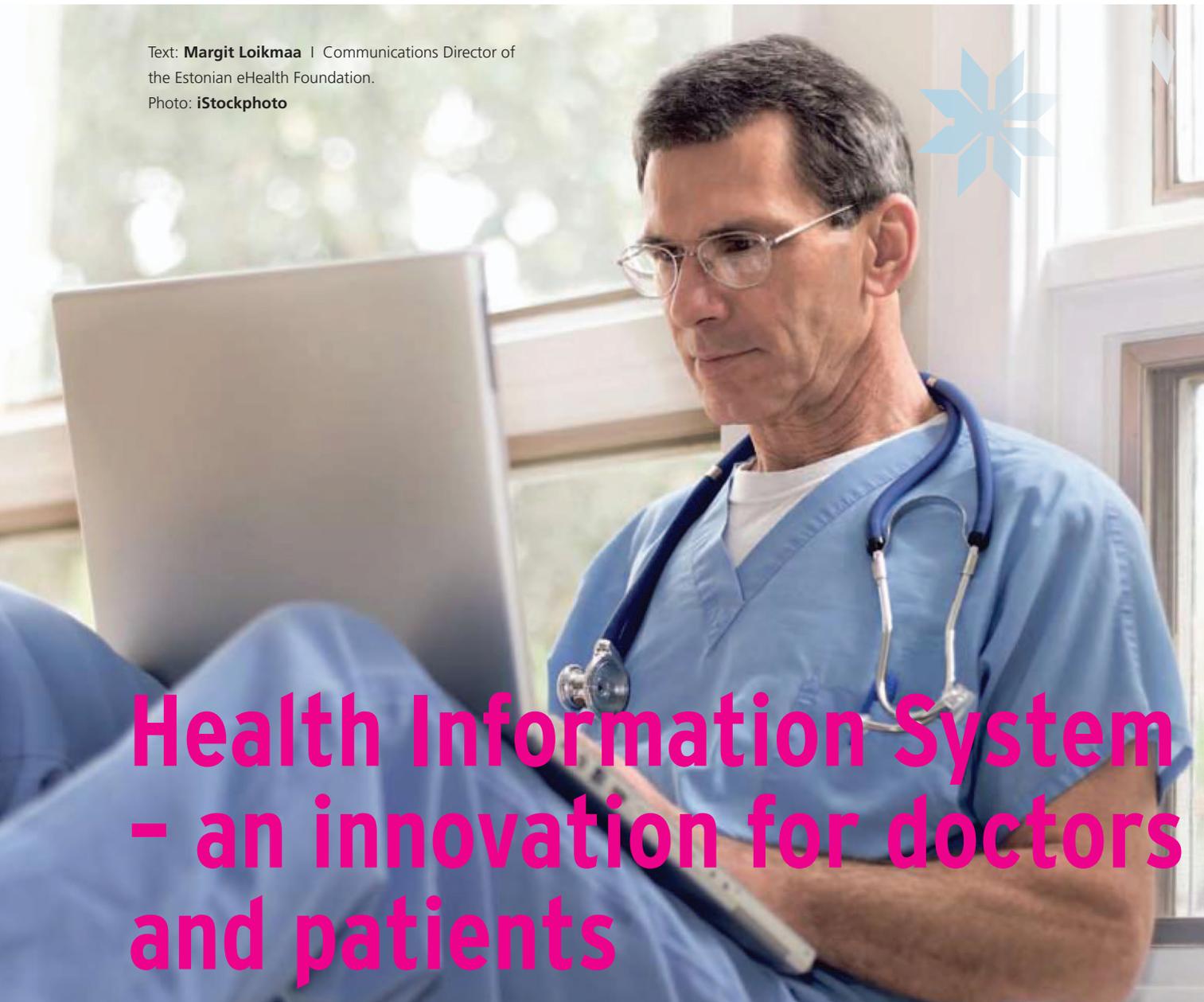
The study materials are already in English. In addition to a varied choice of IT subjects, the curriculum includes quality management, foundations of medicine and healthcare and, of course, the main field of study – eHealth technology.

The first feedback from students and tutors on the necessity, content and quality of the new MA programme will be given at the end of the first semester. Such feedback will be solicited on a regular basis.

The second direction being developed by the Institute is in-service training for people working in the healthcare sector. The modules and schedule have almost been completed.



Text: **Margit Loikmaa** | Communications Director of the Estonian eHealth Foundation.
Photo: **iStockphoto**



Health Information System - an innovation for doctors and patients

As of this autumn, everyone in Estonia will finally have the long-awaited opportunity to view their medical history through an online patient portal. The age-old perception that patients have nothing to do with their medical information is changing, with more and more people realising that an informed person will take better care of their health. On a large scale, such an innovation is a step closer to a working medical relationship between doctors and patients, and to a healthier society.

The portal, which was opened in October, fulfils patients' basic need for information – they can see their test results and the medications prescribed for them, or consent to organ donation after death. A patient can also appoint a representative who is entitled to purchase prescription drugs from a pharmacy on the patient's behalf and who is entrusted with the right to know the person's medical history. Denying physicians access to health records is also possible in the portal, but before deciding to do this, the person must realise that doctors might then lack the necessary information to choose the best treatment. In the patient portal, people can see who has viewed their information and, if necessary, enquire about the purpose of accessing this information. The application has been made more user-friendly and its functions and appearance improved in the course of future development. The portal can be accessed using an ID-card, or by logging in on the www.e-tervis.ee website or the www.riik.ee citizen portal. Currently, people can view the documents that have been submitted since the beginning of this year by the institutions that have joined the system, provided that the person has visited a doctor during this period. At the moment, there are no plans to digitise earlier records.



The patient portal provides a layman's view of the patient's medical history, whereas the Health Information System (launched at the end of 2008) is a tool for medical specialists. This system integrates the information systems of medical institutions across Estonia, to enable doctors in hospitals and health centres to exchange information with each other, regardless of the location, date or time. In this way, a physician can submit an inquiry to the central system to retrieve a patient's medical history and past test results. Also, physicians have the responsibility of entering referrals, case summaries and test results into the system. Data-intensive test results, such as X-rays, tomographic images and sonographic images, will be preserved in data repositories; to provide access to these, each electronic health record will include a link that displays the relevant test results when clicked. Back in 2005, at the beginning of the development of the eHealth application, it was clear that the biggest challenge would not be the technological design but instead the ethical aspects and practical implementation. Both patients and doctors posed relevant questions about which data should be accessible to which people. After long discussions involving all parties, the access terms, roles and responsibilities were finally written up as law in September 2008.

The courage to admit and learn from mistakes

Now is quite a good time to draw conclusions from what we have learned during the launch and implementation of the information system. One of the stumbling blocks, which we can clearly see in hindsight, was our excess optimism in setting deadlines and targets. The need for changes in the internal work organisation of the end-user institutions turned out to be greater than estimated; therefore, we ended up overestimating users' readiness for digital communication. As a result, sign-up was not as active as we had expected. Although things have not happened as fast as we would have liked, we can see more and more institutions taking the initiative to become involved, and their realisation that what we are doing is important and necessary. The institutions have started to use the system more actively in their everyday work, so that their contribution is no longer limited to the acceptance of the general concept. Of the big hospitals, the following are currently submitting their records to the Health Information System: the East Tallinn Central Hospital, the North Estonia Medical Centre, the Lääne County Hospital and the Haapsalu Neurological Rehabilitation Centre. Statistics on new members and the number of records are updated every weekday morning, on the website at <http://www.e-tervis.ee/tisga-liidestunud-tervishoiuasutusused.html>.

The concept of eHealth is not limited to the use of computers in health care institutions. It also covers electronic medical records, diagnostic systems, decision-making support and, perhaps in the future, automated diagnostics and the choice of treatment. A fast-developing branch of eHealth is telemedicine, which allows for medical consultation online, by phone or by using other technological solutions.



Did you know that:

- > **748 health care institutions have joined the system;**
- > **175 medical institutions submit their data to the central system;**
- > **The Health Information System included 181,000 medical documents in the middle of September.**

A topic for future discussion is if, and to what extent, technology can replace human skills and interaction in the treatment process. Health information networks can support data collection and provide access to data, but they can also support communication and the interaction between patients, health care specialists and institutions, and politicians and legislators.

There has been a lot of talk of how the recession is having a positive impact on innovation. The desire to save time and money requires doctors to automate routine procedures. Taking better care of your health, awareness of your current health, and the desire to preserve a fully enjoyable lifestyle even in cases of various chronic illnesses (which will not, unfortunately, disappear in our welfare society) – these are increasing trends in society. Not to mention that information technology and paperless administration are priorities established in the development strategies of both Estonia and the EU, setting us very clear goals. To meet these needs, we must offer technological solutions. We may have plenty of great ideas, but we also need organisations and institutions to be ready and willing to adopt these ideas.

The capabilities and skills of the private sector in regard to the development of information and communication technologies play a significant role in the development of potential applications. Co-operation between the private and public sectors will allow the government to create a supportive framework that enables companies to focus on the development of and investment in solutions.



Kalev Kask, CEO of EGeen:

The biotechnology company EGeen, which mostly carries out clinical trials in Central and Eastern Europe, has demonstrated stable growth. CEO Kalev Kask says in the interview that nowadays pharmaceutical industry has made progress and most illnesses are at least to an extent treatable and he predicts that the prices of medications will fall considerably in the future.

Medicine prices will fall considerably

Text and Photos: **Toivo Tänavsuu** | Eesti Ekspress
TigerPrises.com

Kalev Kask lives in the Silicon Valley in the US, where the headquarters of EGeen are located. He manages the international business of EGeen – clinical trials – on the European front, ranging from Finland to Turkey. Estonians mostly know the company as a major financial backer of the “national gene bank” Geenivaramu.

Kask is in his element when dealing with the pharmaceutical industry and venture capitalists. He acknowledges that the keys to the company’s success have been active communication, sales work and staying focused on its core business. Although the first half of 2009 was slow in the US pharmaceutical market due to the financial crisis, it started to pick up in the second half of the year.

What is needed for pharmaceutical research?

Patients with an appropriate group of diseases are certainly necessary. For example, there is a region in Ukraine which is twice the size of Estonia. There is a hospital there which is the size of all the Estonian hospitals put together. We provide medication to these people and research the effects. For example, we determine whether there is any pain and what kind of pain.

What are the phases of clinical trials and which ones in particular are EGeen involved with?

In the so-called Phase I clinical trials determine whether the medication is safe. Such trials are usually carried out in the USA or Great Britain, and we do not carry them out.

In the Phase II trials, we identify whether the medication has efficacy, in addition to considering safety. Such research is well suited for us and we do quite a lot of these kinds of studies. We also carry out Phase III research, where a larger group of patients is used to ensure that the medication does not have surprising side effects.

No product is as tightly regulated as medicines before they are released onto the market, and therefore drug trials may last a very long time. For instance, in the case of cancer medications, for those which are efficacious, the quality of life of patients is studied and their overall survival is measured. This means that research lasts for years. One of our largest prostate cancer studies took three years.

Do you write reports on the impact of medication?

Yes, exactly. With biotechnology companies, research results are the main stock exchange news. The data comes out and, depending on whether it is good or bad news, the stock prices of companies move up or down.

We have many customers – if something should happen to one, the others will still be there. Some of those are also listed on the stock exchange.

What is your field of work most dependent on - the financing of clinical trials?

It depends on how much money is circulating overall. There is always spending on health care because, just as people want to eat and have shelter, they want to live good and healthy lives.

At the moment, the investment climate in the pharmaceutical sector is very good, because large pharmaceutical companies have not made much of an effort, but there is a great need for new drugs.

Until now, the medications and sales have been good. Pharmaceutical companies have grown indulgent due to the large volume of sales of many drugs, such as for example cholesterol-reducing drugs and drugs for rheumatism. Starting this year, their exclusive patents are starting to run out, which means that generic equivalents of expensive drugs will come onto the market. Those are the same drugs but manufactured by someone else and sold without the price of the patent, which means 90 per cent cheaper.

This is a positive trend mostly for those countries that don't have a lot of funds to purchase drugs. But the situation is catastrophic for those large pharmaceutical companies who have built their business models exclusively on patents. As they themselves do not work on drug development, they have started to buy up biotechnology companies, often paying much more than they're worth.

This does not mean that we have it easy. We have to continue working and looking for export opportunities. EGeen has also a representative in Paris who deals with European pharmaceutical companies.

What kinds of drugs have you studied recently?

For example, we ran large Phase III trials on a drug for multiple sclerosis, as well as on a drug for ulcerative colitis.

Currently a large trial for a drug to treat Parkinson's disease is underway.

You once said that Parkinson's disease does not have a sufficiently large market value for capitalists, that it kills "only" 500,000 people a year in the United States!

Compared to the number of people suffering from depression, Parkinson's is indeed marginal. But there is a trend in the US pharmaceutical market for companies that have realised that the time when one drug earned 10 billion dollars are gone forever. They have to find something new, more specific drugs for smaller groups of people.

Pharmaceutical companies have to make more of an effort to benefit more diverse sets of patients.

Some time ago, EGeen expanded to Poland and Turkey. What was the aim of that expansion?

In the case of larger trials, we used to cooperate with US partners. We do not carry out trials in the USA ourselves because the environment for starting is more competitive, very bureaucratic and the business is not that good there. We try to stay with what we know and we know the medical system of Eastern Europe.

Then there was a need to carry out larger research on our own. We needed more hospitals and patients. We considered Russia as an alternative, but we would have had to send people over there in order to guarantee the quality of the trials, and the transportation costs would have been too high. Russia also lacks roads and the planes do not fly reliably. For economic and legal reasons, we decided in favour of Turkey, although there are problems there as well. For example, in some cases we cannot present questionnaires to patients as they are illiterate.

How many hospitals do you work with?

There are at least 30. In the past, we cooperated with as many as 150 hospitals. The equipment in East European hospitals is comparable to that in the States, which is important in pharmaceutical research.

What is the benefit of trials for patients and hospitals?

For hospitals, trials mean money and the experience of clinical research.

Patients receive innovative treatment, which is often paid for. One Estonian doctor said that a clinical trial is the time when patients receive the most attention. Unfortunately, this is often true.

How big is the business of EGeen?

Our turnover is under 10 million dollars annually, which does not even put us in the top fifty in the States. The turnover of bigger companies is 2-3 billion dollars. But we have our own niche and this is the third year we've shown a profit.

During the last year we have even considered buying out some competitors. Those who manage to survive difficult times will have some good opportunities.

By your "own niche", do you mean Eastern Europe?

Yes. We have been offered the opportunity to expand into Latin America. But imagine someone telling you to go and work as a journalist in Columbia? What can you do? You fly there, but you have no idea who to talk to.

That's the same with us. We know how things work in Eastern Europe. We know how to do business in the States as well, although lawyers have made things too complicated there: when you do this, there are certain dangers, when you do that, they are such and such – the patient will die before they manage to read the contract to them.

How many pharmaceutical researchers like EGeen are out there?

Very many. At first we had trouble getting clients. Now we have a client base and references and this keeps us going. Larger pharmaceutical companies are making people redundant, as they cannot afford to pay the salaries of such great armies. So they just keep top management and marketing – the rest gets spun off into companies like ours.

What is your opinion of the current swine flu panic?

Panic is the right word. In the USA, it started in the spring. Now they have found that normal seasonal flu kills about 30,000 people a year, while only 4,000 have died of the swine flu, and in many cases the real reason is other illnesses. The panic is now almost over in the US.

A common conspiracy theory has it that the panic was created by pharmaceutical companies to serve their business interests...

The truth is that pharmaceutical companies could not have predicted that people would be so ignorant. Swine flu is not that different from seasonal flu: it is not some horribly severe illness.

Yet countries are equipping themselves with millions of vaccination doses!

In democratic countries, the governments would have been blamed for deaths if they had not ordered the vaccine. For example, in Ukraine they are starting to quarantine hospitals, which is foolish, as patients with other illnesses cannot get medical help. But they are due to have presidential elections and the opposition is already blaming the government for the deaths.

In the States, it has been the elderly who have scrambled to get the vaccine, breaking their legs in the process. The damage to their health on the way to get the vaccine is worse than the complications of the illness against which they are vaccinated. Healthy diet, eating vitamins and washing your hands are better than the vaccine.

Skeptics also say that the longer term impact of vaccines is unclear.

Many diseases, such as polio, smallpox and mumps, which devastated previous generations, have been completely eliminated due to vaccines.

You have claimed that there is a medication for practically all illnesses, but that drugs with a higher "market value" are developed faster.

I am not aware of a real medication for Alzheimer's. They are working on it, but the mechanism of this illness is still unclear. It is easier to treat illnesses where the cause and spread of the illness are known.

The best example of the power of the pharmaceutical industry is medication for HIV. This virus, which makes one's immune system break down, was discovered about 25 years ago. Then they studied the virus, investigating the elements of its life cycle. They found three or four proteins which are unique to it and the structures of those proteins were broken down with X-ray spectroscopy. On that basis, drugs were designed which block the spread of the virus. These days you take one tablet per day and HIV is under control. The treatment is relatively expensive, but nonetheless it exists.

In general if you produce a drug which delays the death of very ill people by three months, you already have a market in the United States. The American Medical Association dictates 70 per cent of this business. Americans practically pay for the pharmaceutical development of the rest of the world.

So cancer is curable, and HIV can be kept under control - for patients, it is just a question of money?

Yes, it depends on whether the patient or the state is able to pay for it. The best approach, of course, is to prevent disease. The fact that the HIV medication exists does not mean that you can now do anything. You have to exercise! Personally I keep my cholesterol level low.

What is the trend in the pharmaceutical industry today?

The trend is clear and it originated in Europe. Up until now, medications have constantly been improved, but have also become more expensive. As

Europe is a bit poorer than the USA and not that much treatment is paid for, good drugs must now become cheaper and there must be more of them.

The market has already started to stabilise the prices of medication. Producers have to make more of an effort for clients to buy their products. That has a positive impact on the patient's wallet.

When will our GPs start to analyse our gene data and identify potential illnesses?

I think there is no business at the moment in genetics.

The Icelandic gene technology company Decode spent billions of dollars but recently went bankrupt. The company 23andme, which is linked to Google, and where you can buy a genome card for five hundred dollars, recently sacked its staff. Their genome card only tells you that you are a white and a man. But that is pretty obvious, although perhaps not always in San Francisco. There are definitely easier ways to make sure than to pay a hefty sum to sequence your genome.

EGeen unites US venture capitalists and Estonian businessmen

EGeen is a company founded in 2001 which carries out clinical trials in areas such as cancer, urology, neurology and several internal diseases.

The headquarters are located in California, with sub-branches in Estonia, Latvia, Lithuania, Romania, Ukraine, Poland and Turkey.

The owners of EGeen include the risk funds Draper Fisher Jurvetson (one of the owners is the Estonian-origin Steve Jürvetson), Oxford Bioscience Partners, New Markets Fund, Baltcap and Biobank Technology Ventures. Via LHV, several Estonian businessmen, including Andres Liinat, Rain Lõhmus, Neinar Seli, Urmas Sõõrumaa, Tarmo Sumberg and Koit Uus, have a stake in the company.

EGeen's mother company from 2001 to 2004 was the owner and main financial backer of Eesti Geenivaramu.

By 2004, the data of 10,000 Estonian gene donors was in the bank, but there was no agreement between the owners and management of Geenivaramu about what to do with the data. EGeen left the project.

EGeen's customers are mostly US and European biotechnology companies. Currently, four clinical trials are underway.

Kalev Kask, Ph.D., completed his graduate degree with Prof. Tamas Bartfai at Stockholm University, and his post-doctoral training with Prof. Peter Seeburg at the Max-Planck Institute for Medical Research in Heidelberg. He then joined the neurogenomics company AGY Therapeutics of South San Francisco as a senior scientist, followed by research at Stanford University and advisory work with Asper Biotech and Toshiba, prior to founding EGeen. Dr. Kask has authored numerous scientific publications and has patented genomics-derived drug and diagnostic targets.



Text: **Toivo Tänavsuu** | Eesti Ekspress, **TigerPrises.com**

Photos: **Sven Tupits**

The united front of Estonian cancer research companies: 68 scientific articles and 10 patent applications

A good example of Estonian R&D companies coming together and joining their capabilities is the Competence Centre for Cancer Research, which was founded in 2005. Today the consortium includes 12 partners: Tallinn University of Technology, Protobios, Celecure, Kevelt, InBio, Cambrex Tallinn, TFS Trial Form Support, North Estonia Medical Centre, University of Tartu, Quattromed HTI, Baltic Technology Development, and EPhag.

In the interview given to Life in Estonia, Riin Ehin, Chairwoman of the Board of the Competence Centre for Cancer Research (CCCR), sheds light on the activities and achievements of the Centre.

How does the Centre relate to its members and what was the incentive for establishing it?

The Centre has managed to bring together more or less all the organisations which work actively on cancer research in Estonia. Our aim is to save human lives and to improve the quality of life of cancer patients.

The fight against cancer is definitely not an easy one, because cancer is an extremely heterogeneous disease. In terms of molecular biology, 'cancer' means more than 350 different diseases with varying diagnostic methods and treatments as well. So in the light of our current knowledge, it would be impossible to develop a single universal cure for cancer which would help all in need. Cancer is one of the main causes of death in the developed world: every second man and every third woman will face the diagnosis of cancer in his/her life. At the same time, the development of medicine and biotechnology today has made it possible to re-evaluate the general prognosis of cancer as an illness. Whereas just a few decades ago the diagnosis of cancer meant more or less a clear and fast death sentence, biomedicine today provides the opportunity to regard cancer as a disease which can be treated or as a chronic illness where the best response to treatment is a result of a personal medical approach.

What will the Centre make it possible to achieve?

Estonia has historically strong schools of biochemistry, molecular biology, oncobiology and oncology. Each branch has found its own outlet through clinical medicine, academic research or business. Before the Centre was founded, the contacts between those areas were relatively sporadic. The Centre enables us through synergy between different branches to find innovative solutions in diagnosing and treating cancer as a very difficult and complex illness.

What is the goal of the Centre?

We are running development projects in two important fields – developing new generation cancer drug candidates, i.e. therapy, and developing

and applying the methodology of early cancer diagnosis and prognosis, i.e. diagnostics.

The success of the treatment depends a great deal on how early the cancer is detected. Thus, the diagnostics development orientation of CCCR develops new technological platforms for early diagnoses of cancer. It will enable to diagnose cancer non-invasively, that is, without having to perform surgery on the person to make a diagnosis. CCCR is in the process of developing a new diagnostics platform that will help to test for the markers of certain types of breast cancer and intestinal cancer, using peripheral blood, in very early stages. Protobios, a partner of CCCR, has already licensed a set of markers to a US pharmaceutical company. The next marker-based diagnostic tests are currently undergoing clinical studies, in co-operation with the North Estonia Medical Centre.

Some tumours are genetic in nature, meaning that the gene that increases the risk of cancer is inherited from parents. These people have a much greater risk of cancer than the average population. CCCR has developed an onco-genetic testing platform combined with onco-genetic consultation. Gene testing and genetic consultation are already used in the case of genes that predispose people to certain types of breast cancer.

The early diagnosis of cancer is essential. And it is important to know, for the treatment of cancer, how aggressive the particular form of cancer is. The cancer drugs used today usually have many side effects. Therefore, it is important for the patient's well-being to use an optimal treatment plan. One of the projects of the CCCR's diagnostics development orientation studies the use of semaphorins and plexins (certain proteins) in the diagnosis of gliomas (a type of brain tumour), and the determination of how aggressive these are.

In addition to diagnostics, CCCR also has a therapy development orientation that focuses on the development of candidates for new-generation cancer drugs. The aim is to achieve greater selectivity, so that the drugs will only kill cancer cells and not anything vital to the body, and will minimise side effects. There are currently seven development projects in progress in the therapy development orientation.



Who do you cooperate with?

CCCR unites almost all the organisations in Estonia involved in top-level research on malignant tumours. Also, the Centre has very good partners in the USA, Sweden and Finland. Together we have already come up with solutions which each one of us individually could not have achieved.

In a technology-focused enterprise, the amount of brain-power is critically important. Although the Centre employs 70 people, we can count on the input of nearly 2,500 people in solving problems that we face in development work. All those scientists, doctors and others are linked with the Centre through our partners. Science is an extremely rational field – you cooperate with whoever can offer you opportunities for synergy and the growth of shared values. Estonian biotech companies have various unique capabilities and technological solutions and this has fortunately been noticed in the world already.

What's your assessment of the business potential of your members?

They are top-class in terms of research: our scientists publish articles in the best scientific journals and have continuously received research prizes in Estonia and internationally. For example, during the last three years there have been 68 scientific articles published on topics related to the Centre and 10 international patent applications have been submitted. Our researchers have supervised in the preparation of 14 academic graduation papers (BSc, MSc and PhD) at the Tallinn University of Technology, the University of Tartu and the Karolinska Institute in Sweden.

The business potential is equally noteworthy. As I have already mentioned, our partner Protobios has licensed a set of markers to a US pharmaceutical company; the outcome of another project, involving the company and project partner AS Prosyntest, has now been sold to Cambrex Inc, a listed US corporation. New onco-genetic tests are being used in Estonian hospitals.

Website: www.vtak.ee



The Tallinn University of Technology has submitted an application to the US Patent and Trademark Office to patent the new cancer treatment method discovered by scientists at the university.

Researchers at the Tallinn University of Technology, led by Professor Priit Kogerman, have discovered a new way to use kinase HULK3. This is a kinase which may be suitable as a drug target in treating cancer. According to Kogerman, cancer usually involves the excess production of cells, some of which have the characteristics of stem cells. "HULK3 is a significant protein inside the cell which influences the reproduction of stem cells, and when we manipulate HULK3 we can also manipulate the number of cancer cells," he explained. "It may also be possible to use it to depress the spread of cancer cells outside of the primary tumor, in other words to reduce the creation of secondary tumors, or metastasis."



In order to study cancer cells, Professor Kogerman's research group grows cancer cells in chicken- and goose eggs, for example, and then monitors how they grow, create their own circulation and metastasize from the primary tumor. The research group estimates that those processes can be influenced with the use of experimental cancer drug candidates.

"After lengthy and expensive development work, lasting for a decade on average, those preparations may reach our clinics and patients receive some real benefits," commented the leader of the research group. "And if this dream does not become a reality, we will still have obtained new knowledge which will help to better understand and fight cancer."

At the very least, the researchers of the university foresee tests used as an application in the clinic which will help to diagnose cancer and predict its spread. "This will be the case in no more than five years," adds Kogerman.

Research data on HULK3 will soon be published in international scientific journals; the first article describing the results has been accepted by the journal *Experimental Cell Research*, the main author being the PhD student Alla Maloverjan.

Priit Kogerman has submitted several international patent applications before and has received patents, some of which have been licensed to Estonian biotech companies. There are already cancer drugs developed and on sale in Estonia which target kinases, although not HULK 3, for example the drug for treating breast- and uterine cancer, Herceptin/trastuzumab, and the leukemia drug Glivec.

Text: **Toivo Tänavsuu, Hille Tänavsuu, Eesti Ekspress, TigerPrises.com**
 Photos: **Sven Tupits**

Estonian science breeds world-class researchers



At first sight, it seems that the Estonian chemical and biotechnology sector is experiencing obvious growth problems. Estonia is a small country, with just 1.3 million inhabitants, and hence there is probably a lack of bright chemists and biologists and, due to its young age, the state's experience in sales, marketing and entrepreneurship is not that great. There is probably not enough money for research and development activity either.

But lo and behold, upon closer inspection, there are several valuable "gems" in this field currently being polished.

Estonian science is on a good international level and provides a favourable environment for scientific activity – several spin-off companies with strong international potential in their niche have grown out of the University of Tartu and the Tallinn University of Technology.

Providers of diagnostic services and companies linked to the research and treatment of cancer, among others, stand out, having developed a network of global partners and customers.

Celecure starts clinical trials for a new cancer drug

In 2002 Professors **Priit Kogerman** and **Andres Valkna** of the Tallinn University of Technology made a deal with the venture capitalist **Rainer Nõlvak**, and the company **Celecure** was born.

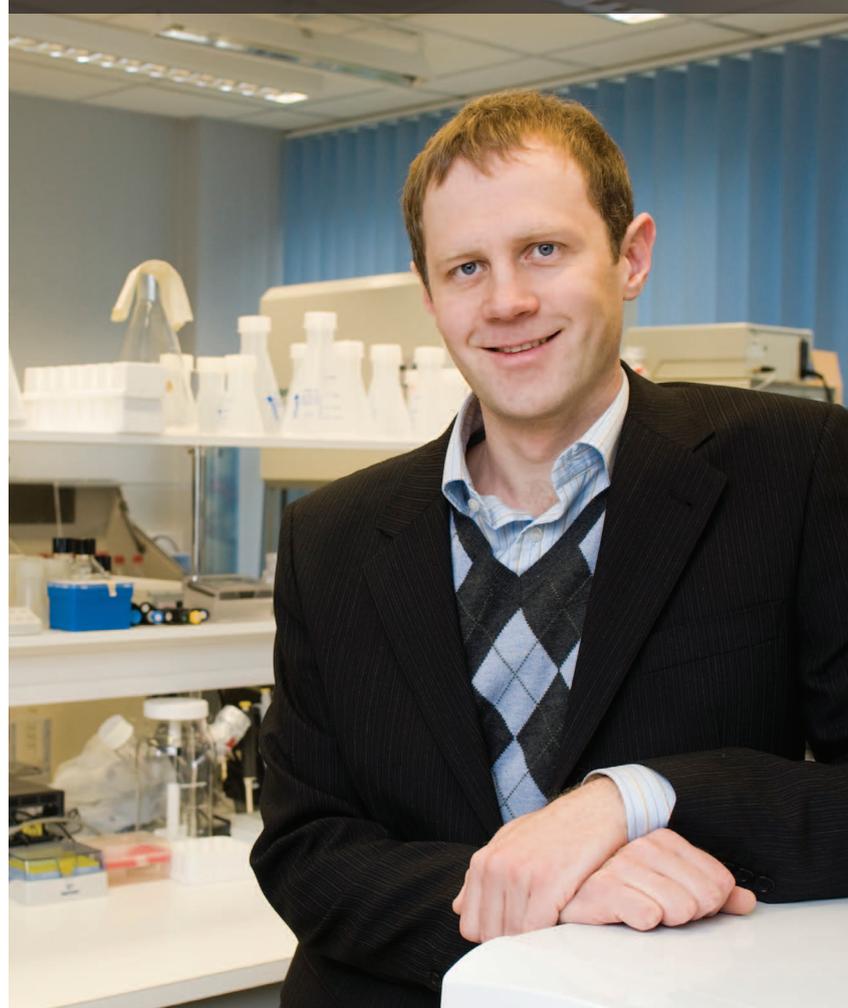
The first project of the company turned out to be quite scandalous, as they started working on a discovery of a Russian scientist who had worked for the military industry of the Soviet Union: preparation CC0101, which kills cancer cells.

"It was a cancer drug candidate which consisted of one protein and a cytotoxin, and which took a certain kind of cancer cells into apoptosis, or programmed cell death," says **Tarmo Kivi**, Manager of Celecure. "However, nothing came of this development work. It remained incomplete, as producing the animal protein needed for the preparation was too complicated and costly due to the existing conditions set on medical preparations in the Western world."

The preparation has a US patent, but the development is more or less stuck away in a drawer. The scandal, however, had to do with critics enquiring whether Celecure was developing a biological weapon at the request of a foreign state. The Estonian Defence Police ran an investigation and disproved all the conspiracy theories.



Tarmo Kivi is certain that if everything goes according to plan, the Celecure cancer drug could become the grandest business project of Estonian biotechnology to date.



Today Celecure is in its fourth year of developing a new cancer drug. The goal is to start clinical trials in 2011 and to sell the license of the product to a large pharmaceutical company. Initial negotiations with several companies are underway.

The angiogenesis inhibitor is primarily meant for cancer treatment, but it may turn out to be of use in the treatment of certain eye and skin diseases. These include adult blindness and macular degeneration caused by the inflammation of the eye retina due to diabetes, as well as psoriasis and various chronic conditions.

Animal tests have shown that administering the drug stops the development of blood vessels in cancerous cells, which in turn means that the cancer cells have no opportunity to get the nutrients and oxygen they need to survive.

Tarmo Kivi says that a couple of drugs which work on the same principle are already successfully on the market, one of which is Avastin, which generates several billion dollars in revenue each year. The drug developed by Celecure should bring better results due to its new and more effective mechanism, as this drug has a direct influence on cells which lead to the formation of new blood vessels in tumour tissue. Celecure will be able to bring its product onto the market in five years, at the earliest.

If everything goes according to plan, the Celecure cancer drug could become the grandest business project of Estonian biotechnology to date. The pharmaceutical industry is growing – people live longer and suffer more from cancer, heart and coronary diseases and other health problems related to age. There is a constant demand for new and better medication with fewer

side effects, even when similar products already exist in the market.

The intellectual property which forms the basis for Celecure's development work has been developed by the scientists who founded the company in cooperation with Swedish scientists. The key figure in Celecure is the biochemistry doctor Andres Valkna, who received his PhD at the University of Tartu and has worked as a visiting researcher at the University of Stockholm and the Scripps Research Institute in the USA.

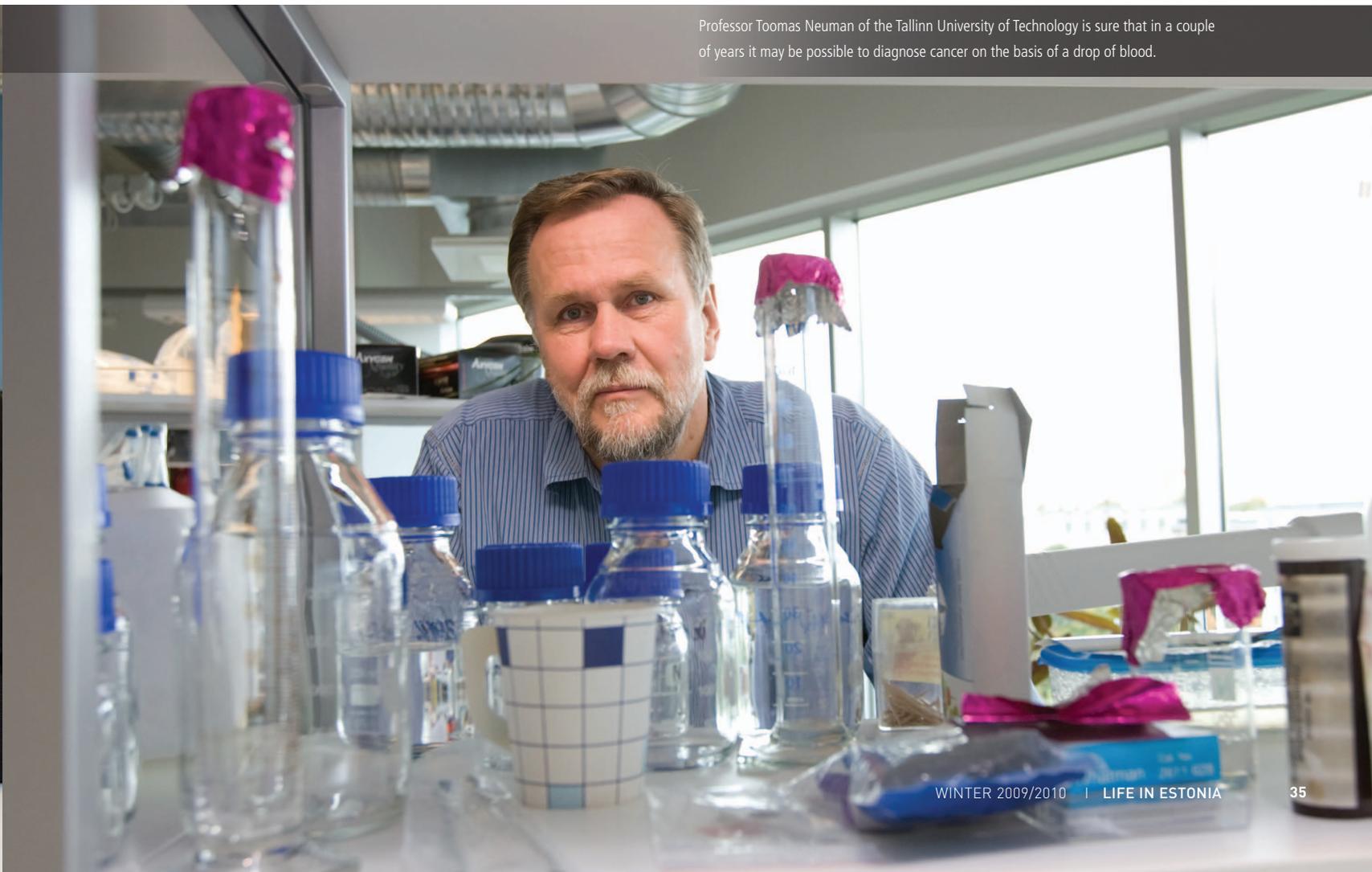
Estonian researchers collaborating with big Pharma

In addition to drug development, Estonian scientists are working on the diagnostics of different diseases, including cancer. It is well known that detection of a disease, including cancer, at an early stage will result in the best treatment results.

Professor **Toomas Neuman** of the Tallinn University of Technology has ambitions in this field. The network of companies linked to him works on biomedical research and the development of diagnostic systems for early detection, prognostics and treatment monitoring of several diseases. The most well known of such enterprises is **Protobios**.

Neuman's team is working more closely on biomarkers and is conducting several clinical trials to validate the clinical significance of discovered biomarkers. Biomarkers are molecular indicators which characterise the condition of the human body. For example, the presence of specific antibodies or a certain insulin level can be biomarkers. The scientist claims that there are as many biomarkers as one is able to measure.

Professor Toomas Neuman of the Tallinn University of Technology is sure that in a couple of years it may be possible to diagnose cancer on the basis of a drop of blood.



Kaia Palm, Managing CEO of Protobios, explains that the company investigates which markers characterise specific illnesses. They try to find opportunities to improve on cancer diagnostics – whether to make an early diagnosis or to monitor the course of the disease and the efficiency of the treatment.

Understanding cancer at the molecular level is complicated, since there are numerous intracellular molecular networks involved in different cancer types. Basically, each patient's cancer is unique and a self-contained illness for which there is no standard treatment.

Neuman's research group is studying the human immune system to identify its responses to disease and to identify immune system related biomarkers that can be used in clinical diagnostics. The immune system responds to diseases by developing specific antibodies and T cells that recognize diseased cells and disease-related molecules. The obtained information concerning immune system response to molecular events related to disease can be used to develop a variety of diagnostic systems.

"Scientists still have a really hazy idea of what happens inside cells. We know what a human being is made up of – what kind of genes and proteins are there and which gene encodes which protein, but how all 25,000 genes work inside a cell—which is ten to fifty microns in size and hence invisible to the human eye—in a coordinated way, still needs to be clarified," explains the cell biologist.

Neuman says that clinical trials are underway in Estonia and elsewhere. Researchers are pinning their hopes on faster success in trials which are taking place in two US cancer treatment centres at the University of Pittsburgh and the MD Anderson Cancer Centre in Houston. These centres have good biospecimen collections and this research focuses on lung cancer. Together

with the Oncology Centre of the North Estonia Medical Centre, Protobios's team is working on creating the methodology for diagnosing breast cancer. This is a future-orientated study, the results of which will be seen in years to come.

There are eight patents and several patent applications for using biomarkers registered in Neuman's name. "There is no point in leaving your house without a patent; you will immediately be outmanoeuvred. There are thousands of people in the world working with biomarkers. This applies in every field – you have to be on the ball and keep an eye on what others are doing," he says.

This activity has a clear business aim as people strive to create their own products. What is unique is an approach involving the development of a system of biomarkers, using existing techniques, which can be applied to get results. Neuman promises that in a couple of years it may be possible to diagnose cancer on the basis of a drop of blood.

Neuman admits that, as medicine is also a kind of business, he hopes for a breakthrough in the large and solvent US market, as well as in the developing markets of India and China. "With our partners in the US, we have licensed a set of biomarkers discovered by Protobios to a large international pharmaceutical corporation and will co-develop a lung cancer test for worldwide use.

Neuman, who worked for sixteen years in the USA, was already fascinated by science, especially biology, as a schoolboy when he came across the book *Guide to the Century of Biology*. His interest took him to the University of Tartu to study cell and developmental biology. His interest in business was born in 2000, when he and his colleague Kaia Palm founded a company in the US.

The team of Protobios tries to find opportunities to improve on cancer diagnostics – whether to make an early diagnosis or to monitor the course of the disease and the efficiency of the treatment.





Young chemists Malle Päre, MSc, and Konstantin Kislitsõn, MSc, at work at the laboratory of Cambrex.

A US stock exchange company acquired the Estonian business

Estonian science is on a decent international level and the price of research and development as a service is cheaper than in the USA or other European countries.

The chemical industry conglomerate Cambrex Corporation—listed on the New York Stock Exchange, with a 450 million dollar turnover and 800 workers—realised this and bought Prosyntest (now **Cambrex Tallinn**), a spin-off company of the Tallinn University of Technology.

Cambrex is a leading supplier of products and services to Life Science Industry. Products include Active Pharmaceutical Ingredients (API's) and advanced intermediates for the synthesis of API's, as well as biologically active compounds. Services include the development of synthesis, analysis and technology platforms needed for product development and production.

The Managing Director of Cambrex Tallinn, **Kaarel Siirde**, says that the company offers research and development services in the field of custom organic synthesis. It develops and introduces various chemical technologies and works in the field of producing chemical products and test productions.

Last year one of the leading Estonian biomedical companies, **Icosagen** (formerly Quattromed), sold its diagnostic division (Quattromed HTI Laboratories OÜ) to

the investment company BaltCap Private Equity Fund. This diagnostic division provided molecular and conventional diagnostic services to Estonian hospitals and now plans to expand its business considerably. The biotechnology division of Icosagen AS (Icosagen Cell Factory OÜ) is involved in the development, production and sales of biochemical, molecular- and cell biological products and technologies to different customers. Icosagen AS has created a network of dignified customers and partners, including such well-known corporations as Bayer HealthCare and Sanofi-Pasteur.

The development work of Icosagen takes place in immunoanalysis, biochemistry and microbiology laboratories in Tartu. They work on creating technologies for the production of therapeutic proteins, antibodies and cellular tests. The company's product catalogue has a wide choice of molecular biology products: monoclonal and polyclonal antibodies, enzymes, DNA & RNA cleaning kits, etc. Under the trademark of FITkit[®], they offer natural rubber latex (NRL) to detect allergens in rubber materials and produce the necessary reagents for determining allergens.

The antibodies of Icosagen have been used in the development of the HIV vaccine for over a decade. These reagents are available from major distributors in Europe and the US, as well as directly from Icosagen AS.





Genorama QuattroImager is the four-colour microarray detector designed for arrayed primer extension (APEX) based genotyping.

There are also first-rate companies in the field of genetic testing, for example **Genorama**, which is linked to the biotechnology entrepreneur **Indrek Kask**.

Genorama was founded in 2008 with the aim of bringing Genorama QuattroImager, the four-colour microarray detector designed for arrayed primer extension (APEX) based genotyping, onto the market. This is an appliance costing approximately 50,000 Euro, which to date has been purchased by twenty-five leading genetics labs all over the world. Six instruments have been sold in 2009.

Indrek Kask says that QuattroImager stands out from competing appliances in terms of its favourable price and high technological flexibility which makes it possible to develop specific genetic tests for any illness.

“In the near future we would like to get diagnostic accreditation for the appliance, as well as for the first products. Following this, we will market the Genorama platform, as one of the best genetic testing solutions, more actively to genetics laboratories,” says Kask.

QuattroImager is another good example of an Estonian product that has been successful in the global market. Kask believes that promoting active business development and sales are the most important aspects of development. “As more quality products which are produced in Estonia reach the market, awareness of our existence grows and turns into more proactive interest from the market in what is going on here,” he says.



Asper, globally leading DNA tester of eye disease

One of the most successful biotech companies based on Estonian capital is **Asper Biotech**, which, with its eye disease tests, is the leading global producer of corresponding genetic analyses. The company has over four hundred clients in fifty countries and its leading position has opened quite a few doors. Asper is also a participant in the Development Centre of Reproductive Medicine, which started activities this year and which provides access to the newest knowledge on problems related to infertility. It is an example of the general product development strategy of the company: to cooperate with the best in its field from Estonia and abroad.

The company's Marketing and PR Manager Terje Behrs says that they provide the service of DNA testing and have, together with their partners, developed over thirty DNA tests, and this number is growing. In 2008 Asper Biotech laboratories conducted genetic analysis of thousands of people.

Twelve DNA tests related to hereditary eye disease have been gathered together under the internationally known brand name **Asper Ophthalmics**, which belongs to the company. Asper is the only company in the world able to test different genetic eye diseases in such quantity.

In addition to ophthalmological tests, the company works in branches of oncology and reproductive medicine in cooperation with practicing doctors.

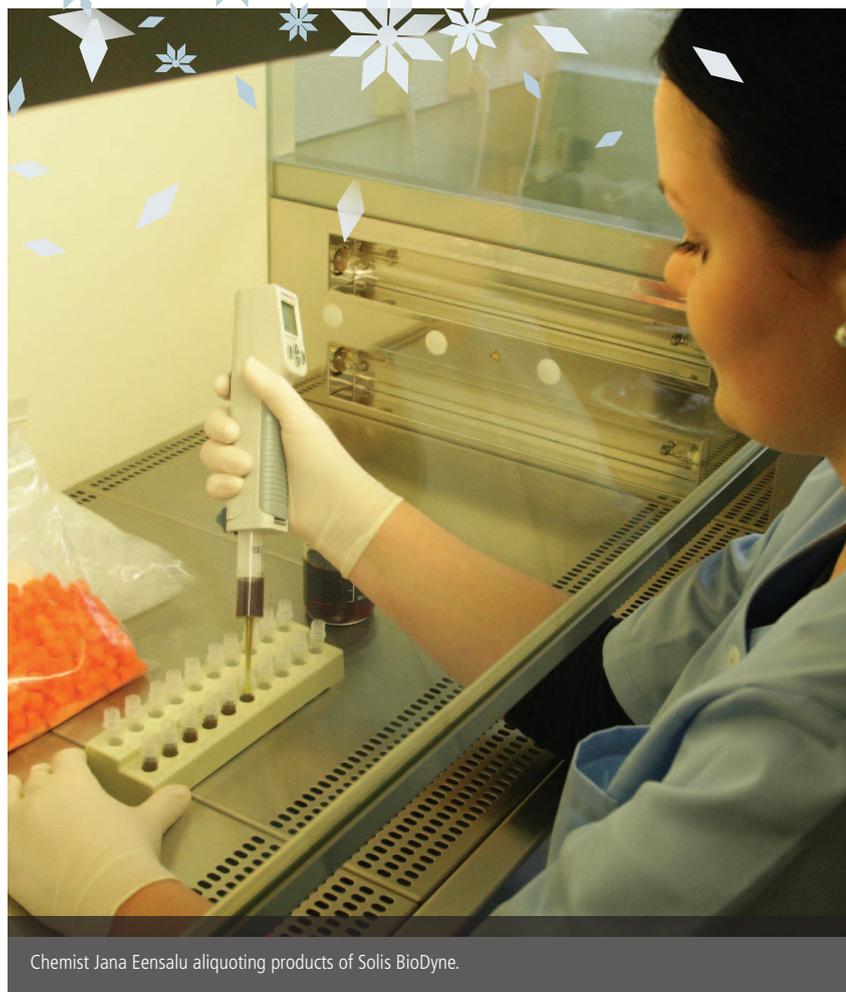
Behrs claims that the main markets of the company are North America and Western Europe. The customers include genetic scientists, medical geneticists and a growing number of practicing doctors. As a new service, there are plans to provide some genetic tests directly to private clients.

Clients worth mentioning are the universities of Stanford, Columbia and Pennsylvania, as well as the International Cancer Research Centre and Baylor Medical College, the University College of London and Regensburg University.

The research and development work at Asper is bearing fruit. "In the last year, we have developed several tests which help to determine the causes of infertility in individuals, which is a very important research area throughout the world. Starting this year, we will offer the service of genetic testing for colorectal cancer," says Behrs.

In the future, the primary emphasis will be on developing the test portfolios of oncogenetics and reprogenetics, and on increasing turnover and the number of services available, thereby providing new jobs in Estonia for people with higher education, and encouraging doctors to use genetic tests as a normal part of medical diagnostics.

Behrs: "Genetic tests are nothing superhuman – they are simply new and very effective ways of reducing and preventing damage which may be caused by genetic illnesses."



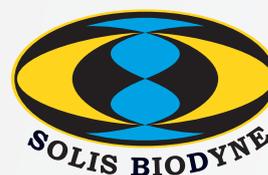
Chemist Jana Eensalu aliquoting products of Solis BioDyne.

A productive exporter in the field of Estonian biotechnology is the company **Solis BioDyne**, which produces, develops and sells reagents for DNA research, mainly DNA polymerases and linked products, to research centres and private companies. In 2008, their products were sold to 26 countries.

"Our competitive edge is the quality and price of the products, and stability at room temperature – our products can be stored for weeks at room temperature, as opposed to those of competitors who transport and use their products on dry ice," says Member of the Board Olev Kahre. The company intends to secure related intellectual property to facilitate its global competitiveness.

Solis BioDyne has had a representation in the USA since 2007, and it has the task of finding new customers and interacting with existing clientele.

"We've been guided by a well-known Estonian proverb: 'A bold start is half the victory', or persist and you'll succeed," says Kahre.



Riin Ehin and Egle Rebane are involved in developing new generation cancer drug candidates, which are more effective, selective and less toxic for other parts of the body.



The most ambitious innovation project in Estonia

Text: **Raivo Murde** | Hei
Photos: **Toomas Huik,**
Terje Lepp | Eesti Päevaleht

“The programme of competence centres, which has been funded from the European Regional Development Fund, is an EE programme which could best be described as one of the most ambitious and one which is aimed at enterprises and researchers, offering them a huge future potential,” relates Ilmar Pralla, the director for the Innovation Division of EE. Competence centres (or CCs) have a great role to play in influencing the competitiveness of Estonian enterprises. Research that is required by Estonian enterprises for product development purposes is the main function of research institutions which have been established as the result of co-operation between enterprises and institutions of higher education.

Approximately 1.3 billion Estonian kroons from the European Regional Development Fund, EE (Enterprise Estonia) and Estonian enterprises will be invested in eight competence centres this year and over the next couple of years, resulting in new innovative products and services and an increase in the capabilities of researchers, stems and universities.

Eight competence centres, which are to be allocated more than 900 million Estonian kroons from the assets of the European Regional Development Fund, were selected at the beginning of May out of a total of fourteen applicants. The maximum amount to be allocated to each development centre is 120 million Estonian kroons. Enterprises which team up with the development centres will invest an additional 400 million Estonian kroons in these research institutions.

The main fields of three-field, four-field and one-field selected enterprises are IT and electronics, bio-technology (food products and medicine) and materials, respectively. Estonia has strong enterprise and research bases in these fields.

development centres will invest an additional 400 million Estonian kroons in these research institutions.

The main fields of three-field, four-field and one-field selected enterprises are IT and electronics, bio-technology (food products and medicine) and materials, respectively. Estonia has strong enterprise and research bases in these fields.

Two types of enterprise have mainly been responsible for joining the competence centres, these being large-scale production enterprises or providers of services which are capable of selling products or services which themselves emerge as the result of research work, and smaller enterprises which offer them development work. "Such combinations work very well; several smaller development companies have also concentrated around Nokia, bringing success to Finland with this synergetic model," Pralla explains.

The founders and partners of CCs are such well-known enterprises as the North Estonia Medical Centre, Leibur, Valio, Võru Cheese Factory, Estiko Plastar, Andrese Klaas, Evikon MCI, Webmedia, Regio, Skype, Swedbank, Delfi, the East Tallinn Medical Centre, Dairy Co-operative E-Piim, the Animal Breeders Association of Estonia etc.

First results

Five of the competence centres have been operating since 2004 and the first results have already been achieved. For example, *Lactobacillus plantarum* TENSIA™, a bacterium which affects blood pressure, was discovered and developed as the result of a co-operation agreement between the researchers of the Bio-Competence Centre of Healthy Dairy Products and the University of Tartu; the bacterium was used by a dairy co-operative called E-Piim to produce a healthy cheese brand called Sūdamejuust (Heart-Friendly Cheese).

According to a representative of the Bio-Competence Centre of Healthy Dairy Products, Ene Tammsaar, they are also the very first consortium to offer milk production and processing companies innovative and practical advice in order to quickly solve everyday problems (workshops, tips on feeding and hygiene etc). Producers of foodstuffs are being given advice and recommendations concerning food, food ingredients and nutrition for each stage of the food production value chain.

According to Ilmar Pralla, the eight competence centres all operate in the spheres that are seen as the most promising for Estonia. "Regrettably, we don't have an energy and environmental technology CC, because there isn't room enough in Estonia for more CCs. The objective is to involve even more companies in the existing CCs," he says.

"One of the objectives of a CC is to promote co-operation between research institutions and enterprises," Pralla explains. Recent studies show that only two per cent of Estonian enterprises are co-operating with universities, which is a very poor result compared to Western European countries and, above all, to Finland. These eight competence centres bring together the *crème de la crème* of companies who are developing traditions of co-operation with universities. According to Mr Pralla, the number of enterprises which have joined the CCs has exceeded all expectations. More than a hundred other companies have expressed their desire to co-operate with the research institutions and invest in development activities.

Competence centres programme

- EE launched the competence centres programme in January 2003. The measure is used to support long-term co-operation ties between enterprises and research institutions, for the purpose of implementing market-oriented research and development activities.
- The budget for the competence centres programme, which is funded by the European Regional Development Fund, is set at one billion Estonian kroons until 2013, with the maximum amount available for each individual development centre being 120 million Estonian kroons.
- By October of last year, all competence centres were supposed to have submitted their intent to participate in the programme to the EE. In total, 29 applications were submitted by research institutions which have been established by enterprises and universities. EE brought similar groups together and fourteen applications made it to the next round.
- Eight CCs which required funding were selected out of the fourteen applications for the establishment of competence centres. Apart from that of the European Regional Development Fund, co-financing will be available for approximately one hundred partnering enterprises.
- A committee of fifty experts assessed the applications; those experts included general experts and internationally recognised specialists in their respective fields. The greatest amount of attention was given to the research capacity of the centres that had been established, something that is required by enterprises in order that they might be able to launch new, innovative products and services.
- Since 2004, the EE has contributed approximately 200 million Estonian kroons to the activities of five competence centres. These are the Competence Centre of Food and Fermentation Technology, the Bio-Competence Centre of Healthy Dairy Products, the Competence Centre in Electronics, Info- and Communication Technologies (ELIKO), the Competence Centre for Cancer Research, and the Estonian Nanotechnology Competence Centre.



“The programme of competence centres could best be described as one of the most ambitious and one which is aimed at enterprises and researchers, offering them a huge future potential,” relates Ilmar Pralla, the director for the Innovation Division of EE.

“This is a good indicator of enterprises’ good will and growing co-operation,” Mr Pralla continues. “CCs also represent a group of enterprises working together in order to achieve objectives which would otherwise remain unachievable if they were alone, and CCs will help to implement more ambitious projects and ideas.”

Benefits

It’s the easiest thing in the world to measure the benefits which have been gained by investing in CCs, by considering the new products and services which can soon be sold by Estonian enterprises.

“If our enterprises use the research results of our scientists for product development purposes, thereby becoming providers of products and services which offer more profitability and added value, the competitiveness of both Estonian companies and the national economy will improve,” Pralla says.

Ene Tammsaar gives an example of a dairy company which mostly exports products with low added value, ‘bulk products’ such as milk powder and

butter. The sales success for bulk products has also been attributable to the implementation of measures which have been provided by the EU’s Common Agricultural Policy (CAP) for the organisation of the dairy market. These include, for example, intervention purchase, private storage subsidies and usage subsidies on skimmed milk powder and butter, as well as export subsidies, including for cheese. Today, the EU has launched CAP reforms, and the liberalisation of the agricultural market is a general trend. Therefore, the dairy sector, in both the European Union and Estonia, is facing a new situation, in which it is necessary to focus on the production and sales of products with higher added value. The key elements of this flexible strategy are food and health, food quality and processing. This also assumes bigger investments being made in research and product development activities by enterprises.

Training people is one of the major benefits of CCs. Contemporary laboratories in competence centres represent an attractive learning environment for students, thereby encouraging them to seek further development in these fields. More and more master’s and doctorate degree theses are being developed at the request of companies which have joined CCs, and the individuals who have prepared their theses in this fashion will be employed by the same companies or will continue to investigate their chosen subjects in development centres.

For example, during the first three years, ten doctorate degree theses and thirteen master’s degree theses were drawn up on subjects related to the research fields being pursued by the Bio-Competence Centre of Healthy Dairy Products. According to the estimates supplied by Ms Tammsaar, between fifteen and twenty master’s degree theses and eleven to fourteen doctorate degree theses will be added to this list over the next few years.

According to Mr Pralla, this will help to inform students about the needs of Estonian enterprises, as well as the problems facing them, while changing the product development policies of enterprises in the long run.

“Changing the behavioural model of enterprises and universities is probably the biggest benefit contributed by the project. Entrepreneurs and research specialists who have joined the CCs will change their attitude towards establishing ties of co-operation and involving themselves in product development,” Mr Pralla predicts.

The interest in the establishment of competence centres has grown since 2004, when the first centres were established at universities. The largest number of CCs has been established at the Tallinn University of Technology, closely followed by different departments of the University of Tartu and the Estonian University of Life Sciences. The fact that, in 2007, four of Estonia’s biggest universities sold their services and entered into more than one thousand contracts, with a total value of 370 million Estonian kroons, speaks volumes. According to Pralla, the ties of co-operation with CCs will change the syllabi at universities, while also adapting research fields to meet the needs of Estonian enterprises.

Ms Tammsaar adds that the synergy that has been born out of the levels of co-operation between researchers and enterprises will help to create innovative products which will contribute to better health levels and will diminish the risks of disease. In the long run, adding up all the expenditures related to human life care, this would lead to considerable savings. “The enterprises can’t do it alone; both research institutions and the state must contribute to this purpose.”

Eight CCs were born out of co-operation ties between enterprises and research institutions

Competence Centre of Food and Fermentation Technology (CCFFT)

The Food Laboratory of the CCFFT develops new ice cream, confection, bread and dairy production technologies. Extending the shelf-life of products and improving the functionality of foods are its main goals. As a result of the work that has so far been carried out, the sales performance levels and the awareness of brand names of the companies involved will improve.

Another important sphere is the participation in co-operation projects with Dutch, Canadian, Finnish and Estonian companies and research institutions, all of which are aimed at the development and sales of technologies, hardware and software all over the world.

Bio-Competence Centre of Healthy Dairy Products (BCCHDP)

The research by BCCHDP focuses on the development of innovative, research-based platforms for the development of sustainable milk production and novel health products. The main research fields include biotechnology and human health.

Breeders of livestock and geneticists, feeding specialists, microbiologists, milk technologists, nutrition specialists, bio-chemists and doctors have joined efforts, within the framework of the CC projects, in order to scientifically digest and improve the milk production chain as a whole, from the breeding and feeding of livestock to the production of healthy milk products. The aim is to increase the competitiveness of the dairy sector of Estonia. The objective of the centre is to use new biotechnical methods to create new solutions and new, innovative technologies for the production of health-supporting, research-based products which aim to help mitigate diseases, are required in the domestic market and feature a high export potential.

The participants are the dairy cooperative E-Piim, the Animal Breeders Association of Estonia, Starter ST OÜ, the Estonian University of Life Sciences and the University of Tartu. The partners are a collection of small and large dairy companies and farms.

Estonian Nanotechnology Competence Centre (NanoCC)

NanoCC is mostly involved in performing common research projects in the field of nanotechnology and the development of new materials for its partners and other stakeholders.

NanoCC has two main research fields: nano-structural gas sensors and functional nano-materials.

The goal of the first research field is to considerably improve the measures in use for the detection of toxic, environmentally hazardous, explosive or just unpleasant gases. It will help to increase the use of gas sensors in industries, offices, households, and in the general monitoring environment. The first solutions suitable for final producers will be completed as the result of co-operation ties between NanoCC, Evikon MCI and other partners, and will hopefully be completed in a couple of years.

The aim of the other research field is to identify alternatives for combining various nano-structures with common everyday materials in order to improve some of their functional properties. Today, the greatest amount of attention is being paid to the implementation of carbon-nanotubes in co-operation with Estiko-Plastar, the Clay Processing Service and the Haine Ribbon Factory. In addition to the implementation of carbon-nanotubes, functional surface treatment materials, such as electro-optical glass, which is based on nano and micro-structures, are being developed in co-operation with Andrese Klaas and Printcenter Estonia.

Software Technologies and Applications Competence Centre (STACC)

The main fields for the STACC include software development methodologies (software systems which work faster, better and have higher levels of quality), and data extraction methods, or how to outsource interesting and important information from bulk data collections.

Such research will result in methods for analysing e-healthcare information in order to improve public health and provide high-quality diagnostic tools, analytical methods ensuring personal privacy (such as in health care or banking) and alternatives for developing better software, among other applications.

The most well-known technological partners of the STACC are Webmedia, Regio, Cybernetica, Quretec, Logica, KnowIT, Skype, Swedbank, Delfi and the East Tallinn Medical Centre, the users of such technologies.

Competence Centre in Electronics, Info- and Communication Technologies (ELIKO)

ELIKO's main domains are Smart Space Technologies and Services (SSTS) and Advanced Signal Processing (AST): in other words, sensing and signal processing methods and personalised data communications services.

Sensing and signal processing methods allow information to be collected from a variety of phenomena and processes. The measuring of biological, electro-chemical and mechanical values is studied and developed for this purpose, mostly by determining their electrical impedance. The goal, above all, is to improve the reliability of sensor networks in the field of health care. However, ELIKO also focuses on the service life of batteries and measuring their electric capacitance, and on identifying defects in a variety of composite materials and their structures (for example, wind turbine blades).

Personalised data communication services are primarily intended for the users of mobile equipment. A type of personal museum guide software called "Smartmuseum", which has been developed for the Research History Museum in Florence within the framework of a project that was launched under the Seventh Framework Programme, serves as a good example. The item suggests artefacts and selects multimedia content to match the wishes and pre-set preferences of a specific user. It is intended to implement similar software solutions in health care, such as in home nursing for patients.

In total, sixteen enterprises are currently participating in the applied research programme.

Competence Centre for Innovative Engineering Production Systems Technology (CCIEPS)

CCIEPS focuses mostly on three research and development domains, their common denominator being the development and implementation of the concept of the plant of the future:

- the development of e-production, and service life management models and identification of implementation requirements for products, which is based on the distribution chain network and cluster level, and on testing the models in enterprises;

- the development of company-centred automated processes based on robot-technical solutions;
- the development of intelligent systems for collecting and analysing the required information from the working environment, using sensors, and the adoption of smart decisions which are then communicated to control centres.

At the moment, this includes fifteen well-known enterprises which belong to an engineering and mechatronics consortium. The research partner of the CCIEPS is the Mechanics and Information Technology Department of the Tallinn University of Technology. On the international level, the plans include co-operation ties with a number of international centres. The CCIEPS development projects are linked to the European Manufacture Roadmap development concept.

Competence Centre for Reproductive Medicine and Biology Technology (Repro-CC)

The main domain of Repro-CC is the development of reproductive medicine technologies. The group mostly focuses on diagnostics of infertility and the development of methods of treatment. The results will be implemented in the form of new technologies, which will be used to identify the causes of infertility attributable to either men or women, and to improve the efficiency of infertility treatment. At the moment, the accuracy of methods for diagnosing infertility leaves a lot to be desired and the treatment has low efficiency rates.

Another priority domain of the Repro-CC is the development of technologies widely used in veterinary medicine (such as livestock breeding), and aimed at improving the efficiency of the breeding of livestock.

Thirteen partners, ten of them enterprises and three of them universities, are participating in the activities of the Repro-CC.

Competence Centre for Cancer Research (CCCR)

The aim of the Competence Centre for Cancer Research is to improve the quality of cancer therapy by developing and implementing new diagnostic platforms and offering the pharmaceutical industry new cancer drug candidates.

As a result of the research work undertaken by the CCCR, it will be possible to diagnose tumours at an earlier stage. The focus is on non-invasive diagnostics, meaning that individuals don't have to be operated on in order to discover whether they are suffering from cancer. Even now, it is possible to assess individual risks in terms of the occurrence of cancer when it comes to certain forms of breast and intestinal cancer.

New generation cancer drug candidates, which are more effective, selective and less toxic for other parts of the body, are being developed by the centre.

The vast collection of experience and knowledge among medical workers, bio-technologists and chemists is being pooled in order to create new drug candidates and diagnostic platforms. A majority of those Estonian organisations involved in cancer treatment and diagnostics are establishing members and partners in the centre.



The Estonian Research Institute of Agriculture is going to be at the helm of an international three-year project, with the aim of making the food produced in Europe much healthier.

Text: **Agne Narusk** | Hei
Photos: **Terje Lepp** | Päevaleht

Estonian scientists scrutinise European food habits

Juuliku is a little place near the small town of Saku, but in three years' time it will be on everyone's lips in Europe. The Estonian Research Institute of Agriculture (ERIA) has an experimental station located in Juuliku, and its laboratory will become a centre in which Estonian scientists will lead an international project which aims to make the food produced in Europe much healthier for consumers.

The expectations are high: funds allocated by the EU will be used to create a molecular and microbiology lab that will help Estonians join the European Union's open scientific field. Marge Malbe, the head of the department of Plant Sciences at the institute and the project's coordinator, says that this is a kind of capability-enhancing project which, if successful, will lead to international renown for ERIA, new and important scientific projects and, let's be honest, money for their execution and for the education of Estonian scientists.

Is Estonian milk the best milk?

Flavoure - as the project has been named - should provide an answer to the question of whether our (Estonian) food and the food produced in other European countries is nutritious, and determine whether it has nutrient levels

which are too high or too low. Food producers will be able to rely on specific research results as they increase or reduce ingredient contents, and will be able to use the same research results in the improvement of quality and production. Consumers will be able to do the same: read the research conclusions and compare them with the ingredients of food products. According to researchers, the problem today is that there are no specific studies that can be used to claim that a particular kind of bread is the best and another type of bread is unhealthy.

Or take milk, for example. "Estonians are absolutely convinced that Estonian milk is the best and is of high quality," Malbe states. "But when we go to Finland, Finnish consumers there will tell us a different story: that Finnish milk is the best and has the best quality. In any other country, the perceptions will be exactly the same. But do we actually know the exact level of this quality? Perhaps our milk is best or perhaps it is the milk in Finland, or perhaps the best is to be found somewhere else." Malbe says that it is just such a research institution as this that can carry out the relevant research and demonstrate which country's milk is the best, based on objective results, or it can show that, yes, the quality is very good, but there is definitely room for improvement in quality.

Is there too much selenium or not enough?

For more than twenty years, Anu Viitak, a senior researcher in the Department of Chemistry of the Tallinn University of Technology, has studied whether Estonians suffer from selenium deficiency or not. Now she can firmly claim that Estonians do have a selenium deficiency. She started her research in the 1980s, working with Finnish scientists. Within the last two years, an additional five or six hundred people have been studied in cooperation with Estonian family health centres. "All the data indicates that there has been no significant increase in our selenium levels; we still verge on a state of deficiency," says Viitak. "Based on actual results, we can prove that Estonians still have a selenium deficiency, despite the fact that their diet has become more balanced and versatile." For normal body functions, the selenium level should be around 100 micrograms per litre, while Estonians usually have 60 to 80 micrograms per litre.

Marge Malbe, head of the Department of Plant Sciences at the Estonian Research Institute of Agriculture, thinks that Estonians are excessively compared to the Finnish in this case. "What Estonians eat as food is not the same as what the Finnish eat," says Malbe. In her opinion, we should consider the fact that extra selenium has been fed to livestock, used in fertilisers, and so on, all due to the feared selenium deficiency. Therefore, we need a new detailed study to see whether all this has not perhaps significantly increased our selenium levels in the meantime. Both Malbe and Viitak are hopeful that, in three years' time, the Flavoure project will reveal the actual levels of each micro- and macronutrient found in our blood and in our food, among other things.



Marge Malbe, the head of the department of Plant Sciences at ERIA and the coordinator of Flavoure project is convinced, that if the project proves successful, it will lead to international renown for ERIA, new and important scientific projects and money for their execution and for the education of Estonian scientists.

Of course, a research institution cannot tell the food industry what to produce and what not to produce. Manufacturers will decide this based on legislation and consumer preferences. The more informed and demanding consumers are, and the better access they have to research about food quality, the more likely manufacturers are to utilise the outcomes and recommendations of any such scientific research. To sum up, Malbe returns to where she began: "If we have high-quality labs and highly qualified researchers with international training, we will be able to offer all of this information. The research institution can produce new innovative solutions and the industry can use them."

Food chain under scrutiny

At first, the Flavoure leadership team will contact manufacturers in the Estonian food and agricultural industry in order to determine our strengths and weaknesses. The other countries participating in the project will do the same.

The participating institutions have been chosen so as to guarantee that the entire food chain can be studied: soil, plant, feed, livestock and humans, in addition to the processing stage etc.

"ERIA will focus on mycotoxins, and study the quality of our animal feed and general food in terms of mycotoxins," explains Malbe. "We have already launched projects in which we try to determine the specific micro- and macronutrients found in our food, e.g. in milk. Are there enough of these, too many, or too few? What is the vitamin content of our foods? Are there plenty of vitamins or too few? People are always told to take vitamin supplements because they are useful for us, and they are encouraged to take these in abundance. But we do not know the actual vitamin content of our diet. Maybe we don't have to take any supplements? These are the specific areas that we are working on now."

"The issue is not so much the quality of the soil, feed, etc. as our lack of detailed knowledge and research," the researcher admits.

Among other things, the research results should draw manufacturer attention to the E-numbered agents and food additives. But we do not know whether this will be taken into account two or three years from now, when we will have some concrete conclusions to present to everyone. Malbe does expect manufacturers to show great interest. "Even now, manufacturers are asking many questions about our activities. They call, or come to us with a specific problem. Also, our researchers visit manufacturers to examine the local situation," says the project coordinator.

The CEO of AS Põltsamaa Felix, Anti Orav, also firmly believes that Estonian food manufacturers will be willing to utilise the research results. His company recently used the help of scientists at an Irish university, although Orav says it is too early to reveal the details. "Decisions depend on the potential for value creation, that is, on the benefits of the implementation of the results for the producer: whether it will induce more consumers to prefer the brand and thus increase profits," explains Orav. "In general, product development is a costly process, often requiring additional investment in production equipment."

Anu Viitak, a senior researcher in the Department of Chemistry at the Tallinn University of Technology, which also participates in the Flavoure project, mentions AS TallEgg as a great example: the company sends samples of its products for testing to check whether the ingredients have been correctly added. At the moment, the department's Chair of Analytical Chemistry is helping to study the quantity and ratio of micronutrients found in cows' milk and cows' blood. "Perhaps manufacturers will also take these findings into account one day. So far, though, we haven't had any such contact with manufacturers," admits Viitak, who herself has studied this field for forty years. Many food products are tested in laboratories but people are not aware of the results. Viitak thinks that this information should be available to ordinary people. Viitak offers an example: "We are in the habit of saying that Spanish strawberries or Polish tomatoes are not as 'clean' as Estonian produce. But we don't really know that for sure, because we have no comparative studies. Yet we should know whether we are eating good or bad food. And that is the main objective of the Flavoure project."



"We should know whether we are eating good or bad food. And that is the main objective of the Flavoure project", clarifies the objectives **Anu Viitak**, a senior researcher in the Department of Chemistry of the Tallinn University of Technology.

Flavoure

- The duration of the Flavoure (Food and Feed Laboratory of Varied and Outstanding Research in Estonia) project is three years.
- Estonian scientists are at the helm of the international project, with ten participating institutions from six countries.
- The European Union allocated approximately fourteen million kroons for the project through the Estonian Research Institute of Agriculture. This is a project under the EU Seventh Framework Programme and proposals were submitted under an open call procedure. Experts gave ERIA's project a score of 14.5 out of a possible 15.
- Almost the entire Institute will start working on the Flavoure project, led by the six working group leaders.
- The aim of the project is to assess the risks related to food and feed quality and to implement the results of the research in the food industry, for the benefit of end-consumers.
- The activities include the creation of a network of scientists, the placement of junior researchers at foreign universities, and the coordination of in-service training for lab technicians.
- The project grant will be used to purchase molecular biology lab equipment for ERIA's laboratory in Juuliku (centrifuges and heating chambers for processing the samples, chromatographs for the analysis of samples, modern DNA testing etc).
- The results of the Flavoure working group are to be made public; updates on the project will be published in agricultural and food magazines, and in international scientific journals.
- Participants in the project: the Chair of Analytical Chemistry of the Institute of Chemistry at the University of Tartu; the Chair of Analytical Chemistry of the Department of Chemistry, Faculty of Science, Tallinn University of Technology; the Lithuanian Institute of Agriculture; the Department of Applied Biology at the Faculty of Agriculture and Forestry, the University of Helsinki; the Faculty of Veterinary Medicine at the University of Helsinki; the Faculty of Agricultural Sciences at Aarhus University; the Bulgarian National Centre for Public Health Protection; the Spanish National Institute of Sustainable Agriculture; and the Spanish National Institute of Natural Resources and Agricultural Biology.

Text: Kristiina Viiron | Hei
 Photos: Terje Lepp,
 Rauno Volmar | Eesti Päevaleht,
 iStockphoto



Four-year survey of the “invisible” bacterium led to the birth of heart-friendly cheese - Südamejuust

Innovation in food industry

Appropriately in this year of innovation, earlier this year, a new functional food was brought into shops. It has been discovered that regular consumption of the heart-friendly cheese that contains the bacterium TENSIA lowers blood pressure and enriches the micro flora of the digestive system.

The new cheese is produced by E-Piim, and is its first pro-biotic product. The TENSIA-bacterium was researched, discovered and developed in a pro-biotic form for the cheese industry by the Bio-Competence Centre of Healthy Dairy Products.

E-Piim, which is the holder of the rights to the healthy bacterium, was one of the dairy companies that concluded a co-operation agreement with the promising new scientific development centre four years ago. Its goal was to create innovative products with the help of science. Jaanus Murakas, the manager of E-Piim, admits that many companies avoided the risk of developing the product as there was no guarantee that a useful bacterium with

beneficial properties would be developed. Moreover, scientific discoveries are not made within a period of months. “I well remember what I thought – that these invisible things would be researched for four years”, says Murakas, with a smile.

Cured through food

Jaanus Murakas explains that the motivation for putting a new, pro-biotic cheese into production was the need to be more competitive. “There is a widespread opinion in Estonia that innovation takes place only in completely new areas,” notes Murakas. “I do not share this opinion; innovation will be put into practice in strong areas which have already been promoted in Estonia for 100 years: in the dairy industry, in forestry, and in the oil shale industry. Especially in the latter, innovation creates new values in a very wide field. In this case, the dairy industry and agriculture sectors will profit. If a farmer is doing well, then rural life will too. And Estonia will get a product which can decrease the risk of cardiovascular disease.”

"The modern food industry is specifically oriented towards decreasing the risk of disease with the help of food," points out Ene Tammsaar, head of the Bio-Competence Centre of Healthy Dairy Products. "More and more resources are used for the treatment of diseases. In the search for new solutions, the conclusion was reached that innovation is needed in the area of disease prevention. Ever more people turn to food that supports health and reduces the risk of diseases."

Surprising survey

At first the scientists did not assume that their research would eventually lead to the discovery of a lactobacillus that would support the function of the cardiovascular system and lower blood pressure. "When we started, we proposed that we should produce a cheese which would protect against infections and diseases and fight listeria, salmonella and other bacteria present in food products", remembers Tartu University Professor Marika Mikelsaar, the former head of the working group. "Initially, we chose 30 special lactobacilli strains existent in human intestines. Later the research continued on a trial-and-error basis in order to determine the best strain. We ended up with the pro-biotic lactobacillus strain *Lactobacillus plantarum* TENSIA, which did not perish during cheese production and stayed viable. The bacterium's ability to survive in cheese was of determining importance for the pro-biotic."

In the scientific experiments it became evident that TENSIA would not help against salmonella as expected; instead, the beneficial effect on blood pressure was discovered.

According to Mikelsaar, a group of 50 persons of different ages ate 50 grams of the cheese every day for three consecutive weeks, not knowing what kind of cheese it was. "So the 'placebo effect' was excluded," claims Mikelsaar. As part of the research, the health indicators of all trial subjects were observed.

"TENSIA was well tolerated by all those in the test group; there was an increase in lactobacillus in the digestive tract, and it also increased the amount of other lactobacilli," explains Mikelsaar. Additionally, it was noted that the consumption of Südamejuust helped to reduce blood pressure, which can be attributed to the absorption of nitrogen oxide and spermidine produced by TENSIA, as these relax the smooth muscles of the blood vessels.

None of the people involved in the trials showed adverse reactions to the consumption of Südamejuust, such as diarrhoea or skin rash. Also, their body mass index did not increase and no tendency to adversely affect other health indicators, such as the levels of glucose, triglyceride or blood cholesterol, was observed.

A special lactobacillus for each product

The bacterium added to the cheese did not influence the taste. According to Jaanus Murakas, the heart-friendly cheese is a common Estonian cheese with an ageing period of 30 days. The cheese is in shops in small packages of 150 grams. E-Piim and its developer hope for a big export potential for this new cheese. As a first step, entry into the Russian market (St. Petersburg) is planned.

Tammsaar notes that other pro-biotic products are in the process of being developed, but that the exact types of cheese are at present being kept secret. Under the leadership of Marika Mikelsaar, the same working group



Jaanus Murakas, the manager of E-Piim, explains that the motivation for putting a new, pro-biotic cheese into production was the need to be more competitive.



Epiim[®]
EESTI JUUSTU TEGIJA

Südamejuust

has discovered another pro-biotic bacterium with specific characteristics - Inducia, for which a patent application has been filed and whose effects on several different dairy products are now being researched.

Several new dairy products enriched with pro-biotic bacteria are being developed by Professor Mihkel Zilmer's working group. The functional characteristics of these products are also now being tested in clinical trials.

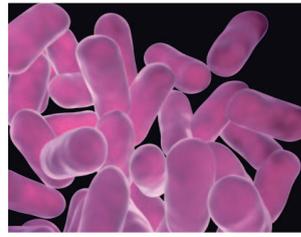
The development of the heart-friendly cheese through applied research was financed by Enterprise Estonia. Products enriched with pro-biotics are also produced by other companies, such as AS Tere, whose yoghurts, kefir, milks and cheeses of the product line "Hellus" contain the lactobacillus fermentum ME-3. This lactobacillus was discovered by a scientist at the University of Tartu and has both antimicrobial and antioxidant effects. Pro-biotic lactic bacteria are also present in Jänksi yoghurt cocktails, produced by Maag Piimatööstus.

Estonian food producers are not afraid of innovation

Braver members of the dairy industry do not limit themselves only to the making of products that have been well received and that have found a stable position in the market. "When we look at the vast selection of products available in the shops it might seem that there is nothing new or extraordinary left to discover," says Mare Reiman, the product development specialist for AS Tere. But, in fact, there certainly is more to discover if one's goal is not only to find interesting flavours, but also to highlight the health benefits of products.

What is “pro-biotic”?

“Pro-biotic” is a descriptive term for live micro-organisms of human origin that do not cause diseases and whose oral consumption in certain amounts has positive effects on human health.



“Pro-biotic” comes from the Latin “pro bios” (good for life). Pro-biotic bacteria enter the organism with food as the carrier, survive there and have an effect due to reproduction in the digestive tract.

Pro-biotic bacteria produce substances which are absorbed in the body and regulate certain functions of the organism, in this case the relaxation of blood vessels. Usually lactobacillus and bifidus bacteria are used as pro-biotics. Different pro-biotic bacteria have different effects, such as balancing intestinal microflora, strengthening the immune system, relieving lactose intolerance, decreasing allergic reactions or lowering the cholesterol level of blood serum. For consumers, pro-biotics are available mainly in dairy products, for instance yoghurt, cheese, kefir or, alternatively, as food supplements - in the form of capsules, powders and pills.

For the consumption of pro-biotics, the overall principle applies: moderation in everything.

Good for the health

The production of Dr Hellus products was preceded by long-term collaboration in investigating the bacterium at the Institutes of Microbiology and Biochemistry, which was led by Professors Marika Mikelsaar and Mihkel Zilmer. The health benefits of ME-3 are numerous and the list of its useful properties long and awe-inspiring. This culture improves liver and intestine functioning, increases resistance to chronic diseases and reduces excessive blood cholesterol. Among its many benefits, the bacterium stem even has potential uses in the rehabilitative treatment of stroke patients.

Fish in yoghurt?

“The development of the yoghurts was quite a challenge,” admits Mare Reiman. “It is widely known that Omega 3 is very good for our health, and EPA and DHA fatty acids which have extra long chains which originate from fish and seafood are especially good. They are good all right, but a yoghurt that tastes like fish is not particularly pleasant. We were looking for the suitable Omega 3 additive for a long time. We experimented with numerous samples, but the taste of fish in the yoghurt was still recognisable. Finally, we came across a company that produced Omega 3 additives in micro-capsule form. The capsules endure the technological process of yoghurt-making well and do not open until they have reached a person’s digestive tract.”

Since the contents of the product were new and innovative, the company wanted its taste to be different from other similar products available on the market. “New and interesting flavours are often the results of a professional interest in coming up with unusual combinations,” says Reiman, describing the process in which the flavours of tomato and strawberry, or pineapple and basil, were united in yoghurts.

May the ideas fly high

“All you need to do is experiment, mix different components to see what comes out. You need to let your ideas fly high and not be afraid to go down roads that nobody else has travelled before you,” the product development specialist of Tere says courageously. At the same time, she admits that making and introducing a completely new product is an expensive and risky undertaking: it is difficult to predict whether the consumer is even ready to accept such a product and buy it in large enough quantities.

“If a company wishes to move ahead, it needs to take such risks,” Reiman stresses. Tere has not taken the risks for nothing: the dairy products in the Dr Hellus product line have been welcomed by grateful consumers not only in Estonia, but also in Latvia and Lithuania.

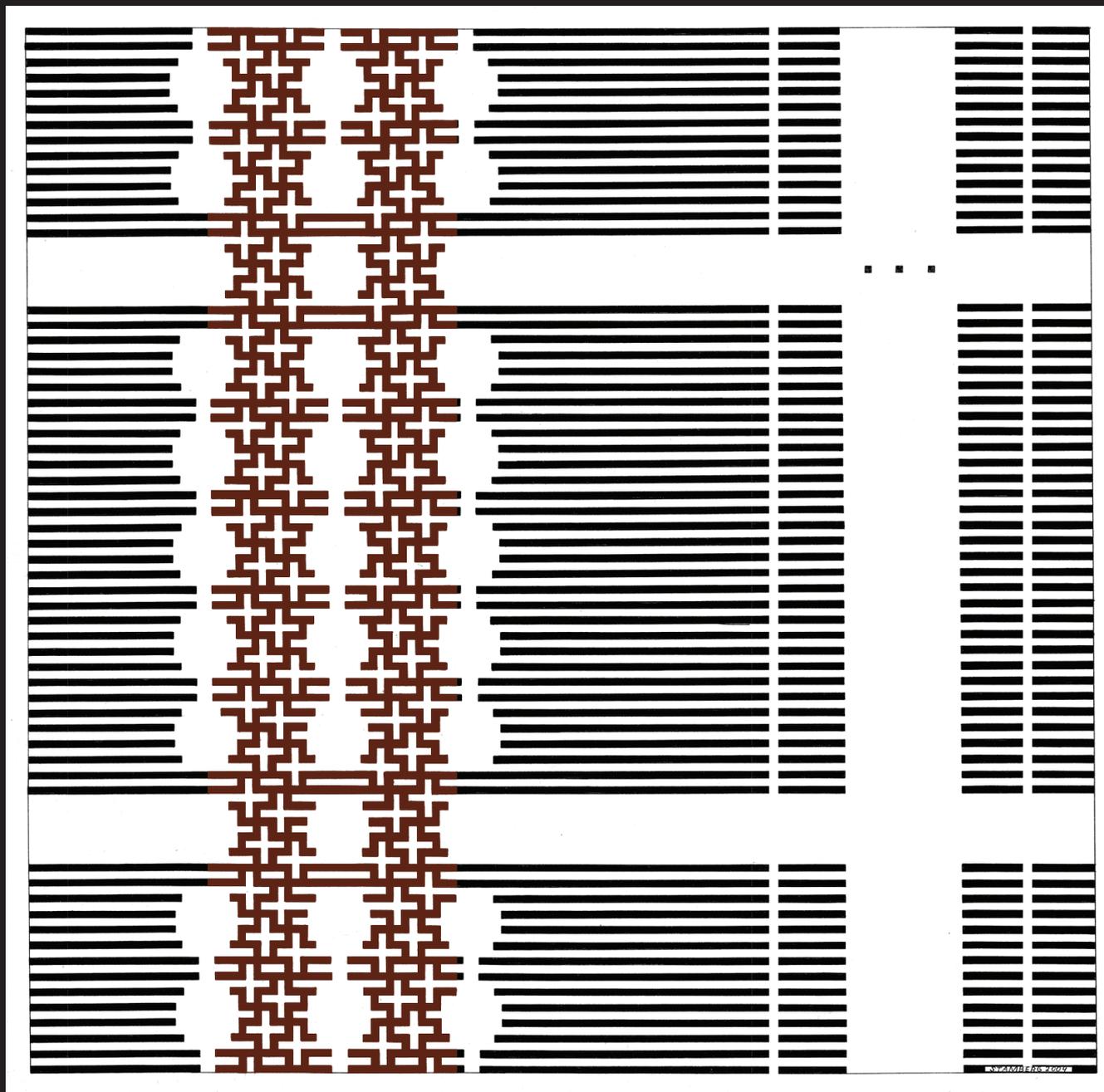
At the SIAL 2008 fair in Paris in October, the Dr Hellus yoghurts, with their *Lactobacillus fermentum* ME-3 and Omega 3 fatty acids, and their glazed cheeses, which contain *Lactobacillus fermentum* ME-3, were selected as part of the fair’s official innovative and trend-setting range of products in the category of products with original recipes and health benefits.

“It took years to develop the Dr Hellus product line and the expense of introducing the products onto the market was large, but we took the risk of not copying any other products available on the market and followed our own path instead. And the risk was well worth it: the development and advancement of the Dr Hellus product line turned out to be a sustainable decision,” says Mare Reiman joyfully.



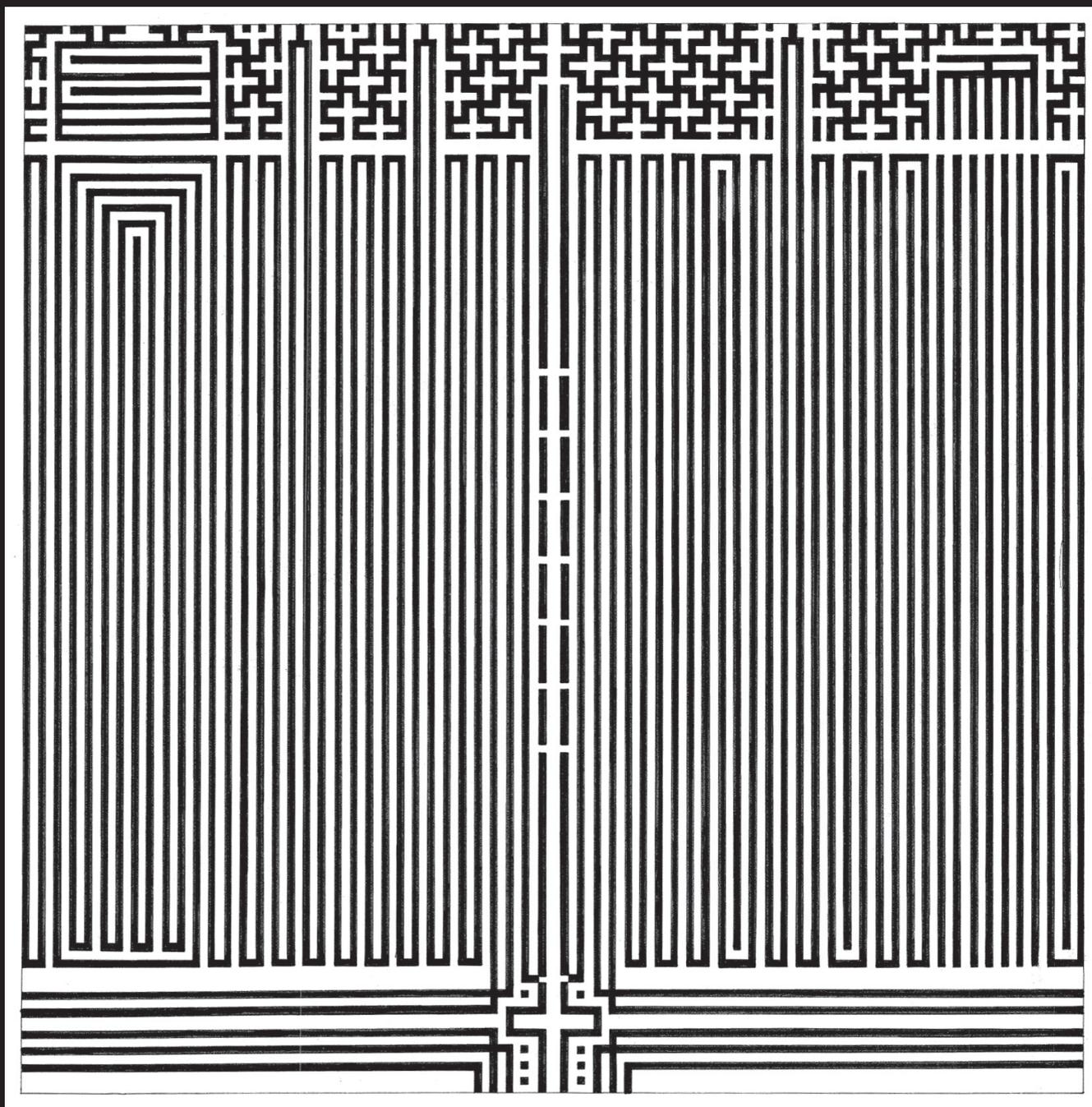
Dairy products containing healthy pro-biotic lactobacilli discovered by Tartu University scientists have found their way to the dinner tables of many Estonians.

PORTFOLIO_STUDIO 22



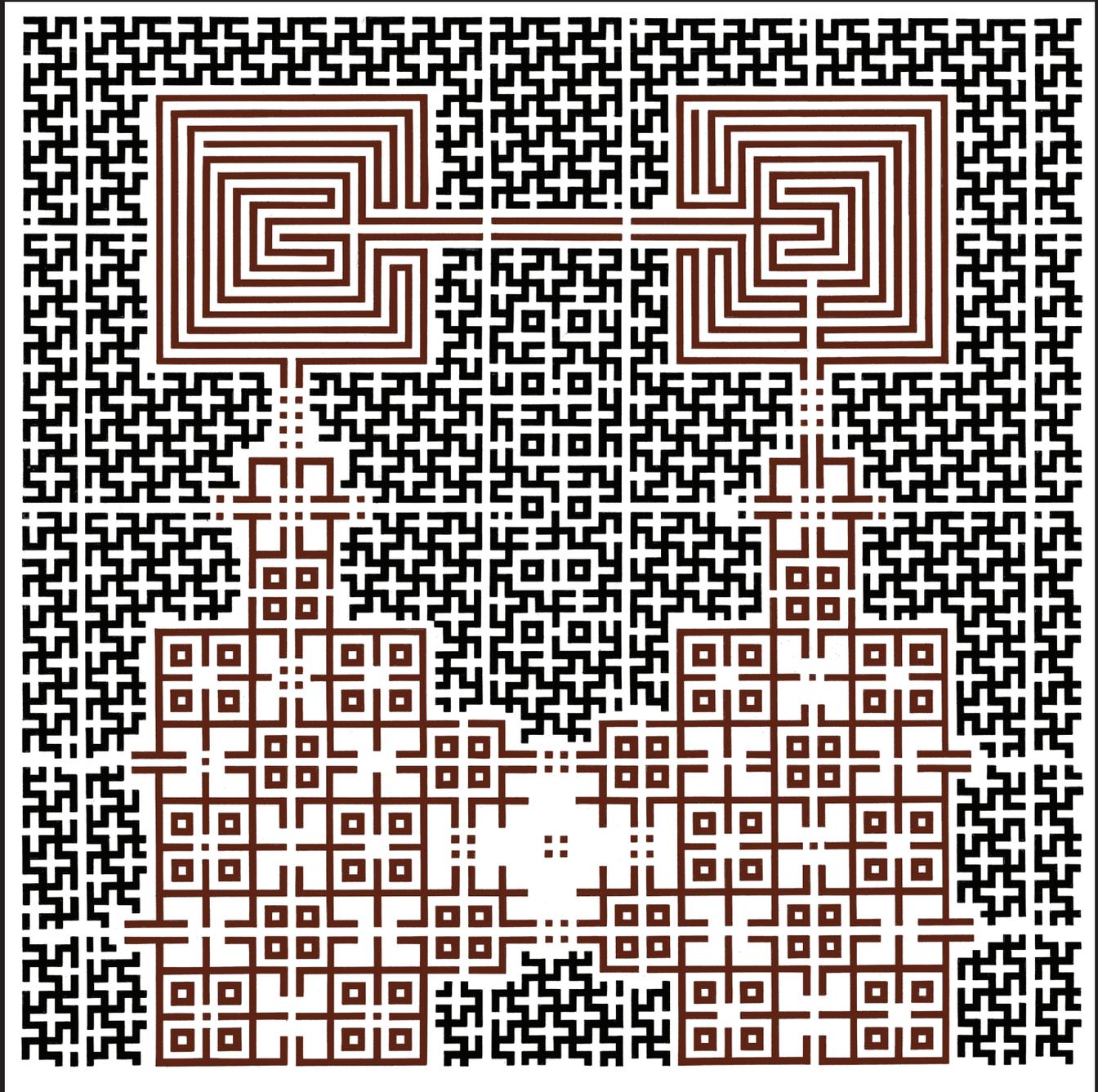
Sven Erik Stamberg

Veritas.II
2005. 410x410. L.E.R. gliceé



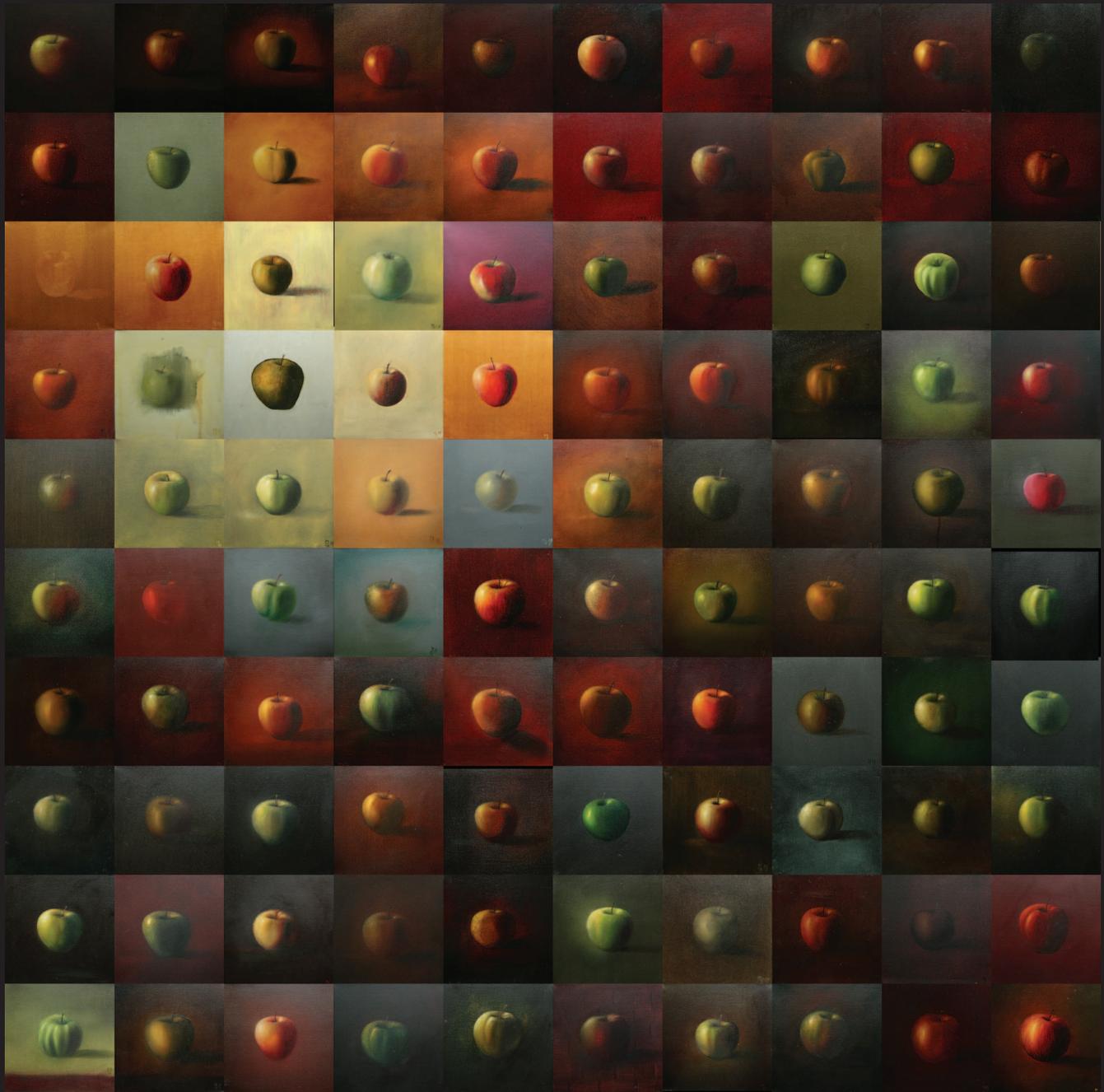
Sven Erik Stamberg

Pacis.II
2006. 410x410. L.E.R. gliceé



Sven Erik Stamberg

The Third Top View.II
2005. 410x410. L.E.R. gliceé



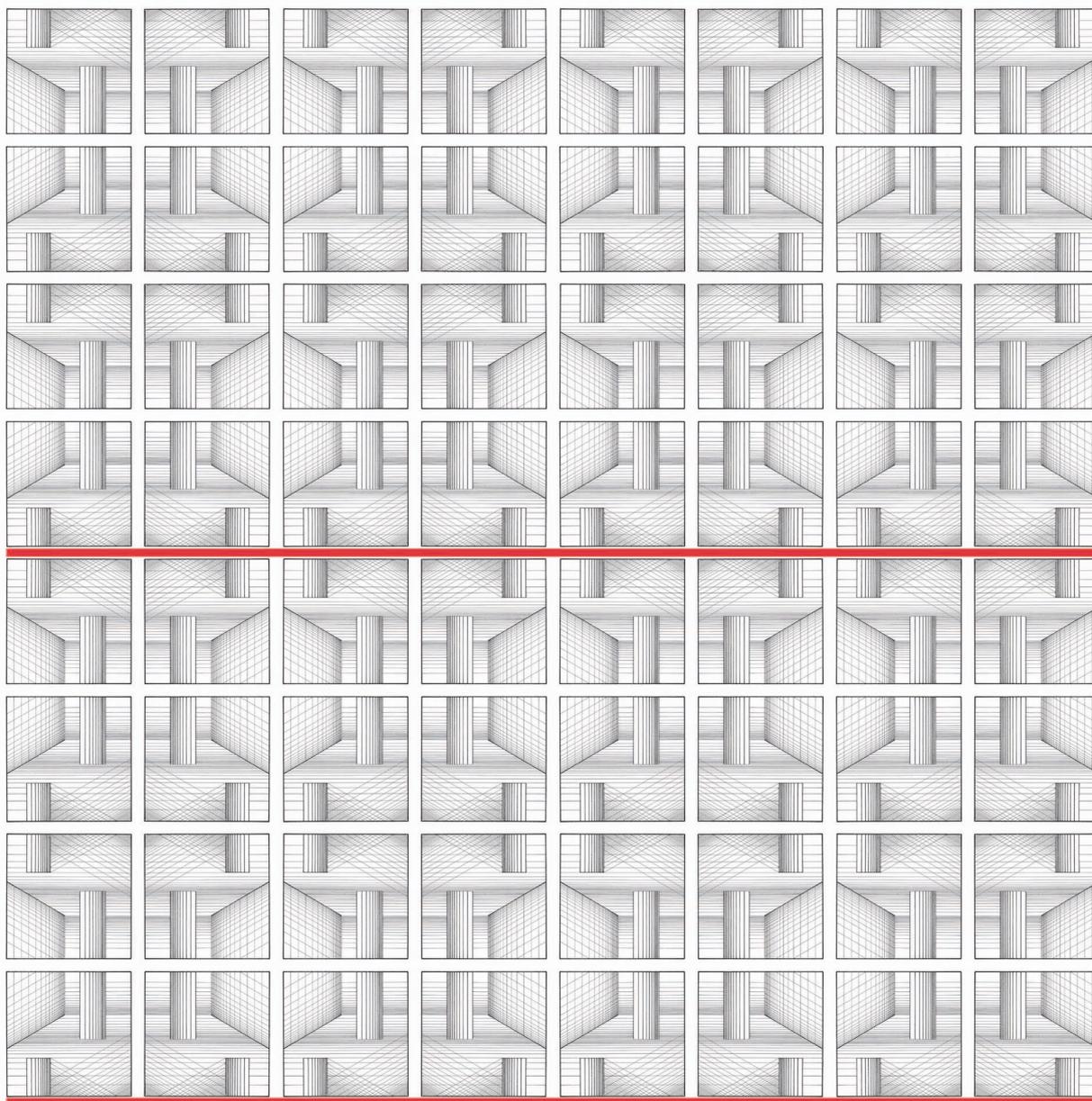
Mauri Gross

Occupational Therapy
2009 | 2000x2000 | Oil on canvas



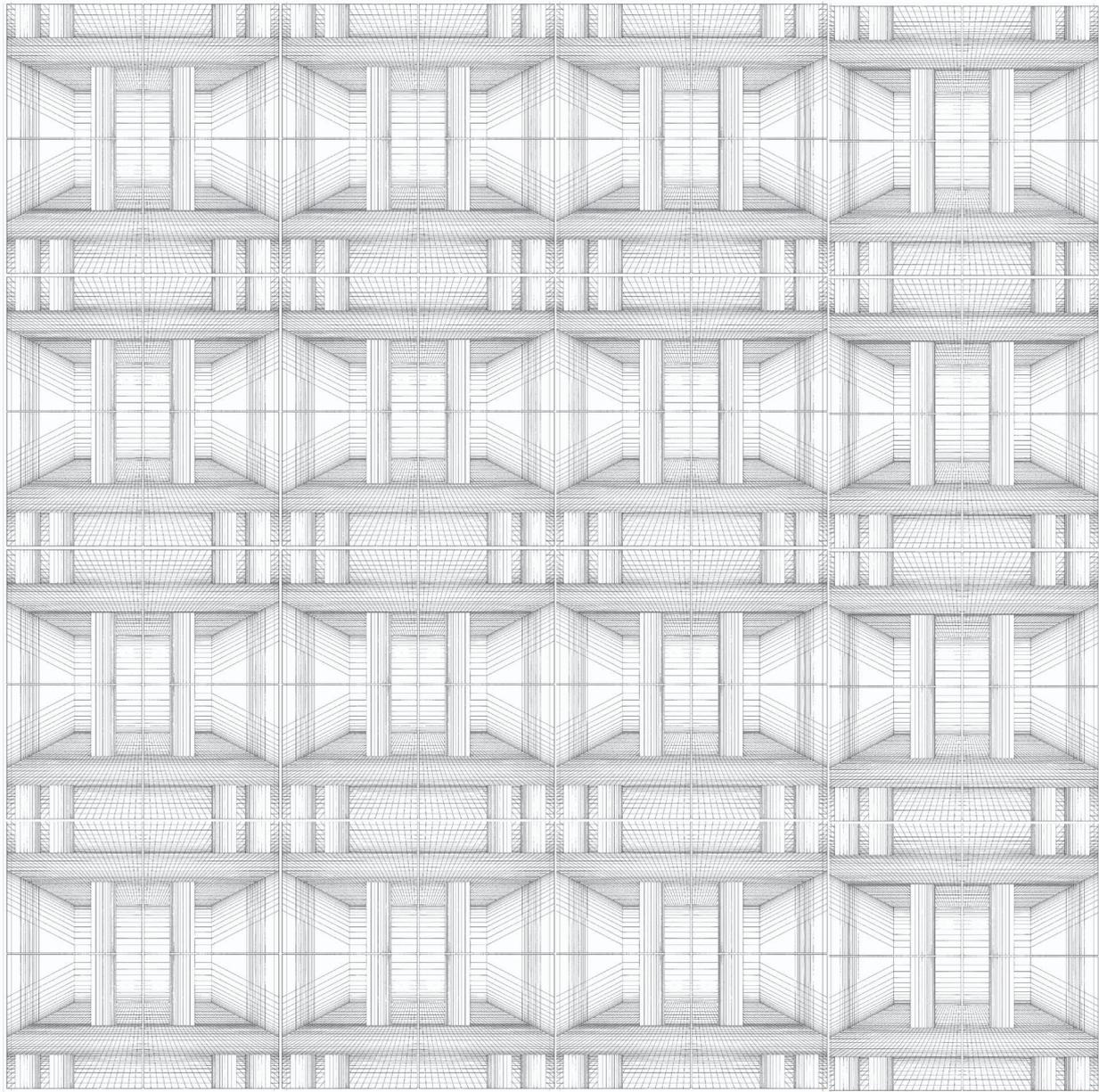
Mauri Gross

Overpower
2009 | 500x500 | Oil on canvas



Marge Viirg

11
2009 | 600x600 | India ink drawing



Marge Viirg

623

2009 | 600x600 | India ink drawing



Marge Laast

Birth symbols from Siberia
2009 | 720x900 | colorized photo montage

Studio 22

The group of artists called Studio 22 first came together in the early 1970s, and it consisted of people who attended a series of discussions at the home of the artist Tõnis Vint. During those informal lectures, the members got an overview of world art history. The topics which were covered most thoroughly were those of most interest to Tõnis Vint: the geometric symbolism of old cultures, ornamental folk art, and Far-Eastern art and its philosophical aspects, especially I Ching. But, from the start, membership in the studio also meant creative activity.

The most active period of Studio 22 was from 1972-2002. During those years, and later on, hundreds of people had links with the Studio. There have been three creatively strong core groups. In the early years, the unifying factor between members was art; later, people with backgrounds in design, architecture, music and theatre joined. Several have become famous as independent artists, including Siim-Tanel Annus, Marje Taska, Ene Kull, Agu Pilt, Inga Aru and Mae Kivilo. Some Studio members have continued their artistic activity abroad and many others who live in Estonia are active in other fields. Lecture evenings still take place twice a month, with less intensity than during the Studio's heyday. In this edition, the most active members of Studio 22 present their work.

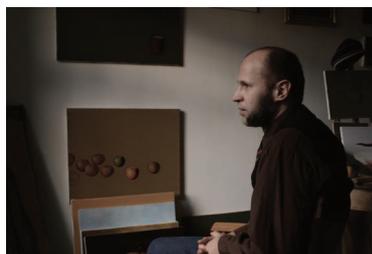
Exhibitions of Studio 22

- > Hermeetria 22, Tallinn Art Hall 1989
- > Myth and Abstraction (part of the Overview of Estonian Art exhibition), Karlsruhe 1992
- > Towers and Gates, Main Exhibition Hall of Estonian National Library 1996
- > Plane sphere (Dionysia festival "Wordless Art"), Tartu Artists' House 1997
- > 22 >> 1999, Tallinn Art Hall 1998
- > Studio 22. 1999, Kuressaare Episcopal Castle 1999
- > Studio 22 (together with ethnographic reconstructions of Tõnis Vint), Riga Sports Museum 1999
- > Estonian art since 1990 (part of the Overview of Estonian Art exhibition), Falconer Gallery, Grinnell College 2001
- > 7 / 22, Dome Church of Haapsalu Episcopal Castle 2002
- > déjà vu, Pärnu mnt 27 temporary gallery in Tallinn 2002
- > Drawing of Breath, Dome Church of Haapsalu Episcopal Castle 2003

Telefilm about the Studio: Estonian Contemporary Art. Tõnis Vint & Studio 22, 1992, 20 min, Director Jaanus Nõgisto



Mauri Gross graduated from the Estonian Arts Academy in stage design in 1997. Prior to 1997, he studied in the Tartu Arts School and the Tallinn Pedagogical University. Today he is a freelance artist, working mostly in painting, computer graphics and graphic art. He has designed several computer animation projects for Estonian Television, MicroLink and the Estonian Drama Theatre; he worked as a computer animator in the American movie "Virtuoso", as an artist in the films "Pauli laululaegas" and "Floriani kiusatus", and as a computer tutor in the Estonian Arts Academy.



Sven-Erik Stamberg has taken part in exhibitions since 1998 – together with "Studio 22" in Tallinn in 1999, in Riga in 2000, in Grinnell, Iowa, USA in 2001, and in Tallinn and Haapsalu in 2002. He has also had three personal exhibitions in Tallinn – in the "Deco Gallery" in 2004, in the "Cnopt Gallery" in 2006, and behind the Grusbeke tower in 2007. Stamberg graduated from the Estonian Arts Institute in 1995 in the field of product design. Since 1998, he has been a member of "Studio 22". He has worked as a boat master for a small company since 2002.



Marge Laast has been a member of "STUDIO 22" since 1988. She is currently enrolled in the Estonian Art Academy MA programme in art and cultural anthropology. In 2007 she studied art and visual anthropology in Paris, at University 8. In 2008 she had an extensive photo exhibition on Siberian Estonians in the Tartu University History Museum. Her works have also been displayed within the framework of exhibitions of the group "Vedelik" (InGraafika 2008, Rakvere Theatre 2009, Gallery Metropol 2009).



Marge Viirg is a freelance graphic artist and has been a member of "Studio 22" since 1986. She graduated from Tallinn University (1994) with a degree in art and technical drawing, and she has a degree in professional photography (1985). With "Studio 22", Marge has participated in numerous exhibitions in Estonia as well as internationally (1999 in Riga (Latvia); 2001 in Grinnell, Iowa, USA). Marge's recent personal exhibitions have been held at the Dragon Gallery and the Paide Watchtower (2006), and she participated in a group exhibition in 2007 with Michael Shernoff at the M-Gallery (Tallinn). Being also a professional photographer, Marge's best known works include a photo series of Kunda Nordic Cement for the World Bank Group publication "Our Dream - a World Free of Poverty" (2000) and a photo series of Siim Tanel Annus' performances (1986-1989).

Text: Mihkel Kärmas | ERR
Photos: Testfilm

Two-faced man

"The Spy Inside"

Premiere: 5 November 2009

Producer: Ene-Maris Tali
Director: Erle Veber
Script: Mihkel Kärmas, Rasmus Kagge
Art Director: Ivi Piho
Camera: Tauno Sirel, Margus Malm
Sound: Martin Vinkel

Testfilm 2009
www.nbn.ee



Uncovering the identity of Herman Simm, the Estonian “keeper of secrets” who was working for Russian intelligence, caused the greatest spy scandal in NATO since the end of the Cold War. The documentary film “The Spy Inside” will bring this psychological drama and extraordinary story of espionage to the big screen.



Herman Simm was the highest ranking Russian spy in NATO in years. Although the full extent and implications of his treachery are still being investigated by counterintelligence agencies around the world, the story of this 62-year-old high-ranking official of the Estonian Ministry of Defence is one of the biggest and most contradictory espionage mysteries of our time. “I don’t remember, as I didn’t even read them,” replies the man who has been sentenced to twelve and a half years of imprisonment, when asked how many secrets he had delivered to the Russians.

Before his deceit was uncovered, only a few people knew of the existence of this grey-haired civil servant. Even less was publicly known about the position in which this inconspicuous functionary served in recent years. His work in the Estonian Ministry of Defence was to protect the classified information of NATO and the state of Estonia, but instead he sold thousands of secrets to Russian foreign intelligence.

On the one hand, this was a personal drama. Simm, whose family suffered under Soviet repression, spent his whole life serving the Communist regime

and its successor, Russia. On the other hand, the Simm case was an unprecedented counter-espionage operation, which involved the cooperation of the intelligence agencies of old and new Europe to expose the Russian agent and his handlers.

“Countries which did not really have many links in this sense had to largely trust Estonians to track Simm, and to collect evidence without him being aware of it. It turned out to be a great success. Hence, although the Simm scandal began as a tragedy and a catastrophe, it ended up as a sort of triumph,” says Deputy Editor and CEE Correspondent of The Economist, **Edward Lucas**.

Uncovering the identities of Simm and his handlers, **Valeri Zentsov** and **Sergei Jakovlev**, brought about the most acute conflict between the intelligence agencies of the West and Russia since the end of the Cold War. During this process, Estonia, one of the smallest members of NATO, became the stage for the biggest known counter-intelligence operation of the military alliance.



Two of a kind: Simm and Hanssen

This tale is brimming with startling details. Herman Simm spent his last minutes of freedom in a department store in Keila where, together with his wife **Heete Simm**, he bought some pastries for the birthday of his mother-in-law.

At that point, he was already surrounded by the Defence Police. In order to determine the right moment to arrest the couple, the leader of the operation, **Aleksander Toots**, observed the couple from the entrance of the shopping centre, pretending to be a customer in a video store. It was only later that the policeman looked at the DVD which he had heedlessly purchased – it was a film about a spy in the USA called **Robert Hanssen**.

It may be a small and peculiar detail, but the stories of Simm, the Russian spy who worked for years in NATO structures, and Hanssen, an FBI agent for 25 years who also worked for the Russians, are remarkably similar. On the outside, both Hanssen, who was caught in 2001 and is claimed to be the most dangerous perpetrator of treason of all time, and Simm, who was arrested seven years later, appeared to be law-enforcement veterans with spotless careers, but they were both bitter and paranoid on the inside. Both were deeply religious and, just before their arrests, had decided to give up spying.

When and how did Herman Simm become a Russian spy?

His public life has to be re-evaluated. There are many strange chapters. For example, Simm as a young militiaman covertly joined a church. At university, he participated in an anti-state action which ruined the lives of several of his classmates. In the middle of the 1970s, when returning from Finland, he was caught at the border with indecent magazines and twelve pairs of nylon tights. But thanks to good fortune, or an invisible helping hand, he remained unpunished.

Until the secret KGB files which have been taken to Russia are made public, we can only rely on what Herman Simm himself says about when and how he gave his “three drops of blood”. Simm claims that his collaboration with the then largest secret service agency of the Soviet Union began in 1985, when he worked as the Deputy Director of the state security firm Valvekoondis. “They needed to carry out certain operations and get access to objects under guard in order to put up their equipment,” says Simm, in an interview given for the film. He was the KGB agent inside the system who at a critical moment switched off the alarm signals coming from the target objects.

But that’s not all. The KGB kept a watchful eye on every trip Simm made, and on his wide international circle of acquaintances. For instance, he was the president of the film club of the Ministry of Interior and a board member of the Estonian Association of Film Clubs, thanks to which he had frequent contact with foreigners. “Whenever he had interactions with someone from abroad, he was given certain tasks regarding certain persons. This information he forwarded to his employer,” the lead investigator explains.



Simm lies under oath

When the KGB of the Estonian Soviet Socialist Republic (ESSR) was liquidated on 18 December 1991 and the Soviet Union itself collapsed three days later, Simm was temporarily left without a master. "When Estonia regained independence in 1991, he asked his handler what would happen to him. According to the handler, everything was fine, there were no remaining documents and he could calmly go on with his life. Nothing would happen," recounts Toots.

After the Estonian Police Force was re-established, Herman Simm swore under oath on 5 October 1992, without batting an eye, that he had not been employed by the KGB and that he wasn't an agent. He could have confessed to the Defence Police as prescribed by the law, but he did not. What followed was Simm's rapid rise in the Estonian Police Force. After two years as Chief Constable of Harju County, he was appointed Chief Director of the Police Board at the end of 1994. So, the top policeman of the country was actually a KGB sleeper agent.

His former masters were merely waiting for the right moment. This came in the spring of 1995, when, accompanied by numerous scandals, Simm was sacked from his Chief Director position. Newspapers published accounts of his corrupt dealings, professional incompetence and his strange phobia of being followed. The fact that the former chief was offered the post of assistant commissary added insult to injury for a man who had worked in the system for thirty years. "Beginning in 1980, I practically never had less than five hundred subordinate workers. I had always worked in large systems," says Simm, showing that he still bears a grudge.

Simm left the police force for good and, in June 1995, bought a last minute ticket to Tunisia via Finland in order to rest his nerves. His crisis was deepened by tensions with his young partner **Ave**, which is why he travelled on his own. For Russian intelligence, which had been watching Simm for some time, he was now ripe for the picking. This was the key moment.



Simm's job involved a lot of travel and an official of his calibre had a diplomatic passport.

Re-recruitment in Tunisia

Simm managed to bask in the sunshine in the Sousse resort for a couple of days before he ran into a familiar face from Tallinn near his hotel one evening! This was Officer **Valeri Zentsov**, who had been employed by the KGB in the ESSR and was now on the staff of the Russian foreign intelligence service SVR. Simm knew his face from Soviet times. At their very first meeting, the Estonian agreed to cooperate with the SVR.

Simm himself claims that the decisive factor was not the threat to expose his KGB past, but threats to the well-being of his family, more specifically his then 21-year-old daughter. The investigators, however, consider this to be a self-serving explanation. Simm seems to have been spurred on by a combination of disappointment, vanity and greed, as in addition to money he was promised a high rank. "During the first meeting, he himself asked whether it would be possible to restore his rank as *polkovnik* (equal to Colonel – ed)," says Aleksander Toots, who investigated the case, with a laugh.

According to Simm, the first talk in Tunisia lasted for three or four beers, and the next meeting with the Russian intelligence spy took place in Tallinn two months later. From August 1995, Simm was employed at the Ministry of Defence as the Head of the Information Analysis Bureau and soon he rose to the position of Head of the State Secrets Division. "To have the former Chief Director of the Police Force working for us at the ministry seemed like winning the lottery," **Andrus Öövel**, the former Defence Minister who hired Simm, later told the press. In reality it was a lottery win for Russian intelligence.

In hindsight, Simm's role seems the more duplicitous as his job was precisely to guarantee that state secrets would not be leaked. Russians gave him money to buy a regular photo camera, which he used to photograph secret documents. There were no Bond-gadgets because, if he were captured, special devices would have raised immediate suspicion. It was quite easy for him to walk out of the ministry with the camera, film or memory card in his bag. The chance of getting caught was close to zero, as Simm himself was the one in charge of the checks.



On 5 October 1992, Herman Simm gave a written oath of conscience that he had not been employed by the KGB and that he wasn't an agent.

“Dead letter drops” in Tallinn suburbs

Although Simm met his agency handler Zentsov three or four times a year, they didn’t hand over copied material directly; rather, Simm left the film or memory card in a previously arranged place, a “dead letter drop”. Many such drops were located in Nõmme and Pirita area parks, including the Botanical Gardens.

Simm mostly used an empty juice carton or beer can as the container, something which just looked like litter to passers-by. The package would be picked up two hours after the drop at the latest. Each “dead letter drop” was only used once.

Contact took place as infrequently as possible and never in the form of a normal phone conversation. Simm was given several ciphers with different meanings, which he forwarded to a certain number via public phone, from where it reached his handler.

In Saue, a few blocks from Simm’s house, there was an electricity post on a street corner where the Russians were able to leave messages for Simm. “When a white line drawn with chalk appeared here, it meant that I had to go to the Nõmme railway station on the Saturday evening of that week. It meant there was an extraordinary call,” describes Simm, showing the electricity post to the Defence Police officers.

All such measures are spy classics. On the other side of the Atlantic, Russians also used “dead letter drops” and signs scribbled on electricity posts to communicate with Robert Hanssen.

SVR wins the lottery for the second time

In hindsight, it is alarming to know that a former Soviet militiaman was among the few selected people who protected some of the most intimate military secrets of the Western world. The closer Estonia’s entry into the European Union and NATO came, the more secrets of Western allies passed through Simm’s hands. “Simm was obviously keen to do his job. Of course

if you’re a spy and at the same time work in the security structures of your country, there is no room to make a single mistake,” recalls Simm’s former deputy, **Meelis Oidsalu**.

“I was so competent and correct in my daily job that nobody had reason to suspect anything,” Simm comments. In retrospect, his co-workers tell funny tales about his personal quirks—how he gave out sweets to the girls at the ministry and how he enjoyed having fun—but in his work he was pedantic, dedicated and extremely assiduous. When he worked with secret documents, he always drew the curtains and, afraid of being spied on, had the ventilation shaft in his office walled up.

A seemingly boring administrative reshuffle took place in 2001, which however had key importance in terms of the flow of information. Simm became the authorised representative of Estonian state security or, in NATO-speak, the NSA - National Security Authority. Although little known publicly, this is an important position, through which the correspondence on the military secrets of all 28 NATO member states moves to Estonia.

“In a sense, Simm was the Estonian ambassador to other countries, and such organisations as NATO and the EU, on questions of secret data protection,” states his former deputy, Oidsalu. Simm has been called the manager of the post office of secret data, but in contrast to ordinary postmen he didn’t just deliver packages safely, he had the right to check that the documents were handled according to the rules at the final destination.

Although there was repeatedly talk of replacing Simm, who had poor language skills and was older than average, it remained just talk. One of the reasons was that younger officials considered the NSA post to be boring!

Tens of thousands of documents, with varying degrees of secrecy, passed through Simm’s hands and he was just as up-to-date on international military information as the Prime Minister or the Defence Minister. This meant that Russian intelligence got their second lottery win.





Jesus comes into play

At the same time, some analysts in army intelligence and the Defence Police suspected that there had to be a Russian intelligence spy somewhere in the system. It seemed that the Russians were too well informed about the business of the Estonian Defence Forces. Counter-intelligence did look for a mole but, embarrassingly enough, suspicion fell only on the secretaries who copied documents, not on Simm, who was operating right under their noses.

A significant change took place in Simm's clandestine career in the spring of 2002. When his former handler Zentsov retired, the valuable agent had to be transferred to a new resident. As in a good movie, the important meeting was set to take place at the train station in the Tallinn suburb of Nõmme.

They agreed on a precise signal system – a bag on Simm's left shoulder would mean no danger. A bag in his hand, however, would mean that the meeting was called off. The contact was timed to take place at eight in the evening, precisely at the moment when two trains from opposite directions arrived at the station. The seemingly accidental meeting of two men by a kiosk would not be noticeable in the commotion.

Simm's new handler was the SVR officer **Sergei Jakovlev**. This guy was a class higher than Simm's previous handler, a specially trained spy, a 'traveling illegal' in intelligence terminology, who used a forged Portuguese identity. On the surface, the businessman **Antonio de Jesus Amoretto Graf**, who had arrived in Estonia looking for business opportunities, had nothing to do with Russia.

Traitor's salary 1,000 Euro per month and a fake medal

Whereas the first couple of meetings took place in Estonia, the following ones were all abroad. This was made easy by the fact that Simm's job involved a lot of travel and an official of his calibre had a diplomatic passport. When Simm visited the NATO headquarters in Brussels, he often also had a meeting with the Russian resident.

It has been established that secret meetings took place in at least fifteen different countries, mostly in Central Europe, Scandinavia, Latvia and Lithuania. Mostly the conversations took place in bars or cafés, but one conversation took place on a long walk on the Curonian spit, near the ruins of a former Soviet military base. It is an amusing detail that Jakovlev had police emblems with him – according to their cover story, they were supposed to be collectors exchanging police memorabilia.

Simm received his salary in cash. According to him, his wages at the beginning of his career were 400 dollars per month, rising to 1,000 Euro a month at the end. Even if we take into account the standard of living of Estonia in the 1990s, this is a startlingly meagre sum. "There is no denying it; he was a very cheap agent for the Russians," says Toots. At the same time, the Estonian believed that his secret ranking in the SVR was constantly on the rise and that he was a general already. In reality this was a Russian bluff.

The exact contents of the material that Simm sold remain secret. Probably, it was mostly technical data on communications and security systems. "It could have turned out to be really dangerous if Russia had decided to launch a military attack against us during that time," comments former intelligence coordinator **Eerik-Niiles Kross**.

"Espionage is always dangerous. We do not know what piece of information could turn out to be explosive in the hands of a potentially hostile state," adds the former Deputy General of the Ministry of Defence **Lauri Almann**.

In March 2004, seven former socialist countries of Eastern Europe, including Estonia with its 1.3 million inhabitants and an army of five thousand, became a part of the world's most powerful military alliance. A year later, Simm received a commendation for integrating the Estonian defence structures into those of the West. In hindsight, it is tragic-comic that the Russian side was also encouraging Simm. During one secret meeting, he was shown a medal for services rendered which was supposedly being given to him by the SVR. Nobody knows whether such a medal really exists.



Simm has been decorated with White Star IV Class Order, Ministry of Defence II Class Service Badge, Defence Forces Cross for special services, Service Badge of the Information Board, and the Police Memorial Medal.



Herman Simm, 61, was found guilty of treason and of passing on classified information. He was sentenced to 12 years and six months in prison.

From his mother's birthday to prison

The exact sequence of events which led to the uncovering of Simm has not yet been revealed by those in the know, because investigations are ongoing in many countries. According to unconfirmed reports, a mistake was made by his handler and the spy affair started to unravel in Lithuania. Apparently, the fake Portuguese businessman tried to recruit a civil servant working for the EU, who informed the Lithuanian intelligence service. While observing Graf-Jakovlev's contacts, the spy hunters, to their shock, came across the Estonian keeper of secrets. A massive international counter-intelligence operation was put in motion, with both Simm and Jakovlev being placed under 24-hour surveillance.

Simm says that in September 2008, three days before his arrest, he received a phone call from Jakovlev. Simm immediately knew that something was very wrong when an intelligence professional was breaking secrecy rules in this manner. In essence, this was an emergency call: Jakovlev announced that he was probably being followed. Simm realised that that was probably the end.

There was no point in fleeing. The only thing he could do was to pretend that everything was well. A day before his arrest, he celebrated the eightieth birthday of his mother Linda at the Eesti Maja restaurant. In the evening, he helped his mother home, with all her bunches of flowers, and this was the last time they saw each other. Herman and his wife Heete were arrested the following night.

On the same night, dozens of documents, of varying degrees of secrecy, were found in Simm's country house in Vihterpalu. The real jackpot, however, was awaiting the investigators in Simm's home in Saue. One briefcase revealed numerous tools of espionage, various talk- and memory cards. In addition to various hiding places, the most exciting find was small pieces of paper. These were notes which Sergei Jakovlev had torn out of his notebook in order to write down ciphers for Simm. They also provided the DNA of the Russian resident.

Just as easily as Simm's recruitment took place, he now gave evidence. It also turned out that, in addition to thousands of documents, Simm had also given Russian intelligence information and recommendations on officials who could be recruited in the future. In February 2009, Herman Simm became the first traitor to be sentenced since Estonia regained independence. He is due to be released from prison in 2021.

Heete Simm, who was charged with abetting treason, was acquitted due to a lack of evidence and was released from custody after two months. Her position at the Police Board was no longer available and she received severance pay. Despite repeated requests, she did not wish to give any comments for the film.

The hunt in the shadows is still on

The spy mystery is far from being solved. Whereas the Estonian keeper of secrets became an anti-hero of international calibre and a national pariah, the other and more significant character, as many believe - Officer Sergei Jakovlev - has disappeared. If Simm and his handler had been under constant surveillance, where could the Russian officer, who was even a bigger catch for spy hunters, have disappeared to?

Many people, including Simm, believe that Jakovlev was caught and, for at least some time, cooperated with Western intelligence, but that this was kept hushed up. This would provide an explanation for why the search for Jakovlev is not that active.

As a consequence of the Simm affair, NATO expelled two Russian diplomats in the spring of 2009, to which Moscow replied by expelling two Western diplomats. Both NATO and the SVR have refused to comment on this case. In Estonia not a single official has been punished in connection with the Simm scandal.





Text: **Oliver Õunmaa** | *Pealinn*

Photos: Foundation Tallinn 2011, Estonian Film Archives, personal collections of Johannes Tilk

The unique maritime history of Tallinn will soon be seen at the grand Sea World at the Seaplane Harbour

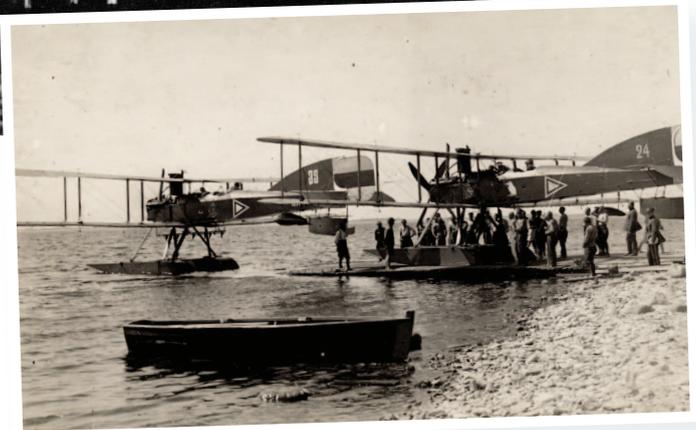


In 2011, when Tallinn will be the European Cultural Capital, the Estonian Maritime Museum will exhibit the submarine 'Lembit' and many other objects of interest at Sea World, opened in the Seaplane Hangar.





The Seaplane Harbour is famous for the world's first seaplane hangars of their size, which were built during the Czarist era. According to Urmas Dresen, Director of the Estonian Maritime Museum, the museum will exhibit its entire collection of naval vessels, as well as sea mines, at Sea World. "Of course, we could have chosen to open the exhibition in any warehouse, but then it would have lacked its current lustre", says Dresen. "After all, these buildings were twelve years ahead of their time when they were built."



The fascinating design solution of the new part of the museum was created by the KoKo architects Andrus Kõresaar and Raivo Kotov, who claim that the hangars are unique buildings. "There is no central support for the ceiling of the 36x109 metre room," the architects explain. "Those hangars are the first constructions in the whole world sealed by a layer of reinforced concrete." The look of the new exhibition space was created by Margit Aule, Indrek Mikk and the interior architect Margit Argus. The sides of the pier at the Seaplane Harbour will be left for the museum's ships, such as steamer-icebreaker 'Suur Tõll'.

Three worlds in one place

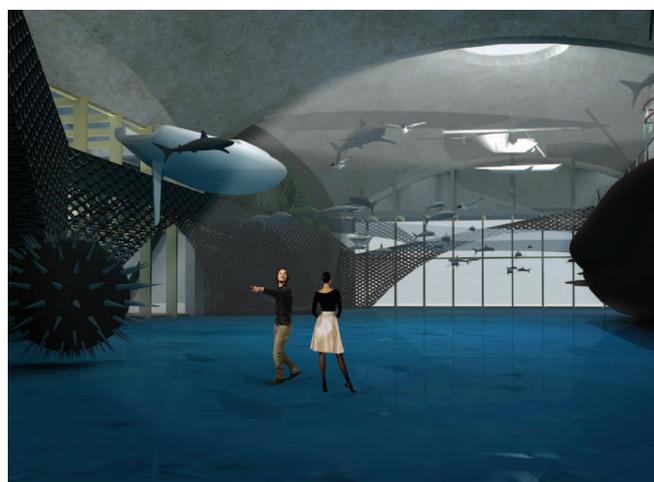
According to Dresen, the Seaplane Harbour is the perfect spot for the museum. "We chose this location back in 2004 because our exhibits included ships and they needed a harbour," explains the Director of the Estonian Maritime Museum. "'Suur Tõll' needs water which is at least 6.5 metres deep and such conditions exist in the Seaplane Harbour," he continues.

The hangars will be restored so that they are weather-proof and ready for use all year round. The exhibition will be divided into underwater, surface and above-the-surface worlds. The biggest exhibition item in the hangar will be the submarine 'Lembit', which will be lifted up a metre. Everything which is visible under the submarine will be a part of the underwater world.

"The initial thought was born from the idea that 'Lembit' would be brought into the hangar," say the architects. "After all, it wasn't possible to deepen the floor of the hangar. At the same time, we wanted to show the submarine from underneath and what happens under the water."

The sea mines and anchors will be exhibited on the floor of the hangar, "under water".

In addition to the submarine, there will be equipment for hauling mines, ice sail-boats and cannons displayed on the surface level. The exhibits located above the floor will be placed on special stands. A restored seaplane will be hung from the ceiling.





The display in the hangars is divided into three levels: the "underwater world", which shows mines and sea creatures, the surface level, showing boats, and the sky, with a real suspended seaplane.

The pier above an iridescent canvas

The exposition will be enlivened by sea flora and fauna. The architects are still working on the solution and hence unable to say whether there will be real jellyfish and seaweed in the hangars.

The water surface is symbolised by a tight iridescent canvas at the height of 5.5 metres, which will have the sparkle of water projected onto it. The ticket office, WCs, souvenir counter and the cloakroom will be located next to the main entrance. The hall and the exhibition room on the ground floor will be separated by a large aquarium with live fish.

The exhibition room showing the surface of the water is divided into the "beach" and "pier" areas. The pier, which has an alternating height and width, will stretch across the room and have boats and sail-boats, as well as cannons and other naval equipment on both sides. "In designing the look of the lightweight pier made of steel profiles, we were inspired by the look and arches of the hangars," say the architects.

Highlight of the Maritime Days

Having circled the room, visitors will descend along a gently sloping staircase into the "underwater world" where, in addition to mines and anchors, they can see fish and tree roots. The appropriate mood will be created by sea sounds from speakers. The closed eastern side of the building will be used to show film sequences about the life and work of submariners and icebreakers. Having circled the underwater world, visitors will work their way back to the main entrance.



On 29 September 1933 Charles Lindbergh, who was the first to fly across the Atlantic, visited the hangars in the seaplane called Lockheed Sirius.



There will be a cafeteria on the second floor of the building offering light snacks and a view of the exposition. It will also have access to the corner towers on the side of the sea and their roof, which will have a terrace.

According to Andri Maimets, Communication Manager of the Capital of Culture Foundation Tallinn 2011, the seaplane hangars are important for Tallinn. "The hangars are open to visitors from the side of the sea," says Maimets. "The Seaplane Harbour is included in the Maritime Days programme and there will be other events there in 2011."

Architectural miracle from Denmark

- The Seaplane Harbour and the seaplane hangars, which are 20x100 metres in size, were built in 1916–1917 as a part of the sea bastion of Peter the Great. They were meant to house the largest seaplanes of the time. The hangars were built and designed by the Danish company Christiani & Nielsen.
- When WWI broke out, the building of the hangars came to a halt. But by the mid-1920s the whole harbour, with buildings and hangars, was completed.
- In 2006, the Maritime Museum won ownership of the buildings after a nine-year court battle. The decaying hangars were rescued from a bankrupt company, which had owned them illegally.



Text and photos: magazine KÖÖK
www.ajakirikook.ee

50 best Estonian restaurants

In 2008, the first chart of top Estonian restaurants was compiled. There were surprises and disappointments, but also a lot of genuine joy. It became clear that there are many unique eating places in Estonia, even more than expected. In our previous issue, we started to introduce the top restaurants in Estonia. In this issue, we bring to you the next six of them, all situated in Tallinn.

www.flavoursofestonia.com



Cuisinier **Dimitri Demjanov**
Head Chef **Emmanuel Wille**

GLORIA

a living legend

Gloria is definitely the most famous restaurant in Tallinn, if not the whole country. It is not just because the *grand old man* of Estonian culinary art, Dimitri Demjanov, leads the troops there, but also because this restaurant has the longest history in Estonia. Seventy-one years is an awe-inspiring age.

Gloria has stayed true to its style and direction. And why should it change? In all honesty, the thought of Gloria undergoing rejuvenation is unimaginable. Thanks to its dignified age, Gloria is allowed to be old-fashioned in a good sense. Gloria walks along its path, unwavering and unashamed of being a timeless classic.

It is the menu which changes in Gloria, and that is sufficient. New Estonian cuisine is so close to Demjanov's heart that one cannot imagine Gloria without it. Demjanov's pea soup is equally famous, even legendary. For Dimitri Demjanov, Estonian food on the menu is not about being trendy, but about authenticity. It was Demjanov who made Estonian food "come out" and started

to deconstruct it, appreciating and guessing what Estonian food is about, understanding and putting it back together in a more contemporary way. The process was successful and the food "worked" so well that there were immediately many followers and supporters.

Gloria does not have to make an effort to be visible. The restaurant is known anyway and people come across the borders to visit it. Gloria has become a legend, not one which is gradually forgotten, but an enduring one. Only a few manage to become legends in their own lifetime.

"Gloria is like a good brandy, which becomes better over time," says Dimitri Demjanov.

Location: Müürivahe 2
Telephone: +372 640 6800

www.gloria.ee





If you wish to enjoy pure luxury, great service and exclusive food and drink, do pay a visit to the Stenhus Restaurant at the Hotel Schössle. It is worth taking time out and enjoying some gourmet dining in this cosy establishment reminiscent of good old England. It's a safe choice whatever the season.

Head Chef: **TÕNIS SIIGUR**

Head Chef Tõnis Siigur can guarantee that the food will be faultlessly scrumptious, and presented with a slightly novel twist, yet familiar. There are no grand surprises, but a good portion of simplicity, with a nice extra touch. They certainly make sure in this restaurant that the ingredients are all in season. The service is virtually invisible, and fine dining is guaranteed.

The food at this restaurant of one of the most prestigious hotels in Estonia is worth the price. Whereas some other establishments may struggle to provide stable quality, there is no danger of that at Stenhus, which has been in business for over a decade already. The only thing which has fluctuated recently is the prices and, to the delight of customers, the quality of the food has remained high.

STENHUS

No concessions on quality

Tõnis Siigur is one of the most esteemed head chefs in Estonia. He has been at Stenhus from the beginning and hopefully will remain there. There is no lack of ideas in this place, which is why one should come every once in a while to taste what's on offer. The menu ranges from BBQ dishes, on Thursdays, to strawberry and tomato gazpacho. Only Siigur knows how to maintain the same high level of quality for over ten years, and how to manage the amount of work behind it. But who says that high quality comes without any effort? It is worth learning from Siigur.

Location: Pühavaimu 13/15
Telephone: +372 699 7780

www.schlossle-hotels.com

Tõnis Siigur himself says that, for him, the freshness of the ingredients and higher than average quality are most important. However, the dishes created must be simple and laconic. Five to seven ingredients are sufficient to ensure pure taste.



lighter than air VERTIGO

Head Chef **IMRE KOSE**



Vertigo charms with its lightness. Partly the location is responsible. The ninth floor is high enough to offer a splendid view of Tallinn. You can sit in the restaurant and enjoy the shimmering lights of the Old Town at night. Seats can be chosen with different views, each one new and interesting.

The food also has an airy quality. Imre Kose has always been fascinated by Italian and Mediterranean cuisine, and inspired by the lighter version of French cuisine. This can be felt in Vertigo. Imre is one of the few head chefs around who can often be spotted moving around the restaurant and chatting with guests. His energy and constant happiness are contagious and his recommendations well worth listening to, for who else but the creator of the dishes is best able to introduce them. The drinks list is exciting at Vertigo, as here you can find tasty and notable wines produced in small wineries or even family estates, which you can't really find anywhere else.

Everything seems to happen by itself, without any effort, in this establishment. And this creates an enjoyable atmosphere. The dishes on offer are tasty, light and definitely have a slight twist. Great emphasis is placed on the freshness of the ingredients. Vertigo's attractive cocktails are famous - one can sip them for hours on end. Bold ideas and taste combinations are playfully brought to life here.

Vertigo is a suitable place for a business lunch, or if you are just looking for something exciting for the taste buds to share with your friends, or want to enjoy a cocktail or two in the bar with your beloved. If the weather permits, you can sit on the large roof terrace and take in the wonderful panoramic view.

Imre Kose says that Vertigo is a place of many opportunities. "It is a good place for those looking for a lump of sugar in their daily lives, a chance to make life interesting, fun and eventful."



Location: Rävåla pst 4
Telephone: +372 666 3456

www.vertigo.ee



BALTHASAR

garlicky and beneficial



Its location in the Old Town pharmacy building is reason enough to offer food which is healthy. Balthasar is probably the only garlic restaurant in Tallinn and its surroundings. The building, with crooked floors and ceilings, dates back centuries and is well-suited for a restaurant which offers garlic as an ingredient in most dishes.

The restaurant got its name from the famous chronicler and writer Balthasar Russow, who lived in this building and wrote his "Chronicles of Livonia", which describe the life and events in Estonia in the 12-16th centuries. "Chronicles of Livonia" is still the main work about Estonian culture and history in this period. The building is also unique because it houses the oldest continuously functioning pharmacy in Europe – the Raeapteek. The first information on the pharmacy is from 1422.

In addition to a healthy menu, Balthasar offers a superb view of the Town Hall Square. The restaurant is popular with locals and tourists. It is a pleasant place to host your guests.

In addition, the building has such a medicinal effect that the best Estonian sommeliers have come from here. Kristjan Markii won the title of best Estonian sommelier this year, and his recommendations on which wine to have are well worth listening to. The unique wine list is also quite useful. It is also recommended that you try the local garlic *schnaps*, which makes one healthy and strong.

Garlic has always been and will always be around and so will the garlic restaurant Balthasar, a top Tallinn restaurant, with superb service and food. As the Head Chef says, "Not a single kitchen in the world functions without garlic! We offer good quality and tasty food with garlic." It is true, after all, that garlic means health and vigour.

Head Chef: **Sergei Trunov**
Sommelier: **Kristjan Markii**

Location: Raeoja plats 11
Telephone: +372 627 6400

www.balthasar.ee



Head Chef **Rudolf Visnapuu**

DOMINIC

a dignified classic

Several good restaurants are situated on Vene Street. Dominic is definitely one worth visiting. It is a classic restaurant in the best sense of the word. It's just big enough, perhaps even on the small side. It is a place where everyone feels good: cosy in the cafe and more glamorous in the restaurant. This building, dating back to 1374, has a dignified atmosphere, with its painted ceiling beams and windows with coats of arms. The white piano in the corner adds an air of mystery and luxury.

But let's talk about the food. Dominic's cafe serves the best cakes in town. The restaurant offers true delights for the taste-buds. The food created by Head Chef Rudolf Visnapuu shows the influence of classic French cuisine, which is well-suited to the dignified environment. It is tasty, but not overly ambitious, cleverly put together and delicious. The food is complemented by wine from the wine list, which offers a good selection.

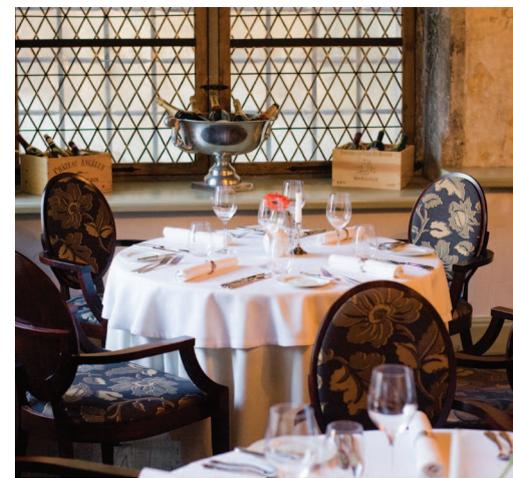
The friendly staff guarantees that the food which you have ordered finds a suitable wine to go with it. All is designed to offer you a memorable taste experience, and to make the meal into an event and not just filling your stomach.

Rudolf Visnapuu wants to interact more with his customers and to fulfil their wishes. "Come and talk to us about what you would like. We find the individual approach very important," he says, encouraging customers to give feedback. This is the way that progressive synergy is born.

What else is there to say about Dominic? It's a restaurant which doesn't create an unnecessary fuss. It just exists, respectable and irrefutable. Yet its name, milieu and service culture breathe the dignity which distinguishes a true restaurant. Not flamboyant pride, but dignity. Dominic is the one and only true restaurant, and not only because its web address says so.

Location: Vene 10
Telephone: +372 641 0400

www.restoran.ee





Head Chef **STEPAN JARTS**

Cheese restaurant ST. MICHAEL cheese in various forms

The only cheese restaurant in Estonia, carrying the name of the archangel Michael, has a medieval city wall as one of its walls. As the Imperial Hotel was built on the ruins of a medieval nunnery, the piece of wall has fortunately survived. The city wall was built in order to offer the city's protective shelter to the nunnery. It is unlikely that the nuns—mostly widows of noble descent and their daughters—thought that their territory would, in future, house an establishment for cheese gourmards. Fortunately, cheese in all its various forms is today available to everyone.

The menu has links to medieval times in the sense that cheese was eaten back then as well. Cheese is used in most dishes on the current menu, whether it is fried, baked, marinated or even served as foam, dip or a filling. Everyone loves cheese and many appreciate its variety. Hence, the restaurant has a regular clientele which includes more than foreign tourists. Both old and young eat cheese, which has a much longer history than the surroundings of the cheese restaurant. But one should not look for a special cart with a cheese selection here – it does not exist.

At least sixteen different types of cheese are used in the dishes here on a daily basis. The head chef, however, is always investigating the growing choice of cheeses available at supermarkets and in the market, just in case something new or more interesting has been imported. Fortunately this is often the case. The menu often includes Estonian cheeses, as well as foreign varieties. Priority is given to those ingredients which are the best available, regardless of their country of origin. Hence, the mozzarella on the menu comes from Vigala and not Italy!

It remains a mystery why there are men clad as monks serving the food in a former nunnery. Modern times perhaps.

Location: Nunne 14
Telephone: + 372 627 4845

www.juusturestoran.ee





Estonia in brief

Official name:	Republic of Estonia
State order:	Parliamentary republic
Area:	45,227 sq kilometres (17,500 sq miles)
Population:	1,356,045 inhabitants: 69% Estonians, 26% Russians and 5% others
Population density:	35 people per square kilometre. Over 70% reside in urban centres
Capital:	Tallinn with 405,562 inhabitants (01.09.2009)
Other major towns:	Tartu (101,190), Narva (67,752), Kohtla-Järve (46,765), Pärnu (44,781)
Administrative divisions:	15 counties (<i>maakond</i>), divided further into 202 rural municipalities (<i>vald</i>)
Official language:	Estonian, a member of the Finno-Ugric group. Russian is widely spoken. Many Estonians speak English, German, Finnish or Swedish
Alphabet:	Latin
Religion:	Predominantly Protestant (Lutheran)
Currency:	Estonian kroon (EEK), divided into 100 sents; 1 euro = 15.65 EEK
Driving:	Right hand side of the road. Speed limits in town 50 km/h, out of town 90 km/h. International driving licence required
Weights and measures:	Metric system
Electricity:	220 volts, 50 Hz
National flag:	Blue-black-and-white
National holiday:	24 February (Independence Day)
National anthem:	<i>Mu isamaa, mu õnn ja rõõm</i> (My fatherland, my joy and happiness)
National flower:	Cornflower (<i>Centaurea cyanus</i>)
National bird:	Chimney swallow (<i>Hirundo rustica</i>)



Practical information for visitors



For more travel details, please consult the sources below: www.visitestonia.com (Estonian Tourist Board), www.riik.ee/en/.

Tourist information centres are located in all larger towns.

The Tallinn Tourist Information Centre in the Old Town is located at 4 Kullassepa Street - no more than 10 steps from the Town Hall Square (ph.: +372 645 7777, e-mail: turismiinfo@tallinnlv.ee). The Tallinn Tourist Information Centre in Viru Keskus (ph: +372 610 1557, 610 1558), open every day 9 am - 9 pm, is located in the centre of the city. A wide selection of maps, brochures and publications in several languages (largest selection in English) can be found at local bookstores and tourist information centres.

Visa

As of 21 December 2007, Estonia is a part of the Schengen visa area.

Nationals of EU and EEA member states are free to enter Estonia. The required travel document for entry is a national ID card or passport.

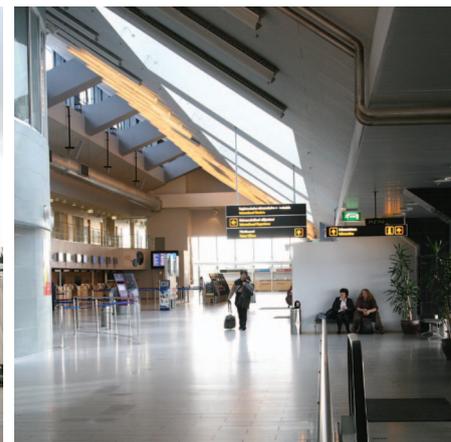
Nationals of the following countries do not need visa to enter Estonia, and can stay for up to 90 days in any 6-month period: Andorra, Argentina, Australia, Brazil, Brunei, Canada, Chile, Costa Rica, Croatia, El Salvador, Guatemala, Holy See, Honduras, Hong Kong, Israel, Japan, Macao, Malaysia, Mexico, Monaco, New Zealand, Nicaragua, Panama, Paraguay, San Marino, Singapore, South

Korea, USA, Uruguay, Venezuela. The required travel document for entry is a valid passport.

Citizens of countries not mentioned above require a visa to enter Estonia. Visitors arriving in Estonia with visa must have national passports valid at least 3 months after their planned departure from Estonia.

Children aged 7 to 15 years must have their own passport when travelling to Estonia or, if they are registered in their parent's passport, must have their photo next to the name. Children under 7 years need not have a photo if they are registered in their parents' passports. Persons above 15 years must have a separate travel document with photo.

For detailed information on visa requirements and entry rules, please consult the Ministry of Foreign Affairs website at www.vm.ee/eng.



Arrival

By plane: Recently renovated, the Tallinn Lennart Meri Airport, just 3 km from the city centre, is welcoming, modern and user-friendly. Among other amenities, travellers have access to a free WiFi area in the transit zone. The airport's 24-hour customer service telephone is +372 6058 888.

The easiest way to get to town is by taxi. A ten-minute ride to the city centre costs approximately 60 Estonian kroons. A hotel transfer minibus meets all incoming flights and takes visitors to downtown hotels for just 25 kroons (€1.60 or \$1.90). City bus #2 connects between the airport, the centre and the harbour. The bus schedule is posted at the bus stops in these places, and tickets can be purchased from the driver (15 kroons, €0.95 or \$1.16 per ride).

Regional airports are located in Kuressaare (Saaremaa), Kärdla (Hiiumaa), Pärnu and Tartu; these provide no regular international connections.

By ship: With over 6 million passengers annually, the Port of Tallinn is undoubtedly Estonia's main gateway. Large passenger ferries arrive from and depart for Helsinki and Stockholm regularly. The 85-km Tallinn-Helsinki line is served by ferries that make the journey in 2 hours; hydrofoils and catamarans make the trip on 1.5 hours and operate between April to November or December, depending on weather conditions. Travellers should note that different ferry lines depart from different terminals and harbours. The City Port with its four terminals is a 10-15 minute walk from Tallinn Old Town; the Paldiski-Kapellskär line uses the Port of Paldiski, about 50 km from Tallinn.

By car: Border checkpoints greet travellers entering or departing the country by way of the Estonian-Latvian border points at Ikla (the Tallinn-Riga highway) and Valga, as well as on the Estonian-

Russian border at Narva (the Tallinn-St. Petersburg highway), Luhamaa, Koidula and Murati. On the Estonian-Russian border, all traffic is subject to border formalities both when entering and leaving Estonia.

By bus: Not only is travel by bus the fastest and most convenient mode of international public transportation in the Baltic states, it also offers excellent value for your money. Regular connections service all major cities in the Baltic countries and St. Petersburg. Eurolines Lux Express offers comfortable Riga Airport transfers from Tallinn, Pärnu, Klaipeda, Vilnius, Panevezys, and Šiauliai. Prices start from €15.90. A useful tip: Regular passenger buses have priority at the border checkpoints, so travel is smooth. For more information and timetables, please contact Eurolines at tel. +372 6800 909 or visit their website at www.eurolines.ee/eng/index.html.

By train: There are only one international overnight train to Moscow. For further details see www.gorail.ee

Customs

We suggest travellers consult with the Estonian Customs Board help desk (ph.: +372 880 0814 or www.customs.ee) for details. The limit on import of alcoholic beverages from outside the EU is one litre for beverages over 22% alcohol content, and two litres for beverages up to 22%, and four litres for wine. Import of tobacco and tobacco products from non-EU countries is limited to 40 cigarettes or 100 cigarillos or 50 cigars or 50 g of tobacco products. Counterfeit goods, including pirated CDs, video and audio tapes, are prohibited by law. A special export permit is required for specimens of plants and animals of endangered species, protected species and hunting trophies (please contact the Nature Conservation Department, Ministry of the Environment for details). Articles of cultural value produced in Estonia more than 50 years ago also require special permits (please contact the National Heritage Board).

are almost always available even immediately before departure (watch out for special events). For weekend travel or trips to more remote locations with fewer connections, it is advisable to buy tickets in advance. The Tallinn Bus Terminal is located at Lastekodu 46. The timetable is also available online at www.bussireisid.ee/index.php and ticket information is available at telephone +372 6800 900.

Travelling by car

Travellers hoping to see more of the country and the rural areas it would be best advised to travel by car. The roads are quite good and traffic is light. Crossing Estonia from north to south or west to east by car takes approximately three to four hours. All major car rental agencies have offices in Tallinn. It is also possible to rent the car in Estonia and drop it off at a rental agency in Latvia or Lithuania, or vice versa. The speed limit in rural areas is 90 km/h and in cities 50 km/h. In some areas the highway speed limit is increased during the summer months. Headlights and seatbelts (front and back) must be on at all times. Driving under the influence of alcohol or other intoxicating substances is punishable by law.

is no additional charge for ordering the taxi by phone, and it usually takes the cab just five to ten minutes to arrive. All taxi drivers must give you a receipt (in Estonian, ask for "Kviitung, palun"). Locals usually give the exact fare and no tip. As in most major cities, some dishonest drivers attempt to overcharge unsuspecting passengers. If in doubt, note the taxi company and license plate number.

Public transportation: Tallinn has a public transport network of buses, trams and trolley-buses. Other Estonian towns have buses. Schedules are posted at bus stops. Tickets are available at newsstands (the yellow and blue "R-kiosks") and from the driver. A pre-purchased ticket (10 kroons, €1.83) must be validated upon boarding and is valid for one ride. A pre-purchased one-hour ticket costs 15 kroons and two-hour ticket 20 kroons. Check the time schedule for Tallinn bus lines for any bus stop at www.tallinn.ee/eng.



Getting Around Estonia

Inter-city public transportation

Public buses are the easiest, cheapest and most convenient solution for visiting Tartu, Pärnu or any other of the larger towns. Buses from Tallinn to Tartu depart every 15-30 minutes, to Pärnu every hour. On weekdays, seats to these destinations

Local transport

Taxis: Taxis must clearly display their fares, driver's taxi service licenses, and a meter. The initial charge for entering a cab ranges from 20 to 45 kroons. Different taxi companies have different rates, but the average charge per kilometre is 7 kroons. In Tallinn, a short ride within the city centre usually costs around 50 kroons. A ride to the suburbs may cost about 100 kroons. There

Accommodations

All major hotels in Tallinn have been newly built or completely renovation in recent years. Despite annual additions to the number of hotels and rooms, it can nonetheless be difficult to find a hotel room on short notice (particularly over the week-end). For the best selection, we urge visitors to Tallinn and the rest of Estonia to book hotel rooms in advance. For more details, see the Estonian Tourist Board website at www.visitestonia.ee.

Money

The Estonian kroon is pegged to the euro (1 euro=15.6466 kroons; 1 kroon=100 cents).

Most larger hotels, stores and restaurants accept Visa, MasterCard, Eurocard, Diner's Club and American Express. However, it is advisable to carry some Estonian kroons with you.

Traveller's checks can be exchanged in most banks but are less likely to be accepted in shops. Eurocheque is the most widely accepted traveller's check, but American Express and Thomas Cook are also accepted. Banks are plentiful and easy to find in Tallinn. Most are open from 9:00 to 18:00 on weekdays, while some offices are also open on Saturday mornings. All banks offer currency exchange services. Exchange offices can also be found in larger hotels, the airport, harbour, rail-road station and major shopping centres. ATMs are conveniently located around town; instructions are in English, Russian and Estonian.



Telephones and Internet

The country code of Estonia is 372. Dial 00 for outbound international calls. Public payphones only accept prepaid phone cards, costing 50 and 100 EEK, which can be purchased at newsstands. As with ATMs, phone instructions are offered in English, Russian and Estonian. The GSM mobile phone system is available; please check compatibility with your operator.

Public Internet access points have been set up all over Estonia. They are located in local libraries and post offices. There are over 100 free **wireless**

Internet zones around the country, many of them in rather unexpected places - beaches, Old Town squares, stadiums, and concert halls.

Emergencies

112 is the emergency number for ambulance, police and fire department. The police can also be reached directly at 110. Emergency numbers can be dialled free of charge and without a phone card from any public telephone. Select pharmacies are open 24-hours-a-day in many major towns. The one in Tallinn is located at 10 Pärnu Road (opposite the Estonian Drama Theatre); the one in Tartu is located in the Town Hall building (Town Hall Square).



National Holidays

Estonians celebrate January 1 as New Year's Day, a rather slow and quiet day as people recover from the festivities. Shops open late and banks are closed. February 24, Independence Day, is celebrated with a parade of the Estonian Defence Forces at Vabaduse väljak (Freedom Square). May 1 is a bank holiday, similar to Good Friday and May Day. June 23 is the biggest holiday of the year as Estonians celebrate Midsummer Eve and the Victory Day in commemoration of the 1919 Battle of Võnnu, and June 24 is St. John's Day (Midsummer). August 20 is the Day of Restoration of Independence (1991). December 24 (Christmas Eve), December 25 (Christmas Day) and December 26 (Boxing Day) are usually spent at home with families.



Food

Traditional Estonian cuisine consists of simple peasant food, such as cottage cheese, potatoes and bread, all of which are still important components of the local diet. The Estonian dark bread is the main staple missed by Estonians abroad. Typical Estonian dishes do not feature prominently on restaurant menus, and traditional home cooking is more likely to appear at small eateries in remote areas. Still, a few establishments have made Estonian specialities their niche; to sample Estonian cuisine, try the Kuldse Notsu Kõrts, Vanaema juures, Eesti Maja, Kaera-Jaan and Kolu Tavern (Open Air Museum) in Tallinn, and the highly recommended Lümända söögimaja on the Island of Saaremaa.

Of meat dishes, pork is the favourite and most common in Estonia; Baltic herring is the most common local fish. A typical, heavy Estonian meal is a pork steak with sauerkraut and potatoes. Soups are also a mainstay in the local diet, with tasty samplings ranging from broth with dumplings and meatballs to delectable vegetable purees.

At local restaurants, appetizer prices start at approximately 50 kroons and main courses start from about 100 kroons. A three-course restaurant meal with coffee will usually cost upwards of 250 kroons. A glass of house wine or beer is usually 40-50 kroons. Cafeterias offer main course for 45-60 kroons and 100 kroons will buy a full meal. Pleased customers usually leave a tip of 10% of the bill.



Drinks

The main drinks in Estonia are beer, wine and vodka. While many young city residents opt for beer or wine, the older generation and rural folk tend to prefer vodka. In the 1930s Estonian vodka made it into the Guinness Book of Records as the strongest vodka in the world (96%). Local brands of beer enjoy a very strong market position in Estonia. The two main breweries are Saku and A. Le Coq. Saku is Tallinn-based, and its corporate colour is navy blue while A. Le Coq is brewed in Tartu and its colour is red. There are also many smaller breweries. A full list of Estonian beers is posted at www.BeerGuide.ee. One glass of beer at bars or restaurants costs 30-60 kroons. A bottle of beer sells at supermarkets for 10 kroons.

Spirits also include some traditional liqueurs. The famous Vana Tallinn (Old Tallinn) has a 45° alcohol content, and is coincidentally made from 45 ingredients - the recipe is known only to a handful of people. Indeed, the legendary 19th-century *kristallkummel* (caraway liqueur) has made its long-awaited comeback.

Estonian wines, made from currants or other local berries, are rather sweet. Wine lovers usually prefer imported wine, of which there is an ever-increasing selection at stores and vinoteks. A very popular and refreshing non-alcoholic drink is *kali*, made of bread, malt, rye or oats flour and yeast; it has a characteristically dark brown colour. It was with this drink that the Estonians forced the Coca-Cola company into submission, or at least into a business deal. *Kali* was enjoying

phenomenal sales, while Coke was not selling up to expectations. It was then that Coca-Cola decided to broaden its horizons by buying one of the local *kali* trademarks in order to make a profit on the stubborn Estonians.

to local and resident DJs, clubs frequently present guest performers from London, the US and other club hubs. For those looking for a more mellow night on the town, Tallinn's streets are brimming with pubs, vinoteks and bar-restaurants, many of



Entertainment

The entertainment scene in Estonia is vibrant year-round, providing visitors and locals alike with a long list to choose from. Concerts, festivals, theatre, street raves, DJ competitions – Estonia has it all. It is not by chance that both Tallinn and Tartu have their own opera and ballet theatre. Tickets are an excellent value for the money; concert tickets start around 150 kroons, and best seats at the opera are yours for as little as 390 kroons. For more information on the concert schedule see www.concert.ee; the programme for the national opera is posted at www.opera.ee. Tickets can be bought at the box offices or via ticket agencies located in all larger supermarkets, or via Internet (www.piletilevi.ee)

Even the most sceptical museum-goer is bound to find something intriguing in Estonia's large selection of museums, which feature everything from history, art, photography to toys, chocolate, musical instruments, even wax figures and many other topics. Most museums are closed on Tuesdays and many on Mondays as well. It is advisable to have cash on hand as many museums do not accept credit cards.

Tallinn is also bustling well into the night with booming and blooming club scene. Clubs are usually open and packed with energised vibes from Thursday to Sunday, with Friday and Saturday drawing the liveliest of crowds. In addition



which offer live music even on weekdays. Rather than take in a movie? Films in cinemas are shown in the original language with subtitles.

Shops

Souvenir shops in Tallinn and most other tourist locations are open seven days a week, 10:00-18:00 or 19:00. Big supermarkets and hypermarkets are open seven days a week from 9:00-21:00 or 10:00-22:00. Department stores close a few hours earlier on Sundays or, in smaller towns, may be closed on Sundays. Smaller food shops may have shorter opening hours. Some 24-hour shops can be found as well. Other shops usually open at 9:00 or 10:00 and close at 18:00 or 19:00; they often close early on Saturdays and are closed on Sundays. The majority of shops accept credit cards, with the exception of smaller stores and stores in rural areas.



Souvenirs

Souvenir and shopping preferences vary hugely but there are certain souvenir gifts that have gladdened many a heart. Estonian handicraft comes in many forms. There are woollen sweaters and mittens with local ethnic patterns, linen sheets and tablecloths, crocheted shawls and veils, colourful woven rugs, handmade jewellery and glassware, baskets, and an array of wooden spoons and butterknives made from juniper. Fine and applied art for show and purchase is on display at art galleries around the country, featuring graphics, glass, ceramics, hand-painted silk scarves and leatherwork. Various herbal teas from wild plants are available at pharmacies. Local honey – pure or flavoured, e.g. ginger, is another delicious treat. In rural areas, you may find hand-milled flour. And those who keep coming back swear by the Estonian black rye bread. To bring home local spirits, popular choices include Vana Tallinn or *kristallkümmel* liqueur or local beer. And there is no place better than Estonia to buy Estonian music.



Crime

Although common sense is advisable in all destinations, Estonia gives no particular reason to be excessively worried. Do not walk the unlit and abandoned areas alone at night. Do not leave bags or items of value in the car, as not to tempt car thieves or robbers. Pickpockets may operate at crowded tourist destinations in Tallinn, so make sure your wallet and documents are stored safely.

Estonians

Estonians are typical Nordic people – they are reserved, not too talkative and speak rather monotonously, with very little intonation. All this may give one the impression of coldness bordering on rudeness. But rest assured, this is not the case, and the speaker may actually be extremely well-meaning, even excited. There are several well-known Estonian sayings, such as “Think first, then speak”, “Weigh everything carefully nine times before making a move”, and “Talking is sil-



Language

Estonian is not widely spoken in the world, so Estonians do not expect short-term visitors to master the local language. Still, local people are thrilled and pleased to hear a foreigner say “Tere!” (Hi!) or “Aitäh (Thank you) in Estonian. Knowledge of foreign languages is naturally a must for hotel staff and numerous other professions in the service sector. Many people are fluent in English, particularly the younger urban generation, and a great number of people also speak Finnish, due to Finnish TV, Finland’s close proximity to Estonia and the great number of Finnish tourists. German is less widely spoken in Estonia, although previous generations have often studied German, not English, at school. Russian-language use has dropped to a point where older people no longer speak the language well and the younger generation have already chosen other languages to learn at school. Studying French has become more popular over the last few years but the number of people who speak French is still quite small. An English-Estonian dictionary is available online at www.ibs.ee/dict.

ver, silence is gold”. It is, therefore, no wonder that the people are not very good at small talk, do not waste too much time on grand introductions, and usually come straight to the point. This is why Estonians’ English may sometimes sound shockingly direct. There is, however, often a subtle irony involved in Estonians’ utterances - delivered with a serious face and just the slightest twinkle of the eye.

Estonians are relatively individualistic. There is a saying that five Estonians mean six parties. Even though people agree on the final objective, they insist on reaching it in their own ways. Estonians also value their privacy. In the old days, it was said that the neighbour’s house was close enough if you could see the smoke from the chimney. Modern, tight-packed urbanites flock to remote countryside on the weekends to enjoy more space and privacy.

Even though guests at birthday parties and concerts are rather quiet and subdued in the onset, they warm up eventually and turn into a direct opposite of their day-character, as you are likely to see in Tallinn’s clubs.