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EV97 application 2017

## General information

Institution [National Institute of Chemical Physics and Biophysics](#)

(Corresponding) R&D field 2. Engineering and technology

Evaluation period 2010 - 2015

The person responsible [Kristian Sülluste](#)

Structural unit(s) to be evaluated

National Institute of Chemical Physics and Biophysics

**Short summary of the institution (formation, activities and role in the Estonian R&D)**

The National Institute of Chemical Physics and Biophysics (NICPB) was founded on 16th of February 1980 as the Institute of Chemical Physics and Biophysics of the Estonian Academy of Sciences. The Institute was formed on the basis of (i) the Department of Physics and (ii) the Department of Biochemistry of the Institute of Cybernetics and (iii) a research group of molecular genetics of the Institute of Physics. Since 1998 the [NICPB is a public research institution](#) – a National Laboratory, financed from the state budget and research grants. [Today NICPB consists of four laboratories](#). The [Laboratory of Chemical Physics](#) is still the largest laboratory in the institute. In 2011 the [Laboratory of High-Energy and Computational Physics](#) was formed from it to host all CERN related theoretical and experimental activities at NICPB. In 2012 the laboratory of Molecular Genetics was renamed to the [Laboratory of Environmental Toxicology](#) to reflect the changed focus of research. The [Laboratory of Bioenergetics](#) was established in 1993. The Laboratory of Bioorganic Chemistry was closed in 2016 as its scientists were not successful in obtaining research grants.

The strength of NICPB is its excellence in research: the scientists of NICPB have published 59 highly cited papers in 2004 – 2014, which is 21% of similar level papers from all Estonian research institutions and universities combined, see [“Progress in Estonian science viewed through bibliometric indicators \(2004–2014\)” Proceedings of the Estonian Academy of Sciences, 2015, Vol. 64, No. 2, 125–126](#). This is a very large share for a small institute, but of course one would expect that a national institute would stand out.

**Short summary of the institution's R&D management (incl. support services)**

Among Baltic countries NICPB is the only institution who runs a helium liquefier or hosts a Tier-2 centre for the CERN computing grid (WLCG). That datacentre is not only used for LHC related computing, but is actually serving a multitude of fields including material science, astroparticle physics, medicine, etc. and is part of the Estonian Research Computational Infrastructure (ETAIS).

According to the “[National Institute of Chemical Physics and Biophysics Act](#)” the management bodies of the NICPB are the director and the [science council](#), see the [organization chart of NICPB](#). NICPB is managed by the director who is elected by the science council. The international [Science Advisory Board \(SAB\)](#) periodically evaluates the research programmes of NICPB and advises the science council to open new programmes and/or to terminate existing programmes. SAB also evaluates scientific and administrative capacities of the candidates to the posts of the director and the heads of laboratories.

The science council is the collegiate decision making body of NICPB which consists of 19 members including the director, deputy directors, scientific secretary and leading scientists of NICPB and related fields. According to the [NICPB act](#) the science council 1) approves the main directions of the activities of NICPB, and carries out supervision over their implementation; 2) Approves the Statutes of NICPB and makes amendments to them; 3) Elects members of the research staff of the NICPB; 4) Approves the financial plan; etc.

The structure of NICPB includes scientific, administrative and economic units. In 2017 the scientific subdivisions consist of laboratories of chemical physics, molecular genetics, bioenergetics and high-energy and computational physics. The laboratory of biochemistry was closed in 2016. The laboratories carry responsibility for the Institute's scientific infrastructure. Specific scientific research is divided into programs, contracts and grants. The PI of the particular program or project is both authorizing the resources as well as carrying the responsibility for the results of the research. Scientific infrastructure is available for universal usage of all programs, contracts and grants.

**Short summary of the process of drawing up the self-evaluation report**

In preparation to the current evaluation the international [Science Advisory Board \(SAB\)](#) of NICPB visited the institute in September 2016 and performed a review of the management, strategy and research programs. According to the [assessment of SAB](#), signed by Peter Littlewood, director of Argonne National Laboratory, the “Institute is sound and well run, with a good relationship between the Staff and the Director. The NICPB is evolving a strategy and direction that will be beneficial for the Institute and for Estonia as a whole, and despite some structural and financial impediments, is performing well scientifically.”

While preparing the current self-evaluation, heads of laboratories and group leaders focused on specific topics: staff, resources, R&D activities, training of PhD students and scientific results. The section of general information was written by the director of the institute, based on discussions with colleagues. The selection of 30 most important projects was straightforward: institutional research projects, centres of excellence, large infrastructure and collaboration projects etc. The list of 30 most significant papers



## Comments

The number of researchers in the institute has steadily grown throughout the evaluation period. The number of technical and auxiliary staff includes also students who work in the institute. The drop of personnel in 2015 is related to unsuccessful grant applications by researchers of the Laboratory of Bioorganic Chemistry that was closed in 2016. In 2011 the Research Council of the NICPB formed a new laboratory – the Laboratory of High-Energy and Computational Physics in our fastest growing field of research.

As a rule PhD level and younger students work in the institute and their number affects the percentage of employees with a science degree. A steady increase of students above the number of those that graduate every year has reduced the % from its peak in 2011. This is a healthy outcome as it shows our ability to attract early phase students from BSc, MSc and PhD programs and increase the sustainability of the research programs.

## Staff in the corresponding field (151)

Name	Gender	Degree	Years	Position	CV
filter...	filter...	filter...	filter...	filter...	
Konstantin Skaburskas	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2010-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Ene Valdmann	f		2010, 2011, 2012, 2013, 2014, 2015	1.01.1997-... National Institute of Chemical Physics and Biophysics, Other staff (1,00)	
			2010,		

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Ene Siigur	f	Doctor's Degree	2011, 2012, 2013, 2014, 2015	1.01.1984-31.12.2015 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Mari Samel	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2012-31.12.2015 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2006-31.12.2012 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Katrin Trummal	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1996-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2010-31.12.2015 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Mait Müntel	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2008-13.06.2013 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Reet Aguraiuja	f	Master's Degree	2010, 2011, 2012, 2013	1.01.1986-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.09.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, Senior Engineer Chemist (1,00)	<a href="#">CV</a>
Lee Põllumaa	f	Doctor's Degree	2010	1.03.2008-31.08.2010 National Institute of Chemical Physics and Biophysics, Extraordinary Senior Researcher (0,25)	<a href="#">CV</a>
			2010, 2011,		

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Dmitri Troškov	m		2012, 2013, 2014, 2015	1.01.2007-... National Institute of Chemical Physics and Biophysics, Other staff (0,50)	
Pilvi Laas	f		2010, 2011, 2012	1.01.1998-30.11.2012 National Institute of Chemical Physics and Biophysics, technician (1,00)	
Saima Mae	f		2010, 2011, 2012, 2013	1.01.2007-31.08.2013 National Institute of Chemical Physics and Biophysics, RMS (1,00)	<a href="#">CV</a>
Ilja Livenson	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2010-... National Institute of Chemical Physics and Biophysics, Other staff (1,00); 1.01.2005-31.12.2010 National Institute of Chemical Physics and Biophysics, Other staff (0,70)	<a href="#">CV</a>
Luca Ferretti	m		2010, 2011, 2012, 2013, 2014, 2015	1.01.2008-... National Institute of Chemical Physics and Biophysics, Other staff	
Tarmo Ploom	m		2010, 2011, 2012, 2013, 2014, 2015	1.01.2008-... National Institute of Chemical Physics and Biophysics, Extraordinary Researcher	

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Yuji Kajiyama	m	Doctor's Degree	2010, 2011	1.01.2008-31.08.2010 National Institute of Chemical Physics and Biophysics, Extraordinary Senior Researcher (1,00); 1.01.2010-31.08.2011 National Institute of Chemical Physics and Biophysics, Senior Research Fellow (1,00)	<a href="#">CV</a>
Andres Tiko	m	Master's Degree	2011, 2012, 2013, 2014, 2015	1.01.2011-31.12.2016 National Institute of Chemical Physics and Biophysics, engineer (1,00)	<a href="#">CV</a>
Christoph Nacke	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, Extraordinary Senior Researcher (0,10)	
Anna Šugai	f	Doctor's Degree	2014, 2015	1.01.2014-31.12.2015 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Hardi Veermäe	m	Master's Degree	2011, 2012, 2013, 2014, 2015	1.09.2011-... National Institute of Chemical Physics and Biophysics, engineer (0,80)	<a href="#">CV</a>
Tiit Saluvere	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	16.02.1980-31.08.2016 National Institute of Chemical Physics and Biophysics, administration employee (1,00)	<a href="#">CV</a>
Toomas Välimäe	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2012-31.12.2016 National Institute of Chemical Physics and Biophysics, deputy director (1,00); 1.01.2010-31.12.2011 National Institute of Chemical Physics and Biophysics, deputy director (1,00)	<a href="#">CV</a>

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Sandra Käosaar	f	Master's Degree	2012, 2013, 2014, 2015	1.09.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Other staff (1,00); 1.01.2015-31.08.2016 National Institute of Chemical Physics and Biophysics, junior researcher (1,00)	<a href="#">CV</a>
Morten Piibelet	m		2013, 2014, 2015	1.01.2013-... National Institute of Chemical Physics and Biophysics, Other staff (1,00)	
Eero Piirisalu	m	Master's Degree	2012, 2013, 2014	1.07.2012-31.01.2014 National Institute of Chemical Physics and Biophysics, engineer (0,80)	<a href="#">CV</a>
Joosep Pata	m	Master's Degree	2011, 2012, 2013, 2014	1.01.2011-31.12.2014 National Institute of Chemical Physics and Biophysics, IT specialist (1,00)	<a href="#">CV</a>
Oleg Janson	m	Doctor's Degree	2012, 2013, 2014, 2015	1.01.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00); 1.01.2015-31.12.2016 National Institute of Chemical Physics and Biophysics, Senior Research Fellow (0,20)	<a href="#">CV</a>
Allar Busch	m		2012, 2013, 2014, 2015	1.02.2012-... National Institute of Chemical Physics and Biophysics, Other staff (0,50)	<a href="#">CV</a>
Christian Spethmann	m	Doctor's Degree	2013, 2014, 2015	1.01.2013-... National Institute of Chemical Physics and Biophysics, Post-Doc (1,00)	<a href="#">CV</a>
			2011,		



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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Andres Toomsalu	m		2012, 2013, 2014, 2015	1.01.2011-... National Institute of Chemical Physics and Biophysics, Other staff (1,00)	
Nicola De Filippis	m	Doctor's Degree	2013, 2014, 2015	1.01.2013-31.12.2019 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Venkat Kaushik	m	Doctor's Degree	2013, 2014, 2015	1.01.2013-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	
Matti Heikinheimo	m	Doctor's Degree	2013, 2014, 2015	1.01.2013-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Sophie De Reguardati	f		2012, 2013, 2014	1.01.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	
Tõnu Tolk	m		2010, 2011, 2012, 2013, 2014, 2015	1.01.1984-... National Institute of Chemical Physics and Biophysics, engineer (1,00)	
Ain Toim	m		2010, 2011, 2012, 2013, 2014, 2015	1.01.2002-... National Institute of Chemical Physics and Biophysics, senior engineer (1,00)	

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Arnab Chatterjee	m	Doctor's Degree	2015	1.01.2015-31.12.2020 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Anirban Chakraborti	m	Doctor's Degree	2015	1.01.2015-31.12.2020 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Gianluca Giorgi	m	Doctor's Degree	2015	1.01.2015-31.12.2020 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Andrew Fowlie	m	Doctor's Degree	2014	2.01.2014-31.07.2014 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Liran Wang	f	Doctor's Degree	2014, 2015	1.01.2014-31.12.2020 National Institute of Chemical Physics and Biophysics, postdoctoral research associate (1,00)	<a href="#">CV</a>
Joseph Law	m	Doctor's Degree	2015	1.01.2015-31.12.2017 National Institute of Chemical Physics and Biophysics, Post-doctoral Research Associate (1,00)	<a href="#">CV</a>
Barbara Mele			2014	1.01.2014-31.12.2014 National Institute of Chemical Physics and Biophysics, visiting researcher (1,00)	
Martin Jakooobi	m	Master's Degree	2013, 2014	1.01.2013-31.12.2014 National Institute of Chemical Physics and Biophysics, engineer (0,50)	
Helen Nurmsoo	f		2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, Other staff (0,20)	
Siim Miller	m		2010, 2011, 2012, 2013, 2014, 2015	1.01.2006-... National Institute of Chemical Physics and Biophysics, Other staff (0,50)	
			2010, 2011,		

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Tanel Joon	m	Master's Degree	2012, 2013, 2014, 2015	1.01.2006-... National Institute of Chemical Physics and Biophysics, Other staff (0,50)	
Himani Khanduri	f	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2009-30.06.2013 National Institute of Chemical Physics and Biophysics, engineer (0,50)	<a href="#">CV</a>
Alexander Leitmäe	m	Master's Degree	2012, 2013, 2014, 2015	1.02.2012-31.08.2015 National Institute of Chemical Physics and Biophysics, engineer (0,50)	<a href="#">CV</a>
Alan Kalda	m	Master's Degree	2012, 2013	1.01.2012-31.12.2013 National Institute of Chemical Physics and Biophysics, MSc Student (1,00)	<a href="#">CV</a>
Taaniel Uleksin	m	Master's Degree	2010, 2011, 2012	4.01.2010-30.09.2010 National Institute of Chemical Physics and Biophysics, Engineer (1,00); 1.10.2010-29.06.2012 National Institute of Chemical Physics and Biophysics, Other staff (0,45)	<a href="#">CV</a>
Juhan Subbi	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1987-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Reio Pöder	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.09.2015-... National Institute of Chemical Physics and Biophysics, senior engineer (1,00); 1.09.2007-31.08.2015 National Institute of Chemical Physics and Biophysics, engineer (0,50)	<a href="#">CV</a>

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Mukesh Chandra	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00); 1.01.2008-31.12.2010 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00)	<a href="#">CV</a>
Johan Viirok	m	Master's Degree	2012, 2013, 2014, 2015	1.01.2015-31.08.2015 National Institute of Chemical Physics and Biophysics, Engineer (1,00); 1.09.2015-... National Institute of Chemical Physics and Biophysics, Junior Researcher (1,00); 1.09.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, engineer (0,50)	<a href="#">CV</a>
Priit Sarv	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014	1.01.1999-31.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,50)	<a href="#">CV</a>
Imbi Kurvet	f	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2001-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Sirje Vija	f	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.09.2010-... National Institute of Chemical Physics and Biophysics, Other staff (1,00); 1.01.1996-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Jüri Jarvet	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2008-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Tiit Tuherm	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.09.2010-... National Institute of Chemical Physics and Biophysics, Other staff (1,00); 1.01.1986-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Radu Prekup	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2004-31.08.2016 National Institute of Chemical Physics and Biophysics, research engineer (0,50)	<a href="#">CV</a>
Helen Maalinn	f		2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-... National Institute of Chemical Physics and Biophysics, Other staff (0,10)	
Aleksander Rebane	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-31.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,10); 1.01.2015-... National Institute of Chemical Physics and Biophysics, NICPB, Research Professor (0,50)	<a href="#">CV</a>
Aleksandr Käkinen	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2014-31.12.2015 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2011-31.12.2014 National Institute of Chemical Physics and Biophysics, Other staff (0,25); 1.01.2010-31.12.2011 National Institute of Chemical Physics and Biophysics, Other staff (0,50)	<a href="#">CV</a>

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Laur Peedu	m	Master's Degree	2011, 2012, 2013, 2014, 2015	7.02.2011-31.08.2011 National Institute of Chemical Physics and Biophysics, Other staff (0,50); 1.07.2014-... National Institute of Chemical Physics and Biophysics, Junior Researcher (1,00); 1.09.2011-30.06.2013 National Institute of Chemical Physics and Biophysics, Other staff (1,00)	<a href="#">CV</a>
Toomas Rõõm	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.09.2012-... National Institute of Chemical Physics and Biophysics, Research Professor (1,00); 1.01.1998-31.08.2012 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Urmas Nagel	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	12.12.2014-... National Institute of Chemical Physics and Biophysics, Research Professor (1,00); 1.01.1995-12.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Jaan Past	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2012-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.01.2007-31.12.2012 National Institute of Chemical Physics and Biophysics, Research Professor (1,00)	<a href="#">CV</a>
Helgi Kooskora	f	Master's Degree	2010, 2011, 2012	1.01.1986-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.09.2010-30.06.2012 National Institute of Chemical Physics and Biophysics, Senior Engineer Chemist (0,40)	<a href="#">CV</a>
Jekaterina Jefimova	f	Doctor's Degree	2010, 2011, 2012, 2013	1.09.2011-31.12.2013 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.09.2007-31.08.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.09.2010-31.08.2011 National Institute of Chemical Physics and Biophysics, senior engineer, a chemist (1,00)	<a href="#">CV</a>

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Olesja Bondarenko	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2014-... National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2006-31.12.2013 National Institute of Chemical Physics and Biophysics, Engineer (0,50)	<a href="#">CV</a>
Ivo Heinmaa	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2000-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Irina Blinova	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2005-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Heiki Vija	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1996-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Urmas Suursalu	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2005-... National Institute of Chemical Physics and Biophysics, Other staff (1,00)	<a href="#">CV</a>
			2010,		

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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Ene Kiirend	f	Master's Degree	2011, 2012, 2013	1.01.1986-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.09.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, Senior Engineer Chemist (0,60)	<a href="#">CV</a>
Mariliis Sihtmäe	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	23.07.2007-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Liis Seinberg	f	Doctor's Degree	2013, 2014, 2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2013-31.12.2015 National Institute of Chemical Physics and Biophysics, Postdoctoral researcher (1,00)	<a href="#">CV</a>
Girsh Blumberg	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-... National Institute of Chemical Physics and Biophysics, Extraordinary Senior Researcher (0,10)	<a href="#">CV</a>
Dan Huvonen	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2002-31.01.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2014-31.12.2014 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2015-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.02.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, Researcher (0,10)	<a href="#">CV</a>
Villem Aruoja	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-31.08.2010 National Institute of Chemical Physics and Biophysics, Extraordinary Researcher (0,40); 1.09.2010-1.09.2012 National Institute of Chemical Physics and Biophysics, Researcher (0,40); 1.09.2012-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>



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<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Anne Kahru	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-... National Institute of Chemical Physics and Biophysics, Research Professor (1,00); 1.01.2005-31.12.2011 National Institute of Chemical Physics and Biophysics, Acting Head of Laboratory of Molecular Genetics; 1.01.2012-... National Institute of Chemical Physics and Biophysics, Head of the Laboratory of Environmental Toxicology; 1.01.2011-31.12.2012 National Institute of Chemical Physics and Biophysics, Head of the Laboratory of Molecular Genetics	<a href="#">CV</a>
Rando Tuvikene	m	Doctor's Degree	2012, 2013, 2014	1.09.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,50)	<a href="#">CV</a>
Raivo Stern	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, NICPB, Research Professor (1,00); 29.04.2006-28.04.2016 National Institute of Chemical Physics and Biophysics, Director (1,00); 1.01.1995-31.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Enno Joon	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1984-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Tiit Anupõld	m	Master's Degree	2010	1.01.1998-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Andres Reinhold	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1986-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.09.2010-... National Institute of Chemical Physics and Biophysics, Other staff (1,00)	<a href="#">CV</a>

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Ago Samoson	m	Doctor's Degree	2010	1.01.2007-8.01.2010 National Institute of Chemical Physics and Biophysics, Research Professor (1,00)	<a href="#">CV</a>
Liina Kanarbik	f	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2010-... National Institute of Chemical Physics and Biophysics, engineer (0,80)	<a href="#">CV</a>
Valeriy Verchenko			2012, 2013, 2014, 2015	1.01.2012-31.12.2015 National Institute of Chemical Physics and Biophysics, visiting PhD student (0,50)	<a href="#">CV</a>
Joosep Link	m		2013, 2014, 2015	1.01.2013-... National Institute of Chemical Physics and Biophysics, engineer (0,50)	<a href="#">CV</a>
Alar Rummel	m	Master's Degree	2010, 2011, 2012, 2013	1.01.1999-31.12.2013 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	
Alexander Tsirlin	m	Doctor's Degree	2012, 2013, 2014, 2015	1.01.2012-31.12.2015 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Küllli Tõnismägi	f	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1996-28.02.2015 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Margit Heinlaan	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2011-... National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.03.2004-31.12.2010 National Institute of Chemical Physics and Biophysics, engineer (0,55)	<a href="#">CV</a>
Jasper Adamson	m	Doctor's Degree	2010, 2014, 2015	1.12.2014-... National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.10.2009-1.07.2010 National Institute of Chemical Physics and Biophysics, Extraordinary Researcher (0,20)	<a href="#">CV</a>
Tõnu Kesvatera	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.1984-30.11.2013 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Mario Kadastik	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2006-31.12.2012 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2013-30.04.2016 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Liis Rebane	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2006-5.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 3.01.2011-14.02.2012 National Institute of Chemical Physics and Biophysics, Researcher (0,36); 14.02.2012-9.02.2015 National Institute of Chemical Physics and Biophysics, scientist (1,00)	<a href="#">CV</a>
Ello Maremäe	f	Doctor's Degree	2010, 2011, 2012	1.01.2007-4.09.2011 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 5.09.2011-1.04.2012 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,50)	<a href="#">CV</a>
Andi Hektor	m	Doctor's Degree	2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Angela Ivask	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Natalja Irha	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1992-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Jüri Pahapill	m	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.09.2010-... National Institute of Chemical Physics and Biophysics, Other staff (1,00); 1.01.1996-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Erik Teinema	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2008-31.12.2013 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,20)	<a href="#">CV</a>
Janek Reinik	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.09.2007-1.09.2012 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.09.2012-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
			2010, 2011,		

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Endel Lippmaa	m	Doctor's Degree	2012, 2013, 2014, 2015	1.01.1961-31.07.2015 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Arno-Toomas Pihlak	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2007-31.12.2012 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.01.2012-20.03.2013 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Aia Simm	f	Master's Degree	2010	1.01.2007-31.12.2010 National Institute of Chemical Physics and Biophysics, Engineer (0,75)	<a href="#">CV</a>
Antonio Racioppi	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.10.2009-30.09.2012 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00); 1.01.2015-... National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.10.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00)	<a href="#">CV</a>
Priit Kallaste	m	Master's Degree	2014, 2015	1.09.2014-... National Institute of Chemical Physics and Biophysics, Engineer (0,30)	<a href="#">CV</a>
Katre Juganson	f	Master's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2010-30.03.2012 National Institute of Chemical Physics and Biophysics, Technician (0,50); 1.04.2012-31.12.2013 National Institute of Chemical Physics and Biophysics, Engineer (0,70); 1.01.2015-... National Institute of Chemical Physics and Biophysics, Junior Researcher (0,40); 1.01.2014-31.12.2014 National Institute of Chemical Physics and Biophysics, Engineer (1,00)	<a href="#">CV</a>
Monika Mortimer	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-31.12.2011 National Institute of Chemical Physics and Biophysics, Researcher (0,50); 1.01.2011-31.12.2012 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2013-30.06.2016 National Institute of Chemical Physics and Biophysics, Research Scientist in the Laboratory of Environmental Toxicology (1,00)	<a href="#">CV</a>

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Elmo Tempel	m	Doctor's Degree	2011, 2012, 2013, 2014	1.01.2011-31.12.2014 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00)	<a href="#">CV</a>
Martti Raidal	m	Doctor's Degree	2012, 2013, 2014, 2015	1.01.2012-... National Institute of Chemical Physics and Biophysics, Research Professor (1,00)	<a href="#">CV</a>
Alessandro Strumia	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2010-... National Institute of Chemical Physics and Biophysics, Senior Researcher (0,75)	<a href="#">CV</a>
Tiina Titma	f	Master's Degree	2013, 2014	1.01.2013-31.12.2014 National Institute of Chemical Physics and Biophysics, engineer (1,00)	<a href="#">CV</a>
Andrea Giammanco	m	Doctor's Degree	2011, 2012, 2013, 2014, 2015	1.01.2011-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Emidio Gabrielli	m	Doctor's Degree	2011, 2012, 2013, 2014, 2015	1.05.2011-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
			2010, 2011,	1.01.2014-28.02.2015 National Institute of Chemical Physics and Biophysics, Research Professor (0,50); 1.09.2007-	

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Jüri Siigur	m	Doctor's Degree	2012, 2013, 2014, 2015	31.12.2013 National Institute of Chemical Physics and Biophysics, Research Professor (1,00); 1.01.1991-31.08.2016 National Institute of Chemical Physics and Biophysics, Head of laboratory of bioorganic chemistry (0,25); 1.01.1980-31.08.2016 National Institute of Chemical Physics and Biophysics, Scientific secretary (0,25)	<a href="#">CV</a>
Ricardo Martinez-Garcia	m	Doctor's Degree	2015	1.01.2015-31.12.2020 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Kristian Sülluste	m		2010, 2011, 2012, 2013, 2014, 2015	1.01.2006-... National Institute of Chemical Physics and Biophysics, Other staff (1,00)	<a href="#">CV</a>
Els Heinsalu	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.01.2007-31.12.2014 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Anu Aaspõllu	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2008-28.02.2011 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,25); 1.03.2011-28.02.2015 National Institute of Chemical Physics and Biophysics, Other staff (0,10)	<a href="#">CV</a>
Elise Joonas	f	Master's Degree	2015	1.07.2015-30.09.2015 National Institute of Chemical Physics and Biophysics, laboratory assistant (1,00)	<a href="#">CV</a>
			2010, 2011,		

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Tõnis Pehk	m	Doctor's Degree	2012, 2013, 2014, 2015	9.01.2007-31.12.2014 National Institute of Chemical Physics and Biophysics, Research Professor (1,00); 1.01.2015-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Annika Kriisa	f	Master's Degree	2010	1.01.2007-31.08.2010 National Institute of Chemical Physics and Biophysics, Extraordinary Researcher (0,10)	<a href="#">CV</a>
Kalle Keskrand	m		2010, 2011	1.01.2010-31.12.2011 National Institute of Chemical Physics and Biophysics, SITIO project (0,70)	<a href="#">CV</a>
Tika Katuwal	m	Doctor's Degree	2011, 2012, 2013	1.09.2011-31.08.2013 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00)	<a href="#">CV</a>
Margit Lassi	f	Master's Degree	2010, 2011, 2012	1.01.2008-31.08.2011 National Institute of Chemical Physics and Biophysics, Extraordinary Researcher (0,90); 1.09.2011-31.03.2012 National Institute of Chemical Physics and Biophysics, Researcher (0,20)	<a href="#">CV</a>
Indrek Reile	m	Doctor's Degree	2012, 2013, 2014	1.09.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Aleksander Trummal	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.1996-31.12.2010 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2010-31.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.01.2015-... National Institute of Chemical Physics and Biophysics, Researcher (1,00)	<a href="#">CV</a>
Uuve Kirso	f	Doctor's Degree	2010, 2011, 2012	1.09.2012-31.12.2012 National Institute of Chemical Physics and Biophysics, Senior Research Scientist (1,00); 1.09.2007-1.09.2012 National Institute of Chemical Physics and Biophysics, Research Professor (1,00)	<a href="#">CV</a>



Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Henri-Charles Dubourguier	m	Doctor's Degree	2010	1.01.2008-11.03.2010 National Institute of Chemical Physics and Biophysics, Extraordinary Research Professor (0,50)	<a href="#">CV</a>
Kai Künns-Beres	f		2012, 2013, 2014	1.01.2012-31.12.2014 National Institute of Chemical Physics and Biophysics, Laboratory of Environmental Toxicology, research scientist (1,00)	<a href="#">CV</a>
Martti Pärs	m	Doctor's Degree	2013, 2014	1.01.2013-31.12.2014 National Institute of Chemical Physics and Biophysics, Extraordinary Senior Researcher (0,50)	<a href="#">CV</a>
Lauri Liibert	m		2015	11.06.2015-... National Institute of Chemical Physics and Biophysics, IT specialist (1,00)	
Kristjan Kannike	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2007-31.12.2014 National Institute of Chemical Physics and Biophysics, Researcher (1,00); 1.01.2015-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Marco Patriarca	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2008-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
David Navidad Maeso			2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, PhD. Student (1,00)	<a href="#">CV</a>
Betty Constante Calpas	f	Doctor's Degree	2014, 2015	1.01.2014-31.12.2016 National Institute of Chemical Physics and Biophysics, Post-Doc (1,00)	<a href="#">CV</a>

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Meeri Visnapuu	f	Master's Degree	2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, engineer (0,90)	<a href="#">CV</a>
Marion Murumaa	f	Master's Degree	2011, 2012, 2013	1.01.2011-1.09.2013 National Institute of Chemical Physics and Biophysics, engineer (1,00)	<a href="#">CV</a>
Marge Muna	f	Master's Degree	2014, 2015	1.09.2014-31.12.2015 National Institute of Chemical Physics and Biophysics, Engineer (0,25); 1.01.2015-31.12.2016 National Institute of Chemical Physics and Biophysics, Junior Researcher (0,60)	<a href="#">CV</a>
Panchanan Khuntia	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, PostDoc Candidate (1,00)	<a href="#">CV</a>
Nikolay Makarov	m	Doctor's Degree	2010, 2011, 2012, 2013	1.01.2010-31.12.2013 National Institute of Chemical Physics and Biophysics, PostDoc (1,00)	
Min Ge	f	Doctor's Degree	2010, 2011	1.01.2007-31.12.2011 National Institute of Chemical Physics and Biophysics, PostDoc (1,00)	<a href="#">CV</a>
Luca Marzola	m	Doctor's Degree	2015	1.01.2015-... National Institute of Chemical Physics and Biophysics, Researcher (0,30)	<a href="#">CV</a>
Kaja Kasemets	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2006-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00)	<a href="#">CV</a>
Merle Uudsemaa	f	Doctor's Degree	2015	2.02.2015-... National Institute of Chemical Physics and Biophysics, research fellow (1,00)	<a href="#">CV</a>

Name	Gender	Degree	Years	Position	CV
<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	<input type="text" value="filter..."/>	
Tuuli Käämbre	f	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2014-... National Institute of Chemical Physics and Biophysics, Senior Researcher (1,00); 1.09.2007-31.12.2014 National Institute of Chemical Physics and Biophysics, Senior Researcher (0,75)	<a href="#">CV</a>
Valdur Saks	m	Doctor's Degree	2010, 2011, 2012, 2013, 2014, 2015	1.01.2015-31.12.2016 National Institute of Chemical Physics and Biophysics, Senior Research Fellow (0,10); 1.09.2007-31.12.2014 National Institute of Chemical Physics and Biophysics, leading researcher (0,50)	<a href="#">CV</a>

## Total revenue in the corresponding R&D field

Source of funding	2010		2011		2012		2013		2014		2015	
	Number	Sum	Number	Sum	Number	Sum	Number	Sum	Number	Sum	Number	Sum
Projects of targeted financing and institutional research funding	1,88	200 669	1,88	201 773	1,88	189 002	1,88	189 002	0,8	165 480	0,8	165 480
Projects of Estonian Science Foundation grants and personal research funding	0,0	0	0,0	0	0,0	0	0,25	16 902	0,25	16 902	0,55	37 048
Domestic R&D contracts (including grant agreements)	13,00	116 521	13,00	97 448	16,00	131 990	16,00	204 629	19,00	540 856	18,00	607 250
International contracts and grants	10,00	42 143	10,00	67 847	5,00	49 078	5,00	80 218	7,00	513 672	6,00	143 476
Funding from EU structural funds	15,00	177 413	24,00	299 484	25,00	304 324	25,00	346 514	24,00	320 140	18,00	201 346
<b>Total</b>	<b>39,88</b>	<b>536 746</b>	<b>48,88</b>	<b>666 552</b>	<b>47,88</b>	<b>674 394</b>	<b>48,13</b>	<b>837 265</b>	<b>51,05</b>	<b>1 557 050</b>	<b>43,35</b>	<b>1 154 600</b>

Source of funding	2010		2011		2012		2013		2014		2015	
	Number	Sum	Number	Sum	Number	Sum	Number	Sum	Number	Sum	Number	Sum
R&D revenue per research and teaching staff member	<b>0,62</b>	8 386	<b>0,80</b>	10 927	<b>0,73</b>	10 218	<b>0,72</b>	12 496	<b>0,76</b>	23 239	<b>0,64</b>	16 979
R&D revenue per FTE	<b>0,69</b>	9 310	<b>0,95</b>	12 927	<b>0,78</b>	11 037	<b>0,82</b>	14 287	<b>0,84</b>	25 651	<b>0,69</b>	18 473

## R&D infrastructure in the corresponding field

### Summary of R&D infrastructure

The NICPB has 4 laboratories. The offices of the High Energy Physics and Computational Physics Laboratory are in our downtown building at Teatri väljak, all other infrastructure and labs including the CERN Tier-2 GRID node are in the main building at Akadeemia tee 23. The institute has obtained in 2016 funding for the renovation of the Akadeemia tee building to improve energy efficiency and working conditions.

Laboratory of Chemical Physics was founded on NMR infrastructure which at present consists of 4 spectrometers covering 200-800MHz range. This radiofrequency apparatus is supported and continuously developed by permanent electronics engineering staff. Additionally, magic angle spinning (MAS) probe manufacturing for NMR dates back over several decades and is continuously developed, allowing sub-10K MAS rotation at 10KHz. Labs ample THz, IR, optical and UV spectroscopy resources are complemented by high magnetic field (0-10T) and low temperature (down to 0.1K) sample environment capabilities supported by in-house liquified helium infrastructure. Sample characterization by bulk thermodynamics probes (susceptibility, magnetization, specific heat) and transport measurements can be performed from 2-400K using PPMS in up to 14T field. In-house cryotechnology expertise and local workshop provides means for continuous development of the instrumentation. Laboratory hosts variety of chemical laboratories with fumehoods for organic and anorganic chemical synthesis and X-ray diffractometer.

The Laboratory of Environmental Toxicology has necessary routine equipment and facilities for micro- and molecular biology, in vitro cell cultures and ecotoxicology in temperature-conditioned laboratories. The lab has equipment with Malvern Zetasizer Nano ZS for hydrodynamic particle size and Z-potential analysis, ventilation hood for nanoparticles weighting, PCR thermocyclers, spectrophotometers, inverted and upright optical and fluorescence microscopes, flow cytometer (BD Accuri C6) and TXRF spectrometer for metal analysis (Bruker S2 Picofox). Also HPLC Agilent 1280 series with PDA and RI detectors and Waters Acquity UPLC with PDA and ELS detectors and wide choice of columns. All the bioassay organisms deposited in NICPB are registered as a database of [NICPB scientific collections](#) on the NICPB web-site.

Two more databases were created by and hosted on the website of NICPB: database [E-SovTox](#) that contains toxicological information nanoparticles and database [NanoE-Tox](#).

The Laboratory of Bioenergetics equipment includes the high resolution respirometer Oxygraph-2K (Oroboros instruments), Varian Cary 100 BIO&ACD spectrophotometer, multichannel confocal fluorescence microscope and equipment for work with cultured cells (a MCO-19AIC(UV) CO2 incubator, ESCO LHC-4A1 laminar flow clean bench, EcoVac vacuum system, and etc.). The cell culture lab in our own rooms allowed extending our research topic from cardiac cell to cancer cell research.

## Collections

### Objects of core R&D infrastructure

The Estonian Research Computational Infrastructure ([ETAIS](#)) is a network of computing centres and expertise distributed between three major partners. The ideology of this core infrastructure is to provide a large scale compute and storage resource as well as experts on hand to the scientific community. The infrastructure is split between Tartu University, Tallinn Technical University and NICPB.

Our contribution is a large scale compute cluster that comprises of over 6000 compute cores and ca 2.5PB of disk space. The datacenter is also used as the Estonian Tier-2 center for CERN computing grid (WLCG) providing millions of compute hours of resources to the data analysis efforts at the LHC. However the center is not only used for LHC related computing, but is actually serving a multitude of fields including material science, astroparticle physics, medicine and others.

Starting with this year the collaboration of ETAIS is extended from pure compute and store resource provision through schedulers to also provide a dynamic platform of cloud computing allowing research groups to provision resources as they see fit on software architectures that they require. This added flexibility will allow even better resource utilization as well as make sure that all researchers have access to the exact platform that matches their needs. This extension also introduces more flexible and longer term storage prospects allowing for data archiving that has not been possible until now.

We also contribute in a major way into developing this new cloud based resource booking and management system to allow the same kind of technologies to be used in a wider scope including for example the government resource cloud project that is hoping to be created technologically compatible to the research cloud to provide contingency options in case of national emergencies when resources might be needed beyond what the state cloud has. The prime prospect for us is technology transfer and availability that we expect to contribute.

### Comments section (comments about collections and/or objects of core infrastructure)

The core computing infrastructure is of vital importance to the ongoing research at the institute. These days data analysis, modelling and processing is almost at the same level of importance as lab experiments are and having a local large compute capacity is vital in being competitive in any field that

the institute is active in. Ongoing operations, modernization and expansion of this infrastructure is of paramount importance to the sustained excellence of the research done both in NICPB as well as in the wider research community in Estonia. Cooperation with other research bodies and their datacentres allows better resource utilization and access to extended amounts of resources if needed. Such extra resources come in handy when a major important discovery is made and analysis of the impact of such a discovery takes massive amounts of computing time. Access to shared resources at such times gives a clear competitive advantage to Estonian researchers and allows them to compete in the global scene.

The scientific collections of the NICPB were established in 1980 together with starting the biological research. In 2004-2008 the development of the collections was supported by the "National Programme on Scientific collections" in a project "Scientific collections in cell biology and toxicological research" (HLK04-4, PI Dr. A. Kahru). The NICPB collections consist of microbial cultures (bacterial and yeast strains and collection of plasmids), cell lines, venoms and environmental samples (soils, sediments, oil-shale industry solid wastes). Currently, all the bioassay organisms deposited in NICPB are registered as a database of [NICPB scientific collections](#) on the NICPB web-site. Two more databases are created by NICPB and hosted on our the website: database [E-SovTox](#) that contains toxicological information available in Russian language data sources published during the Soviet Union era and the database [NanoE-Tox](#) that contains in-depth nanoecotoxicological information on eight nanomaterials published up to year 2015. The scientific collections of NICPB are continuously upgraded, but unfortunately the targeted governmental support for these activities is lacking. Thus, all the costs of this collection(s) (such as controlling and shipping the bacterial strains and plasmids to interested scientific parties) are paid mostly by the Laboratory of Environmental Toxicology.

#### Sufficiency of resources from the sustainability and potential point of view

Resource funding in Estonia has been project based, the objects that are on the scientific roadmap are financed on a sustained basis, however the funding depends on EU structure funds and there are no clear plans on sustained operation and upkeep financing from the core Estonian budget. So far we have managed the funds and financing rounds well and have been able to grow the scientific equipment and resources at a steady pace, but financial instruments for sustained upkeep do not currently exist (for example compute centre resources usually need to be refreshed on a 3-5 year cycle).

In addition to research grants NICPB is funded from two major sources. The baseline financing (~0.5M€ in 2017) is based on prior five-year scientific excellence and industry contracts. The institutional research funding (~1.8M€ in 2017) is grant based, but has rules on possible variances between funding rounds allowing no more than 15% drop on research topics that meet at least average evaluation criteria. This sustained funding has allowed several research programs to reach scientific excellence in the time frame of ten years that is longer than a research grant. Examples in NICPB are high energy physics, ecotoxicology and THz spectroscopy.

As of February 2017 the Estonian science funding system is changing and the institutional grants will be converted to ordinary research grants for teams without any institutional oversight or guarantees. Such

change makes future funding extremely volatile and hampers our possibilities to make long term plans as there is no state provided guaranteed dampening of volatility. While this change comes paired with increase in base financing it is not nearly enough to provide financial stability and long term outlook on its own while competing every few years on all research programs. The substantial experimental infrastructure of chemical physics laboratory is mostly maintained by scientific grants and hence, is susceptible to funding volatility as well. However, whenever feasible, maintenance and development of the instrumentation are done internally, which results in cost saving, focused and conformal development of new capabilities, as well as sustaining the necessary skills.

In 2014 NICPB secured institutional funding in all key research areas and in the 2015 call for Estonian centres of excellence (CeO) we got 2 out of 9. The institutional grants last until 2019 and the CeO-s last until 2022. We face challenges in winning a large number of grants in 2018 and later, but the current situation is good.

## R&D activities

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### Summary of R&D in the corresponding field

[National Institute of Chemical Physics and Biophysics \(NICPB\)](#) is an public research institution. According to the recent [assessment of the Scientific Advisory Board](#) of NICPB there are many high quality science programs, several of international calibre, across the disciplines but including high-energy physics (HEP) and computing, quantum condensed matter physics, NMR spectroscopies, ecotoxicology, and bioenergetics. These programs increasingly make interdisciplinary links within the Institute, and some also support substantial national and international collaborations. The NICPB collaborates with the universities whose PhD level and younger students carry out their research under supervision of our leading scientists.

On national level, the most important activity of NICPB is the representation of the Republic of Estonia in CERN and coordination of research activities of Estonian universities at CERN. NICPB is a member of the CMS Collaboration of the Large Hadron Collider. In addition to the participation in the CMS experiment, the NICPB is also organizing Estonian summer students' programmes at CERN. NICPB has established a Tier-2 level CMS experiment Datacentre which is currently one of the biggest scientific computing centres in Estonia. For Estonia, becoming a member of CERN would open up new markets for high-tech companies and give a boost to economic growth through technology transfer.

Condensed matter physics relies on ample in-house spectroscopic tools (nuclear magnetic resonance, THz spectroscopy in high magnetic fields, IR and optical spectroscopy). Our focus points are (i) on novel

quantum materials, (ii) materials related to energetics and (iii) in high quality unique experimental capabilities. NICPB is running the only helium liquefier in the Baltic countries that supports a range of high field magnets in house, but also supplies liquid helium to the Institute of Physics at Tartu University and for a NMR magnet in Tallinn University of Technology.

Another high impact field at NICPB is the research into ecotoxicology and especially nanoecotoxicology that was introduced in Estonia by NICPB researchers. Today this competence is unique for Estonia and is based on know-how, facilities and international cooperation on evaluation of hazard of existing and emerging environmental pollutants, industrial chemicals and man-made nanomaterials. This is a competence crucial for the EU new chemical regulation REACH. Our competence in this field has been incorporated into EU FP6, FP7 and Interreg projects (OSIRIS, MODERN, NanoValid, RIMA).

The fourth interdisciplinary research programme in NICPB is molecular system bioenergetics we focus on changes in the Intracellular Energetic Units (ICEUs) and Mitochondrial Interactosome (MI) during development and ageing of cells. Cancer cell bioenergetics forms the basis for developing the fundamental and applied bioenergetics aspects of cancer bioenergetics at NICPB as well as in Estonia.

**Main research directions in the corresponding R&D field during 2010-2015**

The key question in modern physics and in cosmology is the origin of different mass components of the Universe, including the Dark Matter and Dark Energy. We addressed it both experimentally and theoretically. In Experimental High Energy Physics we are involved in two CMS working groups: the top quark group studying single top production and the Higgs physics group studying tau and top Yukawa couplings. The team in NICPB is expanding now to include hardware aspects of high energy particle physics with initial plans for CMS upgrade contributions in the L1 trigger. The institute has created a Tier-2 computing centre, one of the biggest CMS experiment computing centres in Europe. The theoretical physics programme of the NICPB contains two main directions: (i) theoretical and phenomenological research topics in particle physics, astroparticle physics and in cosmology, (ii) statistical mechanics, complex systems/interdisciplinary physics.

In condensed matter physics and material science we aim at the understanding of magnetic, optical and thermal properties of condensed phases of new materials and their use in novel technologies. Using our high quality unique experimental capabilities we focussed points were on novel quantum and energetics related materials. Novel quantum materials include multiferroics, high-Tc superconductors, quantum magnets, nanomaterials, etc. Multiferroic materials can exhibit magneto-electric interaction that makes the magnetization and electric polarization mutually inter-dependent, offering new concepts for broad range of applications. Energy materials research focused on (i) solid oxide fuel cells (SOFC) and (ii) environmental impact of national oil shale energy production and applications of it ash residue.

The main goal of the environmental toxicology & chemistry research in NICPB was to elucidate the hazard of (industrial) chemicals and nanomaterials that either are in the environment already or have the potential to end up there. Nanoparticles with one dimension less than 100 nm have novel properties that



have led to breakthroughs in technologies starting from energy production and ending with medicine, but also may lead to adverse effects for man and the environment. The evaluation of the environmental hazard of synthetic nanoparticles that are already produced in large scale is very challenging. We developed novel test systems and strategies that enable cost-efficient assessment of biological effects of chemicals and nanomaterials. We focused on in vitro tests that allow the assessment of adverse effects and toxicity mechanisms of chemicals and nanoparticles using rapid and cost-efficient assays allowing high-throughput. We designed and used novel bioassays on mechanism-based modification of bacteria such as luminescent recombinant bacteria that sense very low concentrations of bioavailable heavy metals. For all the bioassay organisms deposited in NICPB, see <https://kbfi.ee/e-tox-collection/>.

## The most important projects in the main research areas of the corresponding field during 2010-2015 (30)

Number	Project title in Estonian	Principal investigator	Finance program	Start Year	End Year	Total	
TK134	<a href="#">Emerging orders in quantum and nanomaterials</a>	Urmas Nagel	TK	2015	2023	2 753 226,42 EUR	
TK120	<a href="#">Dark Matter in (Astro)particle Physics and Cosmology</a>	Martti Raidal	TK; Tippkeskus 2011	2011	2015	1 473 583,00 EUR	
IUT23-4	<a href="#">Experimental high energy physics at the CMS experiment at LHC</a>	Mario Kadastik	IUT	2014	2019	885 200,00 EUR	
IUT23-1	<a href="#">Mechanisms of regulation of integrated energy metabolism in tumor and muscle cells.</a>	Tuuli Käämbre	IUT	2014	2019	675 600,00 EUR	
IUT23-6	<a href="#">Origin of Mass</a>	Martti Raidal	IUT	2014	2019	758 800,00 EUR	

Number	Project title in Estonian	Principal investigator	Finance program	Start Year	End Year	Total	
IUT23-9	Multi-photon functional optical sensing materials	Aleksander Rebane	IUT	2014	2019	422 800,00 EUR	
IUT39-1	The role of diversity in complex systems	Els Heinsalu	IUT	2015	2020	240 000,00 EUR	
IUT23-5	Nano(ecotoxicology and beyond (ToxBe)	Anne Kahru	IUT	2014	2019	885 200,00 EUR	
IUT23-7	NMR investigations of the local structure and dynamics in solids and solutions	Ivo Heinmaa	IUT	2014	2019	549 200,00 EUR	
IUT23-3	Interaction of THz radiation with magnetic excitations	Toomas Rõõm	IUT	2014	2019	885 200,00 EUR	
SF0690029s09	Spectroscopy of functional materials	Toomas Rõõm	SF	2009	2013	529 126,51 EUR	
SF0690021s09	Chemical energy technology	Aleksander Trummal	SF	2009	2013	506 933,04 EUR	
SF0690030s09	High Energy and Theoretical Physics	Martti Raidal	SF	2009	2013	709 164,91 EUR	
SF0690063s08	Mechanisms and interactions in toxicology and toxinology: in vitro models	Anne Kahru	SF	2008	2013	1 126 446,52 EUR	

Number	Project title in Estonian	Principal investigator	Finance program	Start Year	End Year	Total	
SF0690001s09	Environmentally friendly utilization strategy of oil shale processing solid wastes	Natalja Irha	SF	2009	2013	379 234,78 EUR	
SF0690034s09	New Developments and Applications of Nuclear Magnetic Resonance Techniques	Ivo Heinmaa	SF	2009	2013	689 402,66 EUR	
MTT8	Astro particle physics and the Large Hadron Collider	Alessandro Strumia	MTT	2010	2015	479 337,36 EUR	
MTT60	Search for New Physics beyond the Standard Model and astrophysical implications	Emidio Gabrielli	MTT	2011	2015	544 000,00 EUR	
MTT77	Spin-lattice coupling in magnetism: from quantum magnets to multiferroics	Alexander Tsirlin	MTT	2012	2015	384 000,00 EUR	
MTT59	Top quark physics and exotic searches with the CMS detector	Andrea Giammanco	MTT	2011	2015	512 000,00 EUR	
ETF8703	Sub-Kelvin THz spectroscopy of magnetic materials	Toomas Rõõm	ETF	2011	2014	54 240,00 EUR	
KBFI,KF-21	Two Photon Absorbers for Biomedical Applications (TOPBIO)	Aleksander Rebane	MUU; EC, 7th Framework Program	2010	2014	214 431,75 EUR	
TAP36-1	Materjalide omadused giga- ja tera-herts sagedustel	Toomas Rõõm	TAP	2012	2013	182 400,00 EUR	

Number	Project title in Estonian	Principal investigator	Finance program	Start Year	End Year	Total	
KBFI, Cern KF-15	Teadus-arendus- ja õppealane koostöö CERNiga 2015-2020	Mario Kadastik	MUU; EV ja CERNi vaheline koostöö	2015	2020	1 597 790,00 EUR	
ETAIS	Eesti Teadusarvutuste Infrastruktuur	Mario Kadastik	MUU; Riikliku tähtsusega teaduse infrastruktuuri kaasajastamine	2011	2014	573 455,00 EUR	
612431	High Efficiency Low Temperature SOFC Stack (HELTSTTACK)	Raivo Stern	MUU; FP7-PEOPLE-2013-IAPP	2014	2018	308 130,70 EUR	
KBFI,KF-22	AFM and MFM microscopy for nanoscale properties of functional materials	Raivo Stern	MUU; Eesti-Šveitsi koostööprogramm	2011	2013	206 612,00 EUR	
10.1-9/12/29	Eesti osaluse laiendamine Euroopa Tuumauuringute Keskuse teadus- ja arendustegevuses ning tehnoloogiasirdes (CERN+)	Martti Raidal	MUU; siseriiklik leping	2011	2015	373 000,00 EUR	
KBFI,KTL-2	Design and application of novel levansucrase catalysts for the production of functional food ingredients (Functional Food Ingredients, FFI)	Angela Ivask	MUU; Biotehnoloogia teadus- ja arendustegevuse toetamine	2012	2015	443 310,11 EUR	
PUT748	In vitro toxicological tool-box for targeted design of antimicrobial nanomaterials	Angela Ivask	PUT	2015	2018	201 465,00 EUR	

## Doctoral studies

	2010	2011	2012	2013	2014	2015
Number of enrolled doctoral students in the corresponding field as of 10 November 201x)	30	33	34	33	33	34
Number of doctoral graduates in calendar year engaged in the corresponding R&D field	1	5	2	2	1	2
The number of staff with PhD level degree	52	56	61	66	62	65
Number of staff listed in the Estonian Research Information System as doctoral thesis supervisors	16	18	24	24	25	26
Number of supervised doctoral students in the Estonian Research Information System	34	37	38	38	43	45

#### R&D relation to doctoral studies in the corresponding field

Although NICPB is not a degree granting institution, PhD level and younger students are essential for our research. While doing their research under the supervision of NICPB's scientists and working in the laboratories of NICPB, the students are affiliated with universities. NICPB has collaboration agreements with the Tallinn University of Technology, the University of Tartu and Tallinn University and we see this as a valuable opportunity that brings us into contact with bright students while all the universities have access to our research facilities. The high quality and interdisciplinary research attracts both undergraduate and graduate students to NICPB. Institute introduces its work regularly in other research and degree-granting institutions, in specialised literature, scientific conferences and public media. On national level NICPB has contributed to organizing (i) the Functional Materials and Technologies graduate school encompassing mostly Ph.D. level students of material science and technology and (ii) organization of annual Summer- and Autumn schools of Physics.

During the evaluation period NICPB scientists have supervised total of 13 graduated PhD students in (nano)ecotoxicology and in vitro toxicology topics, high energy physics, chemical physics and bioenergetics, the corresponding numbers are filled in the row "Number of doctoral graduates in calendar year engaged in the corresponding R&D field". The "number of enrolled doctoral students in the corresponding field as of 10 November 201x" is the total number of PhD students who were supervised by NICPB scientists. The Number of supervised doctoral students in the Estonian Research Information System is larger, as this field is automatically filled by the system and contains names whose relation to NICPB is not obvious.

## Outcomes of the R&D

Number of publications and their classification according to Estonian Research Information System

	1.1.	1.2.	1.3.	2.2.	2.3.	3.1.	3.2.	3.4.	3.5.	4.1.	5.1.	5.2.	6.3.	6.4.	6.6.	Total	High-level publications
2010	84	2	0	1	1	7	6	1	0	0	10	32	1	0	0	145	93
2011	131	0	0	0	2	22	5	4	0	0	8	39	0	1	3	215	153
2012	168	1	0	0	0	13	0	1	0	0	6	24	3	0	0	216	182
2013	268	1	2	0	0	93	1	2	4	0	10	29	4	1	1	416	362
2014	179	1	0	0	0	6	1	2	0	1	14	36	1	0	0	241	186
2015	159	1	0	0	0	6	2	1	0	1	12	11	1	0	1	195	166

Number of publications per FTE research and/or teaching staff member

	1.1.	1.2.	1.3.	2.2.	2.3.	3.1.	3.2.	3.4.	3.5.	4.1.	5.1.	5.2.	6.3.	6.4.	6.6.	Total	High-level publications
2010	1,44	0,03	0,00	0,02	0,02	0,12	0,10	0,02	0,00	0,00	0,17	0,55	0,02	0,00	0,00	2,48	1,59
2011	2,50	0,00	0,00	0,00	0,04	0,42	0,10	0,08	0,00	0,00	0,15	0,75	0,00	0,02	0,06	4,11	2,92
2012	2,76	0,02	0,00	0,00	0,00	0,21	0,00	0,02	0,00	0,00	0,10	0,39	0,05	0,00	0,00	3,55	2,99
2013	4,59	0,02	0,03	0,00	0,00	1,59	0,02	0,03	0,07	0,00	0,17	0,50	0,07	0,02	0,02	7,13	6,20
2014	2,96	0,02	0,00	0,00	0,00	0,10	0,02	0,03	0,00	0,02	0,23	0,60	0,02	0,00	0,00	3,99	3,08
2015	2,55	0,02	0,00	0,00	0,00	0,10	0,03	0,02	0,00	0,02	0,19	0,18	0,02	0,00	0,02	3,13	2,67

Impact of scientific articles

[NICPB\\_Engineering and technology\\_Impact of scientific articles.xlsx](#)

Number of industrial property items

	2010	2011	2012	2013	2014	2015	Total
Trademark	0	0	0	0	0	2	2
Other ...	0	0	0	0	0	0	0
Utility model	0	0	0	0	0	0	0

Sort	0	0	0	0	0	0	0
Invention	1	0	0	0	0	0	1

## R&D outcomes with highest impact during 2010-2015 (assessment by the institution) (30)

### 1.1. Scholarly articles indexed by Web of Science Science Citation Index Expanded, Social Sciences Citation Index, Arts & Humanities Citation Index and/or indexed by Scopus (excluding chapters in books)

<p>Ivask, A.; Titma, T.; Visnapuu, M.; Vija, H.; Kakinen, A.; Sihtmae, M.; Pokhel, S.; Madler, L.; Heinlaan, M.; Kisand, V.; Shimmo, R.; Kahru, A. (2015). Toxicity of 11 Metal Oxide Nanoparticles to Three Mammalian Cell Types In Vitro. Current Topics in Medicinal Chemistry, 15 (18), 1914–1929, 10.2174/1568026615666150506150109.</p>	<p>Fail_2015_toxicity of 11 metal oxides_Curr Topics Med Chem_15_1-16 SI.pdf (public)</p>
<p>Janson, O.; Rousochatzakis, I.; Tsirlin, A. A.; Belesi, M.; Leonov, A. A.; Roessler, U. K.; van den Brink, J.; Rosner, H. (2014). The quantum origins of skyrmions and half-skyrmions in Cu2OSeO3. Nature Communications, 5, 5376.</p>	<p>Fail_computation model_Cu2OSeO3-2014.pdf (public)</p>
<p>Calpas, Betty; Giammanco, Andrea; Kadastik, Mario; Murumaa, Marion; Raidal, Martti; Rebane, Liis; Tiko, Andres et al. (2014). Evidence for the direct decay of the 125 GeV Higgs boson to fermions. Nature Phys., 10, 1.</p>	<p>Fail_1401.6527v3.pdf (public)</p>
<p>Wu, Jiahui; Abdelfattah, Ahmed; Miraucourt, Loïs; Kutsarova, Elena; Ruangkittisakul, Araya; Zhou, Hang; Ballanyi, Klaus; Wicks, Geoffrey; Drobizhev, Mikhail; Rebane, Aleksander; Ruthazer, Edward; Campbell, Robert (2014). A long Stokes shift red fluorescent Ca<sup>2+</sup> indicator protein for two-photon and ratiometric imaging. Nature Communications, 5, 5262, 10.1038/ncomms6262.</p>	<p>Fail_Wu_Rebane_Campbell_Nat_Comm_2014_A_long_Stokes_shift_Ca_Indicator.pdf(public)</p>
<p>Giardino, Pier Paolo; Kannike, Kristjan; Masina, Isabella;</p>	

Raidal, Martti; Strumia, Alessandro (2014). The Universal Higgs fit. Journal of High Energy Physics, 1405, 046.	Fail_1303.3570.pdf	(public)
Ivask, A.; Kurvet, I.; Kasemets, K.; Blinova, I.; Aruoja, V.; Suppi, S.; Vija, H.; Käkinen, A.; Titma, T.; Heinlaan, M.; Visnapuu, M.; Koller, D.; Kisand, V.; Kahru, A. (2014). Size-dependent Toxicity of Silver Nanoparticles to Bacteria, Yeast, Algae, Crustaceans and Mammalian Cells in Vitro. PLoS ONE, 9 (7), e102108.	Fail_2014_Ivask et al_PLOS One_size dependent + SI.pdf	(public)
Erni, R.; Abakumov, A. M.; Rossell, M. D.; Batuk, D.; Tsirlin, A. A.; Nénert, G.; Van Tendeloo, G. (2014). Nanoscale phase separation in perovskites revisited. Nature Materials, 13, 216–217, 10.1038/nmat3865.	Fail_NdLiTiO3-NatureMat-2007-comment.pdf	(public)
Mazurenko, V. V.; Valentyuk, M. V.; Stern, R.; Tsirlin, A. A. (2014). Nonfrustrated Interlayer Order and its Relevance to the Bose-Einstein Condensation of Magnons in BaCuSi <sub>2</sub> O <sub>6</sub> . Physical Review Letters, 112, 107202, 10.1103/PhysRevLett.112.107202.	Fail_computation_BaCuSi2O6-2014.pdf	(public)
Kézmárki, I.; Szaller, D.; Bordács, S.; Kocsis, V.; Tokunaga, Y.; Taguchi, Y.; Murakawa, H.; Tokura, Y.; Engelkamp, H.; Rößler, T.; Nagel, U. (2014). One-way transparency of four-coloured spin-wave excitations in multiferroic materials. Nature Communications, 5, 3203, 10.1038/ncomms4203.	Fail_NatComms_4203_2014_Kezsmarki.pdf	(public)
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Ivask, Angela; Juganson, Katre; Bondarenko, Olesja; Mortimer, Monika; Aruoja, Villem; Kasemets, Kaja; Blinova, Irina; Heinlaan, Margit; Slaveykova, Vera; Kahru, Anne. (2014). Mechanisms of toxic action of Ag, ZnO and CuO nanoparticles to selected ecotoxicological test organisms	Fail_2014_Ivask et al_Mechanisms of toxic action of Ag, ZnO and CuO nanoparticles to selected ecotoxicological test organisms and mammalian cells in vitro_Nanotoxicology SI.pdf	(restricted)



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Bondarenko, O.; Juganson, K.; Ivask, A.; Kasemets, K.; Mortimer, M.; Kahru, A. (2013). Toxicity of Ag, CuO and ZnO nanoparticles to selected environmentally relevant test organisms and mammalian cells in vitro: a critical review. <i>Archives of Toxicology</i> , 84, 1181–1200, DOI10.1007/s00204-013-1079-4.	Fail_Bondarenko et al_Arch Toxicol (2013) 87_1181-1200_Springerist SI.pdf	(restricted)
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Degrassi, G; di Vita, S; Elias-Miro, J; Espinosa, J.R.; Giudice, G; Isidori, G; Strumia, A (2012). Higgs mass and vacuum stability in the Standard Model at NNLO. <i>Journal of High Energy Physics</i> , 098, 10.1007/JHEP08(2012)098.	Fail_1205.6497v2.pdf	(public)
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**R&D outcomes with highest impact (assessment by the institution)**

According to ISI Web of Science database, NICPB is the only institution in Estonia that is among 1% most cited research institutions of the world in the field of Physics. NICPB is number one research institution in Estonia in terms of the fraction of top researchers belonging to 1% of most cited researchers in the world compared with the entire research staff.

NICPB researchers worked in the Higgs working group of the CMS experiment at CERN and participated in the discovery of the Higgs boson and this work ultimately lead to awarding the Nobel Prize in Physics in 2013 to F. Englert and P. Higgs. NICPB has created the largest scientific computing centre in Estonia. One of the main R&D results of the NICPB computing centre is to work out a cloud platform for scientific computing. Based on this result, a start-up company OpenNode was created which successfully develops this platform for commercial purposes. Based on research at CERN, NICPB researchers established a start-up company Lingvist which is another R&D application in our society that enables better language learning based on a machine learning algorithm constantly testing the learner's abilities and better guiding the topics of study. By February 2017 Linguist has raised more than 10M€ of funds. M. Raidal, M. Kadastik, A. Tiko, C. Veelken, M. Müntel, L. Rebane, N. De Filippis, A. Giammanco belong to the top 1% most cited scientists worldwide in the field of physics.

In the field of condensed matter physics and material science several significant improvements to the unique experimental capabilities were made. This includes (i) THz spectroscopy at 0.1K, (ii) installation of 17T SC magnet for THz, (iii) development of high-T NMR probe (up to 1200K) for diffusion dynamics in ionic conductors and (iv) sensitive NMR MAS probe for non-enriched <sup>13</sup>C correlation spectroscopy (v) commissioning of atomic/magnetic force microscope insert for PPMS (vi) installation of powder X-Ray diffractometer. Researchwise, the focusing on multiferroic materials in 2010 has yielded series of high impact papers, including 2 in Nature, 3 PRLs, 4 PRB by 2015.

The research into (nano)ecotoxicology of metal oxide nanoparticles is highly visible on international level:

**Highest societal impact of research (assessment by the institution)**

the (nano)safety research direction has resulted in publishing more than 60 publications (ISI WoS) that have been cited 1700 times, 27 cites/paper (2010-2015). NICPB participated in FP6 and FP7 (nano)safety projects (OSIRIS, NanoValid, MODERN), also NICPB participates in the work and STSMs of several COST projects in the field. Drs A. Kahru and A. Ivask belong to the top 1% most cited scientists worldwide in the area Environment/Ecology and A. Kahru also in the field Pharmacology & Toxicology. In 2011 A. Kahru received the Estonian state science award for outstanding papers in recent years, titled "Ecotoxicology and toxicity mechanisms of synthetic nanoparticles".

NICPB represents the Republic of Estonia at CERN. NICPB is a member of the ETAIS collaboration. Over years NICPB has educated about 60 Estonian high-school physics teachers at CERN increasing popularity of physics in Estonia. NICPB sends annually 6-7 Estonian physics and IT students to CERN summer student programme. M. Kadastik is a board member of the LHC Worldwide Grid collaboration at CERN and at ETAIS and Physics program committee chair at Tallinn Technical University. M. Raidal is also professor of high-energy physics in University of Tartu and is responsible for the sustainability of this field in Estonia; he served as Estonian Research Council evaluation board member and is a member of the board of Estonian Academy of Sciences. A. Hektor is a member of the board of Tartu Observatory.

NICPB supports Estonian Society of Toxicology and scientists are active in ETS, EUROTOX and IUTOX. A. Ivask is an expert in Nanomaterials WG of ECHA. K. Kasemets - Representative of Estonia to the OECD WPMN. A. Kahru - evaluator for Swiss NSF Programme "Opportunities and Risks of Nanomaterials" and tenure-track candidates in Aalto Univ. and coordinated Estonian Acad Sci seminar "Nanoparticles in the environment: fate and effects" and served as opponent for 4 PhD Thesis in Finnish Univ. K. and held a TEDx Tallinn 'On water-fleas and concentration' in 2014. Kasemets, I. Blinova - organisation of COST-ENTER meeting in Tallinn. Creation of the open database on nanosafety - Juganson et al. (2015) NanoE-Tox: J. Nanotech. 6, 1788-1804. Chemical safety popularisation in Estonian popular science journals.

Laboratory of chemical physics focuses on fundamental physical properties of complex novel materials (multiferroics, high-Tc superconductors, quantum magnets, nanomaterials, etc.) that can have high-tech applications. We develop commercially usable solid oxide fuel cell elements in partnership with Elcogen Ltd. NMR instrumentation as an analytical tool for structural analyses and control of syntheses in chemistry, biology and physics provides routinely input to collaborative applied projects with Estonian universities and industry. These include: (i) waste structure determination from oil-shale thermal treatment wastewater for AS VKG, (ii) composition determination of Estonian biodiesel for Taisto AS, (iii) determination of polysaccharides in food products for Toidu- ja Fermentatsioonitehnoloogia, (iv) study of biodegradable plastic bags for Tallinn City Council, (v) chem. synth. production support provided to TBD Biodiversity, OÜ Infrared NPS, (vi) solutions to other production issues provided to Balti Laevaremonditehas, AS Helme Energia, AS Balsnack Int., Toom Tekstiil. Environmental chemistry group assesses environmental impact of national energy production from oil shale and applications of its huge ash residue by granulation for everyday use e.g. cement, adsorbent, meliorant, in collaboration with Eesti

**Significant additional facts which indicate the sustainability and potential of R&D (assessment by the institution)**

Energia and KIK as well as other research projects.

NICPB has established experimental high-energy physics in Estonia and represents Estonia at CERN.

NICPB established research in astroparticle physics in Estonia in collaboration with researchers from Tartu Observatory.

NICPB has won 3 Centres of Excellence that are all interdisciplinary in their nature.

NICPB hosts the largest scientific computing centre in Estonia that is part of the ETAIS infrastructure.

NICPB researchers have established two successful start-up companies that are based on the application of R&D results obtained in our institute.

NICPB carries the tradition of low temperature physics research in Estonia and runs a helium liquefier that is essential for this research.

During the past years the Institute has slightly grown in size but at the same time has also been rejuvenated. At the end of 2010, the Institute employed 113 people with the average age of 53 years, whereas in the beginning of 2015 we were 124-strong with the average age of 47 years.

The interdisciplinary research/facilities of NICPB promoted success of the research into ecotoxicology of nanoparticles since 2006. NICPB nanotoxicologists have published close to 90 papers, cited 3500 times (40 cites/paper), involving 9 highly cited papers (ISI-ESI). The research has been recognised by Estonian state science award (A. Kahru, 2011) and Academy of Sciences research professor grant for years 2016-2019 (A. Kahru). 8 PhD degrees defended and currently 9 PhD students work in the (nano)ecotoxicology and in vitro toxicology topics. Altogether 6 young researchers have been successful in obtaining post-doc grants in top level international laboratories in Switzerland, US, Australia, Sweden and Italy – most of them have returned to NICPB and started new research directions (via PUT funding; O. Bondarenko, A. Ivask, M. Heinlaan). Cooperation with the Estonian Universities has resulted in funding of the roadmap grant NAMUR+ providing new equipment, 400000 Eur .

Universality of NMR spectroscopy, state-of-the-art experimental facilities and in-house national center of expertise in multinuclear NMR techniques developed over decades continue to attract increasing scientific and applied research. Unique THz spectroscopy equipment is continuously being supplied research proposals worldwide. In near future we plan to acquire certifications for phase analysis method using X-Ray diffractometer and organic solution structure decomposition using NMR methods to attract increasing amount of applied research and product development projects to the instruments. Currently Laboratory of Chemical Physics has 6 PhD students working on their projects here using the above methods.

## Confirmations

Role	Name of the confirmer	Institution / Structural unit	Date of validation
Principal investigator	Urmas Nagel		14.02.2017 11:24:44
Confirmer	Kristian Sülluste	Keemilise ja Bioloogilise Füüsika Instituut	14.02.2017 11:31:15