

Department of Computer Science Annual Report 2017



Editor: Pirjo Moen

Photo: The department celebrated its 50th jubilee at Vanha ylioppilastalo on 31 August 2017.

Photographer: Valentin Abramenzov



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1. *Thoughts of the Head of Department in 2017*

First of all, in 2017 Finland celebrated 100 years of independence, our Department celebrated its fiftieth anniversary, and the Linux kernel became 26 years old. We had an excellent celebration of the Department at the end of August. We have received very good feedback for the program and festivities. Overall, it has been a very good year for the Department.

We have had many changes in recent years, and in 2017 we successfully launched our new degree programs and prepared for the new Faculty structure that was implemented in January 2018. The Finnish name has changed to “osasto”, but the momentum continues. Our department will continue to grow and flourish in the new structure. We have a newly coined vision of being architects of the future digital world.

In 2017 we started the planning for launching two new research centres: the Finnish Center for AI (FCAI) and Helsinki Centre for Data Science (HiDATA). In addition to the new centres, we have the existing Helsinki-Aalto Center for Information Security (HAIC) and the Foundations of Computational Health (FCHealth). These are key development topics for the next year.

We have the exceptional situation that the number of professors is growing from 16 in Spring, to 21 at the end of 2017, and then 28 next year with our plan reaching to 30 professors. We are expanding and we need more room. We have a plan to renovate half of the 2nd floor of the library for researchers. This space will be the first ubicampus pilot with new technology supporting work and wellbeing. Overall, equality and wellbeing will be emphasised next year.

I would like to thank everyone for their great work at the Department. The future of the 50-year old Department is very bright.



Sasu Tarkoma

Professor, Head of Department 2017

2. Teaching 2017

The basic degrees of the educational programme of computer science are the Bachelor of Science (BSc) and Master of Science (MSc) degrees. The higher degrees in computer science are the Licentiate (PhLic) and the Doctoral (PhD) degrees. The teaching at the department follows a high standard and is based on the research carried out at the department and its focus areas. The degrees offered by the department are high in quality and socially relevant.

2.1. Educational programmes

In 2017, the new education programmes following the Big Wheel programme were launched at the University of Helsinki. Among these programmes, the department will be in charge of the Bachelor's Programme in Computer Science, and the Master's Programmes in Computer Science and Data Science. Furthermore, the department participates in the Bachelor's Programme in Mathematics (the computer science theory sub-programme), the Master's Programme in Theoretical and Computational Methods, and in the Master's Programme in Life Science Informatics. The department is also responsible for the Doctoral Programme in Computer Science, DoCS, which was launched along with other doctoral programmes at the University of Helsinki in 2014.

The teaching at the departments was transferred to these education programmes at the beginning of autumn 2017. Students who have been admitted earlier can, if they so wish, continue in accordance with the old system during a transit period up until 31 July 2020.

2.1.1. Bachelor's Programme in Computer Science

The Bachelor's degree consists of a comprehensive education in computer science offering a solid basis for the specialisation built during the Master's stage and preparing for work in the field of ICT. The education combines theory with practice. The instruction is based in practice from the beginning, including guided exercises and collaboration projects using professional tools. The curriculum follows international norms and guidelines and cover the main fields of computer science, such as software and algorithms, information management and security, user interfaces, computer architecture, operating systems, and data communication.

Director of the programme in 2017: University Lecturer Kjell Lemström

Web pages of the programme: <https://www.helsinki.fi/fi/ohjelmat/kandi/tietojenkasittelytieteen-kandiohjelma>

2.1.2. Master's Programme in Computer Science

The Master's Programme in Computer Science enables students to develop into experts in one of the sub-fields of computer science within the programme (algorithms, networking and systems, or software engineering). The education provides lasting professional skills for specialist, design, or managerial posts in the corporate world, or research and doctoral education, since the Master's Programme in Computer Science creates an aptness for both independent working and multi-professional teamwork.

Director of the programme in 2017: Professor Veli Mäkinen

Web pages of the programme: <https://www.helsinki.fi/en/programmes/master/computer-science>

2.1.3. Master's Programme in Data Science

Data science is a modern combination of computer science and statistics to solve the problems of analysing and utilising different kinds of data within industry, administration, and research. The Master's Programme in Data Science gives students a deep understanding of the central concepts, theories, and research methods of data science while teaching them to apply these skills in practice and create solutions for new challenges in data science. The Department of Computer Science, the Department of Mathematics and Statistics, and the Department of Physics at the University of Helsinki are in charge of the implementation of the education programme. Other contributors to the programme are HIIT and HIP.

Director of the programme in 2017: Professor Hannu Toivonen

Web pages of the programme: <https://www.helsinki.fi/en/programmes/master/data-science>

2.1.4. Doctoral Programme in Computer Science

The doctoral degree in computer science aims at attaining a deeper knowledge in one of the areas of computer science and the ability to produce new scientific insights in this area. The education also gives its students various knowledge-work skills that, coupled with the in-depth knowledge of the scientific field, give the graduates of the doctoral programme in computer science the competence to work in demanding multi-disciplinary research and expert posts both in Finland and abroad.

The Doctoral Programme in Computer Science, DoCS, is actively cooperating with Helsinki Institute for Information Technology HIIT, EIT Digital, the Inforte.fi network, and the CS departments at Aalto University through e.g. the shared doctoral education network HICT.

Director of the programme in 2017: Professor Petri Myllymäki

Web pages of the programme: <http://www.helsinki.fi/doctoral-programme-in-computer-science>

2.2. Further development of teaching

The department has made a long-term investment in teaching and its further development. The department used to be one of the national centres of excellence in higher education, which have not been appointed since 2012. The quality assurance system at the University of Helsinki passed an international audit in 2015. One of the assessment and visiting points was the basic teaching at the department, which gained the highest possible grade, 'advanced,' in the audit.

A new venture within teaching is the TOSKA (tietojenkäsittelytieteen osaston sovelluskehitysakatemia, application-development academy of the Department of Computer Science) project, launched on 1 June 2017. The project, developed by Head of Studies Kjell Lemström, is now in the charge of University Lecturer Matti Luukkainen. Four student developers on one-year, 50-percent contracts work within the TOSKA project, with their contracts starting anew every three months, which ensures that competence is constantly updated within the project. One of the main objectives with TOSKA is to have some of the top students commit to the work of the department and their own studies by offering them the opportunity to develop their expertise as developers of real applications. In 2017, the TOSKA portfolio included Oodikone, Grappa, and Kurki, teaching-

administration tools developed at the department. Among these, Oodikone and Grappa are being developed for use in the whole university.

Matti Luukkainen is also the department's representative in the Teachers' Academy at the University of Helsinki, which was launched in 2013.

3. Research 2017

In the action period 2017, there were two main focal points within research at the department; computer science and the newly established data science based in computer science. Within these two focal points, research at the department is profiled in four sub-fields that support them; machine learning and algorithms, networks and systems, software systems, and bioinformatics. In 2017, the following specialities were especially emphasised within research:

- 1. data science, 'big data,' and computational creativity,*
- 2. data security, and*
- 3. life science informatics.*

There was also some research in other fields of social and financial importance carried out at the department.

In 2017, 30 research groups were active at the department. Some of these research groups are also part of HIIT, Helsinki Institute for Information Technology shared by the University of Helsinki and Aalto University, and some of the research groups are part of three centres of excellence. Furthermore, the department research groups have close collaborations with various research units at the University of Helsinki, as well as corporations and other universities.

The department has participated in a bid to strengthen the profile of the University of Helsinki in the Finnish Academy's profiling funding. The number of professors at the department will be raised significantly on the strength of this. The first two tenure-track professors to be funded in this way (Assistant Professor Arto Klami and Assistant Professor Indre Žliobaite) started working at the department in 2017, and in the years 2018-2019 they will be joined by nine more tenure-track professors.

3.1. Centres of Excellence

In 2017, several research groups from the department participated in centres of excellence funded by the Academy of Finland; the CoE of Inversion Problems, the CoE of Cancer Genetics, and the CoE of Computational Inference.

The CoE for Inversion Problems (<https://wiki.helsinki.fi/display/inverse/Home>) is a network consisting of seven research groups from six Finnish universities; it specialises in the theory, implementation, and application of inversion methods. The CoE is headed by Academy Professor Matti Lassas from the University of Helsinki. From the Department of Computer Science and HIIT, the Neuroinformatics group headed by Professor Aapo Hyvärinen participates in this CoE.

The CoE for Computational Inference COIN (<http://research.ics.tkk.fi/coin/>) is a shared project between Aalto University and the University of Helsinki headed by Professor Samuel Kaski from Aalto University. COIN studies methods of statistical and computational inference, which can help refine the masses of data produced by the current 'big data' revolution into useful information. Groups from the University of Helsinki participating in this CoE are the Complex Systems Computation (CoSCo) group headed by Professor Petri Myllymäki at the Department of Computer Science and the Bayesian Statistics group headed by Professor Jukka Corander at the Department of Mathematics and Statistics; both groups are also part of the COIN group in HIIT.

The CoE of Cancer Genetics CoEGR (<http://www.helsinki.fi/coe/>) is focused on research into the emergence and progress of cancer with the primary goal of developing the care and prevention of cancers. The CoE is headed by Academy Professor Lauri Aaltonen from the Faculty of Medicine at the University of Helsinki. From the

Department of Computer Science and HIIT, participants in this CoE is the Genome-scale Algorithmics group headed by Professor Veli Mäkelä.

3.2. Helsinki Institute for Information Technology HIIT

Many of the department's research groups are also active within the Helsinki Institute for Information Technology, HIIT (<http://www.hiit.fi>), a collaboration between the University of Helsinki and Aalto University. Its mission is to carry out high-end international basic and strategic research in information technology, and to promote the competitiveness of the ICT industry in the long run by bringing together Finnish university research with the industrial innovation chain, especially in the field of long-term strategic product development. It is also the duty of HIIT to carry out multi-disciplinary collaborations with different fields of research in universities and research institutes.

In 2017, HIIT carried out the following research programmes:

- Finnish Center for Artificial Intelligence (FCAI), headed by Professor Samuel Kaski from Aalto University
- Foundations of Computational Health (FCHealth), headed by Professor Juho Rousu from Aalto University
- Helsinki-Aalto Center for Information Security (HAIC), headed by Professor Valtteri Niemi
- Helsinki Centre for Data Science (HiData), headed by Professor Sasu Tarkoma
- Augmented Research, headed by Professor Giulio Jacucci
- Computational Inference (COIN), headed by Professor Samuel Kaski from Aalto University

In 2017, the director of HIIT was Professor Petri Myllymäki from the department. Vice-directors of HIIT were University Lecturer Patrik Floréen (UH) and Professor Juho Rousu (Aalto).

3.3. Research groups

In 2017, 30 research groups were active at the department within the four focus areas of research at the department: machine learning and algorithms, networks and systems, software systems, and bioinformatics. Some of the groups are only active within one of these areas, but some include several in their work.

3.3.1. Machine Learning and Algorithms

The research area of machine learning and algorithms includes method development for modern data analysis, machine learning, data mining, and information-theoretical modelling. Strong application areas for this research are e.g. data analysis of biological data, and computational creativity.

A total of 15 research groups worked in this area at the department in 2017 (Table 3.1.). The person in charge of this research area is Professor Jyrki Kivinen.

Research group	Contact person
Combinatorial Pattern Matching http://www.cs.helsinki.fi/research/algodan/cpm/	Professor Esko Ukkonen
Complex Systems Computation (CoSCo) http://old.hiit.fi/cosco	Professor Petri Myllymäki
Compressed Data Structures https://www.cs.helsinki.fi/u/puglisi/	Academy Research Fellow Simon Puglisi
Computational Creativity and Data Mining https://www.helsinki.fi/en/researchgroups/computational-creativity-and-data-mining	Professor Hannu Toivonen
Computational Linguistics http://puls.cs.helsinki.fi	University Researcher Roman Yangarber
Computer-Assisted Music Analysis, Comparison and Retrieval http://www.cs.helsinki.fi/group/cbrahms/	University Lecturer Kjell Lemström
Constraint Reasoning and Optimization (CoReO) https://www.helsinki.fi/en/researchgroups/constraint-reasoning-and-optimization	Academy Research Fellow Matti Järvisalo
Data Science for the Masses http://www.anttiukkonen.com/main/	Academy Research Fellow Antti Ukkonen
Information, Complexity and Learning (ICL) http://old.hiit.fi/cosco/promo	Associate Professor Teemu Roos
Intelligent Interactive Information Access (INTENT) http://old.hiit.fi/intent	University Lecturer Patrik Floréen
Machine Learning http://www.cs.helsinki.fi/tutkimus/machine-learning	Professor Jyrki Kivinen
Multi-source Probabilistic Inference (MUPI) https://www.helsinki.fi/en/researchgroups/multi-source-probabilistic-inference	Assistant Professor Arto Klami
Neuroinformatics http://www.cs.helsinki.fi/u/ahyvarin/group.shtml	Professor Aapo Hyvärinen
Practical Algorithms and Data Structures on Strings (PADS) http://www.cs.helsinki.fi/group/pads/	University Lecturer Juha Kärkkäinen
Sums of Products http://www.cs.helsinki.fi/u/mkhkoivi/sopu.shtml	Associate Professor Mikko Koivisto

Table 3.1. Research groups in Machine Learning and Algorithms in 2017.

3.3.2. Networks

The research into networks and systems studies networked systems and their requirements. The research themes include middleware (e.g. service and application platforms, management of middleware, trust, and safety), mobility (independence of technology and location, wireless communications), information networks, service networks, context-awareness and ubiquitous computing. This area combines the

department's long-established research into wireless and mobile computing with new emerging research topics on interactive systems and ubiquitous computing. The focus of the research has expanded from protocols towards the problems of the application level and their solutions.

The research groups in this area, a total of eight in 2017 (Table 3.2.), form the NODES research network (Networking in Open Distributed Environments)) within the department. The person in charge of this NODES network (<http://www.cs.helsinki.fi/research/nodes>) in 2017 was Professor Valtteri Niemi.

Research group	Contact person
Collaborative and Interoperable Computing (CINCO) http://cinco.cs.helsinki.fi	University Lecturer Lea Kutvonen
Collaborative Networking (CoNe) http://www.helsinki.fi/collaborative-networking/	Professor Jussi Kangasharju
Content-centric Structures and Networking (COSN) http://www.cs.helsinki.fi/research/nodes	Professor Sasu Tarkoma
Secure Systems http://www.cs.helsinki.fi/group/secures/	Professor N. Asokan and Professor Valtteri Niemi
Systems and Media https://www.cs.helsinki.fi/u/panhui/	Professor Pan Hui
Ubiquitous Interaction https://www.cs.helsinki.fi/en/nodes/ubiquitous-interaction	Professor Giulio Jacucci
Ubiquitous Sensing https://www.cs.helsinki.fi/ubiquitous-sensing	Senior Researcher Petteri Nurmi
Wireless Internet (WInt) http://www.cs.helsinki.fi/research/nodes/wireless.shtml	Lecturer Markku Kojo

Table 3.2. Research groups in Networks in 2017.

3.3.3. Software Systems

The main challenge with research into software systems is how to develop large and complex software systems that are equal to the needs and expectations that are set for them. The field of research within software systems at the department is empirical software engineering, especially some areas of it, such as requirement management and understanding user needs, software architectures, modelling and managing variability, software measurement, and more effective development of software. Furthermore, research into the teaching and learning analytics of software, information systems, and programming fall into the remit of research into software systems.

Three research groups were active in the area of software systems research at the department in 2017 (Table 3.3.). The person in charge of this research area is Professor Tomi Männistö.

Research group	Contact person
Empirical Software Engineering (ESE) https://www.helsinki.fi/en/researchgroups/empirical-software-engineering	Professor Tommi Mikkonen and Professor Tomi Männistö
RAGE - Agile Education Research http://www.cs.helsinki.fi/rage/	University Lecturer Matti Luukkainen
Unified Database Management Systems (UDBMS) http://udbms.cs.helsinki.fi/	Associate Professor Jiaheng Lu

Table 3.3. Research groups in Software Systems in 2017.

3.3.4. Bioinformatics

Bioinformatics is a field of science that uses the methods of computer science and statistics to attempt to answer questions that stem from biosciences and medicine. At the Department of Computer Science, the research in this area focuses on e.g. algorithms and data structures suitable for processing different kinds of biological data, as well as on modelling biological systems, such as evolution.

In the field of bioinformatics, six research groups were active at the department in 2017 (Table 3.4.), two of which (those of Esko Ukkonen and Simon Puglisi) are also mentioned among the research groups for machine learning and algorithms (Section 3.3.1). The person in charge of this research area is Professor Veli Mäkinen.

Research groups	Contact person
Algorithms for Biological Sequencing Data	Academy Research Fellow Leena Salmela
Bioinformatics and Evolution	Professor Ville Mustonen
Combinatorial Pattern Matching http://www.cs.helsinki.fi/research/algodan/cpm/	Professor Esko Ukkonen
Compressed Data Structures https://www.cs.helsinki.fi/u/puglisi/	Academy Research Fellow Simon Puglisi
Data Science and Evolution https://www.helsinki.fi/en/researchgroups/data-science-and-evolution	Assistant Professor Indrė Žliobaitė
Genome-scale Algorithmics https://www.helsinki.fi/en/researchgroups/genome-scale-algorithmics	Professor Veli Mäkinen

Table 3.4. Bioinformatics research groups in 2017.

3.4. Research collaboration

The Department of Computer Science and its research groups also carry out many research collaborations both within the University of Helsinki and outside it. Partners include both other universities and various corporations, both in Finland and abroad.

There is a [bioinformatics research community](#) at the University of Helsinki with research groups from different faculties at the university. Members of the community hailing from the Department of Computer Science in 2017 were the research groups of Professor Ville Mustonen, Professor Veli Mäkinen, Academy Fellow Simon Puglisi, Academy Fellow Leena Salmela, and Professor Esko Ukkonen.

The [Helsinki Institute of Life Science](#) (HiLIFE), established in 2017, is a research institute at the University of Helsinki, which supports and combines groups and researchers carrying out high-level research into life sciences at the different campuses and faculties of the university. Participants in HiLIFE from the department in 2017 were Professor Ville Mustonen and Assistant Professor Indre Žliobaite.

[Helsinki Centre for Digital Humanities](#) (HELDIG) is a national research network and infrastructure, where researchers use computational methods to solve problems within the humanities and social sciences, as well as study digitalisation in general as a phenomenon. From spring 2018, Assistant Professor Michael Mathioudakis from the Department of Computer Science will participate in HELDIG.

In 2017, the University of Helsinki and Aalto University started a research collaboration, [Helsinki Centre for Data Science](#) (HiDATA). At that time, Professor Hannu Toivonen was the director of the centre, but in 2018, Professor Sasu Tarkoma will take over. In 2018, Indre Žliobaite and Patrik Floréen will be the vice-directors of HiDATA.

The Department of Computer Science also cooperates in the national [Finnish Center for Artificial Intelligence](#) (FCAI) with Aalto University and the Technical Research Centre of Finland. In 2017, the representative for the University of Helsinki in the leadership of FCAI was Professor Petri Myllymäki.

Since 2016, the Department of Computer Science has participated in the [Helsinki-Aalto Center for Information Security](#) (HAIC), a strategic collaboration between the University of Helsinki and Aalto University with the objective of promoting research and education in information security in the Helsinki region. In 2017, Professor Valtteri Niemi and his research group from the Department of Computer Science participated in HAIC.

The Department of Computer Science also carried out significant research collaborations with various corporations. In the field of information security, there is the [Intel Research Institute for Security Systems](#) (IGRI-SC) funded by Intel and operating at the department. The [Nokia Center for Advanced Research](#) (NCAR), established in spring 2016, is also still working at the department. Furthermore, the University of Helsinki and especially the Department of Computer Science were elected Distinguished Academic Partner of Nokia Bell Labs in 2017.

3.5. Research and teaching infrastructures

There are several different infrastructures for research and teaching at the Department of Computer Science. They include science class Linkki, the Software Factory, Interaction Lab, Nodes lab, and the Ukko computing cluster.

Linkki (<http://linkki.cs.helsinki.fi>) is a science class operating at the Department of Computer Science, which organises hobby activities for middle- and upper-secondary school pupils, where young people interested in computer science can meet each other and learn about subjects that interest them. Linkki is also a meeting place for teachers needing complementary education. Linkki belongs to the science education centre at the University of Helsinki, and thereby also a part of the national network LUMA centre Finland. The director of

Linkki was University Lecturer Lea Kutvonen in 2017, while Virpi Sumu and Jenna Tuominen were the coordinators.

Software Factory (<http://www.softwarefactory.cc>) forms a shared platform to combine commercial software engineering with theoretical and applied research and teaching in software engineering. Software Factory is an experimental software research-and-design laboratory with the objective of inspiring learning, promoting multidisciplinary research, and encouraging entrepreneurship. Postdoctoral Researcher Fabian Fagerholm acted as the contact officer for Software Factory in 2017.

Interaction Lab is a research infrastructure developed by the Ubiquitous Interaction research group in 2014. The lab offers the opportunity to study the interaction between people, computers, and the physical surroundings, and develop new methods for them. For these purposes, the Interaction Lab is fitted with modern equipment including both fixed and removable eye-movement sensors, various physiological sensors (EDA, HRV, fEMG), EEG equipment, large touch screens, various haptic devices, and sensors for discovering movement. In 2017, Professor Giulio Jacucci was in charge of the Interaction Lab.

The NODES lab (<http://www.cs.helsinki.fi/en/nodes/nodes-laboratory>) is an experimental computer-science research and education infrastructure especially for ubiquitous and mobile computing. The lab contains infrastructure that is vital for research in the area, such as networks and test frameworks for developing new network protocols and routing algorithms, a room for wireless measurements protected against interference, and the smart screens and sensors necessary for interactive computing. The lab supports the research and teaching at the Department of Computer Science and boosts the department's profile in networks and systems. Professor Sasu Tarkoma was the contact officer for the NODES lab in 2017.

Ukko (<http://www.cs.helsinki.fi/en/compfac/high-performance-cluster-ukko>), the computer cluster at the Department of Computer Science, was acquired at the end of 2009 and has been productive since summer 2010. The Ukko cluster was used for demanding computations and evaluating the performance of network algorithms and applications in practice, using the cluster as a virtual network platform. In 2017, this old cluster, now renamed Ukko1, was replaced with a more effective and modern cluster, Ukko2, for the same kind of computation. Ukko1 is no longer maintained, but it can be used as long as the equipment is functional. before, the IT team at the Department of Computer Science was in charge of running the clusters, but in 2017, the responsibility was transferred to the IT for Science unit at the Kumpula campus. In 2017, IT Manager Petri Kutvonen was in charge of the cluster.

4. Organisation 2017

*In 2017, the head of the department was in charge of the work of the department along with the deputy heads. Head of the department was Professor **Sasu Tarkoma** and his deputies were Professor **Veli Mäkinen** and Professor **Valtteri Niemi**. In addition, there is a department council consisting of three professors, three representatives of the staff, and three students along with their personal deputies. The secretary of the department council is responsible for distributing the minutes and other documents from the council's meetings. From the start of 2018, the Faculty of Science was reorganised and the work of the department councils ended.*

*New Bachelor's and Master's programmes were launched at the University of Helsinki in autumn 2017. Head of Studies **Kjell Lemström** was the director of the Bachelor's Programme in Computer Science, Professor **Veli Mäkinen** of the Master's Programme in Computer Science, and Professor **Hannu Toivonen** of the Master's Programme in Data Science in 2017. Professor **Petri Myllymäki** was director of the department's doctoral programme (DoCS) in 2017.*

*Both before and after the reorganisation of education programmes, the teaching at the department in 2017 was divided into four sub-programmes. The supervisors of the sub-programmes in 2017 were Professor **Veli Mäkinen** (algorithmic bioinformatics), Professor **Jyrki Kivinen** (algorithms, data analytics, and machine learning), Professor **Valtteri Niemi** (networking and systems), and Professor **Tomi Männistö** (software systems). The contact officers for the data science sub-programme that preceded the Master's Programme in Data Science were Professors Kivinen and Tarkoma in 2017.*

*Research at the department was organised into research units and groups. The Helsinki Institute for Information Technology HIIT (an institute co-run with Aalto University) where Professor **Petri Myllymäki** was director in 2017 operates at the department. Some of the department's research groups work within HIIT. Furthermore, some of the department's research groups participated in three different Academy of Finland centres of excellence.*

*Head of Studies **Kjell Lemström** was in charge of teaching administration at the department in 2017, in cooperation with the education programme planners and heads of education programmes within the University of Helsinki service organisation. Research Coordinator **Pirjo Moen** was in charge of research and postgraduate education administration, and IT Manager **Petri Kutvonen** of the IT services at the department. General, HR, and financial administration was in the charge of the service organisation of the University of Helsinki. Further, the department has a steering group, steering groups for the education programmes, and a wellbeing team. Employees of the department were also represented in several faculty and university committees and in organisations outside the university.*

4.1. Department council 2017

The 2017 department council comprised the following members:

Chair	<i>Professor Sasu Tarkoma</i>
Member	Deputy
<i>Professor Jussi Kangasharju</i>	<i>Professor Valtteri Niemi</i>
<i>Professor Jyrki Kivinen</i>	<i>Professor Aapo Hyvärinen</i>
<i>Professor Tomi Männistö</i>	<i>Professor Veli Mäkinen</i>
<i>IT Specialist Jani Jaakkola</i>	<i>Training Officer Reijo Sivén</i>
<i>University Instructor Tiina Niklander</i>	<i>University Lecturer Antti-Pekka Tuovinen</i>
<i>Doctoral Student Ella Peltonen</i>	<i>Research Coordinator Pirjo Moen</i>
<i>Student Tero Keinänen</i>	<i>Student Vili Hätönen</i>
<i>Student Ville-Veikko Saari</i>	<i>Student Joel Nummelin</i>
<i>Student Henna Warva</i>	<i>Student Heikki Ahonen</i>
Secretary <i>Pirjo Mulari</i>	



The last meeting of the Department Council in history was held on the 5th of December, 2017.

Photographer: Esko Ukkonen

4.2. Committee memberships 2017

Department steering committee

- *Sasu Tarkoma (chair)*
- *Jyrki Kivinen*
- *Veli Mäkinen*
- *Tomi Männistö*
- *Valtteri Niemi*
- *Hannu Toivonen*
- *Petri Kutvonen*
- *Kjell Lemström*
- *Pirjo Moen*
- *Pirjo Mulari*

Board of the Doctoral Programme in Computer Science (DoCS)

- *Petri Myllymäki (director)*
- *Jyrki Kivinen*
- *Tomi Männistö*
- *Sasu Tarkoma*
- *Otto Waltari*
- *Pirjo Moen (coordinator)*

Board of the Master's Programme in Computer Science

- *Veli Mäkinen (director)*
- *Jyrki Kivinen*
- *Mikko Koivisto*
- *Lea Kutvonen*
- *Tomi Männistö*
- *Valtteri Niemi*
- *Antti-Pekka Tuovinen*
- *Student members: Henna Warva, Johannes Verwijnen*

Board of the Master's Programme in Data Science

- *Hannu Toivonen (director)*
- *Ari Asmi (Physics)*
- *Antti Honkela (Mathematics and Statistics)*
- *Jussi Kangasharju*
- *Arto Klami*
- *Teemu Roos*
- *Jarno Vanhatalo (Mathematics and Statistics)*
- *Student members: Jere Renlund, Johannes Verwijnen*

Board of the Bachelor's Programme in Computer Science

- *Kjell Lemström (director)*
- *Patrik Floréen*
- *Arto Hellas*
- *Jyrki Kivinen*
- *Matti Luukkainen*
- *Tommi Mikkonen*
- *Tiina Niklander*
- *Student members: Heikki Ahonen, Henna Warva*

Group for wellbeing at work

- *Antti-Pekka Tuovinen (chair)*
- *Jani Jaakkola*
- *Minna Lauri*
- *Tiina Niklander*

4.3. Department representatives and liaison officers 2017

University of Helsinki

- *University collegium: Hannu Toivonen (deputy)*
- *Scientific council of the university (TINE): Esko Ukkonen*
- *University committee for health and safety: Tiina Niklander (also vice chair of the campus committee in Kumpula)*
- *Advisory board for cooperation proceedings at the University: Tiina Niklander*
- *Library steering committee: Esko Ukkonen*
- *IT centre steering committee: Esko Ukkonen*
- *Teachers' Academy: Matti Luukkainen*
- *Committee for teaching and support for teaching: Tiina Niklander*
- *Taskforce for evaluation of instruction and research staff for adapting the salary system: Tiina Niklander*

Faculty of Science

- *Members of the faculty council:*
 - *Petri Myllymäki (deputy Sasu Tarkoma)*
 - *Tiina Väisänen (deputy Petri Kutvonen)*
 - *Olli Vanhoja (student member; deputy Jonne Airaksinen)*
 - *(Jukka Corander) (deputy Tomi Männistö)*
- *Scientific specialists of the Faculty (MATIAS): Esko Ukkonen (chair), Petri Myllymäki*
- *Faculty steering committee: Esko Ukkonen, Sasu Tarkoma*
- *Faculty taskforce for social interaction: Jyrki Kivinen*
- *Faculty taskforce for student affairs: Kjell Lemström (deputy Matti Luukkainen); (student member deputy Olli Vanhoja)*
- *Faculty admissions committee: Veli Mäkinen (deputy Jyrki Kivinen)*
- *Faculty facilities committee: Jyrki Kivinen*
- *Steering group of the Doctoral School in Natural Sciences (DoNaSci): Petri Myllymäki*
- *Taskforce for developing bilingual instruction at the Faculty: Patrik Floréen (deputy Pirjo Moen)*

- *Steering committee for LUMA centre: Sasu Tarkoma (deputy Veli Mäkinen)*
- *LUMA resource centre Linkki: Lea Kutvonen (director)*

Kumpula campus

- *Building manager of Exactum: Jyrki Kivinen*
- *Campusgruppen (teaching collaboration in Swedish in Kumpula and Viikki): Patrik Floréen, Pirjo Moen*
- *IT for Science steering group: Sasu Tarkoma, Petri Kutvonen*
- *Kumpula campus library advisory board: Jyrki Kivinen (deputy Sasu Tarkoma)*
- *Kumpula campus infra-structure taskforce: Sasu Tarkoma*
- *Kumpula health and safety committee: Tiina Niklander (vice chair, staff representative), Antti Pekka Tuovinen (staff representative)*
- *IT committee on Kumpula campus: Sasu Tarkoma, Petri Kutvonen*
- *Kumpula deputy health-and-safety officer: Antti-Pekka Tuovinen*

Other organisations

- *Taskforce for national admission exam: Patrik Floréen*
- *Publication forum panel for data-processing and information sciences: Esko Ukkonen (chair)*
- *HIIT board: Sasu Tarkoma (deputy Valtteri Niemi)*
- *Executive committee for the HICT doctoral education network: Petri Myllymäki (chair), Pirjo Moen*
- *Advisory Committee of the Helsinki Doctoral Training Centre of the EIT Digital Doctoral School: Petri Myllymäki*
- *HiData: Hannu Toivonen (director)*
- *FCAI: Petri Myllymäki (vice director)*
- *HAIC: Valtteri Niemi (director)*
- *Foundations of Computational Health (FCHHealth) HIIT programme: Veli Mäkinen (vice director), Ville Mustonen*
- *IFIP WG 2.10 Software Architecture: Tomi Männistö*
- *IFIP WG 6.1 Architectures and Protocols for Distributed Systems: Lea Kutvonen*
- *IFIP WG 5.8 Enterprise interoperability: Lea Kutvonen (vice chair)*
- *Finnish Committee for Research Data: Petri Myllymäki*
- *Scientific advisory board for national defence (MATINE): Sasu Tarkoma*
- *Tekes 5th Gear Research Programme Steering Group: Sasu Tarkoma*
- *Scientific Computing Forum: Petri Myllymäki (chair)*
- *The Finnish Society for Computer Science: Mikko Koivisto (vice chair)*

5. Department statistics

Various indicators can be used to describe the situation in staff, finances, teaching, and research at the department in 2017. The changes and developments in the different areas are better described by comparing these numbers to those of previous years.

5.1. Staff

In 2017, a total of 165.6 person-years was completed at the department, which is 8.5 more than the previous year. The person-years completed on basic funding increased by 4.5 person-years and on external funding by 4.0 person-years. The number of person-years completed on external funding especially increased thanks to funding from the Academy of Finland increasing from 32.9 person-years to 45.7 person-years. The person-years on direct EU funding, for their part, decreased from 9.6 to 3.3, as did the person-years on other funding from abroad, from 6.7 to 3.3.

When considering the statistics over person-years in 2017, we note that the number of teaching and research staff has fallen considerably from the previous year's 148.8 to 127.5 person-years, and at the same time the number of other staff has increased from 8.2 to 38.1 person-years. However, this variation is explained by the fact that the 2017 statistics places teaching assistants (35.2 person-years) in the HR group of support staff for teaching and research, among other staff, while in 2016 they were still categorised on tier 1 of the four-tier scale for teaching and research staff. Without this change in statistical methods the number of teaching and research staff would actually have increased by 13.8 person-years and the number of other staff decreased by 5.3 person-years. For other staff, the transferral of administrative and IT staff from the department during 2016 is evident in this decline.

In the category of teaching and research staff, it was especially the number of doctoral students on tier 1 and postdoctoral researchers on tier 2 that increased in number from 2016. In 2016, doctoral students carried out 43.8 person-years, while in 2017, this number was 52.0 person-years. The work carried out by doctoral students covered over 40% of all person-years carried out by teaching and research staff. The person-years carried out by postdoctoral researchers, for their part, increased from 22.9 to 28.3. There were no big changes in the number of person-years completed by members of other members of the category of teaching and research staff.

The department staff has become increasingly international during the past five years. By the end of 2017, the percentage of foreigners among teaching and research staff was 38.2%, while in 2012, it was 20.0%. The percentage of females rose slightly from 17.6% to 18.2% of the person-years.

Person-years per staff category

	2013	2014	2015	2016	2017
Teaching and research staff	146.4	152.9	163.4	148.9	127.5
Professors	13.5	12.9	13.3	10.9	10.6
Research directors	0.4	0.0	0.3	0.6	0.4
Associate and assistant professors	0.6	2.0	2.4	3.0	3.6
University lecturers, lecturers	15.4	15.5	14.8	13.5	11.5
Researchers (academy researchers, university researchers, senior researchers, research coordinators)	7.4	7.6	10.4	10.1	11.4
Postdoctoral researchers	21.9	24.5	25.3	22.9	28.3
University teachers	1.0	1.4	2.0	2.0	1.0
Doctoral students, assistants	37.6	36.6	44.4	43.8	52.0
Research support staff, project researchers (*)	40.8	43.7	40.8	34.8	0.0
Other teaching and research staff (part-time teachers, project planners)	8.0	8.7	9.6	7.3	8.7
Other staff	16.6	15.8	14.7	8.2	38.1
Research and teaching support staff (**)	0.0	0.0	0.0	0.0	35.2
Administrative staff	8.3	8.0	7.5	3.2	1.0
IT staff	7.6	7.8	7.0	5.0	1.9
Other (trainees)	0.7	0.0	0.2	0.0	0.0
Total	163.0	168.7	178.1	157.1	165.6

* Starting in 2017, research and teaching assistants were categorised among teaching and research support staff among other staff.

** Research and teaching assistants categorised on the 1st tier of teaching and research staff before 2017.

Gender of staff

	2013	2014	2015	2016	2017
Female (% of person-years)	18.3	20.3	21.8	17.55	18.2
Male (% of person-years)	81.7	79.7	78.2	82.45	81.8

Foreign employees

	2013	2014	2015	2016	2017
Percentage of staff	28.6	32.4	31.8	33.1	34.8
Percentage of teaching and research staff	31.4	35.5	35.0	33.7	38.2

Person-years per funding source

	2013	2014	2015	2016	2017
Internal funding	91.7	100.6	99.5	77.0	81.5
Allocated funding (incl. HIIT)	74.8	76.4	83.9	66.8	72.8
Graduate schools, CoEs and performance-based funding	16.9	24.2	15.6	10.2	8.7
External funding	71.3	68.1	78.6	80.1	84.1
Academy of Finland	27.2	13.8	27.9	32.9	45.7
Tekes	25.2	30.9	25.3	19.2	20.3
Finnish companies	3.4	2.9	6.7	6.2	3.3
EU funding	5.7	10.8	11.9	9.6	2.4
Other foreign funding	3.2	6.2	4.6	6.7	6.9
UH foundations	2.8	1.2	0.0	0.0	0.0
Other funding	3.8	2.2	2.2	5.5	5.5
Total	163.0	168.7	178.1	157.1	165.6

* Situation on 31.12.2017

5.2. Funding

In 2017, total funding reached MEUR 12.14. It decreased with 0.24 Million Euros from the previous year. Basic allocated funding fell by MEUR 0.42 and external funding increased by MEUR 0.66. Most of the funding was spent on staff expenses and facilities.

In 2017, on top of basic funding, the department received funding for the doctoral programme, three centres of excellence, and a bonus for two applicants who had been successful in their application for funding. Further, the department received donations from corporations and the Faculty of Science Medium-infra funding (Ukko 2.0).

In 2017, external funding for the department was MEUR 7.13. The funding from the Finnish Academy increased remarkably and was MEUR 1.60 in total, whereas the funding from Tekes fell by nearly 0.21 Million Euros. Both

national corporate funding and EU funding fell from the previous year. Instead, other international funding was increased by MEUR 0.17. Besides being important financially for the department, the external funding is also an indicator of the department's competitive edge. However, when external funding makes up a large part of the department's funding while projects run for shorter periods of time, it brings insecurity especially to long-term planning.

Total funding and external funding (Million Euros)

	2013	2014	2015	2016	2017
Internal funding	6.54	6.77	6.67	5.43	5.01
Allocated funding (incl. HIIT)	5.35	5.44	5.73	4.60	4.01
Graduated schools, CoEs and performance-based funding	1.18	1.33	0.94	0.83	1.00
External funding	5.16	5.42	6.24	6.48	7.13
Academy of Finland	2.19	1.09	2.39	2.94	4.54
Tekes	1.72	2.61	2.12	1.61	1.40
Finnish companies	0.30	0.17	0.51	0.56	0.17
EU funding	0.41	0.81	0.85	0.76	0.29
Other foreign funding	0.19	0.45	0.29	0.41	0.57
UH foundations	0.10	0.06	0.00	0.00	0.00
Other funding	0.26	0.25	0.08	0.20	0.16
Total	11.70	12.19	12.91	11.91	12.14

5.3. Teaching

The department's customary successes in game programming continued this year. Our programming team took second place in the North-western Europe Regional Contest with 120 contestants. They had five hours to solve a set of difficult algorithm assignments. The team consisted of students Hannes Ihalainen, Kalle Luopajarvi, and Antti Röyskö, supervised by Tuukka Korhonen.

When considering the credits produced and the person-years of the teachers, we can note that the new reporting tools no longer supported the results presented in previous annual reports. The series below differs from previous reports in that the credits produced also include credits from other institutions, which have been recognised at the department, and those registered in the Open University produced by our staff in computer science. As a matter of fact, the reporting of credits from the Open University is very relevant in this context, since the credits completed for the ever growing MOOCs developed and supervised by our teachers are registered there. If we assume that the distribution of the recognised credits is sufficiently even, it can be noted

that the efficiency of credit accumulation has clearly continued to grow (the growth compared to the previous year some 7 percent in the series), even though the person-years in teaching have decreased.

The number of new students from abroad fell compared to the previous year. This is most likely due to two circumstances. The first one is that the new Master's programmes were launched in autumn 2017, and the information had not reached all potential applicants yet. Secondly, non-European students now had to pay tuition fees for the first time, which may have had some impact on the number of admitted students who accepted their place at the university.

The number of completed Bachelor's degrees was highest during the observation period; the 104 degrees exceeded the goal for 2017 by 4. Unfortunately, the number of Master's degrees fell very short of the goal, being the second lowest during the observation period.

Number of students

	2013	2014	2015	2016	2017
Main admissions	130	130	130	130	130
Accepted main admissions	142	158	143	119	141
Accepted international admissions	25	22	17	29	21
All students	1 584	1 727	1 688	1 736	1 577

Teaching and credits

	2013	2014	2015	2016	2017
Teacher person-year	38.5	40.5	42.1	36.7	35.4
Credits total	42 752	45 590	50 394	48 824	50 422
Credits per person-years	1 584	1 727	1 197	1 330	1 424

Number of degrees

	2013	2014	2015	2016	2017
Bachelor's degrees	56	76	80	93	104
Master's degrees	71	51	63	83	56
Licentiate degrees	-	1	-	-	-
Doctoral degrees	11	8	6	6	6

5.4. Research

During the year under review, 2017, research at the department focused on four main fields; machine learning and algorithms, networks and systems, software systems, and bioinformatics. As in previous years, the results from all these research fields were actively discussed in writing in 2017. In 2017, researchers at the department published 197 refereed articles and a total of 231 publication. This means the number of publications grew compared to the previous year, yet not significantly.

Researchers from the department continued to participate in various conference programme committees and the editorial staff of journals, as well as acting as referees to articles, during 2017. Further, some researchers acted as chair of programme committees and editors of special issues of scientific journals. Researchers from the department were also invited speakers at international conferences and other events.

International mobility has gained significance in research in the past years. Department researchers made several longer or shorter research visits to universities and scientific institutes abroad in 2017. In addition, some foreign visitors came for short research stays at the department.

The research of the department was not very visible in public media in 2017. Items that received significant media attention during this year were the research of professor Hannu Toivonen's group on producing automatic news articles and Professor Sasu Tarkoma's and Dr Eemil Lagerspetz's research on the Internet of Things.

The department and its staff also gained recognition from other sources. In the Times Higher Education assessment of 2016-2017, the department was ranked 69th of all the computer science departments in the world, 25th among European, and 1st among Scandinavian departments. In 2017, the department was also elected Distinguished Academic Partner of Nokia Bell Labs. The Finnish Centre for Open Systems and Solutions premiered Professor Tommi Mikkonen with the 2017 Open World Hero reward, while the international IEEE organisation awarded Professor Pan Hui with the esteemed title IEEE Fellow. Some conference papers from the department received honourable mention. Among former doctoral students of the department, Juho-Kustaa Kangas received the PhD thesis award from the Doctoral School in Natural Science. Paul Saikko received the MSc thesis award from Tietojenkäsittelytieteen Seura (the association of computer science) for the most meritorious thesis produced in the academic year 2015-2016.

In 2017, the department had research groups in three of the Finnish Academy's national centres of excellence. These units are COIN (The Finnish Centre of Excellence in Computational Inference Research), CoECGR (The Finnish Centre of Excellence in Cancer Genetics Research), and The Finnish Centre of Excellence in Inverse Problems. From the department, Professor Petri Myllymäki and his team participate in the COIN unit, Professor Veli Mäkinen and his team in CoECGR, and Professor Aapo Hyvärinen and his team in the Inverse Problems unit.

All publications 2017 according publication types

Publication type	2013	2014	2015	2016	2017
A1 Refereed journal articles	57	75	72	69	65
A2 Reviews in scientific journals	3	0	3	2	1
A3 Contributions to books/other compilations (refereed)	7	3	8	3	4
A4 Articles in conference publication (refereed)	131	110	103	103	127
B1 Unrefereed journal articles	1	8	5	5	1
B2 Contributions to books/other compilations (non-refereed)	3	6	4	1	1
B3 Unrefereed articles in conference proceedings	4	0	5	10	4
C1 Published scientific monographs	2	2	1	0	1
C2 Edited books, compilations, conference proceedings or special issues of journals	9	9	6	5	3
D1 Articles in professional journals	0	0	1	1	3
D2 Articles in professional manuals, guides, professional information systems or text book material	0	0	0	0	5
D3 Articles in professional conference proceedings	3	0	1	4	1
D4 Published development or research reports	2	5	1	0	0
D5 Text books, professional handbooks, guidebooks or dictionaries	1	0	0	1	0
E1 Popular contributions to journals, books or other compilations	1	1	0	1	1
E2 Popular monographs	0	1	0	0	1
F2 Public contributions to artistic work	8	1	2	0	0
F3 Public artistic plays or exhibitions	2	1	0	0	0
G3 Licentiate theses	0	1	0	0	0
G4 Doctoral theses, monographs	2	0	2	2	0
G5 Doctoral theses, article-based	12	4	5	4	6
H1 Granted patents	0	0	0	0	1
I1 Audio-visual material	0	0	0	0	1
I2 ICT programs or applications	0	0	6	4	5
Total	248	227	225	215	231

Refereed and other publications 2017

	2013	2014	2015	2016	2017
Refereed journal articles (A1)	57	75	72	69	65
Refereed conference and compilation articles, evaluations (A2-A4)	141	113	114	108	132
Other publications (all other categories)	50	39	39	38	34
Total	248	227	225	215	231

6. Awards and recognitions 2017

As in previous years, the staff of the department received many different awards and recognitions in 2017.

6.1. Awards given by the Department of Computer Science

The Department of Computer Science has given some annual awards to its staff members since 2001. During the Department's Christmas Coffee for staff, these awards for 2017 were given to the following persons:

- *Junior Good Teacher: Doctoral student Topi Talvitie*
- *Junior Good Researcher: Doctoral student Jeremias Berg*
- *Senior Good Teacher and Researcher: University Instructor Arto Hellas and Post-doctoral Researcher Samu Varjonen*
- *Group of the year: Research group Carat*

6.2. Awards and recognitions given to the Department and its staff or students

- *Awards related to publications:*
 - *Fabian Fagerholm, Arto Hellas, Matti Luukkainen, Kati Kyllönen, Sezin Yaman, and Hanna Mäenpää received the Distinguished Paper Award of the SEAA 2017 Conference for their article Patterns for Designing and Implementing an Environment for Software Start-up Education.*
 - *Ibbad Hafeez and Sasu Tarkoma together with Markus Miettinen, Samuel Marchal, N Asokan and Ahmad-Reza Sadeghi received the IoT Sentinel Poster/Demo Award of the IEEE ICDCS 2017 Conference for their article and demo IoT Sentinel: Automated Device-Type Identification for Security Enforcement in IoT.*
 - *Antti Hyttinen, Matti Järvisalo and Paul Saikko together with Fahiem Bacchus received the Distinguished Paper Award of the CP 2017 Conference for their article Reduced Cost Fixing in MaxSAT.*
 - *Juho Leinonen and Arto Hellas received the Best Presentation Award of the Koli Calling '17 Conference for their article Thought Crimes and Profanities whilst Programming.*
- *Thesis awards*
 - *Juho-Kustaa Kangas got the Doctoral School in Natural Sciences outstanding doctoral dissertation award 2017 for his doctoral thesis Combinatorial Algorithms with Applications in Learning Graphical Models.*
 - *Paul Saikko got the 2017 master's thesis award of the Finnish Society for Computer Science for his master's thesis Re-implementing and Extending a Hybrid SAT-IP Approach to Maximum Satisfiability for the most distinguished master's thesis done in Academic year 2015-2016.*
- *Awards and recognitions related to teaching and studies:*
 - *The programming team consisting of computer science students (Hannes Ihalainen, Kalle Luopajarvi, and Antti Röyskö, supervised by Tuukka Korhonen) placed second in the North-western Europe Regional Contest with 120 contestants from universities in northwest Europe.*
- *Other awards and recognitions*

- Tuukka Korhonen, Jeremias Berg, and Matti Järvisalo received 2nd prize at the 2017 PACE Challenge.
- Finnish Centre for Open Systems and Solutions COSS awarded Tommi Mikkonen with the 2017 Open World Hero acknowledgement.
- Sasu Tarkoma received honourable mention from Intel in 2017 for his outstanding cooperation with Intel Labs Collaborative Research Institute for Secure Computing.
- N. Asokan and Pan Hui received the title IEEE Fellow in 2017.
- The international N²Women network for women in computer science published a list of significant female researchers working in the field of networks and telecommunications in 2017. One of the ten rising stars selected for this list was Ella Peltonen, doctoral student at the department.



*Logo for the 50th jubilee of the department.
Designer: Elias Jääsaari*

7. Events 2017

Defences of Theses

03.03.2017 M.Sc. Yuan Zou: [On Model Selection for Bayesian Networks and Sparse Logistic Regression](#)

08.06.2017 M.Sc. Yi-Ta Hsieh: [Exploring Hand-Based Haptic Interfaces for Mobile Interaction Design](#)

09.06.2017 M.Sc. Daniel Valenzuela: [Algorithms and Data Structures for Sequence Analysis in the Pan-Genomic Era](#)

27.10.2017 M.Sc. Arto Hellas: [Retention in Introductory Programming](#)

29.11.2017 M.Sc. Mian Du: [Natural Language Processing Systems for Business Intelligence](#)

20.12.2017 M.Sc. Anna Kuosmanen: [Third-Generation RNA-Sequencing Analysis: Graph Alignment and Transcript Assembly with Long Reads](#)

Guest lectures

03.02.2017 Professor Rosalind Picard, MIT, USA: [Adventures in building Emotional Intelligence Technologies](#)

28.02.2017 Markus Sabadello, Danube Tech, Vienna, Austria: [Introduction to Self-Sovereign Identity Technologies: Sovrin, XDI, and others](#)

13.04.2017 Professor Rajeev Raman, University of Leicester, United Kingdom: [Encodings = \(Data Structures\) - \(Data\)](#)

22.05.2017 Dr. Allan Tucker, Brunel University, United Kingdom: [Three Algorithms Inspired by Data from the Life Sciences](#)

19.06.2017 Professor Steven Dow, UC San Diego, USA: [Advancing Collective Innovation](#)

23.08.2017 Associate Professor Pinar Karagoz, Middle East Technical University, Turkey: [Utility Based Mining of Sequential Patterns](#)

12.09.2017 Senior Officer Anna Hänninen, Office of the Data Protection Ombudsman, Finland: [EU General Data Protection Regulation](#)

13.12.2017 Post-doctoral researcher Jouni Sirén, Wellcome Trust Sanger Institute, United Kingdom: [Indexing Paths in Genome Graphs](#)

Events of the educational programmes

22.05.2017 [Data Science Master's Programme Kick-off](#)

08.09.2017 *Data Science Fest*

15.09.2017 [Computer Science Colloquium](#)

13.10.2017 *Data Science Fest*

17.11.2017 [Computer Science Colloquium](#)

24.11.2017 *Data Science Fest*

Scientific conferences and meetings

20.-21.04.2017 [CloSer & PraNA Joint Workshop](#)

31.08.-01.09.2017 [Symposium on Computer Science in Finland 2017](#)

08.-10.11.2017 [The 21st Finnish-Russian University Cooperation in Telecommunications \(FRUCT 2017\) and Advances in Methods of Information and Communication Technologies workshop \(AMICT 2017\)](#)

13.11.2017 [The 10th International Conference on Informatics in Schools \(ISSEP 2017\)](#)

Staff meetings and events

30.01.2017 [Department morning coffee: Security](#) (Guest lecturer: Kaisa Nyberg, Tampere University of Technology)

06.03.2017 [Department morning coffee: IoT](#) (Guest lecturer: Mikko Puuskari, Elisa)

31.03.2017 [Department staff meeting](#)

07.04.2017 [Bouldering event for staff](#)

21.04.2017 [Department afternoon meeting](#)

19.05.2017 [Strategy seminar](#)

08.06.2017 [Department summer trip to Raasepori](#)

16.06.2017 [Communications seminar of the Department](#)

22.08.2017 [Staff visit to the Museum of Technology](#)

22.09.2017 [General Assembly for staff and students](#)

06.10.2017 [Department afternoon meeting](#)

11.10.2017 [Department morning coffee](#)

10.11.2017 [Department staff hearing](#) (Selection of the Head of Department)

15.11.2017 [Department morning coffee](#)

24.11.2017 [Department pre-Christmas party](#)

15.12.2017 [Department Christmas coffee](#)

Other events

31.08.2017 [50 Years of Computer Science in Helsinki Jubilee Seminar](#)

27.09.2017 [CS Alumni Autumn Startup: Data Science](#)

01.12.2017 [Helsinki Centre for Data Science \(HiData\) Kick-off event](#)

Department council meetings

17.01.2017, 07.02.2017, 07.03.2017, 04.04.2017, 02.05.2017, 13.06.2017, 29.08.2017, 03.10.2017, 31.10.2017, 05.12.2017



At the 50th jubilee of the department, the programme in the main building of the university included the musical performance 'Suven laulu', composed by Sampsa Ertamo with lyrics by the poetry machine P.O.Eticus developed at the department.

Photographer: Valentin Abramenkov