



HELSINKI  
INSTITUTE FOR  
INFORMATION  
TECHNOLOGY

Helsinki Institute for Information Technology HIIT  
**Annual Report 2009**



Visa Noronen, Patrik Floréen (eds.)  
HIIT Publications 2010-1



Helsinki Institute for Information Technology HIIT

# Annual Report 2009

*Visa Noronen and Patrik Floréen (eds.)  
HIIT Publications 2010-1*



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Kalenius with mobile usability testing equipment.

More info at [www.hiit.fi/uix/mobileusability](http://www.hiit.fi/uix/mobileusability)

Lay-out: Anna Bergman

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# 1 Review of Year 2009

HIIT celebrated its 10th year anniversary in Dipoli on 10 November 2009. Our institute has reached a mature level in volume, with a budget of about 10 million euro, of which each parent university contributes a million. The institute operated at three locations: Kumpula (UH campus), Otaniemi (TKK campus) and in Spektri Business Park.

## Evaluation and prizes

In the Research Assessment Exercise (RAE) of the Aalto University, HIIT as a whole was among the six best out of 46 units evaluated. The panel had praise for the outstanding level of research at HIIT, but criticized the detachment of the Spektri unit from the rest of computer science on Otaniemi campus. The excellent result of the RAE is a good encouragement for us to go forward in HIIT.

HIIT and its researchers received several prizes during the year. ERCIM, the European Research Consortium for Informatics and Mathematics, chose Dr Teemu Roos as the winner of the 2009 Cor Baayen Award. The Finnish Information Processing Association awarded the Annual Doctoral Thesis Prize to Teemu Koponen. This is the fourth time in a row that this prize is awarded to a HIIT researcher! HIIT

received the "Tietävä organisaatio" award by the Society for Finnish Information Specialists for efficient and innovative use of information.

## Research activities

HIIT continues to have a good presence in the EU Framework Programme for Research, as well as in ICT SHOK. HIIT's international collaboration with University of California at Berkeley and International Computer Science Institute (ICSI) in Berkeley continued. The OtaSizzle project was brought to Africa. HIIT has also numerous other international research collaborations.

Projects supported by the Academy of Finland and Tekes are very important for HIIT. The Finnish Centre of Excellence in Algorithmic Data Analysis Research (Algodan) forms the core of HIIT's Algorithmic Data Analysis (ADA) programme.

## Doctoral studies

HIIT now coordinates two new national graduate schools: Finnish Graduate School in Computational Science FICS and Future Internet Graduate School FIGS.

13 HIIT researchers got their PhD during the year.

## Organizational changes

HIIT got a new Board from the beginning of the year. The previously separate two units of HIIT were merged under one new Director, Professor Heikki Mannila, who then in September was elected Vice Rector of Aalto University. Dr Patrik Floréen was appointed Director for an interim period of 15 November 2009 – 31 July 2010, during which the statutes of HIIT will be reformed and a longer-term Director selected.

The Scientific Advisory Board (SAB) called upon HIIT to make a 10-year plan in its evaluation in May 2008. The work towards such as plan advanced during the year. Some changes to the research programme structure were implemented after summer. The Probabilistic Adaptive Systems (PAS) programme was transformed to an Algorithmic Systems (AS) programme with Professors Ilkka Niemelä and Pekka Orponen joining it, and a regrouping of activities was performed between the ADA and AS programmes: Aapo Hyvärinen's and Samuel Kaski's groups were moved to the ADA programme, and Patrik Floréen's group to the AS programme. A new initiative grouping together theoretical research collaborating with all the programmes was formed: New Paradigms in Computing, led by Dr Petteri Kaski.

## Changes ahead

In December 2009, the European Institute of Innovation and Technology (EIT) announced the first three Knowledge and Innovation Communities: One of the successful ones was EIT ICT Labs, with Aalto as one of the core partners. Undoubtedly, this will have an impact on the future of HIIT. Professor Martti Mäntylä of HIIT was a key person in the application process.

The year marked the last year of operation under the old university law. From the beginning of 2010, TKK was merged into Aalto University, which is a foundation, and UH became a public-law corporation. As a result of this, HIIT is no longer a joint research institute of TKK and the UH, it is a joint research institute of Aalto University and the University of Helsinki.



## HIIT in brief

Helsinki Institute for Information Technology HIIT is a joint research institute of Aalto University and the University of Helsinki for basic and applied research on information technology.

Its research ranges from fundamental methods and technologies to novel applications and their impact on people and society. HIIT's key competences are in Internet architecture and technologies, mobile and human-centric computing, user-created media, analysis of large sets of data and probabilistic modeling of complex phenomena.

HIIT works in a multidisciplinary way, with scientists from computer, natural, behavioural and social sciences, as well as from humanities and design. The projects are conducted in collaboration with universities, companies and research institutions. HIIT employs around 200 researchers.

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<b>Total numbers</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Funding M€	7,5	8,6	9,0
External funding of total funding	78%	76%	71%
Person-years	129	165	174
Original publications	197	327	250



## 2 Research

### 2.1 Algorithmic Data Analysis (ADA)

The mission of the Algorithmic Data Analysis research programme at HIIT is to develop useful algorithmic data analysis methods for other sciences and for industry. The work involves both basic research in computer science and applied work on problems arising from applications.

The core of the programme is formed by the Algodan Center of Excellence.

#### Research challenges

##### **Example challenge 1**

Learning Network Structures. Network-like structures are numerous in various domains including molecular processes, social interactions and the Internet. New computational methods are needed for finding the structure of such networks and for understanding their dynamic behaviour.

##### **Example challenge 2**

The Vocabulary, Grammar and History of Genomes. The genome codes information identifying the species and the individual. Computational techniques are needed for the description and the analysis of variation. Segmentation methods using recurrent sources can be

used to find components with similar underlying structure; latent variable techniques for sequences can also be used.

##### **Example challenge 3**

Computational Modelling of Ecosystems. The environment can be measured in many ways on different scales ranging from remote-sensing based satellite images of landscapes to chemical compositions of nutrients in individual plants. The complex interactions in both the spatial and temporal domains across different scales are largely unknown, and their importance is growing.

##### **Example challenge 4**

Sensor and Context Data Management. To realize a vision of ubiquitous information processing, services and applications make use of a wide variety of context data, including sensor readings. The challenges are to efficiently gather sensor data, to perform context reasoning, and to take into consideration the resource constraints of the devices and the distributed nature of the environment.

## Research groups

### **Combinatorial Pattern Matching**

Professor Esko Ukkonen

### **Data Mining: Theory and Applications**

Professor Heikki Mannila

### **Discovery Group**

Professor Hannu Toivonen

### **Neuroinformatics**

Professor Aapo Hyvärinen

### **Parsimonious Modelling**

Chief Research Scientist  
Jaakko Hollmén

### **Statistical Machine Learning and Bioinformatics**

Professor Samuel Kaski

## Research projects

### **Algorithmic and Probabilistic Methods in Data Mining**

Heikki Mannila

### **Whole genome association analysis strategies for multiple phenotypes**

Heikki Mannila

### **Dammoc: Data mining tools for changing modalities of communication**

Heikki Mannila

### **Analyzing Finnish Forest Data with Modern Data Mining Methods**

Heikki Mannila

### **Algodan: Algorithmic Data Analysis - Centre-of-Excellence**

Esko Ukkonen, Heikki Mannila

### **Biosapiens: European network of genome annotation**

Esko Ukkonen

### **Regulatory Genomics**

Esko Ukkonen

### **MIFSAS: Multidimensional Information Fusion and Data Mining in Situation Awareness System**

Esko Ukkonen

### **Algorithmic Bayesian data analysis with applications in bioinformatics**

Mikko Koivisto

**MOCCA: Methods for Combinatorial Construction**

Petteri Kaski

**ISMO: Intelligent Structural Health Monitoring System**

Jaakko Hollmén

**AD/ED: Analysis of dependencies in environmental time-series**

Jaakko Hollmén

**Causal discovery in science: real problems, practical benchmarks, new methods**

Patrik Hoyer

**Extratiate visual processing\***

Aapo Hyvärinen

**AivoAALTO**

Samuel Kaski

**MULTIBIO: Computational data fusion of multiple biological information sources and background data**

Samuel Kaski

**TRANSCENDO: Computational translation from model organisms to humans**

Samuel Kaski

**DIEM/MMR: Multimodal Mixed Reality\***

Samuel Kaski

**PinView: Personal Information Navigator Adapting Through Viewing\***

Samuel Kaski

**UI-ART: Urban contextual information interfaces with multimodal augmented reality\***

Samuel Kaski

**Flexible dependency modeling in proactive information retrieval and neuroinformatics**

Arto Klami

**Exploration methods that make use of multiple information sources, applied to bioinformatics**

Jaakko Peltonen

**Bison: Bisociation Networks for Creative Information Discovery**

Hannu Toivonen

**Biomine: Knowledge discovery in biological databases**

Hannu Toivonen

**Programme management in 2009**

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Programme Director:  
Professor Heikki Mannila

Programme Manager:  
Dr Greger Lindén

Programme Management Group:

- Professor Heikki Mannila
- Dr Jaakko Hollmén
- Professor Aapo Hyvärinen
- Professor Samuel Kaski
- Professor Hannu Toivonen
- Professor Esko Ukkonen

\* Until July 2009 part of the PAS programme

## 2.2 Algorithmic Systems (AS)

The Algorithmic Systems research programme aims at finding algorithmic solutions for science and society, and with this target in mind, the goal is to study the theory and practice of modelling, designing and managing complex systems. The work has a strong basic research component that intersects artificial intelligence, machine learning, theoretical computer science, information theory and mathematical statistics. The results of this methodological work are applied to both scientific and industrial applications.

- Real-time optimization. Approximate but fast inference methods combining deterministic and stochastic techniques.
- Methods for data fusion. Probabilistic models for combining inputs originating from heterogeneous data sources.
- Intelligent information access. Solutions to information retrieval tasks appearing in ubiquitous environments.
- User modeling. Methods for personalization, profiling, segmentation and visualization.

### Research Challenges

- Theoretical frameworks for probabilistic modeling. Development of computationally efficient, general-purpose methods for probabilistic modeling, focusing on issues related to model selection, parameter estimation and inference.

### Research Groups

#### **Adaptive Computing**

Dr Patrik Floréen

#### **Combinatorial Algorithms and Computation**

Professor Pekka Orponen

#### **Complex Systems Computation (CoSCo)**

Professor Petri Myllymäki

#### **Computational Logic**

Professor Ilkka Niemelä

## Research projects

**Modest: Applications of the MDL Principle to Prediction and Model Selection and Testing**

Petri Myllymäki

**STAM: Algorithmic Methods in Stematology**

Teemu Roos

**VISCI: Virtual Intelligent Space for Collaborative Innovation**

Petri Myllymäki, Patrik Floréen)

**PUPS: Personalised Ubiservices in Public Spaces\***

Patrik Floréen, Petri Myllymäki

**AICA: Adaptive Interfaces for Consumer Applications**

Patrik Floréen, Petri Myllymäki

**GERU: Optimising Data Gathering in Resource-constrained Networks\***

Patrik Floréen

**LUCRE: Local and User-Created Services; as part of the Flexible Services programme of the ICT SHOK\***

Patrik Floréen

**Online Optimisation and Production Planning**

(Pekka Orponen)

**Algorithmics for Data Security**

(Pekka Orponen)

**MCM: Methods for Constructing and Solving Large Constraint Models**

(Ilkka Niemelä)

## Programme management

Programme Director:

Professor Petri Myllymäki

Programme Manager:

Dr Teemu Roos

Programme Management Group:

- Docent Patrik Floréen
- Professor Petri Myllymäki
- Professor Ilkka Niemelä
- Professor Pekka Orponen

\* Until 2009 part of the ADA programme

## 2.3 Future Internet (FI)

The vision of the Future Internet research programme is that the Internet will become a mission critical backbone of a global information society with billions of mobile and wire-line users instantly connected to information and each other, and using the Internet to communicate, conduct business, manage their everyday lives, express themselves, and enjoy entertainment.

The objective is to develop concepts, technologies, and supporting theories and methodologies needed to design and implement future computing services and products for the Internet of the future.

### Research challenges

The future progress of the Internet is constricted by several bottlenecks: unwanted traffic, choking of the routing system, mobility and multi-homing, compensation and congestion, privacy and attribution, and trust and reputation. The current bottlenecks and deficiencies are limiting the potential utility of the Internet.

The core theme of the Future Internet programme is to find ways to remove these obstacles. These include the creation of new network architecture concepts and mechanisms, in particular information-

centric network approaches and post-IP networking architectures. The solutions are applied not only in traditional wireline networks, but also in wireless and pervasive environments, addressing the specific needs of those scenarios.

### Research groups

#### **Collaborative Networking**

Professor Jussi Kangasharju

#### **Distributed Applications**

Dr Ken Rimey

#### **Mobile Computing**

Professor Sasu Tarkoma

#### **Networking Research**

Adjunct Professor Andrei Gurtov,  
Dr Pekka Nikander, Dr Arto Karila

#### **Distributed Networking and Security**

Professor Antti Ylä-Jääski

#### **Usable Security**

Dr Kristiina Karvonen



## Research projects

### **CuteHIP**

Andrei Gurtov

### **DAAD II: Security and Privacy for Mobile Users in Decentralized Collaborative Wi-Fi, Networks**

Andrei Gurtov

### **FICNIA: Finland-ICSI Center for Novel Internet Architectures**

Jussi Kangasharju,  
Kristiina Karvonen

### **ICT SHOK FI SRA**

Jukka Manner

### **InfraHIP II: Infrastructure for Host Identity Protocol II**

Andrei Gurtov, Antti Ylä-Jääski

### **IPOS: Information Processing in Overlay Systems**

Sasu Tarkoma

### **NordicHIP**

Andrei Gurtov, Antti Ylä-Jääski

### **PSIRP: Publish-Subscribe Internet Routing Paradigm**

Arto Karila

### **SPEAR**

Andrei Gurtov

### **UbiLife Foundations**

Sasu Tarkoma

### **WISEciti: Wireless Community Services for Mobile Citizens Project**

Markku Kojo, Andrei Gurtov

## Programme management

Programme Director:

Professor Jussi Kangasharju

Programme Manager:

Dr Kristiina Karvonen

Programme Management Group:

- Adjunct Professor Andrei Gurtov
- Professor Heikki Hämmäinen
- Professor Riku Jäntti
- Professor Raimo Kantola
- Dr Arto Karila
- University Lecturer Markku Kojo
- Professor Jukka Manner
- Dr Pekka Nikander
- Professor Jörg Ott
- Dr Ken Rimey
- Professor Sasu Tarkoma
- Professor Antti Ylä-Jääski

## 2.4 Network Society (NS)

The objective of the Network Society research group is to pioneer and develop human-centric, multidisciplinary, ubiquitous information and communication technology based on comprehensive understanding of needs and practices in the everyday life and social relations of a network society.

### Research domains

- Mobile and ubiquitous interaction
- Open media creation, management and distribution
- Tools and methodology for service innovation
- Development of a sustainable network society

### Research groups

Four partially overlapping research groups collaborate in the research:

#### **Digital Content Communities**

Professor Marko Turpeinen,  
Professor Timo Saari,  
Dr Anu Kankainen

#### **Distributed Applications**

Dr Ken Rimey

#### **Experimental Law & Economy**

Dr Olli Pitkänen, Professor  
Jukka Kempainen, Professor  
Pekka Himanen, Dr Perttu  
Virtanen, Dr Herkko Hietanen,  
Dr Vili Lehdonvirta

#### **Self-Made Media**

Dr Risto Sarvas

#### **Ubiquitous Interaction**

Dr Antti Oulasvirta, Dr Giulio  
Jacucci, Professor Martti  
Mäntylä, Dr Céline Coutrix,  
Dr Antti Nurminen

## Research projects

### **AMOVEO: Work Practises and the Transition to UbiComp**

Antti Oulasvirta

### **ARMS: Acquisition, Retention and Monetisation Strategies in Virtual Social Spaces**

Kai Huotari

### **AVEA: Advanced Virtual Economy Applications**

Kai Huotari

### **BeAware: Boosting Energy Awareness with Adaptive Real-Time Environments**

Giulio Jacucci

### **CALLAS: Conveying Affectiveness Leading-edge Living Adaptive Systems**

Giulio Jacucci

### **ContextCues**

Martti Mäntylä

### **Creative Commons Finland**

Herkko Hietanen

### **DCM**

Olli Pitkänen

### **Emokeitai**

Kai Kuikkaniemi

### **Enactive Social Media and Gaming**

Marko Turpeinen

### **eXdesign: Extreme Design**

Anu Kankainen

### **FUGA: Fun of Gaming**

Marko Turpeinen

### **GAS: Games as Service**

Marko Turpeinen

### **Global Network Society**

Pekka Himanen

### **Hydrosys: Advanced spatial analysis tools for on-site environmental monitoring and management**

Antti Nurminen

### **Innoguard: Detecting patented software**

Perttu Virtanen

### **IPCity**

Ann Morrison

### **LUCRE: Local and User-Created Services**

Antti Oulasvirta

### **Mobile City Moments**

Risto Sarvas

### **Musiquitous**

Lassi Liikkanen

### **Non-use**

Antti Salovaara

### **OtaSizzle: Ubiquitous Social Media for Urban Communities**

Olli Pitkänen

### **P2P-Fusion: Multimedia Archives and Community Content in P2P Networks**

Ken Rimey

### **PASION**

Antti Oulasvirta

**PUPS - Personalised and Ubiquitous Public Services**

Peter Peltonen

**S3: Space, Screen and Social Activity**

Kai Kuikkaniemi

**Social video**

Anu Kankainen

**THESEUS**

Antti Oulasvirta

**UDOI BOOSTER**

Olli Pitkänen

**Programme management**

Programme Director:

Professor Marko Turpeinen

Programme Manager:

MSc Kai Huotari

Programme Management Group:

- Professor Pekka Himanen
- Dr Giulio Jacucci
- Dr Anu Kankainen
- Professor Martti Mäntylä
- Dr Antti Oulasvirta
- Dr Olli Pitkänen
- Dr Ken Rimey
- Dr Risto Sarvas /  
Asko Lehmuskallio

## 2.5 New Paradigms in Computing (NPC)

The New Paradigms in Computing research group performs basic research at the intersection of core computer science (algorithm design and analysis) and discrete mathematics, with an emphasis towards novel techniques and less studied models of computation.

The group invests substantial effort to high-risk, high-yield research problems of relatively broad theoretical interest, selected on both problem and method driven basis. However, it also aims at rapid publication of more specific, smaller observations. It particularly seeks and values solid results with mathematical elegance and simplicity.

### Research challenges:

1. Exploring the interplay between algebraic, combinatorial and geometric techniques in the design of exact deterministic algorithms. For example, many combinatorial problems can be cast in algebraic form, whereby a nontrivial algebraic algorithm yields a more efficient solution compared with direct combinatorial tools.

2. Restricted models of computation and tradeoffs in resources and/or objectives. For example, one fundamental limitation in modern large-scale distributed systems is the infeasibility of central control.

In practice, the system must be operated by a distributed algorithm in which each computational node operates based on the information available in its local neighbourhood only. Assuming this setting, is it possible to achieve globally optimal or near-optimal operation? What is the tradeoff between the available information and the degree of approximation for the optimum?

3. While it is a theory group, the group occasionally engages in practical algorithm implementation. Examples include attacks on combinatorial classification problems and applications in computational geometry (e.g. air traffic management).

Group members:

- Dr Petteri Kaski
- Dr Mikko Koivisto
- Dr Valentin Polishchuk
- Dr Jukka Suomela



## 3 Research training and research visits

### 3.1 Doctoral dissertations in HIIT 2009

#### Kontkanen, Petri:

*Computationally efficient methods for MDL-optimal density estimation and data clustering.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5900-1.

#### Kurki, Ilmari:

*Feature integration in human vision.* Doctoral dissertation. University of Helsinki, Department of Psychology, Helsinki 2009. ISBN 978-952-10-5912-4.

#### Köster, Urs:

*A Probabilistic approach to the primary visual cortex.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5714-4.

#### Laasonen, Kari:

*Mining cell transition data.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5288-0.

#### Lehdonvirta, Vili:

*Virtual Consumption.* Doctoral dissertation. Turku School of Economics, Turku 2009. ISBN 978-952-249-019-3 (printed) 978-952-249-020-9 (electronic) ISSN 0357-4652 (print) 1459-4870 (electronic).

#### Lindholm, Tancred:

*XML-aware data synchronization for mobile devices.* Doctoral dissertation. Helsinki University of Technology, Department of Computer Science and Engineering, Espoo 2009. ISBN 978-952-248-212-9.

#### Miettinen, Pauli:

*Matrix decomposition methods for data mining.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5497-6.

#### Mononen, Tommi:

*Computing the stochastic complexity of simple probabilistic graphical models.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5898-1.

### Nurmi, Petteri:

*Identifying meaningful places.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5789-2.

### Nurminen, Antti:

*Mobile Three-Dimensional City Maps.* Doctoral dissertation. Helsinki University of Technology, Department of Media Technology, Espoo 2009. TKK-ME-D-2, ISBN 978-952-248-192-4 (print) ISBN 978-952-248-193-1 (online).

### Rastas, Pasi:

*Computational Techniques for Haplotype Inference and for Local Alignment Significance.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5879-0.

### Silander, Tomi:

*The most probable Bayesian network and beyond.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5523-2 (print)

### Suomela, Jukka:

*Optimisation problems in wireless sensor networks: Local algorithms and local graphs.* Doctoral dissertation. University of Helsinki, Department of Computer Science, Helsinki 2009. ISBN 978-952-10-5599-7.



### 3.2 Post-graduate courses arranged by HIIT

#### Spring 2009 courses:

- Advanced Course in Computer Science (I. Niemelä)
- Käyttäjäpsykologia ja johdatus käytettävyyteen (A. Oulasvirta)
- Machine Learning: Advanced Probabilistic Methods (J. Hollmén)
- Mobile Middleware (S. Tarkoma)
- PhD Student seminar (J. Kangasharju, J. Rousu, H. Toivonen)
- Project in probabilistic models  
(P. Myllymäki, teaching assistant M. Urtela)
- Satunnaisalgoritmit, Randomized Algorithms laskuharjoitukset  
(P. Miettinen)
- Seminaari: Tiedon louhinta verkoista (H. Toivonen)
- Seminar: Intelligent Systems (H. W Mittag)
- Seminar: Neuroinformatics (A. Hyvärinen)
- Seminar: Peer-to-Peer Systems (J. Kangasharju)
- Special Topics in Computational Geometry:  
Motion Planning and Shape Approximation (V. Polishchuk)
- Todennäköisyysmallit, Probabilistic Models (P. Myllymäki)
- Unsupervised Machine Learning (A. Hyvärinen, exercises  
and computer projects: U. Köster, M. Gutmann)

## Fall 2009 courses:

- Algorithmic Methods of Data Mining (N. Vuokko)
- Computational Complexity Theory (I. Niemelä)
- Computational Methods of Systems Biology (E. Ukkonen)
- Discrete Structures (L. Ahlroth)
- Discrete Structures (P. Orponen)
- Hajautetut järjestelmät, Distributed Systems (J. Kangasharju)
- Individual Studies (T-79 professors)
- Information-Theoretic Modelling (T. Roos, teaching assistant A. Arohi)
- Introduction to Machine Learning (H. Wettig)
- Modeling Biological Networks (F. M. Ali)
- PhD Student seminar (J. Kangasharju, J. Rousu, H. Toivonen)
- Postgraduate Course in Theoretical Computer Science (P. Orponen)
- Project in Information-Theoretic Modelling (T. Roos, teaching assistant A. Arohi)
- QT CodeCamp (S. Tarkoma)
- Research Course in Theoretical Computer Science (P. Kaski)
- Seminaari: Hajautetut algoritmit (J. Suomela)
- Seminar: Hot Topics in IETF (J. Kangasharju)
- Special Course in Bioinformatics (G. Leen)
- Special Course in Bioinformatics (J. Caldas)
- Special Course in Computational Logic (T. Jahnunen)
- Student Project in Theoretical Computer Science (T-79 professors and teaching researchers)
- Symbolic Model Checking (T. Junttila)
- T-61.6080 Bioinformatics, special course II: Advanced probabilistic models in bioinformatics (G. Leen)

### 3.3 Research visits

#### Visits to HIIT 2009

*Albanez-Lucero, Mirtha*  
CICIMAR, Instituto Politécnico  
Nacional, Mexico  
4 months

*Alumäe, Tanel, PhD*  
Institute of Cybernetics at Tallinn  
University of Technology, Estonia  
9 months

*Antovski, Igor*  
Cyril and Methodius University,  
Macedonia  
3 months

*Arias, Marta, PhD*  
Polytechnic University of  
Catalunya, Barcelona, Spain  
1 month

*Barsky, Marina*  
University of Victoria, Victoria, BC,  
Canada  
1 month

*Bohnert, Fabian*  
Monash University, Melbourne,  
Australia  
1 week

*Brewer, Mark, PhD*  
Biomathematics & Statistics  
Scotland (BIOSS), UK  
1 week

*Buntine, Wray, HIIT Fellow*  
National ICT Australia, Canberra,  
Australia  
1 week

*Chuiko, Julia*  
Russian Academy of Science,  
Russia  
1 month

*Congdon, Eliza*  
UCLA, Los Angeles, USA  
1 week

*De Bie, Tijl*  
University of Bristol, UK  
1 week

*Deunser, Andreas*  
HitLabNZ, New Zealand  
3 months

*Fomin, Fedor, Professor*  
University of Bergen, Norway  
1 week

*Gehlenborg, Nils*  
European Bioinformatics Institute,  
Cambridge, UK  
3 weeks

*Gemmeke, Jort*  
Radboud University Nijmegen, The  
Netherlands  
2 months

*Gil Montoya, Concolacio,  
Professor*  
Universidad de Almeria, Spain  
1 month

*Gul, Hasan, PhD*  
Baskent University, Turkey  
7 months

*Götz, Stefan*

RWTH Aachen, Germany

3 weeks

*Hardoon, David, PhD*

University College London, UK

1 week

*Heer, Tobias*

RWTH Aachen, Germany

1 month

*Hotta, Seiji, Professor*

Nagasaki University, Japan

1 week

*Hummen, Rene*

RWTH Aachen, Germany

2 weeks

*Hussain, Zakria, PhD*

University College London, UK

2 weeks

*Jensen, Kasper Lovborg*

Aalborg University, Denmark

1 week

*Karras, Panagiotis, Dr*

National University of Singapore,

Singapore

1 week

*Ladra, Susana*

University of A Coruña, Spain

3 months

*Lai, Po-Hsiang*

Washington University in Saint

Louis, USA

1 week

*Laxman, Srivatsan, Dr*

Microsoft Research India,

Bangalore, India

3 months

*van Leemput, Koen, PhD*

Massachusetts General Hospital;

Harvard Medical School, USA

11 months

*Leen, Gayle, PhD*

University of Paisley, UK

12 months

*Leung, Alex, PhD*

University of Leoben, Austria

2 weeks

*Lugano, Giuseppe*

University of Jyväskylä, Finland

12 months

*Mazalov, Vladimir*

Russian Academy of Science,

Russia

2 months

*Montesino Pouzols, Federico, PhD*

University of Sevilla, Spain

7 months

*Mulloni, Alessandro*

TUGraz, Austria

1 month

*Parisi, Lorenza*

Facoltà di Scienze della

Comunicazi, Sapienza Università

di Roma, Italy

4 months

*Papapetrou, Panagiotis, PhD*  
Boston University, USA  
4 months

*Perez Garcia-Plaza, Alberto*  
The Universidad Nacional de  
Educacion a Distancia (UNED),  
Spain  
3 months

*Pizzi, Cinzia*  
University of Padova, Italy  
1 week

*Prada, Miguel A.*  
University of Leon, Spain  
3 months

*Quadrianto, Novi*  
Australian National University,  
Canberra, Australia  
1 month

*Ramsay, James, Professor*  
McGill University, Canada  
1 week

*Regebrecht, Holger*  
University of Otago, New Zealand  
5 months

*Richards, Gabriela*  
New York University, USA  
2 months

*Rissanen, Jorma, Professor  
Emeritus*  
HIIT Fellow, IBM Research, USA  
1 week

*Sabhnani, Girishkumar*  
Stony Brook University, NY, USA  
2 weeks

*Saunders, Craig*  
Xerox Research Centre Europe,  
Grenoble, France  
1 week

*Schmidt, Daniel, Dr*  
University of Melbourne, Australia  
1 week

*Seo, Eugene*  
Information and Communications  
University (ICU), South Korea  
6 months

*Severin, Eric, Professor*  
University of Lille, France  
2 months

*Weigt, Martin, Professor*  
Institute for Scientific Interchange,  
Turin, Italy  
1 week

*Yamabe, Tetsuo*  
Waseda University, Japan  
11 months

*Yanagimoto, Hidekazu, PhD*  
Osaka Prefecture University, Japan  
4 months

*Yildirim, Sinan*  
Boğaziçi University, Istanbul,  
Turkey  
1 week

*Zliobaite, Indre*  
Vilnius University, Lithuania  
3 months

## Visits from HIIT 2009

*Brumley, Billy*

University of Bristol, UK  
1 week

*Hietanen, Herkko*

MIT/Harvard, USA  
6 months (continues in 2010)

*Honkela, Antti*

University of Manchester, UK  
2 months

*Hoyer, Patrik*

Massachusetts Institute of  
Technology (MIT), USA  
5 months

*Hyvärinen, Aapo*

Berlin Institute of Technology,  
Germany  
2 weeks

*Hyvärinen, Aapo*

University of Toronto, Canada  
1 week  
Riken Brain Science Institute,  
Tokyo, Japan  
1 week

*Hyvärinen, Antti*

INB, Germany  
1 week

*Järvinen, Kimmo*

University of Calgary, Canada  
1 week

*Järvisalo, Matti*

Johannes Kepler University Linz,  
Austria  
6 months

*Klami, Arto*

University of Glasgow, UK  
1 week

*Kontkanen, Petri*

Hong Kong University of Science  
and Technology, Hong Kong  
6 months

*Koskela, Joakim*

ICSI Center, USA  
6 months

*Kupstov, Dmitriy*

RWTH Aachen, Germany  
1 month

*Kurimo, Mikko*

University of Cambridge, UK  
1 week

*Kuusela, Mika*

CERN, Switzerland  
3 months

*Lehdonvirta, Vili*

Waseda University, Japan  
1 month

*Lehtinen, Vilma*

HITLabNZ, New Zealand  
3 months

*Lindh-Knuutila, Tiina*

International Computer Science  
Institute, UC Berkeley, USA  
12 months

*Lindqvist, Janne*

Carnegie Mellon University, USA  
4 months (continues in 2010)

*Malmi, Erik*

CERN, Switzerland  
3 months

*Morrison, Ann*

HITLabNZ, New Zealand  
4 months

*Nechaev, Boris*

ICSI Center, USA  
2 months

*Nurmi, Petteri*

University of Munich, Germany  
1 week  
National ICT Australia, Canberra,  
Australia  
2 months

*Peltonen, Peter*

HITLabNZ, New Zealand  
3 months

*Oikarinen, Emilia*

Vienna University of Technology,  
Austria  
1 week

*Paukkeri, Sanna-Maria*

University of Edinburgh, UK  
12 months

*Polishchuk, Valentin*

The University of Arizona, USA  
1 week

*Reyhani, Nima*

University of California at Berkeley,  
USA  
7 months

*Sarolahti, Pasi*

ICSI Center, USA  
5 months (continues in 2010)

*Sarvas, Risto*

Digital World Research Centre,  
University of Surrey, UK  
12 months

*Sorjamaa, Antti*

Universidad de Granada, Spain  
2 months

*Turpeinen, Marko*

UC Berkeley, Stanford University,  
USA  
6 months (continues in 2010)

*Ukkonen, Antti*

Universitat Pompeu Fabra / Yahoo  
Research, Barcelona, Spain  
9 months

*Yang, Zhirong*

Chinese University of Hong Kong,  
Hong Kong  
4 months

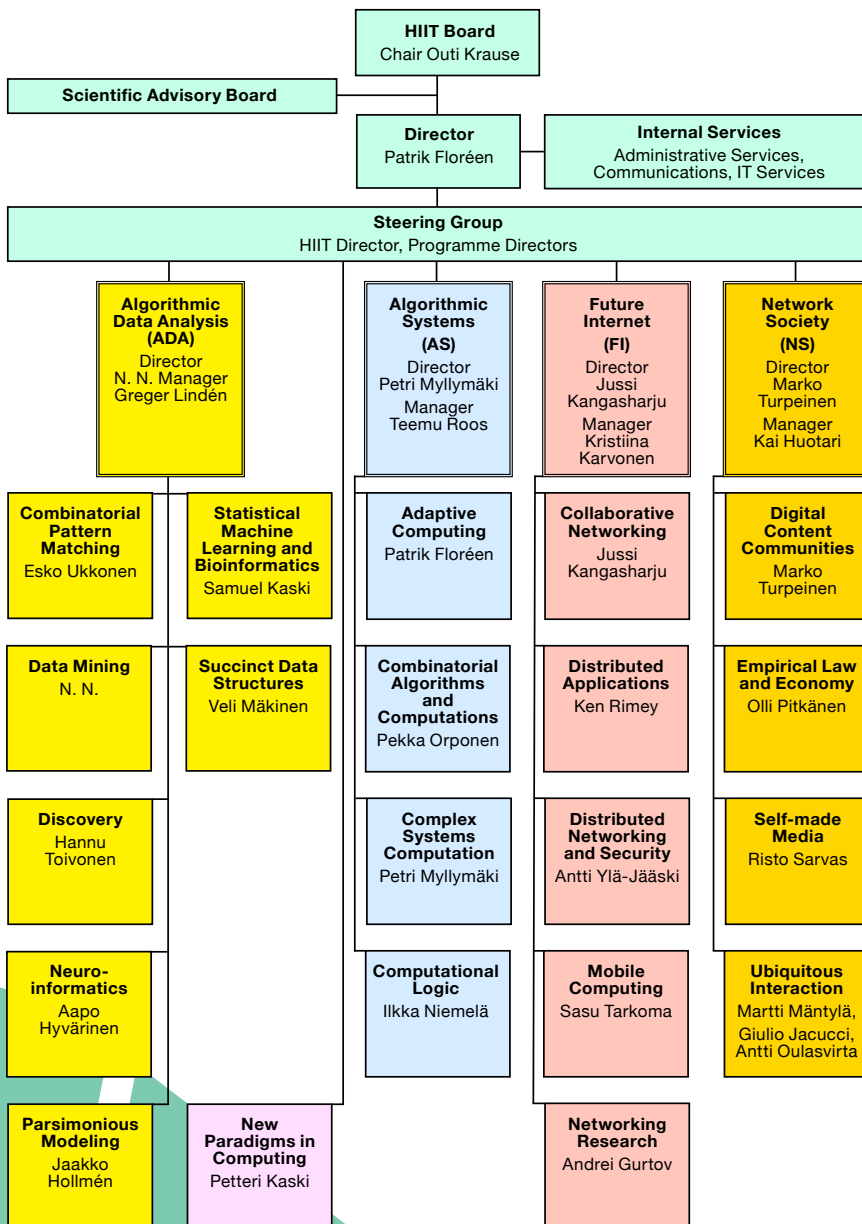
*Yu, Oi*

University of Lille, France  
2 months

For exact details please check the  
databases of TKK and the Univer-  
sity of Helsinki. Only research visits  
lasting one week or longer time are  
listed in this annual report.



# Helsinki Institute for Information Technology HIIT





## 4 Administration

### 4.1 Overview

HIIT is a joint research centre of Aalto University (until 31 December 2009 Helsinki University of Technology) and the University of Helsinki.

The HIIT Board, nominated by the universities, decides on its overall research strategy and research programmes.

The Scientific Advisory Board, nominated by the Board, provides scientific guidance and criticism for the Board.

Research programmes are led by the Programme Directors. Together with the Director, they constitute the Steering Group responsible for interprogramme co-ordination and planning. The Steering Group also accepts new research groups to HIIT.

The Management Group was dissolved. Earlier it was co-ordinating administrative processes such as planning, budgeting, and reporting; communications; and preparation of joint events.

Each research programme has a Programme Management Group consisting of the senior researchers of the research groups contributing to the work. The Research

Programme Manager facilitates the operation of the programme management group and co-ordinates the joint activities of the programme.

A Programme Advisory Board, consisting of invited members from industry and academia, provides feedback on programme results and advises on their vision, mission, and key research lines.

HIIT's administration team provides administrative services. The IT group is responsible for the IT infrastructure and key services of the institute.

## 4.2 Board

The highest decision-making body of HIIT is the Board.

The HIIT board consists of nine members, who are appointed for three years at a time. Each university appoints four board members, two of which are university staff and two are not employed by the university. The members are appointed personal deputies. The staff of HIIT selects one board member and his or her deputy from among their colleagues.

In 2009 the Board convened six times.

Apart from dealing with the statutory tasks (i.e. approving the annual budget and activity plans, following up the work of HIIT through regular activity updates given by the Director of HIIT), the major theme for the Board's work in 2009 was to discuss the future strategy of HIIT.

## Board Members 2009 and their personal deputies

Vice Rector, Professor Outi Krause, TKK  
(Vice Rector, Professor Kalevi Ekman, TKK)

Professor Olli Simula, TKK  
(Professor Heikki Saikkonen, TKK)

Vice Rector, Professor Johanna Björkroth, UH  
(Vice Rector, Professor Matti Tikkanen, UH)

Dean, Professor Jukka Paakki, UH  
(Professor Jyrki Kivinen, UH)

Henry Tirri, Nokia  
(Petteri Alinikula, Nokia)

Kari-Pekka Estola  
(Martin Mäklin, TeliaSonera)

Petri Vasara, Pöyry  
(Lars Gädda, Metsäklusteri)

Kimmo Kiviluoto, Xtract  
(Aimo Maanavilja, Elisa Communications)

Kai Huotari, HIIT  
(Patrik Floréen, HIIT, 1 January - 15 November 2009)  
(Greger Lindén, HIIT, 10 December 2009 - )

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The Director of HIIT Heikki Mannila (1 January - 15 November 2009) and his successor Patrik Floréen (15 November 2009 -) have been responsible for preparing and submitting propositions to the Board. In addition, Head of Planning Matti Apajalahti had the right to attend meetings.

Board Secretary: Research Coordinator Greger Lindén

### 4.3 Scientific Advisory Board (SAB)

The objective of the Scientific Advisory Board (SAB) is to provide critical guidance about HIIT's research activities and to advise the HIIT Board on strategic planning for future research directions of HIIT.

The SAB consists of internationally prominent scientists who are invited by the HIIT Board.

The SAB did not convene in 2009.

#### SAB Members 2009

*Dr Ross Anderson* University of Cambridge

*Professor Alberto Apostolico* Georgia Tech

*Professor Richard Buxbaum* University of California at Berkeley

*Professor Christos Faloutsos* Carnegie Mellon University

*Professor Bengt Jonsson* Uppsala University

*Professor Randy Katz* University of California at Berkeley

*Professor Martin Kersten* University of Amsterdam and CWI\*

*Professor Kari-Jouko R ih a* University of Tampere

*Professor Mart Saarma* University of Helsinki

*Professor Angela Sasse* University College London

*Professor John Shawe-Taylor* University of Southampton

*Professor Hal Varian* University of California at Berkeley

*Dr Martin Vingron* Max Planck Institute for Molecular Genetics

\* National Research Institute for Mathematics and Computer Science in the Netherlands

## *4.4 Personnel*

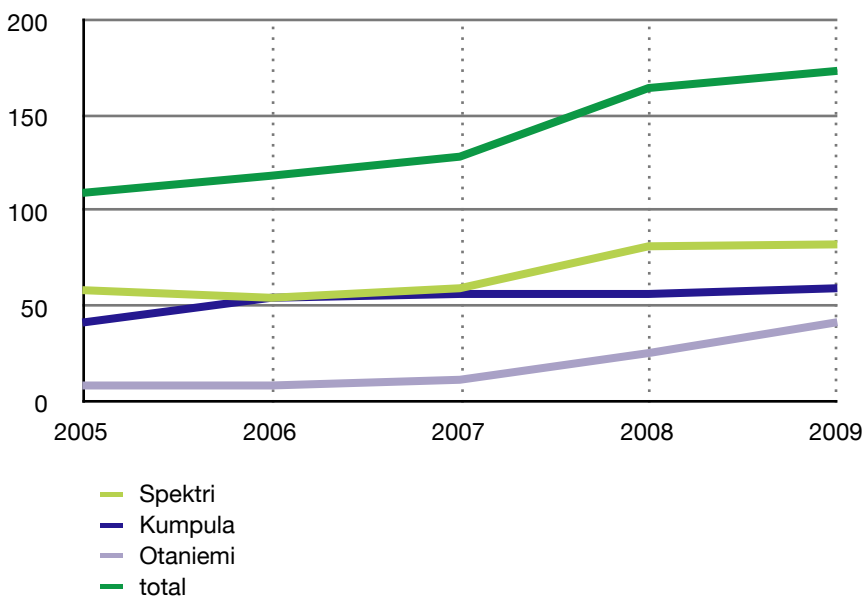
The personnel directly employed by HIIT are formally employed by the two parent universities; the Spektri and Otaniemi personnel have been employed by TKK and the Kumpula personnel by University of Helsinki.

In addition, there are a number of persons working in HIIT with some other form of funding, such as postgraduate students with funding from Helsinki Graduate School of Computer Science and Engineering (HeCSE) and researchers with academic positions.

Many of HIIT's personnel have double or even triple affiliations. Most common is an affiliation with one or both of the parent universities, but there are also some who share their time between HIIT and some other organisation. The diversity of affiliations is characteristic of HIIT personnel.

## Number of person-years and distribution by sites in 2005-2009

Staff (person-years)	2005	2006	2007	2008	2009
Spektri	59	55	60	82	83
Kumpula	42	55	57	57	60
Otaniemi	9	9	12	26	42
<b>total</b>	<b>110</b>	<b>119</b>	<b>129</b>	<b>165</b>	<b>174</b>

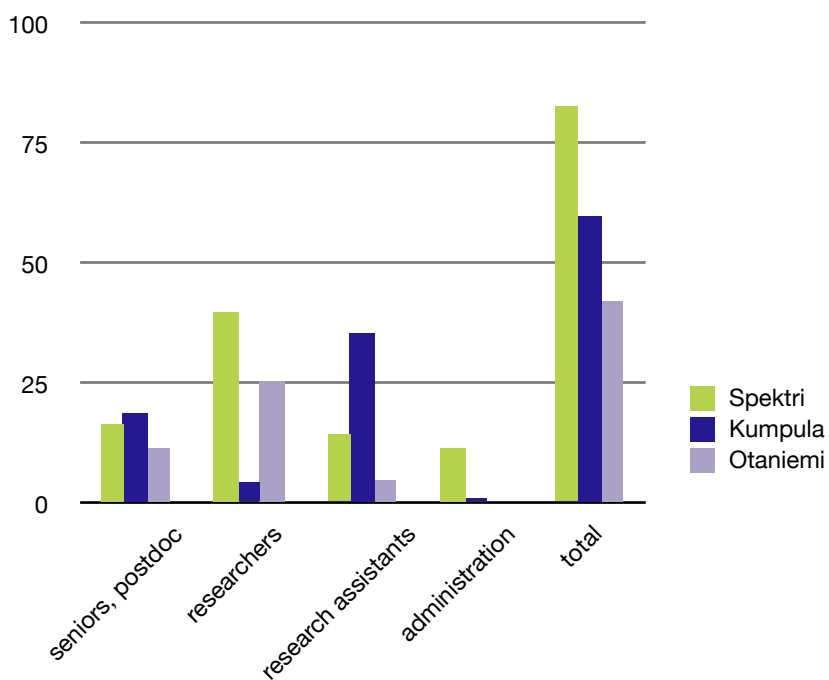


In 2009 the total number of employees was 293, 5 less than a year before.

The HIIT staff completed 174 person-years, 9 more than the previous year.

## Number of person-years and distribution by personnel groups in 2009

Staff (person years)	Spektri	Kumpula	Otaniemi	total	change, prev.year
seniors, postdoc	17	19	12	47	12
researchers	40	5	26	70	-10
research assistants	15	36	5	55	7
administration	12	1	0	13	0
<b>total</b>	<b>83</b>	<b>60</b>	<b>42</b>	<b>185</b>	<b>9</b>



In 2009, number of senior and postdoc researchers in HIIT has risen remarkably while the number of other researchers has gone down.

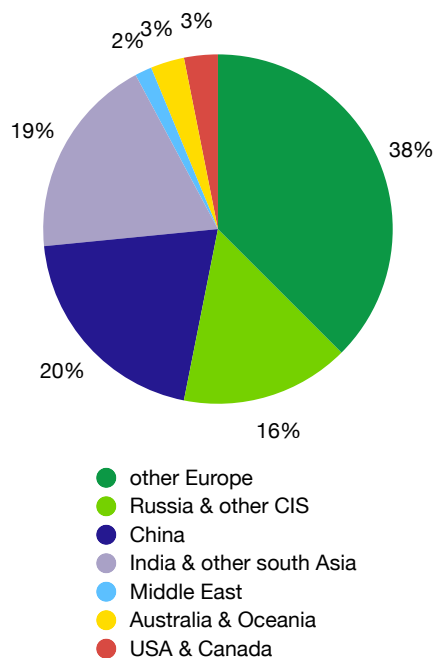
## Origin of staff by sites (Primary citizenship)

Staff (individuals)	Spektri	Kumpula	Otaniemi	total	%
Finland	139	86	46	271	
other Europe	8	8	8	24	7%
Russia & other CIS	8	2	0	10	3%
China	3	6	4	13	4%
India & other South Asia	2	4	6	12	4%
Middle East	0	0	1	1	0%
other Asia	0	0	0	0	0%
Australia & Oceania	1	1	0	2	1%
USA & Canada	2	0	0	2	1%
Central & South America	0	0	0	0	0%
Africa	0	0	0	0	0%
total	163	107	65	335	
Finns out of all	85%	80%	71%	81%	

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The number of non-Finnish staff has gone slightly down compared to the previous year.

Almost all non-Finns come from Europe, former Soviet republics outside of Europe, China, India and India's neighbouring countries. For instance, North Americans are very few despite HIIT's connections to American universities. Compared to 2009, Europeans' share has risen to 1/3 while there are now less researchers from Russia and other former Soviet republics.





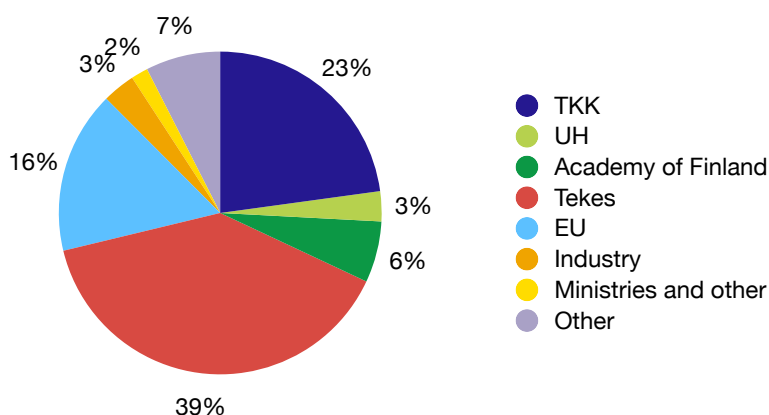


## 5 Funding and costs

### Spektri - Funding sources

Spektri	2006	2007	2008	2009	
<b>Total funding</b>	<b>3 958 172</b>	<b>4 132 540</b>	<b>5 232 367</b>	<b>5 591 965</b>	
TKK funding	263 272	436 837	773 338	1 276 792	23 %
UH funding	168 200	168 200	168 200	168 200	3 %
Academy of Finland	140 698	83 875	178 359	343 300	6 %
National Technology Agency Tekes	1 953 297	1 917 903	2 112 314	2 194 968	39 %
European Union	658 028	852 437	1 051 384	910 838	16 %
Industry	559 943	510 642	306 804	183 766	3 %
Ministries and other public funding	99 727	74 821	147 052	94 820	2 %
Other funding	115 007	87 825	494 917	419 281	7 %

<b>Total expenses</b>	<b>3 809 977</b>	<b>4 014 856</b>	<b>5 073 352</b>	<b>5 333 995</b>	
Salaries	2 511 946	2 538 365	3 496 797	3 616 745	68 %
Other operational expenses	725 940	958 624	1 068 548	957 482	18 %
Rents	407 331	354 006	326 854	426 773	8 %
Service charge to TKK	164 760	163 861	181 154	332 995	6 %

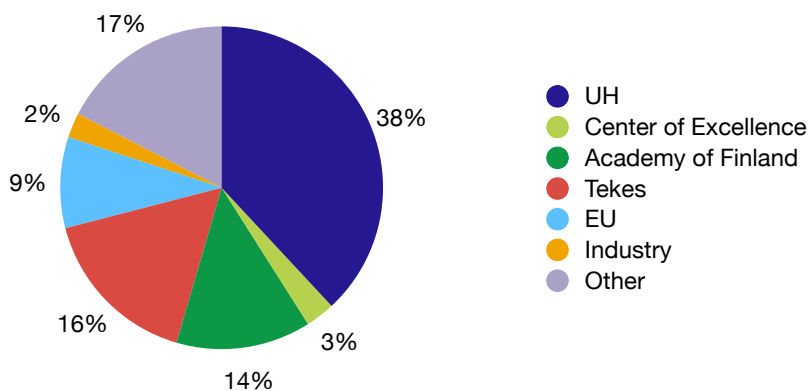


## Kumpula - Funding sources

Kumpula	2006	2007	2008	2009	
<b>Total funding</b>	<b>2 179 499</b>	<b>2 737 000</b>	<b>2 038 431</b>	<b>2 272 824</b>	
UH funding	891 744	877 000	922 400	865 341	38 %
Center of Excellence funding from UH				66 615	3 %
Academy of Finland	490 570	485 000	464 727	306 880	14 %
National Technology Agency Tekes	418 612	665 000	316 811	373 969	16 %
European Union (EU)	274 818	450 000	250 987	207 177	9 %
Industry	103 756	260 000	83 506	56 800	2 %
Other funding				396 042	17 %

<b>Total expenses</b>	<b>1 965 993</b>	<b>2 446 105</b>	<b>2 170 579</b>	<b>2 450 851</b>	
Salaries	1 483 555	1 632 852	1 668 685	1 981 005	81 %
Other operational expenses	242 647	408 628	366 204	261 320	11 %
Service charge to UH (rents included)	239 790	404 625	135 690	208 526	9 %

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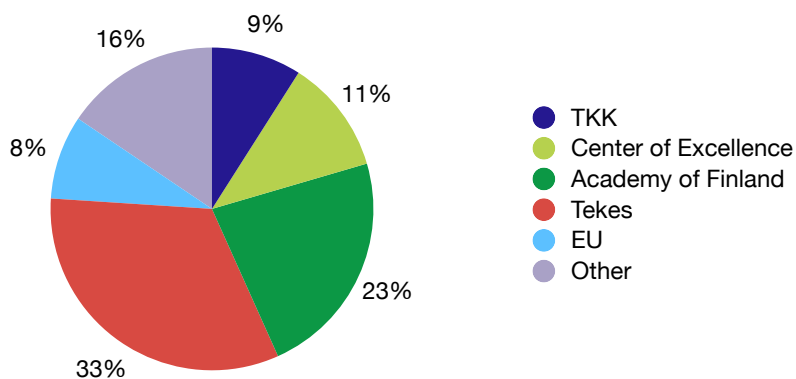




## Otaniemi - Funding sources

Otaniemi	2006	2007	2008	2009	
<b>Total funding</b>	<b>436 790</b>	<b>663 917</b>	<b>1 348 876</b>	<b>1 164 800</b>	
TKK funding	106 386	95 357	104 057	105 000	9 %
Center of Excellence funding from TKK	71 280	71 000	90 000	133 400	11 %
Academy of Finland	218 226	329 400	306 761	265 800	23 %
National Technology Agency Tekes	40 898	168 160	598 048	381 400	33 %
European Union (EU)	0			98 000	8 %
Industry	0		35 074		
Other funding			214 936	181 200	16 %

<b>Total expenses</b>	<b>395 107</b>	<b>581 208</b>	<b>1 328 972</b>	<b>899 300</b>	
Salaries	344 875	479 800	1 008 668	685 100	76 %
Other operational expenses	21 064	25 850	203 608	94 700	11 %
Service charge to UH/TKK (rents included)	29 168	75 558	116 696	119 500	13 %



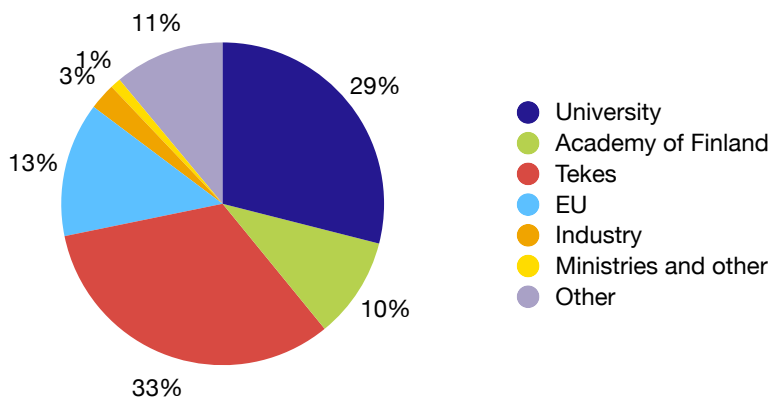
## HIIT - Funding sources

	2006	2007	2008	2009	
<b>Total funding</b>	<b>6 574 462</b>	<b>7 533 457</b>	<b>8 619 674</b>	<b>9 029 589</b>	
University Funding	1 500 882	1 648 394	2 057 995	2 615 348	29 %
Academy of Finland	849 494	898 275	949 847	915 980	10 %
National Technology Agency Tekes	2 412 807	2 751 063	3 027 173	2 950 337	33 %
European Union (EU)	932 846	1 302 437	1 302 371	1 216 015	13 %
Industry	663 699	770 642	425 384	240 566	3 %
Ministries and other public funding	99 727	74 821	147 052	94 820	1 %
Other funding	115 007	87 825	709 853	996 523	11 %

<b>Total expenses</b>	<b>6 171 076</b>	<b>7 042 169</b>	<b>8 572 903</b>	<b>8 684 146</b>	
Salaries	4 340 376	4 651 017	6 174 150	6 282 850	72 %
Other operational expenses	989 651	1 393 102	1 638 359	1 313 502	15 %
Service charge to UH/TKK	433 718	644 044	433 540	635 299	7 %
Rents	407 331	354 006	326 854	452 495	5 %

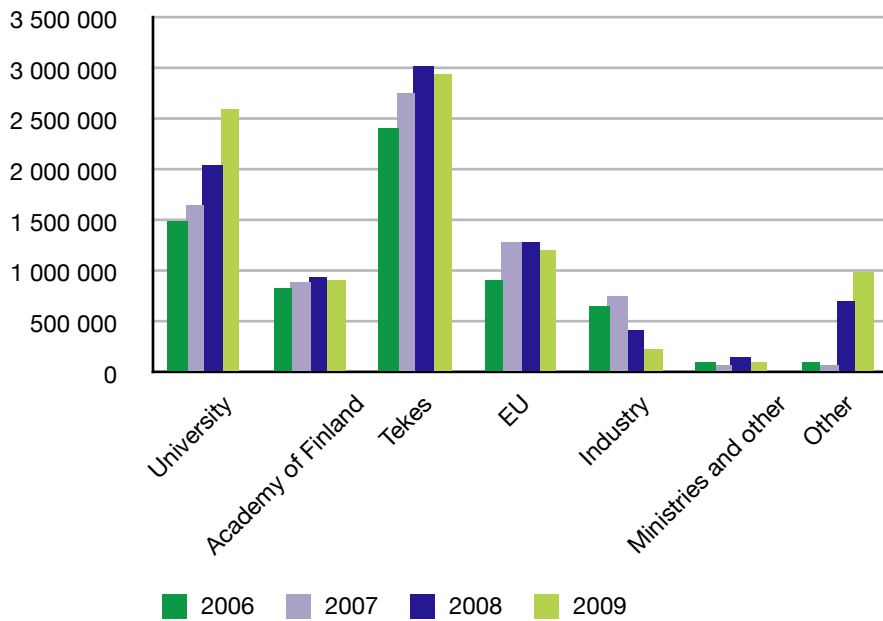
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## Funding sources 2009



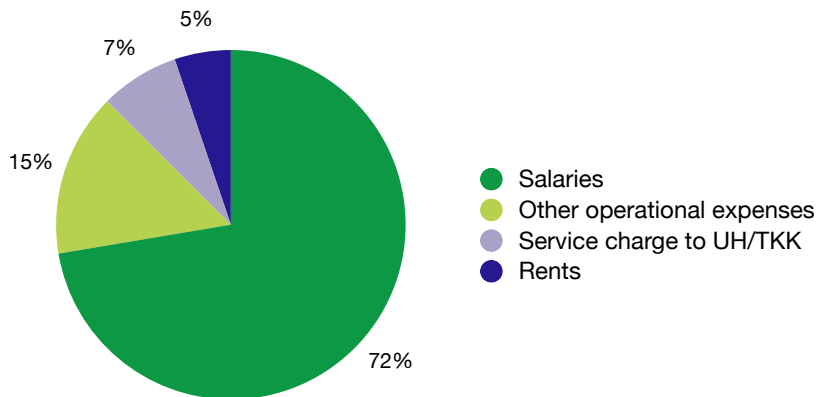


## Funding sources by year



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## Expenses 2009



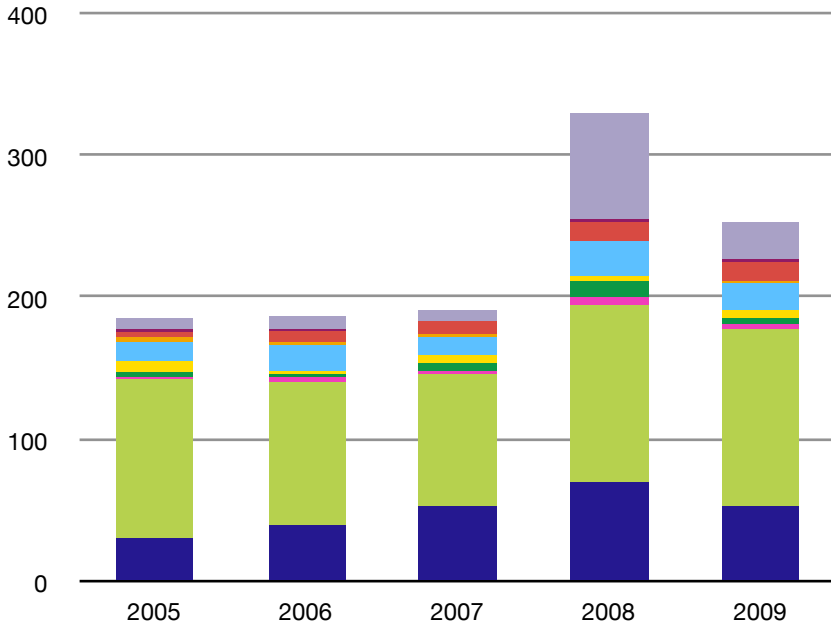
# Appendices

## A - Publications

Publications 2005 - 2009	2005	2006	2007	2008	2009
1. Articles in international scientific journals with referee practice	29	38	50	67	51
2. Articles in international edited works can conference proceedings with referee practice	112	101	94	126	126
3. Articles in Finnish scientific journals with referee practice	1	3	1	5	4
4. Articles in Finnish edited works and conference proceedings with referee practice	3	2	5	11	3
5. Scientific monographs	8	2	6	3	6
6. Other publications	13	18	13	24	18
7. Computer programs and algorithms	3	1	1	0	1
8. Degrees					
8.1 Doctoral dissertations	3	7	9	14	13
8.2 Licenciate theses	1	2	0	1	1
8.3 Master's theses	7	10	8	76	27
<b>Total</b>	<b>180</b>	<b>184</b>	<b>187</b>	<b>327</b>	<b>250</b>

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To see exact details on each publication please visit the publication databases of TKK and the University of Helsinki.



- Master's theses
- Licenciate theses
- Doctoral dissertations
- Computer programs and algorithms
- Other publications
- Scientific monographs
- Finnish edited works and conference proceedings with
- Finnish scientific journals
- International edited works and conference proceedings
- International scientific journals

## 1 Articles in international scientific journals with referee practice

Ajanki, Antti; Hardoon, David R.; Kaski, Samuel; Puolamäki, Kai; Shawe-Taylor, John: Can eyes reveal interest?—Implicit queries from gaze patterns. *User Modeling and User-Adapted Interaction: The Journal of Personalization Research*, 19:307–339, 2009.

Arkin, Esther M.; Bae, Sang Won; Efrat, Alon; Okamoto, Kazuya; Mitchell, Joseph S. B.; Polishchuk, Valentin: Geometric stable roommates. *Information processing letters*. 109 (2009): 4, pp. 219-224.

Arkin, Esther M.; Fekete, Sándor P.; Islam, Kamrul; Meijer, Henk; Mitchell, Joseph S. B.; Nunez-Rodriguez, Yurair; Polishchuk, Valentin; Rappaport, David; Xiao, Henry: Not being (super)thin or solid is hard: a study of grid Hamiltonicity. 42 (2009): 6-7, pp. 582-605.

Benachenhou, Farid; Jern, Patric; Oja, Merja; Sperber, Göran; Blikstad, Vidar; Somervuo, Panu; Kaski, Samuel; Blomberg, Jonas: Evolutionary conservation of orthoretroviral long terminal repeats (LTRs) and ab initio detection of single LTRs in genomic data. *PLoS ONE*, 4(4):e5179, 2009.

Bertsekas, Dimitri P.; Yu, Huizhen: Projected equation methods for approximate solution of large linear systems. *Journal of computational and applied mathematics*. 227 (2009), pp. 27-50.

48 Bingham, Ella; Mannila, Heikki: Complexity control in a mixture model by the Hardy-Weinberg equilibrium. *Computational statistics & data analysis*. 53 (2009): 5, pp. 1711-1719.

Björklund, Andreas; Husfeldt, Thore; Koivisto, Mikko: Set partitioning via inclusion-exclusion. *SIAM J. Comput.* 39 (2009): 2, pp. 546-563.

Brattico, Pauli; Liikkanen, Lassi A.: Rethinking the Cartesian Theory of Linguistic Productivity. *Philosophical Psychology*, 2009. Vol. 22, nro 3, pp. 251–279.



Caldas, José; Gehlenborg, Nils; Faisal, Ali; Brazma, Alvis; Kaski Samuel: Probabilistic retrieval and visualization of biologically relevant microarray experiments. *Bioinformatics*, 25:i145–i153, 2009. (ISMB/ECCB 2009).

Fischer, Johannes; Mäkinen, Veli; Navarro, Gonzalo: Faster entropy-bounded compressed suffix trees. *Theoretical computer science*. 410 (2009), pp. 5354-5364.

Henriksson, Linda; Hyvärinen, Aapo; Vanni, Simo: Representation of cross-frequency spatial phase relationships in human visual cortex. *Journal of neuroscience*. 29 (2009): 45, pp. 14342-14351.

Hietanen, Herkko: Cybercrime: The Transformation of Crime in the Information Age. *International Journal of Emerging Technologies and Society*, 2009. Vol. 7, nro 1.

Hietanen, Herkko: Wikimedia Licensing Policy Change – A Conundrum. *Wipo Magazine*, 2009. Nro 6.

Huopaniemi, Ilkka; Suvitaival, Tommi; Nikkilä, Janne; Orešic, Matej; Kaski, Samuel: Two-way analysis of high-dimensional collinear data. *Data Mining and Knowledge Discovery*, 19:261–276, 2009.

Huttunen, Anniina; Kokkinen, Heikki: Laila, a File Sharing Indulgence Service. *N I R. Nordiskt Immateriellt Raettsskydd*, 2009. Vol. 78, nro 2.

Kaski, Petteri; Östergård, Patric R. J.; Pottonen, Olli; Kiviluoto, Lasse: A catalogue of the Steiner triple systems of order 19. *Bulletin of the Institute of Combinatorics and its Applications*. 57 (2009), pp. 35-41.

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# staff

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Arohi, Anupam	Research Assistant	Kumpula
Aura, Tuomas	Professor	Otaniemi
Avdouevski, Ivan	Researcher	Spektri
Bajaj, Ayush	Research Assistant	Spektri
Bergström-Lehtovirta, Joa	Research Assistant	Spektri
Bhattacharya, Sourav	Research Assistant	Kumpula
Bingham, Ella	Postdoctoral Researcher, Coordinator	Kumpula, Spektri
Björkskog, Christoffer	Researcher	Spektri
Bombino, Sari	Research Assistant	Kumpula
Buntine, Wray	Senior Researcher	Kumpula
Caldas, Jose	Researcher	Otaniemi
Cheng, Lu	Research Assistant	Kumpula
Coutrix, Celine	Researcher	Spektri
Du, Wei	Researcher	Spektri
Dubrovin, Jori	Researcher	Otaniemi
Ekman, Niklas	Project Researcher	Kumpula
Elovaara, Esa	Research Assistant	Kumpula
Entner, Doris	Doctoral Student	Kumpula
Eronen, Jussi	Postdoctoral Researcher	Kumpula
Eronen, Lauri	Doctoral Student	Kumpula
Faisal, Muhammad Ali	Researcher	Otaniemi
Floréen, Patrik	Senior Researcher, Director	Spektri, Kumpula, Otaniemi

Forsblom, Andreas	Research Assistant	Kumpula
Galbrun, Esther	Doctoral Student	Kumpula
Gaur, Sachin	Researcher	Otaniemi
Gillberg, Jussi	Research Assistant	Otaniemi
Gonzales Urquieta, Andrea	Project Secretary	Spektri
Gurtov, Andrei	Principal Researcher	Spektri
Gutmann, Michael	Postdoctoral Researcher	Kumpula
Haiminen, Niina	Researcher	Kumpula
Hamari, Juho	Research Assistant	Spektri
Hanhijärvi, Sami	Researcher	Otaniemi, Spektri
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Hasu, Tero	Researcher	Spektri
Hegedus, Jozsef	Researcher	Otaniemi
Heikkilä, Juho	Researcher	Spektri
Heikkinen, Jani	Researcher	Otaniemi
Helin, Matti	Research Assistant	Spektri
Hemminki, Jaakko	Research Assistant	Kumpula
Hietanen, Herkko	Researcher	Spektri
Himanen, Jari	Principal Researcher	Spektri
Hintsanen, Petteri	Doctoral Student	Kumpula
Hollmén, Jaakko	Principal Researcher	Otaniemi
Hoyer, Patrik	Postdoctoral Researcher	Kumpula
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Jacucci, Giulio	Professor	Spektri
Janhunen, Tomi	Teaching Researcher	Otaniemi
Jin, Zhihua	Researcher	Otaniemi
Johansson, Sofia	Research Assistant	Spektri
Johnson, Fredrik	Researcher	Spektri
Junttila, Esa	Doctoral Student	Kumpula
Junttila, Tommi	Researcher	Otaniemi
Juntunen, Antero	Researcher	Otaniemi
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