

Matti Sakari Latva-aho

born 25.01.1968, Kuivaniemi, Finland



Education

Executive MBA (hons.)	University of Oulu, 2005
Doctor of Technology (hons.)	University of Oulu, 1998
Licentiate of Technology	University of Oulu, 1996
Diploma engineer	University of Oulu, 1992

Work History

- Research Unit Leader for CWC – Radio Technologies, 1.1.2016- .
- Head of Department of Communications Engineering, University of Oulu, 1.8.2011 – 31.8.2014.
- Head of Telecommunication Laboratory, University of Oulu, 1.2.2010-31.7.2011.
- Adjunct Professor at Rice University, Houston, TX, USA, since 2007.
- Director of the Centre for Wireless Communications (CWC) at the University of Oulu 1.11.1998-31.7.2006.
- Research Director of Broadband Wireless Access research area at CWC since 1.1.2005.
- Permanent Professor of Digital Transmission Techniques at the University of Oulu since 1.1.2000.
- Project manager and Research Scientist in several projects at Telecommunication Laboratory and CWC since 1.10.1993.
- Research engineer at Nokia Mobile Phones, Oulu, 1.2.1992 – 30.9.1993.
- Technician at Nokia Telecommunications, Oulu, 15.3.1990 – 30.8.1991.

Most important scientific positions of trust and administration

- Member of Finnish Academy of Technology since 2011.
- National Coordinator for SAVI – WIFIUS Institute (Science Across Virtual Institutes – Wireless Innovation between Finland and USA); a NSF funded research programme since 2011.
- Finland representative in International Federation for Information Processing (IFIP) TC6, 2008-2011.
- Chairman of Board for Center of Internet Excellence at the University of Oulu (www.cie.fi).
- Director for CWC International Doctoral Study Programme since the beginning of 2007.
- Member of the Science Council at the University of Oulu 2006- 2009.
- Member of Nokia Foundation Board 2000-2003.
- Member of TEKES technology programmes (NETS, GIGA) steering boards 2001 – 2010.
- Member of Expert Group for the EU Technology Platform eMobility/Net!Works/NetWorld2020 2005-.
- Chairman and vice-chairman of IEEE Communications Finland Chapter 2000 - 2003.

Awards

- 2015 Nokia Foundation Award; “Due to contributions in advancing radio technology and its application to wireless standards as well as leadership role in Finnish radio technology research and development.”
- Best paper of the year in the area of wireless communications (Mountbatten Premium) in 2003 award from the Institute for Electrical Engineering (IEE).
- Badge of honour: best eMBA graduate at the class of 2005 in the University of Oulu.
- Electrical Engineering Foundation (EIS) Award for the development of CDMA Techniques in Finland in 2000.
- Best doctoral thesis prize of technical sciences in Finland in 1998 awarded by Academic Engineers and Architects in Finland (TEK).
- In total ten scholarships granted in 1995-98 from various Finnish foundations for doctoral thesis studies and research.

Supervised Doctoral Theses (within own research group only)

- Djordje Tujkovic, Space-Time Turbo Coded Modulation for Wireless Communication Systems, University of Oulu 2003.
- Kari Hooli, Equalization in WCDMA Terminals, University of Oulu 2003, accepted with honours.
- Marian Codreanu, Multidimensional Adaptive Radio Links for Broadband Communications, University of Oulu 2007, accepted with honours. The thesis was chosen as the best PhD thesis in technical sciences in Finland.

- Attaphongse Taparugssanagorn, Evaluation of MIMO Radio Channel Characteristics from TDM-Switched MIMO Channel Sounding, University of Oulu 2007.
- Lucian Stoica, Non-Coherent Energy Detection Transceivers for Ultra Wideband Impulse Radio Systems, University of Oulu 2008.
- Alberto Rabbachin, Low Complexity UWB Receivers with Ranging Capabilities, University of Oulu 2008.
- Kaveh Ghaboosi, Intelligent Medium Access Control for the Future Wireless Networks, University of Oulu 2009, accepted with honours.
- Mehdi Bennis, Spectrum Sharing for Future Mobile Cellular Systems, University of Oulu 2009.
- Zaheer Khan, Coordination and Adaptation Techniques for Efficient Resource Utilization in Cognitive Radio Networks, November 2011.
- Leonardo Goratti, Design, Analysis and Simulations of Medium Access Control Protocols for High and Low Data Rate Applications, December 2011.
- Chathuranga Weeraddana, Optimization Techniques for Radio Resource Management in Wireless Communication Networks, December 2011.
- Francesco Pantisano, Cooperative Interference and Radio Resource Management in Self-Organizing Small Cell Networks, June 2013.
- Pedro Nardelli, Analysis of the Spatial Throughput in Interference Networks, August 2013.
- Carlos Lima, Opportunistic Resource and Network Management in Autonomous Packet Access Systems, August 2013.
- Ulrico Celentano, Dependable Cognitive Wireless Networking : Modelling and Design, June 2014.
- Laddu Keeth Saliya Jayasinghe, Analysis on MIMO Relaying Scenarios in Wireless Communication Systems, February 2015, accepted with honours.
- Hirley Alves, On the Performance Analysis of Full-Duplex Networks, March 2015.
- Harri Pennanen, Coordinated Beamforming in Cellular and Cognitive Radio Networks, September 2015, accepted with honours.
- Qiang Xue, Analysis of Near-Optimal Relaying Schemes for Wireless Tandem and Multicast Relay Networks, January 2016.
- Nuwan Suresh Ferdinand, Low Complexity Lattice Codes for Communication Networks, January 2016.
- Vu Thuy Dan Nguyen, Transmission Strategies for Full-duplex Multiuser MIMO Communications Systems, March 2016.

Scientific expert positions

Conferences

- General Chair for EUCNC'17, June 2017, Oulu, Finland. (Event sponsored by European Commission with a research grant of ~180k€. Expected number of participants 400-500.)
- General Chair for 5G for Ubiquitous Connectivity, November 2014, Kittilä, Finland (about 150 participants).
- General Chair for CROWNCOM 2014, June 2014, Oulu, Finland (about 250 participants).
- Technical Program Committee Co-Chair for GLOBECOM 2011 Wireless Communications Symposium, Houston, TX, USA, 2011.
- General Chair for The Nordic Workshop on System & Network Optimization for Wireless (SNOW) in 2010, 2013 and 2015 (about 50 participants).
- Technical Program Committee Co-Chair for WPMC 2009, Sendai, Japan.
- General Chair for WPMC 2008, Saariselkä, Finland, September 2008 (about 400 participants).
- Technical Program Committee Co-Chair for CHINACOM conference 2007, Shanghai, China, August 2007.
- Technical Program Committee Chair for PIMRC 2006 conference held in Helsinki September 2006 (about 800 participants).
- TPC Chair for several (half a dozen) thematic workshops on various topics.

Journals

- Member of editorial board for Wireless Personal Communications, Springer.
- Regular reviewer for major IEEE journals.

Professor positions review

- Virginia Polytechnic Institute and State University, VA, USA (2008); University of Chalmers, Gothenburg Sweden (2010); University of Surrey, Guildford, UK (2008).

PhD thesis external reviewer/examiner

- Total 11 in Finland, U.K., Italy, Netherlands, Thailand, Sweden.

Most important foreign visits

- Organiser and host for several long-term visits of senior researchers to CWC from various countries: USA (Abouzeid, Aazhang, Ephremides, Pahlavan, MacKenzie, DaSilva), Japan (Kohno, Matsumoto), China (Li, Shi), Australia (Oppermann), India (Dixit), Switzerland (Dahlhaus).
- ETH Zurich 6-7/1996.
- Several short (max. 2 weeks) visits to Rice University, Houston TX., USA (host Prof. Aazhang) and University of Maryland, MD, USA (host Prof. Ephremides).
- Distinguished visitor grant obtained from The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia, for max. 6 months visit.
- Visiting professor at UNICAMP, Campinas, Brazil, as a part of Science without Borders Programme 11/2012 – 12/2015 (1 – 3 months per year).

Most significant recent research projects

- Co-Principal Investigator in Academy of Finland Strategic Research Council project: Cloud computing as an enabler of large scale variable distributed energy solutions: Bright Clouds – Dark Clouds (BC – DC), 1.10.2015 – 30.9.2020, total volume 7.1M€, CWC share 1.2 M€.
- Principal investigator at CWC for four EU FP7 Integrated projects:
 - QoS MOS (Quality of service and mobility driven cognitive radio systems), 1.1.2010 – 31.12.2012, total volume 15.3M€, CWC share 930k€.
 - BeFEMTO (Broadband evolved femto networks), 1.1.2010 – 30.6.2012, total volume 11.8M€, CWC share 773k€.
 - EARTH (Energy aware radio and network technologies), 1.1.2010 – 31.12.2012, total volume 16.4M€, CWC share 841k€.
 - METIS (Mobile and wireless communications Enablers for the Twenty-twenty Information Society), 1.10.2012 – 20.4.2015), total volume 15.9M€, CWC share 700k€.
- Principal investigator at CWC for EUREKA/CELTIC-PLUS project SHARING (Self-organized Heterogeneous Advanced Radio Networks Generation), 1.1.2013 – 28.2.2016, total volume 21M€, CWC share 678k€.
- Principal Investigator for several national TEKES projects:
 - 5Gto10G (5G radio access solutions to 10 GHz and beyond frequency bands), 1.1.2015-31.12.2016, 1,68 M€.
 - 5GTN (5G Test Network), 1.1.2015-31.12.2016, 800 k€.
 - JOINTMACS (Joint network and market design for content and spectrum sharing in future 5G networks), 1.1.2015-31.12.2016, 355 k€.
 - 5G-NDP (5G Networks and Device Positioning), 1.1.2015-31.12.2016, 96 k€.
 - CRUCIAL (Solutions for capacity crunch in wireless access with flexible architectures), 1.1.2013-31.12.2013, total budget 480 k€.
 - LOCON (Local connectivity and cross-layer design for future broadband mobile systems), 1.1.2010 – 30.4.2013, total budget 2.548 M€.
 - CORE (Cognitive radio trial environment), 1.1.2011 – 31.12.2012, total budget 870k€.
- Principal Investigator for Academy of Finland and Tekes joint programme FiDiPro:
 - FLECOS (Flexible Wireless Communication Systems), 1.1.2007 – 31.12.2013, total budget 1.14M€. Invited researcher: prof. Behaam Aazhang, Rice University, Houston, TX.
 - MOSSAF (Multi-Operator Spectrum Sharing for Future 5G Networks), 1.1.2014-31.12.2018, 1.5 M€. Invited researchers, prof. Alhussein Abouzeid, Renslair Polytechnic Institute, Troy, NY.
- Principal Investigator for Academy of Finland, Joint optimization of full duplex links and dense networks (Juliet), 1.1.2013 – 31.12.2016, total budget 500k€.
- Principal Investigator for Academy of Finland, Joint Adaptation of Multiple Cognitive Systems without Explicit Coordination (JAMCogSys), 1.1.2013 – 31.12.2014, total budget 281k€.
- Principal Investigator for Academy of Finland and CNPq Brazil joint programme, A Theory for Sustainable Smart Grids: Combining Communication Theory, Power Systems, Signal Processing and Economics from a Complexity Science Perspective, 1.1.2013 – 31.12.2016, total budget 347 k€.
- Principal Investigator for Academy of Finland and National Science Foundation China research programme on 5G Networks, Software Defined Hyper Cellular Architecture for Green and Smart Service Provisioning in 5G Networks, 01.02.2015 - 31.12.2017, total budget 100k€.

Merits and Impact of Research

Dr Latva-aho has provided active leadership in broadband communications research for almost 20 years. He has managed to combine widely cited research and academic credentials with the development of highly relevant practical systems that have led to global mobile phone standards. His pioneering work in multiuser CDMA for mobile radio systems and the development of a large and well-known research group in the Oulu region have had a significant impact on the development of the global 3G and 4G standards.

Dr Latva-aho finalized his PhD thesis in the European FRAMES project in 1995–1998. The project resulted in the 3G standard based on WCDMA technology. His doctoral thesis, titled “Advanced receivers for wideband CDMA systems”, was selected as the best doctoral thesis in all technical sciences in Finland in 1998. Dr Latva-aho became the director of the Centre for Wireless Communications (CWC) in Oulu, Finland, at the age of just 31 in 1998. He served as the director of the CWC in two different periods until the end of 2006. As the CWC director, he grew the centre from a 20-person organization to almost 100 and made it truly international and well known. The growth of the centre took place at the same time as the local mobile phone industry was growing rapidly in Oulu and Finland. Thus, the CWC had a major role in providing sufficient in-depth technical competence to foster the growth of Finnish industry towards the 3G mobile products business. Competing for human resources against the major manufacturers and being successful in growing the volume and output of the research centre is evidence in itself of his success as a technical leader.

In his research, Dr Latva-aho has effectively combined theoretical and experimental research. His most-cited research work deals with practical multiuser receivers for both terminal and basestation receivers, as well as the development of analysis for them in mobile radio channels. His experimental research started when working on wideband CDMA demonstrator development at Nokia in the early 1990s, then continued with the specification and usage of a software defined radio platform developed by Elektrobit Ltd. The platform was later used to demonstrate some key technical innovations developed in the European WINNER project, in which Dr Latva-aho was the PI at the CWC. The WINNER projects resulted in about 100 standard contributions to IMT-A, and was one of the official ITU evaluators behind the candidate technology evaluations. His research group also participated actively in the IMT-A channel measurements and modelling work for the ITU standards process. The last phase of the project, called WINNER+, has received awards from European Celtic twice: the Celtic Gold Award 2011 for the best project and the Celtic Impact Award 2012. Dr Latva-aho’s group was the biggest university group in the project, and they had a significant impact on the success of the project. More recently, his research group has been focusing on the development of cognitive radio demonstrations using real-time HW platforms, remarkably winning the ACM Mobicom demo contest twice, in 2009 and 2010. He has also participated in four large European Commission FP7 projects (Befemto, Qosmos, Earth and Metis) with a combined funding volume of €55 million. Since 1998, Dr Latva-aho has acquired more than €20 million in funding for his research group as the PI. Research has been funded by various national and European sources, as well as industry.

Dr Latva-aho became a permanent professor of digital transmission techniques at the University of Oulu in January 2000, being the youngest-ever nominated permanent professor in the field in Finland. The activeness and results of his research group led to the establishment of the Department of Communication Engineering at the University of Oulu in August 2011, which he led until August 2014. He has made substantial contributions as an educator at the University of Oulu, supervising 20 doctoral theses so far, with one of those being chosen as the best doctoral thesis in engineering sciences in Finland in 2007. Some 25% of all his supervised theses have been accepted with honours (i.e., within the top 5% in the field), showing the high research standards in his group.

The University of Oulu is leading a new Strategic Research Council–Academy of Finland project on distributed energy production and related wireless network-enabled cloud computing project called “Cloud computing as an enabler of large-scale variable distributed energy solutions: Bright Clouds – Dark Clouds” (the project lasts until September 2020). The applicant is the co-PI responsible for studying communication solutions in the project for smart grid applications. International co-operation with several research groups in the USA is realized through WiFiUS – Wireless Innovation between Finland and US – a virtual institute launched by the National Science Foundation (NSF) with the Academy of Finland and Tekes. Dr Latva-aho is the national co-ordinator for WiFiUS activity in Finland. Dr Latva-aho collaborates with Chinese institutes via the Academy of Finland and the National Natural Science Foundation China in a joint 5G Networks research programme through one joint project until December 2017. Prof. Latva-aho also has a visiting researcher position at the University of Campinas, Brazil through the Science without Borders programme until December 2016. Co-operation within Europe is mainly carried out via European co-operation projects through the H2020 and Celtic-Plus programmes, as well as different European research for a such as the EU Technology Platform Network2020 Expert Group, where he has been an active contributor to white papers that have been crucial in forming European Commission research agenda for the wireless domain.

Latva-aho has published over 300 papers (contributing to ten books, authoring 100 journals, and over 200 conference papers) focusing on the physical layer for mobile communications, addressing network performance, signal design, channel modelling and receiver algorithm design. His work has had a significant impact, being widely cited: currently his publications’ citation **h-index is 32**, and his work has been cited over 4,000 times in total (Google Scholar). He also holds several patents. His work received recognition with a prestigious Nokia Foundation Grant in November 2015 for his contributions to advancing radio technology and its application to wireless standards as well as his leadership role in Finnish radio technology research and development.