

CURRICULUM VITAE

1 Name and year of birth

Markku Leskelä (b. 1950)

2 Degrees, dates and places

MSc 1974, Lic.Techn. 1976, D. Techn. 1980 all in Helsinki University of Technology

3 Adjunct professorships

Helsinki University of Technology 1982, University of Turku 1991, Inorganic chemistry

4 Present employment relationship

Professor of Inorganic Chemistry (Epäorgaanisen kemian professori), University of Helsinki, 1990 –

5 Previous employment relationships

Teaching assistant Helsinki University of Technology (1973-1979)

Acting associate professor University of Oulu (1979-1981)

Acting professor Helsinki University of Technology (1981-1982)

Associate professor University of Oulu (1982-1986)

Professor University of Turku (1986-1990)

Academy professor 2004-2009

6 Scientific achievements

Publications

Papers in international peer reviewed journals: 695; Review articles: 65; Books/edited books: 17;

Papers in conference proceedings books: 99; Abstracts of conference presentations: 670

Patents/patent applications: 53

Number of citations 24 500, h-index 71 (ISI Web of Science)

Invited lectures in major international conferences 2001-

65th American Vacuum Society International Symposium, Long Beach, USA 2018

2nd Symposium on Organic and Inorganic Chemistry South Africa, Gaborone, Botswana 2018

27th Materials for Advanced Metallization Conference MAM 2018, Milano, Italy 2018

E-MRS Fall Meeting Warsaw Poland 2017

NanoEnergy 2017, Espoo Finland 2017

HERALD workshop, Riga, Latvia 2017

THERMEC 2016, International Conference on Processing & Manufacturing of Advanced Materials, Graz, Austria 2016,

EU-ASEAN Symposium and Workshop on Photocatalysis, Johor Malaysia 2015

IMEC Symposium on Beyond CMOS, Leuven Belgium 2015

13th Baltic Conference on ALD, Tartu Estonia 2015

ALD 2015 AVS Topical Conference, Portland USA 2015

2nd International Conference on ALD Applications, Shanghai China 2014

11th European Symposium on Thermal Analysis and Calorimetry, Espoo Finland 2014

CELINA COST-action symposium, Erlangen Germany 2014

German MRS Symposium, Cologne Germany 2014
ASEAN-EU Science Technology and Innovation Days, Bangkok Thailand 2014
246th American Chemical Society Meeting, Indianapolis USA 2013
96th Canadian Chemistry Congress, Quebec City Canada, 2013
Nano Sciences & Technologies 2012, Qingdao China, 2012
2nd Chinese ALD Conference, Shanghai, China 2012
Zing Solid State Conference, Canary Island, Spain, 2012
34th International Conference on Ceramic Materials, Daytona Beach USA 2012
Belgian Symposium on ALD, Leuven Belgium, 2011
4th International Symposium on Smart Materials, Agadir Morocco 2011
43rd IUPAC Congress, Symposium Challenges for Materials Chemistry in the 21st Century, Puerto Rico 2011
11th Eurasia Chemistry Congress, Amman Jordan, 2010
11th Conference on the Chemistry of Selenium and Tellurium, Oulu, 2010
56th AVS Meeting, San Jose, USA, 2009
216th ECS Meeting, Vienna, Austria, 2009
3rd International Workshop on Physics and Technology of Thin Films, Espoo, Finland, 2009
ALD 2009, AVS Topical Conference, Monterey, USA, 2009
E-MRS Meeting, Strasbourg, France, 2009
Nanotech 2008 Conference, Suzhou, China, 2008
Russian ALD Conference, Moscow, Russia, 2008
234th ACS National Meeting, Boston USA, 2007
MRS Spring Meeting, San Francisco USA, 2007
E-MRS Spring Meeting, Nice France, 2006
ALD 2006, AVS Topical Conference, Seoul Korea, 2006
EUROCVD-15, Bochum, Germany, 2005
24th Rare Earth Research Conference, Keystone, USA, 2005
Japan-Finnish Symposium on Nanotechnology, Tokyo, Japan, 2005
11th International Workshop on Oxide Electronics, Hakone, Japan, Oct. 2004
Royal Society of Chemistry Conference: From Molecules to Materials, London, UK Sept. 2004
1st International NanoElectronics materials Conference, Grenoble, France, March 2004
204th Electrochemical Society Meeting, Orlando, USA, Oct. 2003
E-MRS Fall Meeting, Warsaw, Poland, Sept. 2003
ALD 2003, AVS Topical Conference, San Jose, USA, Aug. 2003
14th International CVD Conference; 203rd Electrochemical Society Meeting, Paris, France, May 2003
Japan-Finnish Nanochemistry Symposium, Kyoto, Japan, March 2003
5th Baltic ALD Symposium, Tartu, Estonia, Oct. 2002
23rd Rare Earth Research Conference, Davis, USA, July 2002
4th International Conference on Materials for Microelectronics, Espoo, Finland, June 2002
48th American Vacuum Society Meeting, San Francisco, USA, Oct. 2001
2nd Asian Conference on CVD, Kwangju, Korea, May 2001
17th Nordic Structural Chemistry Meeting, Aarhus, Denmark, Jan. 2001

Participation in program and organizing committees of conferences 2004-

Helsinki Chemicals Forum 2009-2018

American Vacuum Society, Topical Conferences on Atomic Layer Deposition:

Incheon Korea 2018, Denver 2017, Dublin 2016, Portland 2015, Kyoto 2014, San Diego 2013,
Dresden 2012, Seoul Korea 2010, Monterey 2009, Bruges Belgium 2008, San Diego USA 2007, Seoul
Korea 2006, San Jose USA 2005, Helsinki Finland 2004

11th Eurasia Chemistry Congress, Amman Jordan, 2010

International Workshop on Electroluminescence:

15th St.Petersburg, Russia 2010, 14th Rome Italy 2008, 13th Jeju Island Korea 2006

Mikkeli International Coating Symposium MIICS, 2008, 2010
International Conference on Luminescence: Lyon France 2008
3rd International Workshop on Physics and Technology of Thin Films, Espoo, Finland, 2009
E-MRS Spring Meeting, Lille France 2014
Nanotechnology in Northern Europe, Helsinki Finland 2007, 2006, 2005
Nanotech Europe 2009, Berlin 2009
Baltic Conference on ALD:
 Linköping 2017, St. Petersburg 2016, Tartu 2015, Helsinki 2014 (chairman), Hamburg 2010, Uppsala 2009, Oslo 2006
Nordic Symposium on Catalysis, Maarianhamina, Finland 2012
28th International Conference on Defects in Semiconductors, ICDS-2015, Espoo 2015
COST action HERALD workshops Helsinki 2016 (chairman), Barcelona 2016

7 Scientific expert task

Expert tasks in academic qualifications

Referee for 29 professor positions:

Aalto University 3 times, University of Oulu 3 times Lappeenranta University of Technology 2 times, Tampere University of Technology, University of Uppsala 2 times, Luleå University of Technology, University of Oslo 2 times, Tallinn University of Technology (2 times), Delft University of Technology, Eindhoven University of Technology, University of Gent, University of Oxford, EFPL Lausanne, McMaster University, University of Florida, Florida State University, Universiti Sains Malaysia, King Abdulaziz University Saudi-Arabia (2 times), Yarmouk University Jordania, Sharjah University, UAE

Referee for 14 docent positions in Finland

Reviewer for 37 doctoral theses

Official opponent in 21 doctoral dissertations in Finland and 13 times abroad (Linköping, Oslo (2), Tallinn (2), Utrecht, Delft, Ghent (2), Eindhoven (2), Lausanne, Cologne)

Research proposal evaluations

Slovenian Research Council 2007-2018, National Centre of Science and Technology Evaluation, Kazakhstan 2017, Portuguese Foundation for Science and Technology 2017, Swedish Foundation for Strategic Research 2015-16, Research Council of Estonia 2013, 2014, 2015-2107, MISTRA Swedish Foundation for Strategic Environmental Research 2013, Research Councils of Austria, Belgium and Estonia 2011, Spanish Research Council 2007, Norwegian Research Council 2005-2008, The Technology Foundation STW, Netherlands, 2007-2009, Department of Energy, USA, 2005 -, International Foundation for Science 2005, Agency for Science, Technology & Research, Singapore, 2003, Swedish Research Council 1998-, National Science Foundation, USA, 1997 -.

Memberships in editorial boards

Acta Chemica Scandinavica 1989 – 1999; Displays and Imaging International Edition 1997 – 2003; Critical Reviews in Solid State Science 2004 -; Research Letters in Materials Science 2007 – 2009, Jordan Journal of Chemistry 2009 -, Advances in Materials Science and Engineering 2009 - 2015, Materials Science in Semiconductor Processing 2013-

8 Supervised doctoral theses

Markku Tammenmaa 1988, Teppo Lindgren 1989, Mikko Ritala 1994, Leena Matilainen 1995, Markku Sundberg 1995, Mikko Koskinen 1996, Risto Saikkonen 1996, Seppo Lindroos 1997, Mika Polamo 1997, Timo Repo 1997, Mika Valkonen 1998, Riitta Juvonen 1999, Timo Laine 1999, Jaana Valo 1999, Wei-Min Li 2000, Kari Mäkelä 2000, Heini Saloniemi 2000, Marika Juppo 2001, Tapio Kanninen 2001, Sari Paavola 2002, Antti Rahtu 2002, Marianna Kemell 2003, Nora Mäkelä-Vaarne 2003, Terhi Nissinen 2004, Mika Kettunen 2004, Raija Matero 2004, Kaisa Kervinen 2005, Petro Lahtinen 2005, Titta Aaltonen 2005, Kristian Lappalainen 2005, Pascal Castro 2005, Petra Alen 2005, Heikki Korpi 2005, Kirill Axenov 2005, Anna Moisala 2006, Antti Niskanen 2006, Jaakko Niinistö 2006, Katariina Yliheikkilä 2006, Erkki Aitola 2006, Antti Pärssinen 2006, Minna Räisänen 2007, Markku Talja 2007, Marko Vehkamäki 2007, Helena Hyvönen 2008, Kai-Erik Elers 2008, Pertti Elo 2009, Harri Kiiski 2009, Vasilij Kozlov 2010, Viljami Pore 2010, Victor Sumerin 2011, Jahir Ahmad 2012, Jani Hämäläinen 2013, Timothee Blanquart 2013, Kostiantyn Chernichenko 2013, Maija Hakola 2013, Yoann Tomczak 2014, Ahlam Sibaouih 2015, Afnan Al-Hunaiti 2015, Markus Lindqvist 2015, Sari Rautiainen 2016; Tiina Sarnet 2016, Miia Mäntymäki 2017, Antti Kestilä 2017, Maarit Mäkelä 2018, Zhongmei Han 2018

9 Scientific acknowledgements

Member of Finnish Academy of Science and Letters 1991-

Member of Finnish Academy of Technical Sciences 1996-

Member of Finnish Society of Sciences and Letters 2005-SVRI 2005

Magnus Ehrmrooth Foundation Award in Chemistry 2002

ISI Highly cited scientist (materials science) 2004

A.I Virtanen award 2011

American Vacuum Society ALD award 2012

Honorary award of Finnish Academy of Sciences and Letters 2014

Honorary member of Finnish Chemical Society 2014

Honorary doctor, University of Tartu 2016

Member of EU Academy of Sciences 2018

10 Scientific positions in trust 1990-

Domestic:

Finnish Chemical Society:

- member of the board 1991 - 2011 (vice chairman 93-94, chairman 95-96)

- chairman of the Nord-Finland chapter 1985; chairman of the Southwest Finland chapter 1990

Association of Finnish Chemical Societies:

- member of the board 1994 - 2012 (vice chairman 97 -98)

Finnish Chemical Congress:

- program chairman of the Chemical Congress 1997-1999, symposium chairman 2009-2017

Finnish Academy of Science and Letters:

- chemistry chapter: secretary 1994 – 2003; chairman 2004 – 2008

- chairman of the member selection committee 2018-2020

Finnish Society of Sciences and Letters:

-chairman of the chapter for physical sciences and mathematics 2015-2019

Scientific Council of Chemical Industry Federation in Finland 1994 – 2000, 2005-2010

- Technology strategy of Chemical Industry in Finland (1996 co-author)

- Education strategy of Chemical Industry in Finland (1999 co-author)

Federation of Finnish Learned Societies

- member of the board 1994 -99; 2008-2016

Council of Finnish Academies 2008 – 2010, 2014-2017

University of Helsinki

Member of the Council of the Faculty of Science, 1990-94
Member of the education council at University of Helsinki 1995-1997
Member of the scientific council 2004-2007
Member in committee for research funding 2004-2007
Member of Board of University of Helsinki (2010-2017)

Finnish Science Centre Heureka

Member of the board (2016-2017)
Member of the council (2018-2019)

International:

Nordic Society for Thermal Analysis:

- member of the board 1982 -2000

International Confederation for Thermal Analysis and Calorimetry:

- member of the council 1985-92

International Union of Pure and Applied Chemistry:

- Division II (Inorganic Chemistry):

- titular member 2006-2009, 2012-2015, associate member 2010-2011

- secretary of the Division 2012-2019

Nordic Research Academy (NorFA)

- member of the scientific board for Science 1997- 2001

11 Board member in foundations

Orion-Farmos Research Foundation 1992 – 2011

Foundation for Chemical Congress 1996 – (chairman 2013-)

Gust Komppa Fund (A. Kordelin Foundation) 2002 - (chairman 2002 –)

Outokumpu Foundation 2003-2010

Alfred Kordelin Foundation 2009-2017

Magnus Ehrnrooth Foundation 2009 – 2016

Fortum Foundation 2017-2018

12 Visits abroad

University of Utrecht 1983, post doctoral researcher

University of Florida 1987-1988, visiting professor

University of Paris VI (P& M Curie University) Spring 1999, visiting professor

13 Research Funding 1994 –

European Research Training Network of Functional Hybrid Coatings by Molecular Layer Deposition (EU, 2017-2021) 538 000€

Finnish Centre of Excellence in Atomic Layer Deposition (University of Helsinki, 2018-2019) 310 000 €

New olefin polymerization catalysts (Reliance Ltd 2017-2018) 177 00 €

Finnish Centre of Excellence in Atomic Layer Deposition (Academy of Finland, 2015-2017) 2 640 000€

Building-up Centre of Excellence for advanced materials application (CEMEA), (EU Teaming project, 2015-16) 130 000 €

Development of ALD processes for microelectronic applications (ASM Microchemistry, 2014-2018) 1 300 000 €

ALD of silicon nitride, Finnish-Korean collaboration (Academy of Finland 2013-2014) 125 000 €

4th Generation Photocatalysts (EU 2013-2015) 500 000 €

Finnish Centre of Excellence in Atomic Layer Deposition (Academy of Finland, 2012-2014) 2 640 000€

TlBr film radiation detector (ESA 2011-2013) 50 000€

New inorganic-organic nanocomposite materials for nanobiotechnological applications (Academy of Finland, 2010-2013) 401 000€

Development of LED based photocatalytic water purification (Tekes 2009-2012) 228 000€

NanoComp ALD (Marie Curie fellow, EU 2010-2012) 185 000€

European Research Training Network of New Materials: Innovative Concepts for their Fabrication, Integration and Characterisation (EU, 2009-2013) 568 000€

New materials for photovoltaics (OmniPV, 2008-2010) 140 000 €

Development of new ALD processes (ASM Microchemistry 2009-2013) 1 240 000 €

Hydrolysis technologies for production of sugars from biomass (Tekes, 2008-2010) 100 000 €

Catalytic decomposition of wood (Academy of Finland, 2008-2011) 366 000€

New pre-treatment techniques for bio-mass (Tekes, 2008) 92 000€

MEDEA + project MaxCaps (EU 2008-2011)

From wood to prosperity using gold: selective synthesis of fine chemicals by tailored supported gold nanoparticles (Academy of Finland, 2007-2010) 125 000 €

Improvement of optical properties of paper by increasing refractive indices of materials (Tekes, J.M. Huber, Omya, UPM-Kymmene, M-Real, 2006-2008) 100 000 €

Characterization of TlBr single crystals (Baltic Scientific Instruments, Oxford Instruments Analytical Oy 2007-2008) 40 000 €

Nanodevices using functionality in ferroelectrics FERNAND (Academy of Finland, 2007-2010) 210 000 €

Functional nanoparticles and -devices FUNANO (Academy of Finland, 2007-2010) 137 000 €

Development of ALD of noble metal films for microelectronics and X-ray optics (TEKES, ASMM, Oxford Instruments Oy, Picosun Oy, 2006-2008) 240 000 €

Enhanced functionality of self-cleaning and antibacterial surface coatings, FUNCOAT (Nordic-MINT, 2007-2008) 25 000 €

Development of ALD processes for DRAM applications (Quimonda Inc.2006-2008) 275 000 €

Photocatalytic materials (COST 540, 2006-2009)

Purification of gypsum (Kemira Ltd, 2006) 50 000 €

Fabrication of nanomaterials and –structures via metalorganic synthesis and thin films (Academy of Finland, 2004-2009, Academy professor) 970 000 €

Development of ALD processes for ferroelectrics and other microelectronics applications (ASM Microchemistry, 2004-2008) 1 000 000 €

Development of ALD processes for La₂O₃ (Honeywell Inc., 2005-2007) USD 120 000 Optical IR rejection filter technology (ESA, Oxford Instruments Oy, 2004-2007) 120 000 €

Understanding and control of interactions between liquid phase and solid surfaces in aqueous process conditions (Tekes, 2002-2006) 560 000€

Small particle and surface force and surface oxidation control (Tekes, 2002-2006) 280 000€

Bio- and nanopolymers Center of Excellence (Academy of Finland, TEKES, University of Helsinki, 2002-2007) 1 020 000 €

Development of ALD of noble metal films (TEKES, ASMM, Environics Oy, 2002-2006) 244 000 €

New technologies for passive integration and ALD dielectrics for microelectronics (TEKES, ASM Microchemistry, 2002-2004) 225 000 €

Fabrication of micro- and nanostructures by ALD and other surface chemistry controlled methods (Academy of Finland, 2002-2006) 150 000 €

Solution Deposition of thin films, COST 528 (2001-2005)
Metal complexes as selective initiators for ionic and radical polymerizations (Academy of Finland, 2001-2003) 100 000 €
Nanochemical phenomena (TEKES, 2001-2004) 325 000 €
New ALD processes for low refractive index materials (Planar Systems 2001-2002), 75 000 €
New generation polymerization catalysts (Borealis Polymers Oy, 2000-03) FIM 2 000 000
Metallocenes as polymerization catalysts (Academy of Finland, 2000-2002) FIM 1 100 000
Atomic Layer Deposition of high-k oxides for gate dielectrics (Motorola, 2000-2002, 2004-2005) USD 180 000 + 60 000
INTAS-project: Development of new single-component Pd(II)-based catalysts for alternating copolymerization of 1-olefins and CO (1999-2001)
Fabrication of thin films for electronics by Atomic Layer Epitaxy and Electrodeposition (Academy of Finland, 1999-2002) FIM 1 910 000
ALD of transition metal nitrides (ASM-Microchemistry Oy) FIM 100 000
Optical brighteners for paper industry (TEKES, 1999) FIM 143 000
ESF-ALENET network (European Science Foundation, 1999-2002)
ALE-technology for thin film structures in opto- and microelectronics (TEKES, ASM Microchemistry Oy, Planar Systems Oy 1999-2001) FIM 2 000 000
Characterization of volatile precursors for commercialization (TEKES, 1998-2000) FIM 1 160 000
Photovoltaics based on CuInSe₂ thin films (University of Helsinki, 1998-2000, IVO-foundation) FIM 700 000 + 35 000
Catalytic bleaching of cellulosa: synthesis of complexes (TEKES, 1998-2000) FIM 630 000
Solid state detectors and arrays for X-ray astronomy (ESA, Metorex Oy, 1998-2000) FIM 450 000
Atomic Layer Epitaxy growth of Al₂O₃, TiO₂, SiO₂, Cu, Pd and Mo on high surface area powders and as thin films (TEKES 1998-2001) FIM 1 890 000
Preparation of lead chalcogenides by electrodeposition (TEKES, 1998-99) FIM 796 000
Dielectric-, luminescence-, conducting and acoustic film for micro- and optoelectronics (TEKES, 1997-99) FIM 1 080 000
Coordination compound catalysts (TEKES, MATRA-ohjelma, Borealis Polymers 1997-2000) FIM 1 530 000 and 400 000
Atomic Layer Epitaxy films for corrosion protection (TEKES, 1997-98) FIM 265 000
Academy of Finland-DAAD researcher exchange programme to University of Ulm 1997-2005
Industrial ALE-coatings (TEKES, 1997-98) FIM 60 000
New polymerization catalysts (Academy of Finland, MATRA-program, 1997-1999) FIM 1 760 000
Patterning of electric glass (E-glas Oy, 1997) FIM 105 000
Coordination compound catalysts (TEKES, Borealis Polymers, 1996-97) FIM 550 000
Surfaces and thin films (Faculty of Science, materials research programme 1995-98) FIM 300 000
Development of productive ALE-processes (TEKES, 1995-97) FIM 500 000
Sulfide-, oxide- and nitride films needed in EL displays (TEKES, 1995-96) FIM 460 000
Phosphors for flat panel displays (University of Florida, DARPA 1994-96) USD 180 000
Infrared detectors based on lead chalcogenide thin films (Academy of Finland, 1994-96) FIM 300 000
New polymerization catalysts (Academy of Finland, MATRA-program, 1994-1996) FIM 1 242 000