

Curriculum Vitae - Kimmo Kaski

Current positions:

Professor of Computational Science, Aalto University School of Science (1996-), **Supernumerary Fellow**, Wolfson College of Oxford University (2001-) and **Associate Fellow**, Said Business School of Oxford University (2014-), **Visiting Professor**, Physics Department, Northeastern University (2014-), **External Faculty**, Complexity Science Hub Vienna (2017-), **Visiting Fellow**, The Alan Turing Institute (2018-).

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Academic Degrees and Qualifications:

- Master of Science (MSc) (1973), in Electron Physics, Helsinki University of Technology (HUT);
- Licentiate in Technology (1977), in Electron Physics, HUT;
- Doctor of Philosophy (D.Phil.) (1981), in Theoretical Physics, Oxford University;
- Adjunct Professor in Physics (1984-), Department of Physics, Jyväskylä University;
- Associate Professor (Microelectronics) (1985-86), Temple University, Philadelphia (tenured);
- Professor in Microelectronics (1987-96), Tampere University of Technology (tenured);
- Professor in Computational Science (1996-), HUT and Aalto University, (tenured, current position);
- Academy Professor (1996-2001 & 2001-06) in Computational Science, Academy of Finland.

Awards and Honours:

- British Council Fellowship for Oxford University, UK, 1978-1981.
- Fellow of the American Physical Society, USA, 1994.
- Academy Professor, Academy of Finland, (two five year terms) 1996-2001 and 2001-2006.
- Fellow of Finnish Academy of Technical Sciences, 1997.
- Fellow of the Institute of Physics, UK and granted the title of Chartered Physicist, 1998.
- Laboratory of Computational Engineering chosen as Centre of Excellence by the Academy of Finland, Director for 2000-2005 and 2006-2011.
- Member of Academia Europaea, Section of Physics and Engineering Sciences, 2001.
- Supernumerary Fellow, Wolfson College, University of Oxford, 2001.
- Member of Finnish Academy of Sciences and Letters, 2002.

Research and Academic Positions:

- Assistant Researcher, Semiconductor Lab., Technical Research Centre VTT, 1972-73, 1974-75.
- Teaching Assistant & Research Engineer, Radio Lab, Helsinki University of Technology, 1973-74.
- Teaching & Research Assistant, Electron Physics Lab, Helsinki University of Technology, 1974-80.
- Research Student, Theoretical Physics, Oxford University, British Council Fellowship, 1978-81.
- Research Assistant, Academy of Finland (Technical Science Council), 1980-81.
- Visiting Scientist, Depart. de Physique Theorique, Universite de Geneve, Switzerland, 1981-82.
- Scientist & Visiting Scientist, Institut fur Festkorperforschung, Kernforschungsanlage, Julich, Germany, 1981-82, 1983, 1984.
- Postdoctoral Fellow, Physics Department, Temple University, Philadelphia, USA, 1981-83.
- Lecturer, Physics Department, Tampere University of Technology, Finland, 1983-87.
- Junior Research Fellow, Academy of Finland (Natural Science Council), 1984-85.
- Visiting Scientist, Physics Department, Temple University, Philadelphia, USA, 1984.
- Head, Computer Centre, Tampere University of Technology, Finland, 1984-85.
- Visiting Fellow, Theoretical Physics Department, Oxford University, England, 1985.
- Visiting Professor of Electrical Engineering (Microelectronics), Temple University, Philadelphia, USA (since 1.9.1985, tenured Associate Professorship granted, 1.9.1986), 1985-86.
- Senior Research Fellow, Academy of Finland (Natural Science Council), 1986-87.
- Professor of Microelectronics, Tampere University of Technology, Finland (tenured), 1986-96.
- Consulting Scientist and Research Scientist, IBM Bergen Scientific Centre, Norway, 1987-88.
- Senior Research Scientist at the Academy of Finland, 1989-90.
- Research Fellow of the Science and Engineering Research Council (SERC) of United Kingdom in Theoretical Physics Department of Oxford University, 1989-90, and 1993.
- Dean, Electrical Engineering Department, Tampere University of Technology, 1991-92.
- Senior Research Scientist, Academy of Finland, 1992-93, 1993-94.
- Scientific Director, Research Institute for Theoretical Physics, University of Helsinki, 1992-93.

- Visiting Fellow at the University of Mexico (UNAM), 1994. Visiting Professor at the Southern Illinois University, 1994.
- Academy Professor, Academy of Finland, (two five year terms) 1996-2001 and 2001-2006.
- Director, Centre of Excellence in Computational Science and Engineering 2000-2005 & in Computational Complex Systems Research 2006-2011, Helsinki Univ. of Tech. & Aalto University.
- Supernumerary Fellow, Wolfson College, University of Oxford, 2001-.
- Vice-Dean (Research), Aalto University School of Science, 2011-2012.
- Dean, Aalto University School of Science, 2013-2014.
- Associate Fellow, Said Business School, University of Oxford, 2014 -.
- Visiting Professor, Physics Department, Northeastern University, 2014.

Memberships in Professional Organizations:

- American Physical Society (APS), Fellow.
- European Physical Society, chairman of IGAPPI (1998-2000).
- Finnish Physical Society; vice-chairman (1989-1991), chairman (1991-1993).
- Institute of Physics (IOP, United Kingdom), Fellow.
- The Finnish Academies of Technology, Fellow.
- Academia Europaea, Member by invitation.
- The Finnish Academy of Sciences and Letters, Fellow.

Other Academic Activities:

- Editorial board of the International Journal of Modern Physics: Computers in Physics.
- Referee for e.g. APS journals, IOP journals, IEEE (USA) journals, and IEE (UK) journals.
- Memberships of various programme committees for international conferences.
- Memberships of EU evaluation panel for Research Networks.
- Memberships of EU evaluation panel for Marie Curie Fellowships.
- Evaluation of proposals for NATO, NSF, ESF, IRCSET (Ireland), BELSPO (Belgium), Slovenia.
- Evaluation of researchers and research proposals for the Academy of Finland.
- Evaluation of Technology programmes of State Research Centre.
- Evaluations of candidates for more than 20 professorships.
- Evaluations of ERC Advanced Investigator and EU's FP7 FET Open Grant proposals.

Degrees Supervised:

PhD: 67 (of which 3 in USA, 3 in UK and 61 in Finland); **Licentiate:** 23, **MSc:** 128.

Recent PhD's (over the period from 2004 to 2017: 29 PhD's):

- Juvonen, Laura: *Monte Carlo simulations in the study of semiconductor surfaces*, Helsinki University of Technology (HUT), 2004.
- Leppänen, Teemu: *Computational Studies of Pattern Formation in Turing Systems*, HUT, 2004.
- Mustonen, Ville: *Wetting, filling and interface dynamics*, University of Oxford, 2004.
- Sammalkorpi, Maria: *Molecular Dynamics Simulations of Strained and Defective Carbon Nanotubes*, HUT, 2004.
- Lahtinen, Jani: *Statistical Inference and Random Network Simulation*, HUT, 2005.
- Szelestey, Peter: *Computational modelling of fracture and dislocations*, HUT, 2005.
- Sysi-Aho, Marko: *A game perspective to complex adaptive systems*, HUT, 2005.
- Nikunen, Petri: *Studies of surface diffusion and dissipative particle dynamics*, HUT, 2006.
- Onnela, Jukka-Pekka: *Complex networks in the study of financial and social systems*, HUT, 2006.
- von Althaus, Sebastian: *Computational Studies of Silicon Interfaces and Amorphous Silica*, HUT, 2006.
- Zhao, Wei: *Molecular Modeling of Charged Membrane Systems*, HUT, 2006.
- Kumar, Vibhor: *Statistical analysis and modeling for bio-molecular structures*, HUT, 2007.
- Kumpula, Jussi: *Community structures in complex networks: detection and modeling*, HUT 2008.
- Segerstahl, Margareta: *Developmental Biology of Sex Determination: Establishing a Basis for Systems Approach*, HUT, 2008.
- Heimo, Tapio: *Complex Networks and Spectral Methods: An Econophysics Approach to Equity Markets*, HUT, 2009.
- Toivonen, Riitta: *Social networks: Modeling structure and dynamics*, HUT, 2009.
- Laksameethanasan, Danai: *Three-Dimensional Reconstruction Methods for Micro-Rotation Fluorescence Microscopy*, HUT, 2009.
- Jouhten, Paula: *Metabolic Modelling and 13C Flux Analysis: Application to Biotechnologically Important Yeasts and a Fungus*, HUT, 2009.

- Mäkinen, Ville-Petteri: *Computational Analysis of the Metabolic Phenotypes in Type 1 Diabetes and Their Associations with Mortality and Diabetic Complications*, Aalto University School of Science - AALTO SCI, (Former Helsinki University of Technology), 2010.
- Peddinti, Gopal; *Data integration, pathway analysis and mining for systems biology*, AALTO SCI, 2010.
- Yetukuri, Laxman: *Bioinformatics approaches in lipid analysis*, AALTO SCI, 2010.
- Lehtola, Ville: *Dynamics of Single Biopolymer Translocation and Sedimentation*, AALTO SCI, 2010.
- Kumpula, Linda: *Computational models and methods for lipoprotein research*, AALTO SCI, 2011.
- Lindfors, Erno: *Network Biology: applications in medicine and biotechnology*, AALTO SCI, 2011.
- Tukiainen, Taru: *Metabolomics meets genetics – from an NMR metabolomics platform to the genetic architecture of serum metabolites*, AALTO SCI, 2012.
- Iniguez, Gerardo: *Statistical Physics of Opinion and Social Conflict*, AALTO SCI, 2013.
- Sandholm, Niina: *Genome-wide associations and computational search for the genetic risk factors for diabetic nephropathy*, AALTO SCI, 2014.
- Hric, Darko: *Community detection in complex networks: the role of node metadata*, AALTO SCI, 2017.
- Della Briotta Parolo, Pietro: *Analysis of cumulative and temporal patterns in science*, AALTO SCI, 2017.

Grants (recent highlights):

Some latest grants:

- *EU Horizon 2020, FET Open* funding of 450 000 euros (share of the partner) for IBSen project "Individual Behavior to the Socio-technical maN", 2015-2018.
- *Academy of Finland* funding of 465000 € for the project "Complex Social Dynamics in Networks - COSDYN", 2014–2017.
- *TEKES* funding of 820000 € for the Finland Distinguished Professor Programme (FiDiPro) to host Prof. Janos Kertesz in Finland 2010–2013 (4 months/annum).
- *EU FP7, FET Open* funding of 2500000 € for the ICTeCollective project "Harnessing the ICT-enabled Collective Social Behaviour", 2009 – 2013 with Prof. Kaski of COSY of Aalto University as Coordinator and Oxford University, Budapest University of Technology and Economics, University of Warsaw, and ISI Torino, as partners.
- *Academy of Finland, TEKES, and Aalto University/Helsinki University of Technology* funding of 8665000 € for the Centre of Excellence grant of the "Centre of Excellence in Computational Complex Systems Research", over the period of six years (1.1.2006–31.12. 2011); Prof. Kaski as Director.

Earlier grants:

- *Academy of Finland and Helsinki University of Technology* funding for the Centre of Excellence grant of the "Centre of Excellence in Computational Science and Engineering", over the period of six years (1.1.2000–31.12. 2005); Prof. Kaski as Director.
- *Academy of Finland and Helsinki University of Technology* funding for Academy professorship for two periods; 1.8.1996 - 31.7.2001 and 1.8.2001 – 31.7.2006.
- *EU FP4, FP5, FP6* projects (1997-2009) 5 as partner and one *FP7* project (2010-12) as coordinator.

Media Coverage (some highlights):

- *Science News Focus* 10. November 2006, *Tracking People's Electronic Footprints*.
- *New Scientist* 24.04.2007 (online): *Cellphone study shows the ties that bind nations*.
- *Der Spiegel Online* 25.04.2007: *Flüchtige Bekanntschaften halten die Info-Gesellschaft zusammen*.
- *Helsingin Sanomat* 29.5.2007: Interview and one-page coverage on complex and social networks [Finland's main daily newspaper].
- *NatureNews* 10 October 2007 [Nature **449**, 644-645 (2007)].
- *Der Spiegel* 18/2008, pp. 148-150.
- *Science* **323**, 721 (2009). *Story on computational social science*.
- *CNN News* June 6, 2016, *This is the age when you start losing friends*, <http://edition.cnn.com/2016/06/06/health/losing-friends-mid-twenties/>

Publication metrics & Other academic activity:

Publication metrics: *Web of Science* (All DB's): 368 publ., with 8175 citations (of which 514 ('11), 595 ('12), 694 ('13), 730 ('14), 764 ('15), 743 ('16), 712 ('17)) & H-index = **45**; *Google Scholar*: 505 publ., with 15194 citations & H-index = **59**, i10-index = 221 (since 2013: with 7335 citations & H = 42, i10 = 117); *ResearchGate*: 465 publ., Reads:>14985; Citations:>11185; RG-Score: 45.48; H-index=**52**.

Other activity: *Books chapters* > 30; *Conf. proceedings* > 120; *Reports* > 100; *Plenary/invited talks* > 100.

Selected publications:

1. Structure and tie strengths in mobile communication networks, *Proceedings of National Academy of Science (PNAS)* 104, 7332-7336, 2007, with J.-P. Onnela, J. Saramäki, J. Hyvönen, G. Szabo, D. Lazer, J. Kertész, A.-L. Barabasi. (Jufo=3; IF(WoS)=10.142, Cit(WoS)/Cit(GS)=736 / 1558).
2. Dynamics of market correlations: Taxonomy and portfolio analysis, *Physical Review E* 68, 056110, 2003, with J.-P. Onnela, A. Chakraborti, J. Kertész, A. Kanto. (Jufo=1; IF=2.508, Cit=276 / 557).
3. Intensity and coherence of motifs in weighted complex networks, *Physical Review E* 71, 065103, 2005, with J.-P. Onnela, J. Saramäki, J. Kertész. (Jufo=1; IF=2.508, Cit=305 / 555).
4. Small but slow world: How network topology and burstiness slow down spreading, *Physical Review E* 025102, 2011, with M. Karsai, M. Kivelä, R. Pan, J. Kertész, A.L. Barabasi. (Jufo=1; IF=2.508, Cit=258/ 444).
5. Analysis of a large-scale weighted network of one-to-one human communication, *New Journal of Physics*, 9: Art. No. 179 Jun 28, 2007, with J.-P. Onnela, J. Saramäki, J. Hyvönen, G. Szabó, M. Argollo de Menezes, A.-L. Barabási, J. Kertész, (Jufo=2; IF=4.177, Cit=172 / 347).
6. Dynamic asset trees and Black Monday, *Physica A* 324, 247, 2003, with J.-P. Onnela, A. Chakraborti, J. Kertész. (Jufo=1; IF=1.732, Cit=153 / 248).
7. Clustering and information in correlation based financial networks, *European Physical Journal B* 38, 353, 2004, with J.-P. Onnela, J. Kertész (Jufo=1; IF=1.651, Cit=149 / 235).
8. 1H NMR metabonomics approach to the disease continuum of diabetic complications and premature death, *Molecular Systems Biology* 4, 167, 2008, with Mäkinen V. et al., (Jufo=3; IF=12.243, Cit=114 / 160).
9. Emergence of communities in weighted networks, *Physical Review Letters*, 99, 228701, 2007, with J. M. Kumpula, J.-P. Onnela, J. Saramäki, J. Kertész. (Jufo=3; IF=7.943, Cit=124 / 206).
10. Time-dependent cross-correlations between different stock returns: A directed network of influence, *Physical Review E* 66, 026125, 2002, with L. Kullmann, J. Kertész. (Jufo=1; IF=2.508, Cit=102 / 163).
11. Limited resolution in complex network community detection with Potts model approach, *European Physical J. B* 56, 41, 2007, with J. Kumpula, J. Saramäki, J. Kertész (Jufo=1; IF=2.542, Cit=101 / 176).
12. Generalisations of the clustering coefficient to weighted complex networks, *Physical Review E* 75, 027105, 2007, with J. Saramäki, M. Kivelä, J.-P. Onnela, J. Kertész. (Jufo=1; IF=2.508, Cit=143 / 312).
13. Modelling the development of epidemics with dynamic small-world networks, *Journal of Theoretical Biology* 234/3, 413-421, 2005, with J. Saramäki. (Jufo=1; IF=2.454, Cit=57 / 101).
14. Are the structures of twist grain boundaries in silicon ordered at 0 K? *Physical Review Letters*, 96, 055505 2006, with S. von Althaus, P. Haynes, A.P. Sutton. (Jufo=3; IF=7.943, Cit=58 / 74).
15. Emergence of Bursts and Communities in Evolving Weighted Networks, *PLoS One*, 6, e22687, 2011, with H.H. Jo, R. K. Pan. (Jufo=1; IF=4.411, Cit=33 / 46).
16. Sex differences in intimate relationships, *Nature Scientific Reports*, 2, Art. N:o 370, 2012, with V. Palchykov, J. Kertész, A.-L. Barabasi, R. I. M. Dunbar. (Jufo=2; IF=5.578, Cit=31 / 96).
17. Universal features of correlated bursty behaviour, *Nature Scientific Reports*, 2 Art. N:o 397, 2012, with Márton Karsai, Albert-László Barabási and János Kertész. (Jufo=2; IF=5.578, Cit=99 / 201).
18. A comparative study of social network models: Network evolution models and nodal attribute models, *Social Networks* 31 (4), 240-254, 2009, with R Toivonen, L Kovanen, M Kivelä, JP Onnela, and J Saramäki, (Jufo=2; IF=2.930, Cit=63 / 166).
19. World citation and collaboration networks: uncovering the role of geography in science, *Nature Scientific Reports*, 2 Art. N:o 902, 2012, with R. K. Pan, S. Fortunato. (Jufo=2; IF=5.578, Cit=49 / 121).
20. Opinions, Conflicts and Consensus: Modelling Social Dynamics in Collaborative a Environment, *Physical Review Letters*, 110, 088701, 2013, with J. Török, G. Iniguez, T. Yasseri, J. Kertész. (Jufo=3; IF=7.943, Cit=35 / 41).
21. Temporal motifs reveal homophily, gender-specific patterns and group talk in mobile communication networks, *PNAS* 110, 18070, 2013, with L. Kovanen, J. Kertész, J. Saramäki, (Jufo=3; IF=10.142, Cit=45/ 83).
22. Effects of deception in social networks, *Proceedings of the Royal Society B-Biological Sciences*, 281, 20141195, 2014, with G. Iniguez, T. Govezensky, R.I.M. Dunbar, R. Barrio, (Jufo=3; IF=5.678, Cit=7 / 55).
23. Analytically Solvable Model of Spreading Dynamics with Non-Poissonian Processes, *Physical Review X*, 4, 011041, 03/2014, with H.H. Jo, J Perotti, and J. Kertész. (Jufo=3; IF=9.043, Cit=41 / 67).
24. Reputation and Impact in Academic Careers, *PNAS*, 111, 15316, 2014, with A. M. Petersen, S. Fortunato, R. K. Pan, O. Penner, A. Rungi, M. Riccaboni, H. E. Stanley, F. Pammolli, (Jufo=3; IF=10.142, Cit= 43 / 80).
25. Spatial patterns of close relationships across the lifespan, *Scientific Reports*, 4, 6988, 2014, with Hang-Hyun Jo, J. Saramäki, R. I. M. Dunbar, (Jufo=2; IF=5.578, Cit= 9 / 20).
26. Complex contagion process in spreading of online innovation, *Journal of the Royal Society Interface*, 11, 20140694, 2014, with M. Karsai, G. Iniguez, and J. Kertész, (Jufo=1; IF=3.856, Cit = 19 / 38).