

JUKKA-PEKKA ONNELA

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Current affiliation Post-Doctoral Fellow, Fulbright Visiting Scholar
Harvard Kennedy School, Harvard University

EDUCATION

Doctor of Science (D.Sc.), Helsinki University of Technology, Finland, 2003 - 2006

- Dissertation: *Complex networks in the study of financial and social systems*
Opponent: Prof. Alessandro Vespignani
Grade: Pass with distinction
Best dissertation at HUT in 2006 (ranking 1/158)
- Major: Computational engineering
- Minor: Systems analysis

Master of Science (M.Sc.), Helsinki University of Technology, Finland, 1996 - 2002

- Thesis: *Taxonomy of Financial Assets*
Grade: Excellent (5/5)
- Major: Computational engineering
- Minor: Strategy and international business

International Baccalaureate (IB), Atlantic College, UK, 1993 - 1995

POSITIONS

2008 - present Post-Doctoral Fellow, Harvard Kennedy School, Harvard University
2007 - present Associate Fellow, Saïd Business School, Oxford University
2006 - present Research Fellow, Wolfson College & Department of Physics, Oxford University
2003 - 2006 Researcher, Laboratory of Computational Engineering (LCE), HUT, Finland
2001 - 2002 Research assistant, LCE, HUT, Finland

GRANTS AND AWARDS

2008 Article of the Year Prize, Journal of Peace Research, awarded for paper A16.
2007 Fulbright Visiting Scholar grant to Harvard University 2008/9 - 2009/8 (USD 36,000)
2007 Best Dissertation of 2006, Helsinki University of Technology (EUR 4,000)
2006 Excellence in teaching, HUT (EUR 600)
2006 Best paper of the European Conference of Complex Systems'06, Oxford, UK (GBP 1,000)
2006 Obtained D. Sc. under the age of 30, HUT (EUR 3,000)
2006 Support for completing doctoral dissertation, Tekniikan edistämissäätiö (EUR 5,000)
2005 Excellence in teaching, HUT (EUR 600)
2005 Rapid completion of doctoral coursework, HUT (EUR 1,000)
2004 Excellence in teaching, HUT (EUR 600)
2004 Finnish Academy of Science and Letters, Väisälä Foundation (EUR 3,300)
2004 European Science Foundation (EUR 1,400)
2002 ComMIT graduate school position with full funding for 1.1.2003-31.12.2005
2001 The European Science Foundation (EUR 1,100)
1993 Atlantic College scholarship for 1993-1995, Finnish Cultural Fund (EUR 25,000)

PUBLICATIONS

ARTICLES

- A19 J.-P. Onnela, N. F. Johnson, S. Gourley, G. Reinert, and M. Spagat, Sampling bias due to structural heterogeneity and limited internal diffusion, *Europhysics Letters* **85**, 28001 (2009).
- A18 J. M. Kumpula, J.-P. Onnela, J. Saramäki, J. Kertész, and K. Kaski, Model of community emergence in weighted social networks, *Computer Physics Communications*, in print (2008).
- A17 J.-P. Onnela, J. Töyli, and K. Kaski, Decimalization and asset returns, *Physica A*, in print (2008).
- A16 N. F. Johnson, M. Spagat, S. Gourley, J.-P. Onnela, and G. Reinert, Bias in epidemiological studies of conflict mortality, *Journal of Peace Research* **45**, 5, 653-663 (2008).
- A15 D. M. D. Smith, C. F. Lee, J.-P. Onnela and N. F. Johnson, Link-space formalism for network analysis, *Physical Review E* **77**, 036112 (2008).
- A14 J. M. Kumpula, J.-P. Onnela, J. Saramäki, K. Kaski, and J. Kertész, Emergence of communities in weighted networks, *Physical Review Letters* **99**, 228701 (2007).
- A13 J.-P. Onnela, J. Saramäki, J. Hyvönen, G. Szabó, D. Lazer, K. Kaski, J. Kertész, and A.-L. Barabási, Structure and tie strengths in mobile communication networks, *Proc. Natl. Acad. Sci. USA* **104**, 7332-7336 (2007).
- A12 J.-P. Onnela, J. Saramäki, J. Hyvönen, G. Szabó, M. Argollo de Menezes, Kimmo Kaski, A.-L. Barabási, and J. Kertész, Analysis of a large-scale weighted network of one-to-one human communication, *New Journal of Physics* **9**, 179 (2007).
- A11 D. M. D. Smith, J.-P. Onnela, and N. F. Johnson, Accelerating networks, *New Journal of Physics*, **9**, 181 (2007).
- A10 T. Heimo, J. Saramäki, J.-P. Onnela, and K. Kaski, Spectral and network methods in the analysis of correlation matrices of stock returns, *Physica A* **383**, 147-151 (2007).
- A9 J. Saramäki, M. Kivelä, J.-P. Onnela, K. Kaski, and J. Kertész, Generalizations of the clustering coefficient to weighted complex networks, *Physical Review E*, **75** 027105 (2007).
- A8 G. Tibély, J.-P. Onnela, J. Saramäki, K. Kaski, and J. Kertész, Spectrum, intensity and coherence in weighted networks of a financial market, *Physica A* **370**, 145-150 (2006).
- A7 R. Toivonen, J.-P. Onnela, J. Saramäki, J. Hyvönen, and K. Kaski, Model for social networks, *Physica A* **371**, 851 (2006).
- A6 J.-P. Onnela, J. Saramäki, J. Kertész, and K. Kaski, Intensity and coherence of motifs in weighted complex networks, *Physical Review E* **71**, 065103 (2005).
- A5 J.-P. Onnela, K. Kaski, and J. Kertész, Clustering and information in correlation based financial networks, *European Physical Journal B* **38**, 353-362 (2004).
- A4 J.-P. Onnela, A. Chakraborti, K. Kaski, J. Kertész, and A. Kanto, Asset trees and asset graphs in financial markets, *Physica Scripta* **106**, 48-54 (2003).
- A3 J.-P. Onnela, A. Chakraborti, K. Kaski, J. Kertész, and A. Kanto, Dynamics of market correlations: Taxonomy and portfolio analysis, *Physical Review E* **68**, 056110 (2003).
- A2 J.-P. Onnela, A. Chakraborti, K. Kaski, and J. Kertész, Dynamic asset trees and Black Monday, *Physica A* **324/1-2**, 247-252 (2003).
- A1 J.-P. Onnela, A. Chakraborti, K. Kaski, and J. Kertész, Dynamic asset trees and portfolio analysis, *European Physical Journal B* **30**, 285-288 (2002).

ARTICLES UNDER REVIEW

- R3 D. M. D. Smith, J.-P. Onnela, and N. S. Jones, Master-equation analysis of accelerating networks, submitted to *Physical Review E* (2008). Preprint: arXiv:0810.4119.
- R2 R. Toivonen, L. Kovanen, M. Kivelä, J.-P. Onnela, J. Saramäki, and K. Kaski, A comparative study of stochastic algorithmic models for social networks, submitted to *Social Networks* (2008). Preprint: arXiv:0805.0512.

R1 D. M. D. Smith, J.-P. Onnela, C. F. Lee, M. Fricker, and N. F. Johnson, Network automata and the functional dynamic network framework, submitted to *Physical Review E* (2007). Preprint: arXiv:physics/0701307v2.

CONFERENCE PROCEEDINGS

C4 R. Toivonen, J. M. Kumpula, J. Saramäki, J.-P. Onnela, J. Kertész, and K. Kaski, The role of edge weights in social networks: modelling structure and dynamics, in J. Kertész et al (eds.), Proceedings of SPIE: Noise and Stochastics in Complex Systems and Finance, Proc. of SPIE **6601**, 660110 (2007).

C3 J.-P. Onnela, J. Saramäki, J. Kertész, and K. Kaski, Financial market - a network perspective in: H. Takayasu (Ed.), *Practical Fruits of Econophysics, Nikkei Econophysics III Proceedings*, Springer, Tokyo, 302 (2006).

C2 J. Saramäki, J.-P. Onnela, J. Kertész, and K. Kaski, Characterizing motifs in weighted complex networks in: J.F.F. Mendes, et al. (Eds.), *Science of Complex Networks - AIP Conference Proceedings* **776**, 108 (2005).

C1 J.-P. Onnela, K. Kaski, and J. Kertész, Financial market – a network of capital flows, *InterJournal Complex Systems*, 936 (5/2004).

WORKING PAPERS

W3 J.-P. Onnela, S. Reid, N. Jones, M. A. Porter, and P. J. Mucha, Dynamic community spectroscopy.

W2 M. Beguerisse-Díaz, M. A. Porter, and J.-P. Onnela, Analysis and model of a bipartite network of movie ratings.

W1 M. A. Porter, J.-P. Onnela, and P. J. Mucha, Statistical mechanics of network communities.

THESES

T2 J.-P. Onnela, *Complex networks in the study of financial and social systems*, Laboratory of Computational Engineering, Helsinki University of Technology, Finland (2006).

T1 J.-P. Onnela, *Taxonomy of Financial Assets*, Laboratory of Computational Engineering, Helsinki University of Technology, Finland (2002).

POPULAR SCIENCE

P1 J. Saramäki, J.-P. Onnela, K. Kaski, Kompleksisten verkostojen fysiikkaa (“Physics of complex networks”, in Finnish), *Arkhimedes* **1** (2007).

MEDIA COVERAGE

M8 Selbstmord durch Ansteckung, *Der Spiegel*, 28 April 2008.

M7 Heikot linkit – verkon elinehto, *Helsingin Sanomat*, 29 May 2007.

M6 Study maps network of 7 million cell phone users, *PhysOrg.com*, 12 May 2007.

M5 Cellphone study shows the ties that bind nations, *New Scientist*, 24 April 2007.

M4 Flüchtige Bekanntschaften halten die Info-Gesellschaft zusammen, *Spiegel Online*, 25 April 2007.

M3 Mobile-phone network reveals the ties that bind, *PhysicsWeb*, 31 October 2006.

M2 Tracking people’s electronic footprints, *Science* **314**, 914-916 (2006).

M1 Death toll in Iraq: survey team takes on its critics, *Nature* **446**, 6-7 (2007).

INVITED TALKS

- 2009 *(scheduled) Studying Society in a Digital World, Princeton University, USA*
- 2009 Social Brains and Social Networks, Oxford University, UK
- 2008 Complex Systems in a Nutshell, Oxford University, UK
- 2008 Network Science 2008, Norwich, UK
- 2008 Empirical Analysis of Networks, Alicante, Spain
- 2008 Social Science Seminar, Nuffield College, Oxford University, UK
- 2008 Data in Complex Systems Conference, Palermo, Italy
- 2008 Workshop on Network Communities, UCL, Belgium
- 2008 CABDyN Complexity Seminar, Oxford University, UK
- 2008 Complexity Seminar, Centre for Complexity Science, Imperial College, London, UK
- 2008 Complexity Research Seminar, Brunel University, London, UK
- 2007 Workshop on Social Networks, Microsoft Research, Cambridge, UK
- 2007 Social Science and Technology Seminar, Stanford University, USA
- 2007 Conference on Computational Physics 2007, Brussels, Belgium
- 2007 Fluctuations and Noise 2007, Florence, Italy
- 2006 IMSc Complex Systems School 2006, Institute of Mathematical Sciences, Chennai, India

CONFERENCES AND VISITS

- 2008 Sociophysics, Turin, Italy
- 2007 Social Data Mining and Knowledge Building Workshop, UCLA, USA
- 2006 Econophysics Colloquium 2006, Tokyo, Japan
- 2006 European Conference on Complex Systems (ECCS) 2006, Oxford, UK
- 2006 ONCE-CS Workshop on Complex Systems Science, Vilnius, Lithuania
- 2006 IMSc Complex Systems School 2006, Institute of Mathematical Sciences, Chennai, India
- 2005 Visit to Prof. Albert-Lászlo Barabási, Harvard University, USA
- 2005 Visit to Prof. Neil F. Johnson, Department of Physics, Oxford University, UK
- 2005 School and Workshop on Structure and Function of Complex Networks, Trieste, Italy
- 2004 Visit to Prof. Albert-László Barabási, Department of Physics, University of Notre Dame, USA
- 2004 Visit to Prof. János Kertész, Department of Theoretical Physics, Budapest University, Hungary
- 2004 International Conference on Complex Systems 2004, Boston, USA
- 2003 The Second International Conference on Frontier Science: A Non-linear World, Pavia, Italy
- 2001 Visit to Prof. János Kertész, Department of Theoretical Physics, Budapest University, Hungary

TEACHING AND SUPERVISION

- 2008 MBA teaching, Saïd Business School, Oxford University
- 2007 - present Co-supervision of D.Phil. thesis, Physics Department, Oxford University
- 2007 - 2008 Co-supervision of M.Phys. projects, Physics Department, Oxford University
- 2004 - 2006 Supervision of complex systems assignments, HUT
- 2005 Teaching assistant on Complex Networks (S-114.220), HUT
- 2005 Lecturer / teaching assistant on Business Game (S-114.155), HUT
- 2004 Teaching assistant on Business Game (S-114.155), HUT
- 2003 Teaching assistant on Business Game (S-114.155), HUT

MISCELLANEOUS

- Languages:
 - Finnish (native), English (excellent), German (satisfactory), Swedish (satisfactory), Spanish (basic)
- Refereeing: Nature, Nature Physics, Physical Review Letters, Physical Review E, Europhysics Letters, European Physical Journal B, Physica A, Journal of Statistical Mechanics, Quantitative

Finance, Social Networks

- Convenor of CABDyN Complexity Seminar 2007-2008, Saïd Business School, Oxford University
http://sbs-xnet.sbs.ox.ac.uk/complexity/complexity_seminars.asp
- Coordinator of Complex Networks Journal Club 2007-2008, Physics Department, Oxford University
http://sbs-xnet.sbs.ox.ac.uk/complexity/complexity_journalclub.asp

MY FAVOURITE THINGS

- Going to the gym, jogging in Boston, dancing salsa, kick-boxing
- Listening to jazz, playing tenor saxophone
- Reading fiction and non-fiction
- Cooking and, of course, eating