

Adam Kleczkowski

Date of birth	22nd August 1961	Address	Department of Comp. Sci. & Maths University of Stirling, Stirling FK9 4LA, Scotland
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Employment

2007-present: Senior Lecturer in Applied Mathematics, Department of Computing Sciences and Applied Mathematics, University of Stirling, Stirling, and Head of Mathematics and Statistics Group:

- developing mathematical models for applications in environmental sciences, epidemiology and economics;
- developing statistical methods of data analysis and synthesis;
- preparation of scientific papers and research grants;
- supervision of PhD projects;
- teaching of various Applied Mathematics courses, including lectures and tutorials (400 hours pa);
- various administration duties including running a research group (11) and teaching administration for the whole Mathematics and Statistics honours programme at Stirling;
- 2009/10: acting Research Director for the Department of Computing Science and Mathematics.

2005-2007: Lecturer in Mathematical Biology, Department of Plant Sciences and College Lecturer in Mathematics for Natural Sciences, Selwyn College, Cambridge;

2003 (concurrent with below): joint project with Univ. of York, Development of Soil Ecosystem Model for the NERC Soil Biodiversity Thematic Programme (developing models for soil microbial diversity);

2002-2005: Research Associate, Department of Plant Sciences, Cambridge; *A strategic model to evaluate control strategies and disease risk of Rhizoctonia in field vegetables*; DEFRA-funded project (developing models for spread of plant pathogens; risk analysis; parameter estimation);

2000-2002 Research Associate, King's College Research Centre and Dept. Plant Sciences, Cambridge (model development and fitting for plant pathogens, particularly cereal pathogens);

1996-2000 Senior Research Fellow in Mathematical Biology, King's College, Cambridge (model development and fitting for plant pathogens; data analysis and models of plant-climate interactions);

1993-1996 Research Associate, Department of Plant Sciences, University of Cambridge (deterministic and spatial models of plant pathogens and model fitting, particularly soil-born diseases of vegetables);

1992-1993 Research Fellowship, Department of Zoology, University of Cambridge (models of childhood diseases, particularly measles);

1989-1991 (concurrent with below) Wissenschaftler (Research Associate), Arbeitsgruppe Theoretische Ökologie, Forschungszentrum Jülich, Germany (deterministic and stochastic models in ecology);

1984-1992 Research Assistant, Institute of Physics, Jagiellonian University, Kraków (deterministic and stochastic models in physical systems).

Education

1984-1989 PhD (honours), Jagiellonian University, Kraków, Poland;

1979-1984 MSc (honours), Jagiellonian University, Kraków, Poland;

1975-1979 Secondary school, A-levels with distinction.

Awards and grants

(I participated in writing several other grant applications, listed below are those for which I was formally an investigator)

2011 Department for International Development grant on *Characterising livestock system "zoonoses hotspots"*

2010 Medical Research Council Catalyst grant, *EPISYSTEM: Designing biological, social and economic environments to enhance resistance to zoonotic outbreaks*

2010 European Investment Bank grant, *Designing Markets for Ecosystem Services Delivery (ECO-DELIVERY)*

2009 IMA and BSPP travel grants

2005-2007 Fellow and College Teaching Officer in Mathematics for Natural Sciences, Selwyn College.

2003 NERC Soil Biodiversity Programme, travel (overseas) grant; 2003 STOCHDYN - Stochastic Dynamics: fundamentals and applications, ESF project, as a part of the European consortium.

2002-2005 Bye-fellowship, Selwyn College, Cambridge

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Adam Kleczkowski, Stirling, 01 June 2011

2002 British Council/KBN British-Polish Young Scientist Research Collaboration Programme, travel grant for a PhD student, jointly with Jagiellonian University, Poland, *Plant and animal disease on lattices and networks – dissemination and prevention*;

1999 British Council/KBN British-Polish Joint Research Collaboration Programme, travel grant jointly with Jagiellonian University, Poland, *Spatial and temporal heterogeneities in nonlinear models of biological systems*;

1997 BBSRC/EPSRC 3-year grant *Scaling up from individual to population behaviour in stochastic, spatially-extended systems* as a second principal investigator;

1997 BBSRC 3 years PhD studentship *Analysis and prediction of nonlinear dynamics in biological control of plant pathogens*, as a second supervisor and a joint applicant; PhD awarded in 2001;

1996 Senior Research Fellowship in Mathematical Biology. King's College, Cambridge;

1992 Royal Society Postdoctoral Fellowship (the Royal Society, the Wolfson Foundation and the Foreign & Commonwealth Office);

1990 Polish Ministry for Higher Education prize for scientific research;

1987, 1988 Jagiellonian University internal prize for scientific research;

1984 MSc with distinction;

1979-1983 (every year) Jagiellonian University prize for an outstanding student;

Teaching

Lectures and practicals: *Stirling*: Lectures and tutorials for various mathematical courses across 4 years of studies, including calculus, advanced calculus, probability, statistics and numerical methods. *Cambridge*: Lectures and practicals for Quantitative Biology Part IA; Part IB Plant and Microbial Sciences lectures and practicals; lectures and supervisions in Frontiers in Plant-Microbe Interactions, Part II; Cambridge Infectious Disease Consortium: Graduate course in modelling; College supervisions. *Kraków*: Classes in physics and mathematics for year 1 and 4 physics students;

Project supervisions: PhD supervisor (2 students pending; 4 students as a second supervisor, 3 finished successfully, one pending); Honours projects at Stirling; Part II and Part III Physics projects at Cambridge (with application to biological systems); Supervision of three summer student projects (UROP: Cambridge-MIT);

Other teaching duties: Internal and external PhD Examiner; *Cambridge*: Tutor and Personal Tutor, Selwyn College and King's College (Cambridge); Director of Studies in Mathematics for Natural Sciences Tripos, Selwyn College; interviews of candidates for admission to study physical sciences, computer sciences and biology (King's College, Selwyn College); *Kraków*: Supervisor of a student computer laboratory; computing classes.

Skills and relevant experience

Basic skills and experience: Practical and theoretical knowledge of mathematics, physics, computing, statistics, ecology, biology and economics; ability to develop and analyse mathematical models of a wide range of physical and biological phenomena; a wide range of mathematical, computing and simulation techniques in physics and biology; experienced in experimental design and in statistical analysis of experimental data, including classical and Bayesian statistics, time series analysis, spatial statistics and modelling, MCMC and likelihood parameter estimation; excellent knowledge of 3 programming languages (Pascal, C and R/S) and scientific/statistic software (R, S-plus, WinBUGS, Matlab, Mathematica), basic knowledge of Java and C++; many computer programs, including simulation, graphics and mathematical software, desktop publishing and spreadsheet packages; practical knowledge of computer systems MacOSX, Unix, Linux, DOS and Windows; experience in design and maintenance of (non-profit and scientific) Web pages and internet domain handling. Co-organiser of seven international conferences (1987-1990, 2003, 2010 twice); member of an International Scientific Committee, Symposium on Statistical Physics, 2007. Participant and invited lecturer at scientific conferences (a list on request).

Commercial consultancy: Founder of an internet consultancy, askstatistician.com (since 2005).

Professional courses and qualifications: Expert seminar in E-Learning, Cambridge, 2005. Interviewing for Cambridge Colleges, Cambridge, 2003. Applying for research grants, Cambridge, 1996.

Languages: Polish – mother language; fluent English; conversational German; basic Russian. Experienced English-Polish translator (including simultaneous oral translation).

Professional organisations: Fellow of the Institute for Mathematics and its Applications (from 2010), Fellow of the Royal Statistical Society (from 2006), Member: European Society for Mathematical and Theoretical Biology, British Society for Plant Pathology (from 2003), British Ecological Society (from 2000);

Other relevant experience: Scientific consultant, European Union; refereeing papers for scientific journals; BBSRC, NERC grant refereeing; assessment of scientific work of a research institute (IACR Rothamsted, UK); full Polish driving license since 1984, full British driving license since 1993.

Other interests: Bible and Christianity; history, particularly Central European; piano and classical music; hiking; gardening.

Scientific publications

Published

1. A. Kleczkowski and A. Fuliński, 1987, *Nonlinear maps with time delay*, Physica Scripta, **35**, pp. 119-122;
2. A. Kleczkowski, 1988, *Some formal properties of the time-symmetry breaking operator*, Acta Physica Polonica **A73**, pp. 19-24;
3. A. Kleczkowski, 1989, *On the different forms of master equations: dynamical Ising model*, Acta Physica Polonica, **A75**, pp. 365-376;
4. E. Gudowska-Nowak, G.O. Williams and A. Kleczkowski, 1989, *Stochastic vs. chaotic dynamics in a deterministic system*, J. Stat. Phys. **54**, pp. 539-548;
5. A. Kleczkowski, 1993, *Dynamical systems with impulses: stroboscopic maps approach*, Acta Physica Polonica **B 24**, pp. 1061-1071;
6. A. Kleczkowski, 1993, *Stochastic versus chaotic dynamics for genetic model - revisited*, Acta Physica Polonica **B 24** pp. 1445-1473;
7. B.T. Grenfell, A. Kleczkowski, S.P. Ellner and B.M. Bolker, 1994, *Measles as a case study in nonlinear forecasting and chaos*, Phil. Trans. Roy. Soc. **A 348**, pp. 515-530;
8. B.T. Grenfell, A. Kleczkowski, S.P. Ellner and B.M. Bolker, 1994, *Nonlinear forecasting and chaos in ecology and epidemiology: measles as a case study*. In: *Forecasting and chaos*, (ed. Tong, H.), Singapore, New Jersey, London, Hongkong: World Scientific, pp. 321-345;
9. B.T. Grenfell, B. Bolker, and A. Kleczkowski, 1995, *Seasonality and extinction in chaotic metapopulations*, Proc. Roy. Soc. **B 259**, pp. 97-103;
10. B.T. Grenfell, B. Bolker, and A. Kleczkowski, 1995, *Seasonality, Demography, and Dynamics of Measles in Developed Countries*, in D. Mollison (ed.) *Epidemic Models*, Publications of the Isaac Newton Institute for Mathematical Sciences, Cambridge Univ. Press, Cambridge, pp. 248-268;
11. B.T. Grenfell, A. Kleczkowski, C.A. Gilligan and B.M. Bolker, 1995, *Spatial heterogeneity, nonlinear dynamics and chaos in infectious diseases*, Statistical Methods in Medical Research **4**, pp. 160-183;
12. A. Kleczkowski, D.J. Bailey and C.A. Gilligan, 1996, *Dynamically generated variability in plant-pathogen systems with biological control*, Proc. Royal Soc. **B 263**, pp. 777-783;
13. C.A. Gilligan and A. Kleczkowski, 1997, *Population dynamics of botanical epidemics involving primary and secondary infections*, Phil. Trans. Royal Soc. **B 352**, pp. 591-608;
14. A. Kleczkowski, C.A. Gilligan and D.J. Bailey, 1997, *Scaling and spatial dynamics in plant-pathogen systems: from individuals to populations*, Proc. Royal Soc. **B 264**, pp. 979-984;
15. A. Kleczkowski, 1998, *Statistical properties of dynamical systems with disturbances: variation in parameters*, Proceedings of the Marian Smoluchowski Symposium on Statistical Physics, Zakopane. Acta Physica Polonica **B 29**, pp. 1717-1735;
16. K.J. Willis, A. Kleczkowski and S.J. Crowhurst, 1999, *124,000-year periodicity in terrestrial vegetation change during the late Pliocene epoch*, Nature **397** pp. 685-688;
17. K.J. Willis, A. Kleczkowski, K.M. Briggs and C.A. Gilligan *The role of sub-Milankovitch Climatic Forcing in Initiation of the Northern Hemisphere Glaciation*, 1999, Science **285** pp. 568-571.
18. L. Heusser, C. Heusser, A. Kleczkowski and S.J. Crowhurst. *A 50,000 yr record of South American millennial-scale climate instability during the last glaciation from Chile*, 1999, Quaternary Research **52** pp. 154-158;
19. G.J. Gibson, C.A. Gilligan, A. Kleczkowski, *Predicting variability in biological control of a plant-pathogen system using stochastic models*, 1999, Proc. Roy. Soc. **266** pp. 1743-1753;
20. A. Kleczkowski and B.T. Grenfell, *Mean-field-type equations for spread of epidemics: the 'small-world model'*, 1999, Physica **A 274** pp. 355-360; also published in A. Gadomski, J. Kertész, H.E. Stanley and N. Vandewalle (eds.), *Applications of Statistical Physics*, Elsevier, 1999.
21. S. Gubbins, C.A. Gilligan and A. Kleczkowski, *Population dynamics of plant-parasite interaction: thresholds for invasion*, 2000, Theor. Pop. Biol., **57** (3) pp. 219-234;
22. E. Gudowska-Nowak, A. Kleczkowski, G. Kraft, E. Nasonova, S. Ritter and M. Scholz, *Mathematical Models of Radiation-Induced Mitotic Delay: Time-Course Analysis and Statistics of Lesions*, 2001, Physica Medica **17** pp. 161-163;
23. A. Kleczkowski and P.F. Góra. 2003. *Quenched disorder and long-tail distributions*. Physica **A 327** (3-4) pp. 378-398.
24. Bailey DJ, Kleczkowski A, and Gilligan CA. 2004. *Epidemiological dynamics and the efficiency of biological control of soil-borne disease during consecutive epidemics in a controlled environment*. New Phytologist **161** pp. 569-575.
25. Gibson G.J., Kleczkowski A and Gilligan CA. 2004 *Bayesian analysis of botanical epidemics using stochastic compartmental models*. Proc. National Academy Sciences USA **101** pp. 12120-12124.
26. B. Dybiec, A. Kleczkowski and C.A. Gilligan. 2004. *Controlling disease outbreaks on networks with incomplete knowledge*, Physical Review E **70** pp. 066145-1-5.

27. B. Dybiec, A. Kleczkowski and C.A. Gilligan, 2005. *Optimizing control of disease spread on networks with incomplete knowledge*. Acta Physica Polonica **36** (5) pp. 1509-1526
28. A. Kleczkowski, 2005. *Predictability in simple population models*. Acta Physica Polonica **36** (5) pp. 1623-1634.
29. E. Gudowska-Nowak, A. Kleczkowski, E. Nasonova, M. Scholz and S. Ritter, 2005. *Correlation between mitotic delay and aberration burden, and their role for the analysis of chromosomal damage*. Int. Journal Radiation Biology **81** (1) pp. 23-32.
30. A.H. Fitter, C.A. Gilligan, K. Hollingworth, A. Kleczkowski, R. Twyman, J.W. Pitchford, 2005. *Biodiversity and ecosystem function in soil*, Functional Ecology **19** pp. 369-377.
31. Bailey DJ, Kleczkowski A and Gilligan CA., 2006. *The role of disease resistance in the response of winter wheat to take-all*. Phytopathology **96** pp. 510-516.
32. A. Kleczkowski, B. Dybiec and C.A. Gilligan 2006. *Influence of economic and social factors on disease control strategies for epidemics on local, global and small-world networks*. Acta Physica Polonica **B37** pp. 3017-3026.
33. L. Irvine, A. Kleczkowski, A. Lane, J. Pitchford, D. Caffrey and P. Chamberlain, 2006. *An integrated data resource for modelling the soil ecosystem*, Applied Soil Ecology **33** pp. 208-219.
34. Willis KJ, Kleczkowski A, New M, Whittaker RJ, 2007. *Testing the impact of climate variability on European plant diversity: 320 000 years of water-energy dynamics and its long-term influence on plant taxonomic richness*, Ecology Letters **10** pp. 673-679.
35. A. Kleczkowski and C.A. Gilligan, 2007. *Parameter estimation and prediction for the course of a single epidemic outbreak of a plant disease*, Journal of the Royal Society Interface **4** pp. 865-877.
36. B. Dybiec, A. Kleczkowski and C.A. Gilligan, 2009. *Control of epidemics spreading by Lévy fliers*. Journal of the Royal Society Interface **6** pp. 941-950.

Selected refereed conference publications

1. A. Kleczkowski, J. McGlade and N. Leader-Williams, *Mathematical Models of Rhino Poaching in Africa*, Proceedings of the European Simulation Multiconference, Nuremberg, Germany, 1990;
2. P. Kleczkowski and A. Kleczkowski, *Advanced Methods for Shaping Time-Frequency Areas for the Selective Mixing of Sounds*, 120th Convention of Audio-Engineering Society, Paris, France, 2006;
3. A. Kleczkowski, D.J. Bailey, W. Otten, M. Grose and C.A. Gilligan, *Implications of root spatial relationship in young wheat obtained from CT-scanning for an invasion by fungal pathogens*, IOBC Conference on *Multitrophic Interactions in Soil*, 2007, published in IOBC Bulletin **42** pp. 109-112, 2009.
4. A. Kleczkowski and S. Maharaj, *Stay at Home, Wash Your Hands: Epidemic Dynamics with Awareness of Infection*, Proceedings of the Summer Computer Simulation Conference, Ottawa, Canada, July 2010.

Other publications

1. A. Kleczkowski, *Polish agriculture in the 21st Century: a strategy for sustainable farming*. A report for Chancellerie diplomatique, République de Pologne, Bruxelles, 1999;

Publications currently in print, accepted or submitted

1. A. Kleczkowski, K. Sławińska, E. Gudowska-Nowak and C.A. Gilligan. *Searching for the most cost-effective strategy for controlling epidemics*. Journal of the Royal Society Interface (in print)

Publications currently in preparation (in order of advancement)

1. A. Hockey, C.A. Gilligan and A. Kleczkowski, *Epidemic spread and control on hierarchical networks*. Phys. Rev. E, to be submitted 2008
2. A. Kleczkowski, D.J. Bailey, C. Pillinger, W. Otten, A. Bates, I. Moltini and C.A. Gilligan. *Modelling parasitic and saprotrophic spread of R. solani in plant populations*. New Phytologist (in draft).
3. A. Kleczkowski, C. Pillinger, D.J. Bailey, I. Moltini and C.A. Gilligan. *Epidemiological models for field epidemics of vegetable crops*. New Phytologist (in draft).