

## **Prof. Adam Kleczkowski**

**Current Post:** University of Stirling: Chair in Mathematics.

**Research interests:** Mathematical modelling and statistical analysis of systems at the interface of epidemiology, socio-economics and policy.

- Main current areas of application:
  - Spread and control of tree, plant and animal diseases, including trade;
  - Dynamics of potato diseases and their economic impact;
  - Plant disease decision support systems (commissioned by Defra/FC);
  - Delivery of ecosystem services, including pollination and impact of neonicotinoids on bee population;
  - Prediction of outbreaks, social impact and human behaviour during influenza epidemics;
  - Impact of intensification on food security in shrimp and fish production;
  - Control of Norovirus dynamics in shellfish.
- Main modelling approaches:
  - Stochastic, spatially extended, network- and agent-based models;
  - Bioeconomic models, including stochastic game theory;
  - Design and use of computer games in epidemiology and health protection;
  - Parameter estimation for epidemiological data (classical and Bayesian).

## **Qualifications**

MSc (1984) and PhD (1989; Polish Ministry of Education award for excellence), Jagiellonian University, Kraków, Poland.

## **Previous positions:**

Senior Lecturer (2007-14) and Reader (2014-15), University of Stirling.

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

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); NERC Soil Biodiversity Thematic Programme; Bye-Fellow, Selwyn College, Cambridge, 2002-2005;

Senior Research Fellow, King's College, Cambridge (model development and parameter estimation for plant pathogens; models of biodiversity), 1996-2002;

Research Associate, Dept. of Zoology and Dept. of Plant Sciences, University of Cambridge, 1992-1996; Royal Society and Wolfson Foundation Fellow (1992-1993)

Scientific Researcher (Wissenschaftler), Research Centre (Forschungszentrum) Jülich, Germany, 1989-1992;

Research/teaching Assistant, Institute of Physics, Jagiellonian University, Poland, 1989-1992.

**Current grants:** 2016-2021 *Disease management options: Insights from comparing forestry and agriculture* (Scottish Government Strategic Research Programme, £300k; PI of the HEI component); 2017-2019 *The epidemiology of novel PdR1 resistant grapevines: epidemic and vector movement models to support integrated disease management* (USDA, led by Univ. of California at Berkeley, cooperator); 2017-2018 'AgriFood at York' funded project on *Biosecurity and food security: The role of Private-Public Partnerships and Assurance Schemes* (£14k, CoI); 2016-2017 Defra ITT FEE/0365 *Developing a Plant Health Outbreak Decision Support Framework* (£120k, partner organisation); 2014-2017 *Modelling economic impact and strategies to increase resilience against tree disease outbreaks* (BBSRC, £1.1m,

PI); 2014-2017 *Risks of Animal and Plant Infectious Diseases Through Trade* (NSF-BBSRC, USD1.5m USA component, £600k UK component, Co-I);

**Key recent grants:** 2016 BSPP summer student project: *A few bad potatoes: Modelling economic aspects of disease control in seed potatoes*, £2500; 2013, 2014, 2015, 2016 NERC Graduate Course (£30k, Co-I); 2012 CASE studentship (CEFAS/University of Stirling; £28k, PI); 2011 Department for International Development (£19k; PI); 2010-2011 Medical Research Council Catalyst grant (£50k, PI); 2010-2013 European Investment Bank (€300k, Co-I).

**Pending applications:** 2019-2025 The Leverhulme Trust, Doctoral Training Centre (Stirling, Co-I); 2018-2021 Modelling Middle-East Respiratory Syndrome outbreaks in Saudi Arabia (PhD studentship, Saudi Arabia government, application pending);

**Administration duties (current and recent):** Head of Biological Modelling group at University of Stirling.

**Teaching (current):** Lectures and tutorials for various mathematical courses across all levels of studies, including algebra, calculus, advanced calculus, real and complex analysis, probability, statistics and numerical methods. Supervision of honours projects.

**PhD students:** 3 supervised and 3 co-supervised to completion.

**Professional membership:** Fellow of the Institute of Mathematics and its Applications; Fellow of the Royal Statistical Society; Member of the British Ecological Society; British Society for Plant Pathology; Edinburgh Mathematical Society.

**Other duties:** Member of the Plant Health Expert Group, Scottish Government (2014-2015). FP7/HORIZON 2020 expert evaluator (2013-2017), MSCA and RISE. Regular grant (BBSRC, NERC, MRC, ISF) and journal paper reviewer. External examiner.

**Key recent papers:** (51 publications. h-index 23, 1475 citations; Google Scholar).

Kleczkowski A, Ellis C, Hanley N, Goulson D. 2017. Pesticides and Bees: ecological-economic modelling of bee populations on farmland. *Ecological Modelling*, 360, 53–62.

Macpherson M.F., Kleczkowski A., Healey J., Quine C. and Hanley N. 2017. The effects of invasive pests and diseases on strategies for forest diversification. *Ecological Modelling*, 350, 87-99

Macpherson M.F., Kleczkowski A., Healey J. and Hanley N. 2017. Payment for multiple forest benefits alters the effect of tree disease on optimal forest rotation length. *Ecological Economics*, 134 82-94

Macpherson M.F., Kleczkowski A., Healey J. and Hanley N. 2016. The Effects of Disease on Optimal Forest Rotation: A Generalisable Analytical Framework. *Environmental and Resource Economics* DOI: 10.1007/s10640-016-0077-4

Bate A, Jones G, Kleczkowski A, MacLeod A, Naylor R, Timmis J, Touza J, White P. 2016. Modelling the Impact and Control of an Infectious Disease in a Plant Nursery with Infected Plant Material Inputs. *Ecological Modelling*, 334:27-43.

Kleczkowski A, Maharaj S, Rasmussen S, Williams L and Cairns N. 2015. Spontaneous social distancing in response to a simulated epidemic: a virtual experiment. *BMC Public Health*, 15:973.

Marmara V, Cook A and Kleczkowski A. 2014. Estimation of force of infection based on different epidemiological proxies: 2009/2010 Influenza epidemic in Malta. *Epidemics* 9:52-61.