Rachel A. Taylor

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Profile:

I research ecological and epidemiological systems using mathematical modelling techniques to understand their dynamics, potential control strategies and spread of disease. I am particularly interested in systems of conservation or management concern. I have a strong background in many different ecological systems using a variety of model analyses such as stochastic modelling, optimal control methods and bifurcation analysis.

Experience:

University of South Florida: Postdoctoral Researcher **2014 - Present**

- I work in Dr Leah Johnson's lab in the Department of Integrative Biology.
- I am currently researching into ***(i)*** the spread of citrus greening (Huanglongbing) within Florida, and ***(ii)*** how temperature affects vector traits and the resulting influence on disease spread.

Education:

Heriot-Watt University: PhD in Mathematical Biology **2010 - 2014**

- I worked with supervisors Prof Andrew White and Prof Jonathan Sherratt, focussing on understanding the influence of seasonal forcing on the population dynamics of ecological systems.

University of Bath: MMath (Hons), First Class **2006 - 2010**

- This included an undergraduate project researching the changing population levels of Scottish seabirds.

Publications:

Taylor, R.A., Ryan, S.J., Brashares, J.S. and Johnson, L.R., 2016.Hunting, food subsidies, and mesopredator release: the dynamics of crop-raiding baboons in a managed landscape. *Ecology,* **97**: 951–960

Taylor, R.A., Sherratt, J.A. and White, A., 2015. Seasonal forcing in a host-macroparasite system. *Journal of Theoretical Biology,* **365**:55-66

Taylor, R.A., White, A. and Sherratt, J.A. 2013. How do variations in seasonality affect population cycles? *Proceedings of the Royal Society B*, **280**:20122714.

Taylor, R.A., Sherratt, J.A. and White, A., 2013. Seasonal forcing and multi-year cycles in interacting populations: lessons from a predator-prey model. *Journal of Mathematical Biology*, **67**:1741-1764

Forthcoming Publications:

Taylor, R.A., Mordecai, E., Gilligan, C.A., Rohr, J.R. and Johnson, L.R. Mathematical models are a powerful method to understand and control the spread of Huanglongbing. *Under Review*

Adapa, S.R., **Taylor, R.A.,** Wang, C., Thomson-Luque, R., Johnson, L.R., Jiang, R.H.Y. Transmission expression signature in nascent *Plasmodium vivax* blood stage infection. *Submitted*

Barraquand, F., Louca, S., Abbott, K.C., Cobbold, C., Cordoleani, F., DeAngelis, D.L., Elderd, B.D., Fox, J.W., Greenwood, P., Hilker, F., Lutscher, F., Murray, D.L., Stieha, C.R., **Taylor, R.A.**, Vitense, K., Wolkowicz, G. and Tyson, R.C. Moving forward in circles: challenges and opportunities in modeling population cycles. *In Revision*

Awards and Scholarships:

05/2015	I received the Landahl Travel Grant from Society of Mathematical Biology to attend their annual conference ($500).
11/2014	I received a travel grant from the Office of Graduate Studies at USF ($350) to attend a career symposium at Scripps, Florida.
11/2014	I won a runner-up prize at the Integrated Mathematical Oncology workshop.

09/2010 My PhD was funded by an Engineering and Physical Sciences Research Centre (EPSRC) grant (approximately £60,000).

06/2010 I won the David Powell prize for Applied Mathematics at University of Bath which is awarded yearly to the final year student who has performed best in the Applied units (£250).

08/2009 I received an Undergraduate Nuffield Bursary to complete an 8-week research project (£1400). This was with a lecturer from the University of Ulster on modelling traffic flow within transport planning.

Presentations:

06/2016 I presented a poster entitled 'Mathematical Models are a powerful method to understand and control Huanglongbing' at Ecology and Evolution of Infectious Diseases conference in Ithaca, NY.

12/2015 I presented a poster entitled 'Data-driven mathematical models for the assessment and control of Huanglongbing' at Epidemics5 conference in Clearwater, FL.

06/2015 I presented "Mesopredator Release and Crop-Raiding Baboons" and "Data-Driven Mathematical Models for Control of Huanglongbing" at the Society for Mathematical Biology annual meeting in Atlanta, GA.

04/2015 I presented "The Influence of Seasonal Forcing on the Population Dynamics of Ecological Systems" at the Department of Integrative Biology seminar at University of South Florida.

02/2015 I presented a poster entitled "Data-Driven Mathematical Models for HLB: Testing interventions in a virtual world" at the International Research Conference on Huanglongbing, Orlando, FL.

11/2013 I presented "Seasonal Forcing and Vole Cycles in Fennoscandia" at BIRS, Banff, Canada.

08/2013 I presented "Seasonal Forcing and Vole Cycles in Fennoscandia" at Mathematical Modelling in Ecology and Evolution (MMEE) conference at York University.

06/2013 I presented "Vole Cycles" at Young Researchers in Mathematics conference at Edinburgh University.

01/2012 I presented "Seasonal Forcing and Multi-Year Cycles: Lessons from a Predator-Prey Model" at a day seminar on Patterns and Nonlinear Dynamics (PANDA) at Leeds University.

Workshops and Courses Attended:

08/2016 Bayesian Modeling for Socio-Environmental Data workshop at SESYNC, Annapolis, MD.

03/2016 I attended VectorBiTE – Vector Behaviour in Transmission Ecology workshop in Clearwater, FL.

01/2016 Coursera course: R Programming: I attained 96% overall.

10/2015 I attended a workshop on Advanced methods in R held at University of South Florida.

10/2015 I attended a day seminar on Data Analysis in Matlab at University of South Florida.

9/2015-12/2015 I attended the graduate-level course 'Data Analysis for Scientists' at University of South Florida.

2/2015-4/2015 I took part in the 8th International Dynamic Energy Budget theory tele course.

11/2014 I took part in the 4th Integrated Mathematical Oncology workshop at Moffitt Cancer Center, based on Viruses in Cancer.

11/2013 I took part in a workshop entitled "Current Challenges for Mathematical Modelling of Cyclic Populations" at BIRS in Banff, Canada.

08/2011 I attended a 2 week mathematical biology summer school run jointly by MBI and NimBioS in Columbus, Ohio.

9/2010-4/2011 Scottish Mathematical Sciences Training Centre (SMSTC) courses: Applied Mathematical Methods, Applied Analysis and PDEs and Mathematical Models.

Teaching Experience:

5/2011-12/2014 I worked for Disability Services at Heriot-Watt University doing invigilating and scribing for students with special needs.

2/2011-12/2012 I tutored an undergraduate student one-on-one who needed extra help with his mathematics for engineers courses.

9/2010-1/2014 I worked for the Heriot-Watt Mathematics department doing large group tutoring, marking and invigilating for courses at all undergraduate levels.

9/2009-5/2010 I was a Teaching Assistant and Marker for the University of Bath Mathematics department. I ran a tutorial for first-year undergraduates and marked their weekly problem sheets.

Mentorships:

Mentorship of a graduate student, Fadoua El Moustaid: The relationship between R0 and time of infection peak.
Supervision of two undergraduates, Abagail Dobson and James Martin: How trypanosomiasis is affected by temperature.

Computer Programs:

I have a good working knowledge of Matlab, R, AUTO bifurcation software and Latex. I also have some knowledge of Mathematica, Maple, and Fortran.

Memberships:

Society for Mathematical Biology, British Ecological Society

Other Experience:

Reviewer for Animal Conservation, Annals of Epidemiology, International Journal on Geomathematics, Proceedings of the Royal Society A, Journal of Theoretical Biology.