

ROBERT J. SMITH

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EDUCATION:

- Ph.D. in Mathematics, McMaster University, Canada (2001).
Dissertation: Impulsive Differential Equations with applications to Self-Cycling Fermentation.
Advisor: Gail S.K. Wolkowicz.
- M.Sc. in Mathematics, McMaster University, Canada (1996).
Dissertation: Regularity of, and Estimates for, the Degenerate Monge-Ampere Equations.
Advisors: Eric Sawyer and Pengfei Guan.
- B.Sc. with Honours (First class - the equivalent of an advanced M.Sc.) in Mathematics, Macquarie University, Australia (1994). Valedictorian.
Dissertation: Stability in Nonlinear Dynamical Systems.
Advisor: Bon Clark.

RESEARCH INTERESTS:

Mathematical modeling of infectious diseases (HIV, West Nile virus, malaria, Chagas' disease). Impulsive differential equations. Dynamical systems.

RESEARCH EXPERIENCE:

- Postdoctoral Researcher (2004-2005). Department of Mathematics and Department of Pathobiology, The University of Illinois at Urbana-Champaign.
 - Mathematical modeling of vector-borne diseases, grant writing for three grants, coordinating field research, managing large datasets.
 - *Supervisor:* Uriel Kitron.
- Postdoctoral Researcher (2003-2004). Department of Biomathematics, University of California, Los Angeles.
 - Mathematical modeling of HIV epidemiology, grant writing.
 - *Supervisor:* Sally Blower.
- Imperial Oil Postdoctoral Fellowship (2001-2003). Department of Applied Mathematics, The University of Western Ontario.
 - Mathematical modeling of HIV immunology, bone remodeling, self-cycling fermentation, impulsive differential equations.
 - *Supervisor:* Lindi Wahl.
- Countrywide Ecological Service (2001).
 - Environmental assessment, researching endangered species and habitats.
 - *Supervisor:* Leong Lim.

TEACHING EXPERIENCE:

- Co-teaching VP527: Parasitology and Epidemiology Seminar (graduate seminar), Department of Pathobiology, The University of Illinois at Urbana-Champaign (2005).
- Organizer and principle lecturer of five-day Mathematical Modelling Workshop for Scientists, Faculty of Exact and Natural Sciences, The University of Buenos-Aires, Argentina (July 2005).

- Designed and taught MATH016: Algebra and Trigonometry (pre-calculus) (freshmen), Department of Mathematics, The University of Illinois at Urbana-Champaign (2004).
- Designed and taught DE215: Ordinary Differential Equations (second year), The Department of Applied Mathematics, The University of Western Ontario (2002).
- Designed and taught AM315: Partial Differential Equations (third year), Department of Applied Mathematics, The University of Western Ontario (2002).
- Designed and taught AM380: Mathematical Methods for Scientists (third year) Department of Applied Mathematics, The University of Western Ontario (2001-2002).
- Designed and taught MATH2R03: Linear Algebra II (second year), Department of Mathematics and Statistics, McMaster University (2001).
- Designed and taught MATH1AA3: Calculus II / MATH1NN3: Calculus for Engineers (first year combined course) Department of Mathematics and Statistics, McMaster University (2001).
- Teaching Assistant (1995-2000). McMaster University
- Tutorial Leader (1994-1995), only awarded to outstanding students. Macquarie University.

RELEVANT COURSES ON EFFECTIVE TEACHING:

- Presenting Effective Lectures, McMaster University (1998).
- Principles and Practice of University Teaching, McMaster University (1996).

ADVISING AND MENTORING EXPERIENCE:

- Yi Ling Lin, mentored as part of the mentoring program at the European Conference on Mathematical and Theoretical Biology 2005, Dresden, Germany (summer 2005).
- Colleen Ball, undergraduate student who I mentored in math biology (spring 2003; she is now undertaking an M.Sc. at the University of British Columbia).
- Ashley Pitcher, supervised for summer research project when her supervisor was on leave (summer 2002; she was recently accepted to Oxford University for a PhD).
- Jane Heffernan, co-advised for her M.Sc. when her supervisor was on leave (summer 2002; she has recently accepted a postdoctoral position at the University of Warwick).

SERVICE ACTIVITIES:

- Manuscript Reviewer: Dynamics of Continuous, Discrete and Impulsive Systems, International Journal for Parasitology (2002-2004).
- "The Flower Hour" biomath seminars (organizer and multiple presentations given), The University of Western Ontario (2001-2003).
- Member Gender Equity Committee, McMaster University (2000-2001).
- Organizer of Graduate Student Seminars, McMaster University (1999-2001).
- Faculty of Science Representative for Graduate Students, McMaster University (1998-2001).
- Member McMaster Math and Statistics Society (1996-97).
- Founder and President, Macquarie University Maths Club, Macquarie University (1992-1994).
- Member Golden Key Society (only top 15% of students eligible), Macquarie University (1991).

SELECTED HONORS, AWARDS AND SCHOLARSHIPS:

- Merit award for outstanding research, University of Illinois at Urbana-Champaign (2005).
- Sherman Scholarship, McMaster University (1998-99 and 1999-2000)
- Richard Fuller Scholarship, McMaster University (1996-97 and 1997-98)

- Milos Novotny Scholarship, McMaster University (1995)
- Australian Postgraduate Research Award, Macquarie University (1995)

INVITED LECTURES AND PRESENTATIONS:

- "Perspectives on mathematical modelling of microbicides" Organizer of multi-panel minisymposium and talk given, The European Conference on Mathematical and Theoretical Biology, Dresden, Germany (July 2005)
- "The epidemiological impact of low efficacy HIV prevention methods" Workshop on Modelling the Rapid Evolution of Infectious Diseases: Epidemiology and Treatment Strategies London, Ontario (May 2005)
- "Rethinking the basic reproductive ratio: Perspectives on R_0 " Organizer of multi-panel minisymposium and overview talk given, The Society for Mathematical Biology Annual Meeting, Ann Arbor, Michigan (July 2004)
- "Distinct effects of protease and reverse transcriptase inhibition in an immunological model of HIV-1 infection with impulsive drug effects" The Society for Mathematical Biology Annual Meeting, Dundee, Scotland (August 2003)
- "A Size-Structured Model for the Nutrient-Driven Self-Cycling Fermentation Process" The Society for Mathematical Biology Annual Meeting, Knoxville, Tennessee (July 2002)
- "Analysis of a Model of the Nutrient Driven Self-Cycling Fermentation Process" Conference on Discrete, Continuous and Impulsive Dynamical Systems, London, Canada (July 2001)
- "Monotone Impulsive Differential Equations" Poster, Math 2000: Canadian Mathematical Society, Hamilton, Canada (June 2000)
- "Stability in Nonlinear Dynamical Systems" Workshop on Nonlinear Dynamics, Montreal, Canada (May 1997).

PROFESSIONAL MEMBERSHIPS:

- The European Society for Mathematical and Theoretical Biology.
- The Society for Mathematical Biology.
- The Canadian Mathematical Society.
- The Australian Mathematical Society.

PAPERS IN REFEREED JOURNALS:

1. R.J. Smith, Adherence to antiretroviral HIV therapy: How many doses can you miss before resistance emerges? (Proceedings of the Royal Society B: Biological Sciences 2005, *in press*)
2. J.M. Heffernan, R.J. Smith and L.M. Wahl, Perspectives on the basic reproductive ratio (Journal of the Royal Society Interface 2005, 2:4, 281-293; *invited review*).
3. R.J. Smith and L.M. Wahl, Drug resistance in an immunological model of HIV-1 infection with impulsive drug effects (The Bulletin of Mathematical Biology 2005, 67:4, 783-813).
4. R.J. Smith, E.N. Bodine, D.P. Wilson and S.M. Blower, Evaluating the potential impact of vaginal microbicides in reducing the risk of HIV acquisition in female sex workers (AIDS 2005, 19:4, 413-421).
5. R.J. Smith and S.M. Blower, Could disease-modifying HIV vaccines cause population-level perversity? (The Lancet Infectious Diseases 2004, 4:10, 636-639).
6. R.J. Smith and L.M. Wahl, Distinct effects of protease and reverse transcriptase inhibition in an immunological model of HIV-1 infection with impulsive drug effects (The Bulletin of Mathematical Biology 2004, 66:5, 1259-1283).

7. R.J. Smith and G.S.K. Wolkowicz, Analysis of a Model of the Nutrient Driven Self-Cycling Fermentation Process (Dynamics of Continuous, Discrete and Impulsive Systems, Series B: Applications & Algorithms 2004, 11:3, 239-265)
8. S.V. Komarova, R.J. Smith, S.J. Dixon, S.M. Sims and L.M. Wahl, Mathematical Model Predicts a Critical Role for Osteoclast Autocrine Regulation in the Control of Bone Remodeling (Bone 2003, 33:2, 206-215)
9. R.J. Smith and G.S.K. Wolkowicz, A Size-Structured Model for the Nutrient-Driven Self-Cycling Fermentation Process (Dynamics of Continuous, Discrete and Impulsive Systems, 2003, 10:2, 207-220)
10. R.J. Smith and G.S.K. Wolkowicz, Growth and Competition in the Nutrient-Driven Self-Cycling Fermentation Process (Canadian Mathematics Quarterly 2002, 10:1, 171-177)

COURSE MANUALS:

11. R.J. Smith, Modelling Disease Ecology with Mathematics (published through The University of Illinois at Urbana-Champaign 2005; 114 pages).

CONFERENCE PAPERS:

12. Z. Li, K.P. Smith, I. Hlohowskyj, J. Hayse, R.J. Smith, An Agent-based Model for Simulation of West Nile Virus Transmission (The Agent 2005 Conference on Generative Social Processes, Models, and Mechanisms, Argonne National Laboratory, Oct. 2005)

LETTERS:

13. D.P. Wilson, E.N. Bodine, R.J. Smith and S.M. Blower, Response to Foss et al., 'Care should be taken when promoting microbicide use among sex workers who are able to use condoms consistently' (AIDS 2005, 19:17, 2044-46).
14. S.M. Blower and R.J. Smith, Is population-level perversity a likely outcome of mass vaccination against HIV? - Authors' reply (The Lancet Infectious Diseases 2005, 5:5, 255-256).

PAPERS UNDER REVIEW:

15. R.J. Smith, Could low efficacy malaria vaccines increase secondary infections in endemic areas? (submitted to the ECTMB 2005 conference proceedings)

REFERENCES:

- Uriel Kitron, Professor of Epidemiology and Preventive Medicine
University of Illinois at Urbana-Champaign
(217) 244 6221; fax (217) 244 7421 ukitron@uiuc.edu
- Sally Blower, Professor of Biomathematics
University of California, Los Angeles
(310) 794 8911; fax (310) 794 8653 sblower@mednet.ucla.edu
- Lindi Wahl, Canada Research Chair in Mathematical Biology
University of Western Ontario
(519) 661 2111 x88795; fax (519) 661 3523 lwahl@uwo.ca
- Gail Wolkowicz, Professor of Mathematics
McMaster University
(905) 525-9140 x24808; fax (905) 522-0935 wolkowic@mcmaster.ca
- Miroslav Lovric', Professor of Mathematics
McMaster University (teaching reference)
(905) 525-9140 x27362; fax (905) 522-0935 lovric@mcmaster.ca