Curriculum Vitae – Marc D. Ryser (September 2018)

CONTACT INFORMATION

Department of Population Health Sciences
Duke University
Imperial Building, 215 Morris St Durham, NC 27701
Web: www.math.duke.edu/∼ryser
E-mail: marc.ryser@duke.edu

POSITIONS HELD

Duke University, Durham, NC, USA

Assistant Professor in the Department of Population Health Sciences and the Department of Mathematics	**9/2018-present**
Senior Research Associate in the Department of Surgery	**9/2016-8/2018**
Visiting Scholar in the Department of Mathematics	**8/2015 - present**
Visiting Assistant Professor in the Department of Mathematics	**1/2012 -7/2015**

EDUCATION

McGill University, Montréal, Canada **2007 -2011**

Ph.D. in Mathematics

- 2013 Doctoral Prize of the Canadian Mathematical Society
- Thesis title: *Of Bones and Noise*

Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland **2004 - 2006**

Master of Science (M.Sc.) in Theoretical Physics

- Thesis title: *Electromagnetic Fluctuations in Charged Fluids Coupled to the Radiation Field*

Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland **2001 - 2004**

Bachelor of Science (B.Sc.) in Physics

GRANTS

- *K99: The Mathematics of Breast Cancer Overtreatment: Improving Treatment Choice through Effective Communication of Personalized Cancer Risk.* Agency: NIH-NCI; Role: PI; Duration: 2016-21; Budget: USD $1,068,714. K-phase mentor: Prof. E.S. Hwang, Chief of Breast Surgery, Duke
- *Mathematical Analysis of Spatial Cancer Models.* Agency: NSF; Role: Co-PI (PI: Prof. R. Durrett); Duration: 2016-19; Budget: USD $287,214.
- *Genomics meets mathematics: inferring the evolutionary dynamics of breast cancer.* Agency: Triangle Center for Evolutionary Medicine; Role: PI; Duration: 2017-18; Budged: USD $20,000.
- *Advanced Postdoc.Mobility Fellowship: Mathematical Models of Cancer Evolution and HPV Infection.* Agency: Swiss National Science Foundation; Role: PI; Duration: 2015-16; USD $\$95,000$ (second year declined for K99/R00).
- *Quantifying the Phenotypic Evolution during Tumor Growth.* DataPlus Research Program. Agency: Information Initiative Duke; Role: PI; Budget: USD $13,000
- *Complex decisions, real numbers: a big data approach to medical decision making.* DataPlus Research Program. Agency: Information Initiative Duke; Role: PI; Budget: USD $13,000

AWARDS

- *2013 Doctoral Prize* of the Canadian Mathematical Society. CAD $\$500$.
- Hydro-Québec Doctoral Fellowship, 2010-11. CAD $\$15,000$.
- Hydro-Québec Doctoral Fellowship, 2009-10. CAD $\$15,000$.

- Schulich Fellowship, 2008-09. CAD $\$12,500$.
- ISM Scholarships for Graduate Studies, 2008-09. CAD $\$15,000$.
- McGill Graduate Studies Fellowship for excellent academic standing, 2007-08. CAD $\$5,000$.

PUBLICATIONS

See attached publication list.

IN THE MEDIA

- NIH Director's Blog (5/2018)
  Are Some Tumors Just ?Born to Be Bad??
- Duke Today (10/17/2017)
  Bacteria Self-Organize to Build Working Sensors
- TIME (12/16/2015)
  Who Can Delay Breast Cancer Treatment? A New Math Model Adds Clues
- National Public Radio (10/14/2015)
  Treatment Changes For DCIS Haven't Affected Breast Cancer Deaths
- BioCentury Innovations (05/14/2015)
  HPV on clearance
- MedicalResearch.com (04/01/2015)
  Random Stem Cell Divisions May Play Role in Persistent HPV Infections (interview)
- The Herald Sun (03/25/2015)
  Duke study: Chance plays key role in HPV/cancer development
- Sci Guru - Science News (03/24/2015)
  Unpredictable division patterns in HPV-infected stem cells determines body's ability to fight it
- WUNC - North Carolina Public Radio (03/16/2015)
  Report on the Morning Edition
- Pharmacy Times (03/13/2015)
  Greater Emphasis on HPV Vaccinations for Boys Could Lead to Better Outcomes

EDITORIAL SERVICES

- Guest Editor for PLOS Computational Biology
- Guest Academic Editor for PLOS One
- Reviewer for PNAS (1); Cell Reports (1); Cancer Research (2); JNCI (2); PLOS Computational Biology (1) ; PLOS One (2); The Journal of Theoretical Biology (2); BioMed Central (1); Biomechanics and Mechanobiology (1); BMC Medical Genetics (1); Vaccine (1).

STUDENT SUPERVISION

Duke University, Durham, USA

- Yiling Liu: MS student in Biostatistics (2016-present)
- Kevin Murgas: NSF-funded summer student (2015)
- Tayyab Wasim: NSF-funded summer student (2014)
- Michael Lin: NSF-funded summer student (2013)
- Mandy Jiang: PRUV fellow and honors thesis (2012 – 2013)
- Andrew Yuan: NSF-funded summer student (2012)

TEACHING EXPERIENCE

Duke University, Durham, USA **2012 - present**

- Instructor for MATH 353: ODEs and PDEs; undergraduate level (Spring 2015)
- Instructor for MATH 230: Probability Theory (Fall 2014)

- Instructor for MATH 353: ODEs and PDEs; undergraduate level (Fall 2013)
- Instructor for MATH 353: ODEs and PDEs; undergraduate level (Spring 2013)
- 4-week course: *Introduction to Stochastic PDEs*; graduate level (Fall 2012)

Simon Fraser University, Vancouver, Canada **2009-2011**

- Teaching assistant for 3 undergraduate-level courses

McGill University, Montréal, Canada **2007 - 2008**

- Teaching assistant for 1 graduate-level and 2 undergraduate-level courses

Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland **2004 - 2005**

- Teaching assistant for 2 undergraduate-level courses

Conference Organization

- Co-organizer of mini-symposium on *Spatial Cancer Models*, ECMBT 2014, Gothenburg, Sweden
- Group coordinator at the *Fifth Montreal Problem Solving Workshop*, Montreal, 2013
- Organizer of mini-symposium on *Mathematical Modeling in Bone Biology* at ICIAM 2011, Vancouver, Canada

Presentations

- *The Impact of Prognostic Estimates on Surgical Decision Making in the Setting of Severe Traumatic Brain Injury: A Survey of Neurosurgeons.* Preventing Overdiagnosis 2018, Copenhagen, Denmark, 2018
- *Natural history of ductal carcinoma in situ in the absence of locoregional treatment.* Preventing Overdiagnosis 2018, Copenhagen, Denmark, 2018
- *Mechanistic Multi-Scale Models of Carcinogenesis: Building Bridges between Biologic Mechanism and Population Data.* Department of Population Health Sciences, Duke University, Durham, NC, 2018
- *Mechanistic Multi-Scale Models of Carcinogenesis: Building Bridges between Biologic Mechanism and Population Data.* Lombardi Comprehensive Cancer Center, Georgetown University, Washington DC, 2018
- *Mechanistic Multi-Scale Models of Carcinogenesis: Building Bridges between Biologic Mechanism and Population Data.* Canary Center at Stanford for Cancer Early Detection & Stanford Cancer Institute, Stanford University, Palo Alto, CA, 2018
- *Active Surveillance vs. Surgery after Diagnosis with DCIS.* Society for Medical Decision Making, Pittsburgh, PA, 2017
- *Reducing Overtreatment of DCIS Through Active Surveillance.* Preventing Overdiagnosis, Quebec City, QC, 2017
- *The Mathematics of Cancer: Building Bridges between Biologic Mechanism and Population Data.* Research Colloquium, Department of Surgery, Duke University, Durham, NC, 2017
- *DCIS: To treat, or not to treat (right away), that is the question.* Shriners Hospital for Children Canada, McGill University, Montreal, QC, 2017
- *The Mathematics of Cancer: Building Bridges between Biologic Mechanism and Population Data.* McGill University, Montreal, QC, Canada, 2017
- *The Mathematics of Cancer: Building Bridges between Biologic Mechanism and Population Data.* Swiss Federal Institute of Technology (ETHZ), Basel, Switzerland, 2016
- *DCIS: To treat, or not to treat (right away), that is the question.* Fred Hutchinson Cancer Center, Seattle, WA, USA, 2016
- *The Mathematics of Cancer: Building Bridges between Biologic Mechanism and Population Data.* Fred Hutchinson Cancer Cancer Seattle, WA, USA, 2016

- *Sexual Behavior, HPV Exposure and Cancer Incidence: Connecting the Dots.* AMS Sectional Meeting, Raleigh, NC, USA, 2016
- *The Mathematics of Cancer: Building Bridges between Biologic Mechanism and Population Data.* Cancer Epidemiology Seminar, UNC Chapel Hill, USA, 2016
- *Bridging the gap in HPV research.* ECMTB, Nottingham, UK, 2016
- *Using multi-scale models to bridge basic and population sciences.* EUROGIN, Salzburg, Austria, 2016
- *Quantifying the dynamics of field cancerization in tobacco-related head and neck cancer.* Guest speaker at U01 Co-I Meeting, School of Public Health, University of Michigan, Ann Arbor, USA, 2016
- *Ductal carcinoma in situ: to treat or not to treat (right away), that is the question.* Guest speaker, NIH CISNET Half-Year Meeting, Boston, USA, 2016
- *Stage 0 breast cancer: to treat or not to treat (right away), that is the question.* Seminar, The Moffitt Cancer Center and Research Institute, Tampa, USA, 2016
- *Bridging the gap in cancer research: from biological mechanism to population level data.* Biostatistics & Bioinformatics Seminar, Duke University, Durham, USA, 2016
- *Treat or wait? Model-based Risk Projections for Active Surveillance in Patients with Ductal Carcinoma in Situ.* Computational Biology Seminar, Duke University, 2015
- *HPV clearance and the neglected role of stochastic stem cell dynamics.*
  30th International Papillomavirus Conference, Lisbon, Portugal, 2015
- *Competing natural history models predict differential patterns of future HPV prevalence in older women.*
  30th International Papillomavirus Conference, Lisbon, Portugal, 2015
- *Active surveillance as a possible management strategy for ductal carcinoma in situ: a computational risk analysis.* Preventing Overdiagnosis, Bethesda, MD, USA, 2015
- *HPV clearance and the neglected role of stochasticity.*
  CMO Workshop: Viral Dynamics and Cancer, Oaxaca, Mexico, 2015
- *Human papillomavirus: from biology to public health.*
  Seminar talk at UC Irvine, California, 2015
- *Human papillomavirus: from biology to public health.*
  Seminar talk at Moffitt Cancer Center, Tampa, Florida, 2014
- *Human papillomavirus: from biology to public health.*
  Seminar talk at ETH, Zurich, Switzerland, 2014
- *HPV clearance and the neglected role of stochasticity.*
  Ecology and Evolution of Cancer, Mathematical Biosciences Institute, Columbus, OH, 2014
- *Bone (re)modeling: a spatial game of stochastic nature.*
  7th World Congress of Biomechanics, Boston, 2014
- *Tracking the invisible: a probabilistic approach to field cancerization.*
  9th European Conference on Mathematical and Theoretical Biology, Gothenburg, Sweden, 2014
- *Tracking the invisible: a probabilistic approach to field cancerization.*
  Conference on *Evolutionary Biology and the Theory of Computing*, Simons Institute, 2014
- *Of Noise and Cancer.*
  Seminar talk, Department of Mathematics and Statistics, UNC Charlotte, Charlotte, 2014
- *Of Noise and Cancer.*
  Prize Lecture, Winter Meeting of the Canadian Mathematical Society, Ottawa, December 2013
- *On the cost-effectiveness of male HPV vaccination in the USA.*
  Mathematical Biology Seminar, University of Minnesota, Minneapolis, 2013
- *A Stochastic Modeling Approach to Field Cancerization.*
  Mini-symposium, INFORMS, Minneapolis, 2013
- *A random dynamic graph approach to HPV transmission in adolescent sexual networks.*

Mini-symposium, INFORMS, Minneapolis, 2013

- *HPV and cervical cancer: a stochastic model at tissue level.*
  Mini-symposium, SIAM Dynamical Systems, Snowbird, UT, 2013
- *Of cells and people: multiscale modeling of HPV dynamics.*
  STOR Colloquium, University of North of Carolina at Chapel Hill, 2013
- *HPV and cervical cancer: a stochastic model at tissue level.*
  Applied Math Seminar, Department of Mathematics, University of Florida, 2013
- *HPV and cervical cancer: a stochastic model at tissue level.*
  Cancer Modeling Seminar, Department of Mathematics, Duke University, 2013
- *From physiological remodeling to cancer metastases: a mathematical model of bone cell dynamics.*
  Math Biology Seminar, School of Mathematics, University of Minnesota, USA, 2012
- *Stimulating inhibitors: on the controversial role of OPG in bone metastases.*
  Mini-symposium, ECCOMAS 2012, Vienna, Austria
- *Triviality of the 2D stochastic Allen-Cahn equation.*
  8th World Congress in Probability and Statistics 2012, Istanbul, Turkey
- *On the well-posedness of nonlinear SPDEs.*
  ICIAM 2011, Vancouver, Canada
- *Stimulating inhibitors: on the controversial role of OPG in bone metastases.*
  Mini-symposium, ICIAM 2011, Vancouver, Canada
- *On traveling waves and hybrid models in bone remodeling.*
  Mini-Symposium, ASME Applied Mechanics and Materials Conference, Chicago, USA, 2011
- *On the well-posedness of the 2D stochastic Allen-Cahn equation.*
  Mathematics Seminar, Simon Fraser University, Vancouver, Canada, 2011
- *On the well-posedness of nonlinear SPDEs in higher dimensions.*
  Mathematics Seminar, Heriot-Watt University, Edinburgh, UK, 2010
- *Bone remodeling and its role in bone metastases: a mathematical approach.*
  Bio-Math Seminar, University of Leeds, Leeds, UK, 2010
- *On the well-posedness of nonlinear SPDEs in higher dimensions.*
  Mathematics Seminar, University of Manchester, Manchester, UK, 2010
- *On the well-posedness of nonlinear SPDEs in higher dimensions.*
  PANDA Meeting, University of Leeds, Leeds, UK, 2010
- *On the well-posedness of nonlinear SPDEs in higher dimensions.*
  Mathematics Seminar, Reading University, UK, 2010
- *Bone remodeling and its role in bone metastases: a mathematical approach.*
  RSBN Seminar, Reading University, UK, 2010
- *A nonlinear PDE model of bone remodeling.*
  Mini-Symposium, WCCM/APCOM, Sydney, Australia, 2010
- *A Nonlinear Spatio-Temporal Model of Bone Remodeling.*
  Computational Biology Seminar, University of Western Australia, Perth, Australia, 2010
- *The cellular dynamics of bone remodeling: a nonlinear PDE model.*
  Mini-Symposium, ECCM, Paris, France, 2010
- *Bone growth and destruction at the cellular level: a mathematical model.*
  Mini-Symposium, ISAAC, London, UK, 2009
- *The dynamics of a single bone multicellular unit: a mathematical model.*
  Seminar at Centre for Nonlinear Dynamics, McGilll University, Montreal, Canada, 2008
- *Spatio-temporal dynamics of a single bone remodeling unit.*
  ASBMR, Honolulu, USA, 2007

POSTER PRESENTATIONS

- *Quantifying the Natural History and Overtreatment Rate of Ductal Carcinoma in Situ.* San Antonio Breast Cancer Symposium, San Antonio, TX, 2017
- *Using Mechanistic Modeling to Evaluate Sexual Behavior Cohort-Effects on HPV Exposure in U.S. Women.* HPV 2017, Capetown, South Africa, 2017
- *A stochastic modeling approach to field cancerization.* IBECC 2013 - University of California San Francisco, 2013
- *On the Well-Posedness of Nonlinear SPDEs in Higher Dimensions.* SPDE Conference, Cambridge, UK, 2010
- *Role of tumor-derived OPG in supporting cancer growth within bone tissue.* ASBMR, Toronto, Canada, 2010
- *Impact of the spatial RANKL/OPG distribution on BMU branching.* Symposium on Biotechnology in Musculoskeletal Repair, Lausanne, Switzerland, 2008

INTERNSHIPS

Swiss Federal Institute for Snow and Avalanche Research,
Davos, Switzerland **August - October 2004**

Under the direction of M. Lehning I investigated the numerical simulation of snow transport above alpine terrain, and programmed an appropriate finite element method in both C and $MatLab$.

WORKSHOPS/ SUMMER SCHOOLS

- IMO Workshop V3.0 - Personalized Medicine. Mathematical modeling workshop at the Moffitt Cancer Center, Tampa, FL, 2013
- SPDEs: Computations and Applications. Workshop at the International Centre for Mathematical Sciences. Edinburgh, UK, 2008
- Bio-Math Summer School and Workshop: Stochastic Differential Equation Models with Applications to the Insulin-Glucose System and Neuronal Modelling, Middelfart, Denmark, 2008
- 10th PIMS Graduate Industrial Mathematics Modelling Camp, Edmonton, Canada, 2007
- 11th PIMS Industrial Problem Solving Workshop, Edmonton, Canada, 2007

COMMUNITY SERVICE

- Volunteer for the *Let's Talk Science* program: leader of hands-on science sessions at *Tecumseh Elementary School* in Vancouver, January 2009-August 2011
- Member of the Committee for Graduate Student Support at McGill, 2007-08
- Student Representative for the Department of Mathematics at the Post-graduate Student Society, McGill, 2007

LANGUAGES

- German: Mother tongue.
- French: Fluently written/spoken, university level.
- English: Fluently written/spoken, university level.
- Spanish: Two years of formal education.