

Shalla Hanson

LJLL-UPMC, 4 Place Jussieu, F75252 Paris Cedex 05, FR
120 Science Dr., Off. 274E, Durham, NC 27708, US
✉ shalla.hanson@duke.edu
🌐 www.math.duke.edu/grad/shanson

Education

- 2018 **PhD Mathematics**, *Duke University*, Durham, North Carolina, USA.
- 2018 **PhD Applied Mathematics**, *Université Pierre et Marie Curie*, Paris, France.
Advisors: Michael C. Reed, Ph.D., Department of Mathematics, Duke University, and Jean Clairambault, Ph.D., M.D., Jacques-Louis Lions Laboratory, Université Pierre et Marie Curie & INRIA, Paris.
- 2015 **MA Mathematics**, *Duke University*, Durham, North Carolina.
- 2012 **Post-baccalaureate Certificate Mathematics**, *Smith College*, Northampton, Massachusetts.
- 2009 **BS Biochemistry**, *Southern Methodist University*, Dallas, Texas.

PhD Thesis

Dynamic Optimisation of Anti-tumor Immunity in Rapidly Mutating Cancers: Manipulating the Evolutionary Trajectory.

Current Research Interests

- *Interaction Dynamics in Heterogeneous and Opposing Populations, most specifically Evolving Cancer Cells and Responding Immune Cells.*
- *Designing Patient Specific Combination Chemo- & Immunotherapy Treatment Protocols for Glioblastoma.*
- *Dynamic Optimisation of CAR T Cell Therapy for B-ALL.*
- *Mathematical Modelling of T Cell Activation and Differentiation.*

Selected Talks

- Jul. 2016 *Foreseeable Changes in Lymphocyte Phenotype May Shape Patient Responses to Immunotherapy*, 2016 joint meeting of the European Society for Mathematical and Theoretical Biology and the Society for Mathematical Biology, Nottingham, United Kingdom.
- Apr. 2016 *Impacts of T-cell Heterogeneity in Tumor Immunology*, Laboratoire Jacques-Louis Lions, Université Pierre & Marie Curie, Paris, France.
- Sep. 2015 *A Case for Consistency Among Opposing Models of T Cell Activation and Differentiation*, International Conference of Numerical Analysis and Applied Mathematics, Rhodes, Greece.
- May 2015 *Mathematical Analysis Reveals Plausibility of Misdiagnosis among Chemotherapy Patients: Specious Presentation of Immune Exhaustion Mimics Development of Resistance*. Duke University Workshop on Applications of Mathematics to Physiology and Medicine, Durham, North Carolina, USA.
- Apr. 2015 *Lessons from Mathematical Modeling of Tumor-Immune Dynamics*, Brain Tumor Immunotherapy Program, Duke University Medical Center, Durham, North Carolina., USA.

- Jan. 2013 *Mathematical Modeling of Zebrafish Spinal Cord Development: Ordinary Differential Equation Approximation for Spatially Inhomogeneous 2-dimensional Growth in a Circular Domain*, Joint Mathematics Meetings, San Diego, California, USA.
- Aug. 2011 *The Pros and Woes of Standardized Testing*, McDonalds Education Workshop, Houston, Texas, USA.

Honors and Awards

- 2013-2017 NSF Research Training Grant DMS-0943760, Duke University.
- 2015-2016 Chateaubriand STEM Fellowship, Office for Science and Technology, Embassy of France, and INRIA.
- 2015 Triangle Graduate Fellowship in Evolutionary Medicine, National Evolutionary Synthesis Center & Triangle Center for Evolutionary Medicine.
- 2014 Howard Hughes VIP Fellowship, Duke University.
- 2012 Post-baccalaureate Research Fellowship, Smith College.
- 2010 Official Recognition for Founding & Directing the St. Vincent's Patient Assistance Program, University of Texas Medical Branch School of Medicine.
- 2009 Leonard Andrews Scholarship Recipient, Southern Methodist University.
- 2008 Cheatum-Longnecker Scholarship Recipient, Southern Methodist University.
- 2004-2006 Centennial Scholarship, Lee University.

Publications

- 2016 **Hanson S**, Grimes DR, Taylor-king JP, Bauer B, Warman PI, Frankenstein Z, et al. *Toxicity Management in CAR T cell therapy for B-ALL: Mathematical modelling as a new avenue for improvement*. BioRxiv 2016. Available from: <http://dx.doi.org/10.1101/049908>.
- 2016 **Hanson S**, Taylor-King JP, Grimes DR, Warman PL, Bonassar MJ, Arango A, and Davila M. *Designing Patient Specific Protocols for Anti-CD19 CAR-T Cell Therapy with Ancillary Immunomodulation in B Cell Acute Lymphoblastic Leukemia*. Note: In Preparation 2016.
- 2016 **Hanson S** and Sanchez-Perez L. *Distinguishing Functional from Phenotypic Characterizations of T Cell Subsets is Necessary for the Resolution of the Current Debate on T Cell Activation Pathways*. Note: In Preparation 2016.
- 2015 Ortiz L, Reed M, and **Hanson S**. *Modeling of Oncolytic Virotherapy & Immune Responses in Cancer Therapy*. ABRCMS 2015.
- 2013 **Hanson S**, Zaccheo K. *Modeling Zebrafish Spinal Cord Development*. JMM Preliminary Report 2013.

Special Session Workshops Attended

- Jul. 2016 Minisymposia on Tumor-Immune Dynamics and Virotherapy, 2016 joint meeting of the ESMTB & SMB, University of Nottingham, Nottingham, UK.
- Mar. 2016 INRIA & Cancer Days, INRIA-Paris, Paris, FR.
- Nov. 2015 IMO Workshop 5: Immune Cancer, Integrative Mathematical Oncology, Moffitt Cancer Center & Research Institute, Tampa, FL, USA.

- Sep. 2015 ICNAAM Symposium on Mathematical Models and Methods to Investigate Heterogeneity in Cell and Cell Population Biology, Rhodes, Greece.
- Aug. 2015 CMO-BIRS Workshop on Viral Dynamics and Cancer: Modeling Oncogenic and Oncolytic Viruses, Casa Matematica Oaxaca, Oaxaca, Mexico.
- Jun. 2015 CAMBAM-MBI-NIMBioS Workshop on Nonlinear Dynamics in Biological Systems, Montreal, Canada.
- Mar. 2015 MBI Workshop on Targeting Cancer Cell Proliferation and Metabolism Networks, Mathematical Biosciences Institute, Columbus, Ohio, USA.
- Feb. 2015 MBI Workshop on Treatment, Clinical Trials and Resistance of Cancer, Mathematical Biosciences Institute, Columbus, Ohio, USA.
- Jan. 2015 AIM Workshop on Tumor-immune Dynamics, American Institute of Mathematics, San Jose, California.

Public Health Experience

- 2013 *Senior Health Policy Analyst*, Program Effectiveness and Sustainability, State Consulting, The Lewin Group, Washington, District of Columbia.
- 2010-2011 *Director and Founder of the St. Vincent's Clinic Patient Assistance Program*, University of Texas Medical Branch, School of Medicine, Galveston, Texas.

Teaching Experience

Undergraduate Research Mentored

- Summer 2015 L Ortiz, (Metropolitan University of San Juan, Puerto Rico) Co-mentored during the Duke University Summer REU in Mathematical Biology. Project: *Modeling of Oncolytic Virotherapy & Immune Responses in Cancer Treatment*.
- Summer 2015 Laurel Bates (Appalachian State University), Mentored during the Mathematics Applied to Physiology and Medicine Workshop at Duke University, Project: *Mathematical Modeling of Oncolytic Virotherapy*.
- 2014-2015 Mario Khalil (Duke University), Co-mentored during the Howard Hughes Vertically Integrated Partners Program and Continued Collaboration through the Subsequent Academic Year, Projects: *Mathematical Modeling of Arsenic Detoxification*, and *Dynamics of Disulfide Linking in Human Plasma and Theoretical Optimization of N-acetylcysteine Therapy in Acetaminophen Overdose*.
- Summer 2014 Thomas Debo (Arizona State University) and Kayleah Cumpian (Northeast Texas Community College), Mentored during the Mathematics Applied to Physiology and Medicine Workshop at Duke University, Project: *The Effects of Chemotherapy on Tumor Growth and Angiogenesis*.

Teaching Assistantships

- 2013 Calculus I, Department of Mathematics, Duke University.
- 2012 Calculus I, II, III, and Linear Algebra, Department of Mathematics, Smith College, and College Algebra, Spinelli Center for Quantitative Learning, Smith College.
- 2006 General Physics I, Department of Natural Science and Mathematics, Lee University.

Instruction

- 2013-2015 *Assorted lectures* in Introductory Calculus and Real Analysis, Duke University, Durham, North Carolina.

2009-2010 Options for Health Care Funding for the Indigent Population, University of Texas Medical Branch School of Nursing, Galveston, Texas.

Professional Memberships

Society for Industrial and Applied Mathematics (SIAM)

Society for Mathematical Biology (SMB)

American Mathematical Society (AMS)

Association for Women in Mathematics (AWM)

Sigma Xi

Relevant Skills

Programming and Computation

MATLAB, Scilab, html, Mathematica, Maple, JMP, SAS, R, LaTeX.

Language Proficiencies

English (Native), Spanish (Fluent), French (Beginner)