
CURRICULUM VITÆ

January 15th, 2018

TRACHETTE L. JACKSON

Professor of Mathematics, University of Michigan

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email: tjacks@umich.edu
Born July 24, 1972
Citizen of the USA

EDUCATION

Ph.D. in Applied Mathematics, University of Washington, August 1998

Supervisor: Prof. J. D. Murray

M.S. in Applied Mathematics, University of Washington, 1996

B.S. in Mathematics, Arizona State University, 1994

Summa Cum Laude, University Honors, Honors in Major

RESEARCH EXPERIENCE

Professor: Department of Mathematics, University of Michigan

August 2008 – present

Associate Professor: Department of Mathematics, University of Michigan

September 2003 – July 2008

Assistant Professor: Department of Mathematics, University of Michigan

September 2000 - August 2003

John Hope Franklin Postdoctoral Fellow: Department of Mathematics, Duke University *August 1999-September 2000*

NSF Graduate Fellow: Department of Mathematics, University of Washington

September 1995 - June 1998

TEACHING EXPERIENCE

Course Developer and Instructor: University of Michigan

Winter 2002, 2003, 2005, 2014

Math 563: Advanced Mathematical Methods for the Biomedical Sciences.

Course Developer and Instructor: University of Michigan

Winter and Fall 2001, Fall 2004, Fall 2005, Fall 2007, Fall 2008, Fall 2009, Fall 2010, Fall 2011, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017

Math 463: Introduction to Mathematical Biology.

Instructor: University of Michigan

Spring 2005, Spring 2012, Spring 2014, Spring 2016

Math Math 454: Boundary Value Problems for Partial Differential Equations.

Instructor: University of Michigan

Fall 2000, Winter 2006

Math 115: First Calculus I.

HONORS AND AWARDS

- 2018 Voted into the Inaugural class of AWM Fellows
- 2016 Featured in Stem Gems: How 44 Women Shine in Science, Technology, Engineering and Mathematics, And How You Can Too!
- 2014 DAPCEP Real McCoy Award
- 2013 Featured in Darwin's Extra Sense

This is a documentary project on the new math of the life sciences that was premiered at the Joint Math Meetings on January 11th, 2013. The movie features leaders in the field of Mathematical Biology and is freely available and streamable at www.math.dartmouth.edu/des.

- 2013 Interviewed for the Scientific American blog, "Roots of Unity" and AWM News
- 2012 Simon's Foundation Fellowship Advertised in the NY Times
- 2012 Elizabeth Caroline Crosby Award
- 2012 Elected to the IMA Board of Governors
- 2011 Imes-Moore Award

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- 2011 Featured in a 2-page article in SIAM News
 - 2011 Featured on the AMS Women in Mathematics Poster
 - 2010 Blackwell-Tapia Award
 - 2010- present Director of Marjorie Lee Browne Bridge Program
 - 2008 - present Senior Editor of Mathematical Oncology for Cancer Research
 - 2008 Diverse: Issues In Higher Education Standout Scholar
 - 2005 James S. McDonnell 21st Century Research Award
 - 2003 Robert D. and Janet E. Neary Faculty Research Award
 - 2003 Amoco Faculty Undergraduate Teaching Award
 - 2003 Alfred P. Sloan Research Fellowship
 - 2003 WWNF Career Enhancement Fellowship for Junior Faculty
 - 2003 Elizabeth Caroline Crosby Research Award
 - John Hope Franklin Postdoctoral Fellowship
 - NSF Graduate Fellowship

GRANTS AND OTHER FUNDING

Please see current and pending support page (provided separately).

PUBLICATIONS

bold = my graduate student underline = my undergraduate student

1. **Nazari F**, Pearson AT, Nör JE, Jackson TL. A Mathematical Model for IL-6-mediated, Stem Cell Driven Tumor Growth and Targeted Treatment. *Accepted. PLoS Comp Bio* (2018)
2. Jackson TL, Jain HV. Mathematical Modeling of Cellular Cross Talk Between Endothelial and Tumor Cells Highlights Counterintuitive Effects of VEGF Targeted Therapies. *Accepted. Bull Math Bio* (2017) <https://doi.org/10.1007/s11538-017-0273-6>.
3. Yu A, Jackson TL, Tsume Y, Koenigsnecht M, Wysocki J, Marciani L, Amidon GL, Frances A, Baker JR, Hasler W, Wen B, Pai A, Sun D. Mechanistic Fluid Transport Model to Estimate Gastrointestinal Fluid Volume and its Dynamic Change Over Time. *AAPS J* (2017) **19(6)**:1682-1690.
4. Pearson A, Ingram P, Bai S, Yoon E, Jackson TL, Buckanovich RJ. Sampling From Single-Cell Observations to Predict Tumor Cell Growth In-vitro and In-vivo. *Oncotarget* (2017) **8**: 111176-111189.

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5. Farhat A, Jiang D, Cui D, Keller ET, Jackson TL. An Integrative Model of Prostate Cancer Interaction With the Bone Microenvironment. *Math Biosci* (2017) **294**: 1 - 14.
 6. Swiecicki PL, Bellile E, Sacco AG, Pearson AT, Taylor JM, Jackson TL, Chepeha DB, Spector ME, Shuman A, Malloy K, Moyer J, McKean E, McLean S, Sukari A, Wolf GT, Eisbruch A, Prince M, Bradford C, Carey TE, Wang S, Nör JE, Worden FP. A phase II trial of the BCL-2 homolog domain 3 mimetic AT-101 in combination with docetaxel for recurrent, locally advanced, or metastatic head and neck cancer. *Invest New Drugs* (2016) **34(4)**:481-489.
 7. Pearson A, Finkel K, Warner K, Nor F, Tice D, Martins M, Jackson TL, Nor JE. Patient Derived Xenograft (PDX) Tumors Increase Growth Rate with Time *Oncotarget* (2016) **7(7)**:7993-8005.
 8. Pearson AT, Jackson TL, Nör JE. Modeling head and neck cancer stem cell-mediated tumorigenesis. *Cell Mol Life Sci* (2016) **73(17)**:3279-89.
 9. **Cook, AL**, Ziazadeh, DR, Lu J, Jackson TL. A Multiscale Modeling Framework for Investigating Synergism Between Chemotherapy and Molecular Targeted Therapies. *DCDS-B* (2015) **2(6)**: 1219-1235.
 10. Jackson TL, Komarova NL, Swanson KR. Mathematical Oncology: Using Mathematics to Enable Cancer Discoveries. *Am Math Monthly* (2014) **21(9)**: 840-856.
 11. Zheng X, Koh GY, Jackson TL. A continuous model of angiogenesis: initiation, extension, and maturation of new blood vessels modulated by vascular endothelial growth factor angiopoietins, platelet-derived growth factor-B, and pericytes *Dis Cont Dynam Sys B* (2013) **18(4)** 1109-1154.
 12. **Gentry SN** and Jackson TL. A Mathematical Model of Cancer Stem Cell Driven Tumor Initiation: Implications of Niche Size and Loss of Homeostatic Regulatory Mechanisms. *PLoS ONE* (2013) **8(8)**: e71128. doi:10.1371/journal.pone.0071128.
 13. **Jain HV** and Jackson TL. A Hybrid Model of the Role of VEGF Binding in Endothelial Cell Migration and Capillary Formation. *Frontiers in Oncol* (2013) **3(102)** 1-15.
 14. Kim JK and Jackson TL. Mechanisms for enhancing sustainability of p53 pulses *PLoS One* (2013) **8(6)** e65242. doi:10.1371/journal.pone.0065242.
 15. Jackson TL. Modeling Tumor Vasculature: Molecular, Cellular, and Tissue Level Aspects and Implications Springer Pub Group (2012) <http://dx.doi.org/10.1007/978-1-4614-0052-3>.

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16. Gentry BG, **Gentry SN**, Jackson TL, Zemlicka J, Drach JC. Phosphorylation of Endogenous and Fraudulent Nucleotides to Di- and Triphosphates by Guanosine Monophosphate Kinase *Biochem Pharm* (2011) **80**: 43-49.
 17. Zheng X, Jackson TL. A Multiscale Model of Cell Elongation, Proliferation and Maturation During Angiogenesis. *Bull Math Bio* (2010) **72**: 830-868.
 18. **Bauer AL**, Rohlf T, Jackson TL, Jiang Y. Receptor Cross-Talk in Angiogenesis: Mapping Environmental Cues to Cell Phenotype using a Stochastic, Boolean Signaling Network. *J Theoret Biol* (2010) **64(3)**: 838-846.
 19. Ventrua AC, Jackson TL, Merajver SD. On the Role of Cell Signaling Models in Cancer Research *Cancer Res* (2009) **69(400)**: 400-402.
 20. **Gentry SN**, Ashkenazi R, Jackson TL. A Maturity-Structured Mathematical Model of Mutation Acquisition in the Absence of Homeostatic Regulation *Math Model Nat Phenom* (2009) **4(2)**: 156-182.
 21. **Bauer AL**, Jackson TL, Jiang Y. Topography of Extracellular Matrix Mediates Vascular Morphogenesis and Migration Speeds *PLoS* (2009) **5(7)** e1000445. doi:10.1371/journal.pcbi.1000445.
 22. **Jain HV**, Nör JE, Jackson TL. Quantification of Endothelial Cell-Targeted Anti Bcl-2 Therapy and its Suppression of Tumor Growth and Vascularization *Molec Cancer Therap* (2009) **8(10)**:2926-2936.
 23. Ashkenazi R, **Heusel SN**, Jackson TL. Pathways to Tumorigenesis: Mathematical Modeling of Cancer Stem Cell Hypothesis *Neoplasia* (2008) **10(11)**: 11701182..
 24. Bortz DM, Jackson TL, Taylor KA, Younger JG. Klebsiella pneumoniae flocculation dynamics. *Bull. Math. Biol.* (2008) **70(3)** pp. 745-768.
 25. Chung H, Cartwright MM, Bortz DM, Jackson TL, Younger JG. Dynamical System Analysis of Staphylococcus Epidermidis Bloodstream Infection *Shock* (2008) **30(5)**: 518-526.
 26. **Jain HV**, Nör JE, Jackson TL. Investigating the VEGF-Bcl-2-CXCL8 Pathway and Its Role in Sustained Angiogenesis *Bull Math Biol* (2008)**70(1)**: 89-117.
 27. Kiel MJ, He S, Ashkenazi R, **Heusel SN**, Teta M, Kushner JA, Jackson TL, Morrison SJ. Hematopoietic stem cells do not segregate chromosomes asymmetrically and cannot be reliably identified based on bromo-deoxyuridine label-retention *Nature* (2007) **449xiii**: 238-242.
 28. **Bauer AL**, Jackson TL, Jiang Y. A Cell-Based Model Exhibiting Branching and Anastomosis During Tumor-Induced Angiogenesis *Biophys J* (2007) **92**: 1-17.

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29. Dong Z, Song W, Sun Q, Zeitlin BD, Karl E, Spencer DM, **Jain HV**, Jackson TL, Núñez G, Nör JE. Apoptotic Requirement for Microvessel Disruption *Exp. Cell Res.* (2007) **313(6)**: 3645-3657.
 30. Ashkenazi R, Jackson TL, Dontu G, Wicha MS. Breast Cancer Stem Cells - Research Opportunities Utilizing Mathematical Modeling (2007) *Stem Cell Rev* **3(2)**: 176-182.
 31. Wu M, Kwon HY, Rattis F, Blum J, Zhao C, Ashkenazi R, Jackson TL, Gaiano N, Oliver T, Reya T. Imaging Hematopoietic Precursor Division in Real-Time *Cell - Stem Cell* (2007) **1(5)**: 541-554.
 32. Jackson TL, Ashkenazi R, **Heusel SN**, **Jain HV**. Cancer Modeling: A Perspective on What's New and What's Next *Contemp Math* (2006) **40**: 229-243.
 33. Garner AL, Lau YY, Jackson TL, Uhler MD, Jordan D, Gilgnebach RM. Incorporating spatial dependence into a multicellular tumor spheroid growth model. *J Appl Phys* (2005) **98**: 124701-8.
 34. Ben-David I, Price SE, Bortz DM, Cohen SE, **Bauer AL**, Jackson TL, Younger JG. Dynamics of intrapulmonary bacterial growth in a murine model of repeated microaspiration. *Am J Res Cell and Molec Biol* (2005) **33**: 476-482.
 35. Bushnell PJ, Shafer TJ, Bale AS, Boyes WK, Simmons JE, Eklund C, Jackson TL. Developing an Exposure-Dose-Response Model for Organic Solvents: Overview and Progress on in vitro Models and Dosimetry. *Envir Tox Pharm* (2005) **19(3)**: 607-614.
 36. Jackson TL, A Mathematical Investigation of the Multiple Pathways to Recurrent Prostate Cancer: Comparison with Experimental Data. *Neoplasia* (2004) **6(6)**: 697-704.
 37. Lai R, Jackson TL. A Mathematical Model of Receptor-Mediated Apoptosis: Dying to Know Why FasL is a Trimer. *Math. Biosci Engin* (2004) **1(2)**: 325-338.
 38. Jackson TL. A Mathematical Model of Prostate Tumor Growth and Androgen-Independent Relapse. *Dis Conti. Dynam Sys* (2004) **4(1)**: 187-202.
 39. Jackson TL, Arciero J, Kirschner D. A Mathematical Model of Tumor Immune Evasion and siRNA Treatment. *Dis Contin Dynam Sys* (2004) **4(1)**: 39-58.
 40. Criminale WO, Jackson TL, Nelson PW. Limit Cycle-Strange Attractor Competition. *Stud Appl Math* (2004) **112**: 133-160.
 41. Jackson TL. Intracellular Accumulation and Mechanism of Action of Doxorubicin in a Spatio-Temporal Tumor Model. *J Theor Biol* (2003) **220(2)**: 201-213.

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42. Jackson TL. Vascular Tumor Growth and Treatment: Consequences of polyclonality, competition, and dynamic vascular support. *J Math Biol* (2002) **44(3)**: 201-226.
 43. Lubkin SR, Jackson TL. Multiphase Mechanics of Capsule Formation in Tumors. *J. Biomech Eng* (2002) **124(2)**: 237-243.
 44. Jackson TL, Byrne HM. A Mechanical Model of Tumor Encapsulation and Transcapsular Spread. *Math Biosci* (2002) **180**: 307-328.
 45. Jackson TL, Byrne HM. A Mathematical Model to Study the Effects of Drug Resistance and Vasculature on the Response of Solid Tumors to Chemotherapy. *Math Biosci* (2000) **164**: 17-38.
 46. Jackson TL, Senter PD, Murray JD. Development and Validation of a Mathematical Model to Describe Anti-cancer Prodrug Activation by Antibody-Enzyme Conjugates. *J Theo Med* (2002) **2(2)**: 93-111.
 47. Jackson TL, Lubkin SR, Murray JD. Theoretical Analysis of Conjugate Localization in Two-Step Cancer Chemotherapy, *J Math Biol* (1999) **(39)4**: 353-376.
 48. Jackson TL, Lubkin SR, Siemers NO, Kerr D, Senter PD, Murray JD. Mathematical and Experimental Analysis of Localization of Anti-Tumor Antibody Enzyme Conjugates. *Br. J. of Cancer* (1999) **80(11)**: 1747-1753.
 49. Tang B, Sitomer A, Jackson TL. Population Dynamics and Competition in Chemostat Models with Adaptive Nutrient Uptake, *J Math Biol* (1997) **35**: 453-479.

EDITED BOOKS AND VOLUMES

- Jackson TL and Radunskya A. (Eds.) Applications of Dynamical Systems in Biology and Medicine, Springer NY (2015).
- Jackson TL. Modeling Tumor Vasculature: Molecular, Cellular, and Tissue Level Aspects and Implications Springer Pub Group (2012).
- Book Review: L. Preziosi, Editor, Cancer Modeling and Simulation, Chapman and Hall/CRC (2003) ISBN 1584883618.

STUDENT TRAINING AND MENTORING

Postdoctoral/Clinical Assistant Professors

- Alexander Pearson (2013-2017), Internal Medicine Oncology, NIH K-Award Mentee
- Xiaoming Zheng (2006-2009), Associate Professor Central Michigan University
- Rina Ashkenazi (2005- 2008), Minnesota Center for Financial & Actuarial Mathematics
- David Bortz (2004 - 2007), Associate Professor University of Colorado, Boulder

PhD Students

- Derrick Sund, AIM PhD Student, Current Thesis Advisor
- Fereshteh Nazari, SAL MCMSC PhD (2017), Co-Thesis Advisor
- Alexander Yu, Pharmacology PhD Student, Current Committee Member
- Cornelius Cilliers, Chemical Engineering PhD Student, Current Committee Member
- Kevin Hannay, AIM PhD (2017) Committee Member
- Olivia Walch, AIM PhD (2016) Committee Member
- Andrew Brouwer AIM PhD (2015), Committee Member
- Daniel Dewoskin, AIM PhD (2015) Student, Committee Member
- Jae Kyoung Kim, AIM PhD (2013), Co-supervised with D. Forger
- Ambika Natarajan, PIBS Student, One semester + summer rotation 2011
- Shanshan Cheng, CCMB Student, One semester rotation 2009
- Harsh Jain AIM PhD (2008), Thesis Advisor
- Sara Heusel AIM PhD (2008), Thesis Advisor
- Amy Bauer AIM PhD (2007), Thesis Advisor
- Andy Stein, AIM PhD (2007), Thesis Advisor

Master's Students

As the founder and director of the Marjorie Lee Browne Bridge to the PhD program in Applied and Interdisciplinary Mathematics, I have supervised and mentored the following six cohorts of underrepresented minority master's students.

- 2011: Daniel Jonas, Ray Navarrete, Andre Souza, Dana Suttman
- 2012: Alexis Cook, Adrian Ochoa, David McMillon, Louis Ly
- 2013: Bryan Nevarez, Joe Borja, Erick Vega, Ismael Xique
- 2014: Derrick Sund, Adrian Caraballiera
- 2015: Jonathan Guzman, Anthony Della Pella, Jay Barazza, Brittany Jackson
- 2016: David Guzman, Alex Kapiamba, Jenia Rousseva, Ursula Trigos
- 2017: Joseph Ballardo, Esteban Coronel, Uzziel Cortez, Moise Mouyebe

Undergraduate Students

- Ali Farhat, 2015 - 2017
- Daqian Jiang, Summer 2013 + 2013-2014 academic year
- Joshua Abramson Summer 2013 + 2013-2014 academic year
- Zach Berg, Summer 2012 + 2012-2013 academic year
- Beatrix Belogh, 2012-2013 academic year
- Hilary Monaco, 2011-2012 academic year
- Joshua Abramson, Winter and Summer 2011
- James Brunner, Summer 2010
- Xiao Ai Chi, Summer and Fall 2009
- Noah Smith, 2005-2007
- Crystal Kosebutzi, Summer and Fall 2005
- Ronald Lai, Summer and Fall 2004
- Julia Arceiro, 2001-2003

SELECTED INVITED CONFERENCES, WORKSHOPS, PRESENTATIONS

- 2018 Society for Mathematical Biology Annual Meeting, Sydney Australia
- 2018 Genomes, Cells, and Mathematics Workshop, Hong Kong
- 2018 AACR Annual Meeting, Chicago
- 2018 Chicago State University, Departmental Colloquium
- 2017 CSBC-PSON Mathematical Oncology Meeting
- 2017 Duke University, Mathematical Biology Seminar Speaker
- 2017 University of Washington Boeing Lecturer
- 2017 Alma College, Departmental Colloquium
- 2016 SAMSI Workshop: Methodology for Precision Medicine
- 2016 Williams College Oliver Lecture and Class of 1960 Speaker
- 2014 Dorothy Wrinch Lecture Series in Biomathematics, Inaugural Lecture
- 2014 Biomathematics and Ecology Education and Research Conference
- 2014 International Cancer Modeling Workshop, Seoul, Korea
- 2013 AMSI Public Lecture, University of Sydney, Australia
- 2012 Infinite Possibilities Conference, Keynote Speaker

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- 2011 MIT Women in Mathematics Lecture Series
 - 2011 AWM Michor Symposium, Joint Mathematics Meetings
 - 2010 University of Dundee Cancer Modeling Summer School
 - 2010 H. Lee Moffitt Cancer Center Integrated Mathematical Oncology Seminar
 - Computational Biology Center at Memorial Sloan-Kettering Cancer Center
 - 2008 ABRCMS, Invited Plenary Speaker
 - 2008 MSRI Diversity Conference, Invited Lecture
 - 2008 Distinguished Lecture Series, Invited Speaker Lewis and Clark College
 - 2008 Gordon Conference, Invited Session Organizer
 - 2007 University of Arizona, Applied Mathematics Colloquium
 - 2007 MAA Carriage House Distinguished Lecture
 - 2006 Falconer Lecture at the Mathematical Association of America MathFest
 - Michigan MAA Section Meeting, 2006
 - Cancer Modeling Workshop, Dundee Scotland, 2006
 - Cornell Summer Math Institute, 2006
 - SIAM Annual Meeting, Invited Topical Speaker (July, 2005)

PROFESSIONAL ACTIVITIES AND MEMBERSHIPS

- 2018 NAM Panelist: Advising Our Students on the Transition to Graduate School
- 2017 AWM Session Organizer, Poster Presentation Mentor
- 2016 SIAM Life Sciences Conference, Organizing Committee Member
- 2016 AWM Workshop at SIAM Annual Meeting, Co-organizer
- 2013 WhAM! Research Collaboration Workshop for Women, Co-organizer
- 2013 AMS Centennial Fellowship Committee
- 2013 AWM Research Symposium, Session Organizer
- 2012-2013 NIH MABS Study Section Member
- 2012 MSRI Spring Opportunities Workshop Organizer
- 2012-2015 IMA Board of Governors
- 2010-2013 AWM Executive Committee (Elected Position)
- 2008-present Senior Editor, Cancer Research
- 2008-present SIAM Diversity Committee

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- 2008-present, Diversity Committee for the Mathematical Biology Institute
 - 2008-2011, Advisory Board for the NIMBioS
 - 2006-2009 Steering Committee Member for ABRCMS
 - 2006 SIAM ANNUAL MEETING, Organizing Committee Member
 - 2006 IPAM Cells and Materials, Organizing Committee Member
 - Co-organizer, 2004 Annual Meeting of the Society for Mathematical Biology
 - Co-organizer, University of Michigan's Mathematical Biology Research Group
 - Member, Society for Mathematical Biology
 - Member, Society for Industrial and Applied Mathematics
 - Member, Association for Women in Mathematics