

GREGORY WILLIAM CARTER

The Jackson Laboratory, 600 Main Street, Bar Harbor, ME 04609

Greg.Carter@jax.org, 207-288-6025

POSITIONS

Associate Professor, The Jackson Laboratory, 2016-Present

Assistant Professor, The Jackson Laboratory, 2010-2016

Affiliate Faculty, Sackler School of Medicine, Tufts University, 2011-Present

Graduate Faculty, Graduate School of Biological Sciences, University of Maine, 2010-Present

Senior Research Scientist, Institute for Systems Biology, 2007-2010

Postdoctoral Research Fellow, Galitski Lab, Institute for Systems Biology, 2003-2007

Postdoctoral Research Fellow, Physics, University of Washington (Seattle), 2001-2003

Postdoctoral Research Associate, Physics, Stony Brook University (New York), 1999-2001

Postdoctoral Research Fellow and Leon Rosenfeld Fellow, Physics, The Niels Bohr Institute (Copenhagen, Denmark), 1997-1999

EDUCATION

Ph. D. in Physics, University of Minnesota (Minneapolis, MN), 1997.

Thesis: *A Chiral Effective Lagrangian Approach to Nuclear Physics*. Advisor: Paul J. Ellis.

B. S. in Physics, Case Western Reserve University (Cleveland, OH), 1993

ACTIVE FUNDING

NIH/NIGMS R01 GM115518	Carter (PI)	9/2016-8/2021
<i>Methods and Tools to Analyze Genetic Complexity</i>		
NIH/NIA U54 AG054345	Carter, Howell, Lamb, Territo (mPI)	9/2016-8/2021
<i>Alzheimer's Disease Translational Center for Disease Model Resources</i>		
Role: Head of Bioinformatics and Data Management Core		
NIH/NEI R01 EY027860	Carter, Nishina (mPI)	5/2017-4/2022
<i>Identifying Shared Pathogenic Networks and Molecular Targets Underlying Retinal Pigmented Epithelial Associated Disease</i>		
JAX-SSIF-FY17-MS (Jackson Lab)	Buass, Carter, Grass, Howell, Sasner (mPI)	4/2017-3/2018
<i>Optimization of CRISPR on Collaborative Cross lines to study the effect of genetic background and late-onset Alzheimer's disease phenotypes</i>		
NIH/NIGMS P01 GM099640	Paigen (PI)	9/2013-7/2018
<i>Molecular Regulation of Mammalian Meiosis</i>		
Role: Project Leader and Head of Computational Core		
NIH/NEI R01 EY011996	Nishina (PI), Carter (Co-I)	7/2015-6/2020
<i>Retinal Disease: Molecular Basis and Pathophysiology</i>		
NIH/NIA RF1 AG051496	Howell, Stevens (mPI), Carter (Co-I)	9/2015-8/2020

Investigating the Role of Complement-expressing Myeloid Cells in Synapse Loss and Vascular Compromise in Alzheimer's Disease

NIH **U54** OD020351 Burgess (PI), Carter (Co-I) 8/2015-6/2020

The Jackson Laboratory Center for Precision Genetics: From New Models to Novel Therapeutics

NIH/NIA **R01** AG054180 Kaczorowski (PI), Carter (Co-I) 5/2017-4/2022

Systems Control of Normal Aging and Alzheimer's Disease

NIH/NIA **R01** AG057914 Kaczorowski (PI), Carter (Co-I) 9/2017-5/2022

Systems Genetics of Resilience to Alzheimer's Disease

PENDING FUNDING

NIH/NIA **R01** Carter, Howell, Sasner (mPI) 3/2018-2/2023

Determining Genetic Interactors of Apolipoprotein E in Alzheimer's disease

NIH/NIDDK **R01** Naggert (PI), Carter (Co-I) 3/2018-2/2023

Genetic Networks Underlying Hepatosteatitis in Alström Syndrome

COMPLETED FUNDING

NIA/NIGMS **P50** GM076468 Churchill (PI), Carter (Project Leader) 7/2011-6/2016

Center for Genome Dynamics Project G: Using Multiple Phenotypes to Model Genetic Epistasis

TJL DIF FY14 (Jackson Lab) Carter, Howell (mPI) 5/2014-9/2016

Maximizing Human and Mouse Resources to Identify Novel Variants for Alzheimer's Disease

TJL DIF FY14 (Jackson Lab) Carter (PI) 5/2014-6/2016

Genetics of Molecular Epigenetics

JAX DIF FY15 (Jackson Lab) Banchereau, Ucar (mPI), Carter (Co-I) 7/2015-6/2016

Advancing ATAC seq Data Generation and Analysis Pipeline for Epigenetic Biomarker Discovery

JAX PYE FY14 (Jackson Lab) Carter (PI) 9/2012-8/2014

Pyewacket Research Fellowship

JAX CC FY13 (Jackson Lab) Carter (PI) 1/2013-6/2013

JAX Cancer Center Pilot: Modeling of Genetic Interactions between Tumor Variants

NIH/NIGMS **K25** GM079404 Carter (PI) 9/2007-8/2013

Inference and Testing of Quantitative Models of Genetic Interaction

Alliance for Lupus Research Roopenian (PI), Carter (Co-I) 7/2011-6/2013

Novel Approach to Modeling the Functional Genomics of Human SLE in Mice

PUBLICATIONS

Biology – Peer Reviewed (*equal contribution, †corresponding author)

1. Marnik EA, Wang X, Sproule TJ, Park G, Christianson GJ, Lane-Retiker SK, **Carter GW**, Morse III HC[†], Roopenian DC[†], *Precocious Interleukin 21 Expression by CD4 T cells of Naïve Mice Identifies a Novel Stage of T follicular Helper Cell Development in Autoimmune Disease*, Cell Reports, **21**(1):208-221.
2. Wu JW, Preuss C, Wang SP, Yang H, Ji B, **Carter GW**, Gladly R, Andelfinger G, Mitchell GA[†]. 2017. *Epistatic interaction between the lipase-encoding genes Pnpla2 and Lipe causes liposarcoma in mice*, PLoS Genetics, **13**(5):1007716.

3. Tyler AL, Ji B, Gatti DM, Munger SC, Churchill GA, Svenson KL, **Carter GW†**. 2017. *Epistatic networks jointly influence phenotypes related to metabolic disease and gene expression in Diversity Outbred mice*, *Genetics* **206**, 621-639.
4. Ball RL, Fujiwara Y, Sun F, Hu J, Hibbs, M, Handel MA†, **Carter GW†**. 2016. *Regulatory complexity revealed by integrated cytological and RNA-seq analyses of meiotic substages in mouse spermatocytes*, *BMC Genomics*, **17**:628.
5. Tyler AL, Donahue LR, Churchill GA, **Carter GW†**. 2016. *Weak Epistasis Generally Stabilizes Phenotypes in a Mouse Intercross*, *PLoS Genetics*, **12**(2): e1005805.
6. Walker M, Billings T, Baker CL, Powers N, Tian H, Saxl RL, Choi K, Hibbs MA, **Carter GW**, Handel MA, Paigen K, Petkov PM†. 2015. *Affinity-seq detects genome-wide PRDM9 binding sites and reveals the impact of prior chromatin modifications on mammalian recombination hotspot usage*, *Epigenetics and Chromatin*, **8**(1):1-13.
7. Tyler AL, McGarr TC, Beyer BJ, Frankel WN, **Carter GW†**. 2014. *A Genetic Interaction Network Model of a Complex Neurological Disorder*, *Genes Brain & Behavior*, **13**(8):831-840.
8. Philip VM, Tyler AL, **Carter GW†**. 2014. *Dissection of Complex Gene Expression Using the Combined Analysis of Pleiotropy and Epistasis*, *Pac Symp Biocomput.*, **19**:200-211.
9. Jackson HM, Soto I, Graham LC, **Carter GW**, Howell GR†. 2013. *Clustering of transcriptional profiles identifies changes to insulin signaling as an early event in a mouse model of Alzheimer's disease*, *BMC Genomics*, **14**(1):831.
10. Tyler AL, Lu W, Hendrick J, Philip V, **Carter GW†**. 2013. *CAPE: An R Package for Combined Analysis of Pleiotropy and Epistasis*, *PLoS Computational Biology*, **9**(10): e1003270.
11. **Carter GW†**. 2013. *Inferring Gene Function and Network Organization in Drosophila Signaling by Combined Analysis of Pleiotropy and Epistasis*, *G3* **3**(5):807-14.
12. Mirzaei H, Knijnenburg T, Kim B, Robinson M, Picotti P, **Carter GW**, Li S, Dilworth D, Eng J, Aitchison J, Shmulevich I, Galitski T, Aebersold R†, and Ranish J†. 2013. *Systematic measurement of transcription factor-DNA interactions by SRM mass spectrometry identifies candidate gene regulatory proteins*, *PNAS* **110**(9):3645-3650.
13. **Carter GW†**, Hays M, Sherman A, Galitski T. 2012. *Use of Pleiotropy to Model Genetic Interactions in a Population*, *PLoS Genetics* **8**(10): e1003010.
14. **Carter GW†**, Hays M, Li S, and Galitski T. 2012. *Predicting the Effects of Copy-Number Variation in Double and Triple Mutant Combinations*, *Pac Symp Biocomput.* **17**:19-30.
15. **Carter GW**, Rush CG, Uygun F, Sakhanenko NA, Galas DJ, and Galitski T. 2010. *A Systems Biology Approach to Modular Genetic Complexity*, *Chaos* **20**:026102.
16. Galas DJ†, Nykter M, **Carter GW**, Price N, and Shmulevich I. 2010. *Biological Information as Set-Based Complexity*, *IEEE Transactions on Information Theory* **56**(2):667-677, preprint arXiv:0801.4024.
17. **Carter GW†**, Galas DJ, and Galitski, T. 2009. *Maximal Extraction of Biological Information from Genetic Interaction Data*, *PLoS Computational Biology* **5**(4):e1000347.
18. **Carter GW†**, Prinz S, Neou C, Shelby JP, Marzolf B, Thorsson V, and Galitski T. 2007 *Prediction of phenotype and genomic expression for combinations of mutations*, *Molecular Systems Biology* **3**:96.
19. Selinummi J, Niemistö A, Saleem R, **Carter GW**, Aitchison J, Yli-Harja O, Shmulevich I, and Boyle J†. 2007. *A case study on 3-D reconstruction and shape description of peroxisomes in yeast*, *Proceedings of the 2007 IEEE International Conference on Signal Processing and Communication (ICSPC 2007)* 672-675.
20. **Carter GW**, Rupp S, Fink GR, and Galitski T†. 2006. *Disentangling information flow in the Ras-cAMP signaling network*, *Genome Research* **16**: 520-526.

21. *Drees BL, *Thorsson V, *Carter GW, Rives AW, Raymond M, Avila-Campillo I, Shannon P, and Galitski T†. 2005. *Derivation of genetic interaction networks from quantitative phenotype data*, Genome Biology **6**: R38.

Biology – Reviews and Book Chapters

1. Tyler AL and Carter GW. 2017. *Genetic Interactions Improve Models of Quantitative Traits*, Nature Genetics, **49**(4): 486-488. News and Views.
2. Carter GW and Dudley, AM. 2009. *Systems genetics of complex traits*, in Robert, ed., “Encyclopedia of Complexity and Systems Science”, Springer, New York, 9105-9124.
3. Killcoyne S, Carter GW, Smith J, and Boyle J. 2009. *Cytoscape: A Community-Based Framework for Network Modeling*, Methods Mol Biology **563**: 219-239.
4. Carter GW, Thorsson V, and Galitski T. 2007. *Network Modeling of Molecular and Genetic Interactions*, in Conn PM, ed., “Source Book of Models for Biomedical Research”, Chapter 9, Humana Press.
5. Carter GW. 2005. *Inferring Network Interactions within a Cell*, Briefings in Bioinformatics **6**(4): 380-389.

Biology – Manuscripts in Preparation

1. Wang X, Philip V, Ananda G, Malhotra A, Michalski P, Sasner M, Karuturi RMK, Howell GR, Carter GW†, *A Bayesian generalized linear mixed model identifies novel loci for late-onset Alzheimer’s disease*, in minor revision for Genetics.
2. Preuss C, Ananda G, Nho K, Wang X, Fine A, Uyar A, Philip V, Karuturi RMK, Logsdon B, Saykin A, Sasner M, Howell GR, Carter GW†, *Whole-exome analysis of late-onset Alzheimer’s disease reveals novel candidate genes involved in cognitive function*, under review at Molecular Psychiatry.
3. Ji B, Tyler AL, Ananda G, Carter GW†, *Modeling Genetic Interactions Associated with Subtypes of Breast Cancer*, in preparation.

Physics

1. Carter GW and Henley EM, *Corrections to the Nuclear Axial Coupling in a Nuclear Medium*, nucl-th/0404037, Int. J. Mod. Phys. E **14** (2005) 1017.
2. Henley EM and Carter GW, *g_A in Nuclei*, in “Proceedings of the 10th International Conference on Nuclear Reaction Mechanisms”, Eur. Phys. J. A **24S2** (2005) 103.
3. Carter GW, *Axial Vector Current and Coupling of the Quark in the Instanton Model*, hep-ph/0208250, Phys. Rev. D **67** (2003) 014008.
4. Ostrovsky DM, Carter GW, and Shuryak EV, *Forced Tunneling and Turning State Explosion in Pure Yang-Mills Theory*, hep-ph/0204224, Phys. Rev. D **66** (2002) 036004.
5. Carter GW, Ostrovsky DM, and Shuryak EV, *Instanton-Induced Semi-Hard Parton Interactions and Phenomenology of High Energy Hadron Collisions*, hep-ph/0112036, Phys. Rev. D **65** (2002) 074034.
6. Carter GW, *Color Superconductivity and Blinking Proto-Neutron Stars*, in proceedings of “Compact Stars in the QCD Phase Diagram”, hep-ph/0111353, eConf C010815 (2002) 149-154.
7. Carter GW and Prakash M, *The Quenching of the Axial Coupling in Nuclear and Neutron-Star Matter*, nucl-th/0106029, Phys. Lett. **B525** (2002) 249.
8. Carter GW, *Classical Gluon Production in Hadronic Collisions*, in proceedings of the “RIKEN/BNL Workshop on High Energy QCD: Beyond the Pomeron”, Guryon W and Kovchegov Yu, Eds., (2001).
9. Carter GW and Shuryak EV, *Do Instantons and Strings Cluster when the Number of Colors is Large?*, hep-ph/0101061, Phys. Lett. **B524** (2002) 297.
10. Carter GW and Reddy S, *Neutrino Propagation in Color Superconducting Quark Matter*, hep-ph/0005228, Phys. Rev. D **62** (2000) 103002.

11. Carter GW and Diakonov D, *The Nonperturbative Color Meissner Effect in a Two-Flavor Color Superconductor*, hep-ph/0001318, Nucl. Phys. **B582** (2000) 571.
12. Carter GW and Diakonov D, *Instanton-Induced Interactions in Finite Density QCD*, hep-ph/9908314, in "Panic 99: Proceedings of the XVth Particles and Nuclei International Conference", Nucl. Phys. **A663** (2000) 741.
13. Carter GW and Diakonov D, *Instanton-Induced Interactions in Finite Density QCD: from Chiral Symmetry Breaking to Colour Superconductivity*, hep-ph/9908314, in "Proceedings of the XIV International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions (Quark Matter 99)", Nucl. Phys. **A661** (1999) 625.
14. Carter GW and Diakonov D, *Chiral Symmetry Breaking and Color Superconductivity in the Instanton Picture*, hep-ph/9905465, in "ECT* International Workshop on Understanding Deconfinement in QCD", Blaschke D, Karsch F, and Roberts CD, Eds. (Singapore, World Scientific, 2000).
15. Carter GW and Jackson AD, *Finding the Pion in the Chiral Random Matrix Vacuum*, hep-ph/9905231, Phys. Rev. D **61** (2000) 077902.
16. Carter GW and Diakonov D, *Light Quarks in the Instanton Vacuum at Finite Baryon Density*, hep-ph/9812445, Phys. Rev. D **60** (1999) 016004.
17. Carter GW, Scavenius O, Mishustin IN, and Ellis PJ, *An Effective Model for Hot Gluodynamics*, nucl-th/9812014, Phys. Rev. C **61** (2000) 045206.
18. Carter GW and Diakonov D, *Symmetry Breaking by Instantons at Finite Density*, in proceedings of the "RIKEN/BNL Workshop on QCD Phase Transitions", Schäfer T and Shuryak EV, Eds. (1998).
19. Carter GW and Diakonov D, *Towards a Theory of Instantons at Nonzero Fermion Density*, hep-ph/9807219, Nucl. Phys. **A642** (1998) 78.
20. Carter GW and Ellis PJ, *An Effective Lagrangian with Broken Scale and Chiral Symmetry IV: Nucleons and Mesons at Finite Temperature*, nucl-th/9707051, Nucl. Phys. **A628** (1998) 325.
21. Carter GW, Ellis PJ, and Rudaz S, *An Effective Lagrangian with Broken Scale and Chiral Symmetry III: Mesons at Finite Temperature*, nucl-th/9612043, Nucl. Phys. **A618** (1997) 317.
22. Carter GW, Ellis PJ, and Rudaz S, *An Effective Lagrangian with Broken Scale and Chiral Symmetry II: Pion Phenomenology*, nucl-th/9512033, Nucl. Phys. **A603** (1996) 367; erratum **A608** (1996) 514.

INVITED SEMINARS

Biology

1. *Using Genetic Complexity to Understand Quantitative Traits*, North Carolina State University, Raleigh, NC, 30 October 2017.
2. *Using Genetic Complexity to Understand Complex Disease*, Pacific Northwest Research Institute, Seattle, WA, 15 August 2017.
3. *Using Genetic Complexity to Understand Complex Disease*, Indiana University, Indianapolis, IN, 15 December 2016.
4. *Modeling Complex Traits with Genetic Interactions and Pleiotropy*, Ewha Womans University, Seoul, Korea, 23 September 2015.
5. *Modeling Complex Traits with Genetic Interactions and Pleiotropy*, Seoul National University, Korea, 23 September 2015.
6. *Early Molecular Signatures of Alzheimer's disease in the Mouse Brain*, University of Connecticut Health Center, 24 March 2015.

7. *Deciphering Genetic Complexity with the Combined Analysis of Pleiotropy and Epistasis*, University of California at San Francisco, 6 February 2013.
8. *Inferring Genetic Interaction Networks to Predict Phenotype*, University of Maine, 23 March 2012.
9. *Systems Genetics of Yeast Cell Differentiation*, University of Minnesota, 10 March 2010.
10. *Systems Genetics of Yeast Cell Differentiation*, National Institutes of Health, 29 January 2010.
11. *Inference and Prediction of Genetic Interactions*, Jackson Laboratory, 13 January 2010.
12. *Systems Genetics of Yeast Cell Differentiation*, University of Arizona, 12 November 2009.
13. *Systems Genetics of Yeast Filamentation*, University of Luxembourg, 6 October 2008.
14. *Modeling and Prediction of Genetic Interactions*, Rosetta Inpharmatics, Seattle, WA, 8 June 2007.

Physics

1. *Axial Coupling of the Quark*, TRIUMF (Vancouver, BC, Canada), 1 April 2003; ECT* (Trento, Italy), 13 March 2003; Technical University of Munich (Germany), 10 March 2003; J. W. Goethe University (Frankfurt am Main, Germany), 7 March 2003; Brookhaven National Laboratory/RIKEN, 15 November 2002; SUNY Stony Brook, 14 November 2002
2. *Proto-Neutron Star Neutrinos as a Signal of Color Superconductivity*, Los Alamos National Laboratory (T-8), 11 May 2001; Yale University, 23 February 2001; Duke University, 21 November 2000
3. *Neutrino Propagation in Color Superconducting Quark Matter and Proto-Neutron Stars*, RIKEN, Brookhaven National Laboratory, 02 June 2000
4. *The Color Meissner Effect in Superconducting QCD*, University of Minnesota, 27 January 2000
5. *Instanton-Induced Interactions in Finite Density QCD*, Massachusetts Institute of Technology, 16 February 1999
6. *From Chiral Symmetry Breaking to Color Superconductivity in Finite Density QCD*, University of Oslo (Norway), 23 April 1999; University of Bergen (Norway), 20 April 1999; SUNY Stony Brook, 9 February 1999; Brookhaven National Laboratory, 2 February 1999; University of Washington, 14 January 1999; University of Minnesota, 11 January 1999
7. *Chiral vs. Color Symmetry Breaking by Instantons*, University of Minnesota, 24 July 1998
8. *Mesons of an Effective Chiral Lagrangian at $T > 0$* , TRIUMF (Vancouver, BC, Canada), 18 February 1997

CONFERENCE PRESENTATIONS

Biology

1. *Genetic Variation Mediates the Epigenetic Response to Corticosteroids in Mice*, contributed talk at ISMB/ECCB, Prague, Czechia, 22 July 2017.
2. *Novel Candidate Loci for Late-Onset Alzheimer's Disease from Bayesian Mixed Modeling of Whole-Genome and Whole-Exome Sequencing*, poster at the Alzheimer's Association International Conference, London, UK, 19 July 2017.
3. *Model Organism Development and Evaluation for Late-Onset Alzheimer's Disease*, invited talk at the Accelerating Medicines Partnership meeting, Bethesda, MD, USA, 11 July 2017.
4. *Genetic variation modifies epigenetic states that mediate steroid response and gene expression QTL in mice*, contributed talk at the 15th Annual Meeting of the Complex Trait Community, Memphis, TN, USA, 16 June 2017.
5. *Novel Candidate Loci for Late-Onset Alzheimer's Disease Identified with Bayesian Mixed Modeling*, contributed poster at AD/PD, Vienna, Austria, 30 March 2017.
6. *Genetic Interactions Suppress Extreme Bone and Weight Phenotypes in a Mouse Intercross*, contributed plenary talk at The Allied Genetics Conference (GSA), Orlando, FL, USA, 17 July 2016.

7. *Genetic Variation Mediates the Epigenetic Response to Corticosteroids in Mice*, contributed talk at The Allied Genetics Conference (GSA), Orlando, FL, USA, 14 July 2016.
8. *Modeling Genetic Interactions Associated with Molecular Subtypes of Breast Cancer*, contributed talk at the HUGO Human Genome Meeting, Houston, TX, USA, 1 March 2016.
9. *Systems Genetics of Complex Neurodegenerative Diseases*, invited Minisymposium talk at Society for Neuroscience 2015, Chicago, IL, USA, 20 October 2015.
10. *Network Modeling of Complex Traits*, invited talk at the International Conference of the Korean Society for Molecular and Cell Biology, Seoul, Korea, 22 September 2015.
11. *Genetic Interactions Suppress Bone and Weight Phenotypes in a Mouse Intercross*, contributed talk at the 14th Annual Meeting of the Complex Trait Community, Portland, OR, USA, 11 June 2015.
12. *Complex Genetics with the Combined Analysis of Pleiotropy and Epistasis*, keynote at the 3rd Annual Epistasis Discovery in Genetics and Epidemiology (EDGE) Conference, Key West, FL, USA, 4 February 2015.
13. *Modeling Binding Affinity of the Multiple Zinc-Finger Protein Prdm9*, contributed talk at the 12th Annual Rocky Mountain Bioinformatics Conference, Snowmass Village, CO, USA, 12 December 2014.
14. *Using Multiple Phenotypes to Model Epistasis in Complex Traits*, talk at the 2014 National Centers for Systems Biology Annual Meeting, La Jolla, CA, USA, 18 July 2014.
15. *Complex Trait Analysis of Breast Cancer Subtypes*, contributed talk at the 13th Annual Meeting of the Complex Trait Community, Berlin, Germany, 18 May 2014.
16. *Dissection of Complex Gene Expression Using the Combined Analysis of Pleiotropy and Epistasis*, contributed talk at the Pacific Symposium on Biocomputing, Kona, HI, USA, 4 January 2014.
17. *Genetic Complexity with Integrated Interaction Analysis across Multiple Phenotypes*, keynote at the 11th Annual Rocky Mountain Bioinformatics Conference, Snowmass Village, CO, USA, 12 December 2013.
18. *Populations and Visualization*, invited talk at the 3rd IEEE Symposium on Biological Data Visualization (BioVis), Atlanta, GA, USA, 13 October 2013.
19. *Deciphering Genetic Complexity with the Combined Analysis of Pleiotropy and Epistasis*, contributed poster at the 12th Annual Meeting of the Complex Trait Community, Madison, WI, USA, 30 May 2013.
20. *Deciphering Genetic Complexity of Cellular Signaling by Combined Analysis of Pleiotropy and Epistasis*, contributed poster at the Joint Conference of HGM and ICG 2013, Singapore, 16 April 2013.
21. *Use of Pleiotropy to Model Genetic Interactions in a Population*, contributed poster at RECOMB SB/RG/DREAM 2012, San Francisco, CA, 12 November 2012.
22. *Modeling Strain-Specific Response to Dietary Challenge*, contributed poster at the 26th International Mammalian Genome Conference, St Petersburg, FL, 22 October 2012.
23. *Complex Haploinsufficiency as a Tool for Modeling Genetic Disease*, invited talk at the U Conn-Jackson Laboratory Symposium, 6 September 2012.
24. *Genetic Variation in Body Composition of Collaborative Cross Founder Strains*, contributed talk at the 11th Annual Meeting of the Complex Trait Community, Paris, France, 11 June 2012.
25. *Predicting the Effects of Copy-Number Variation in Double and Triple Mutant Combinations*, contributed talk at the Pacific Symposium on Biocomputing, Kona, HI, 3 January 2012.
26. *Pleiotropy and Genetic Interactions*, invited talk at CIFAR Genetic Networks, New York, NY, 29 October 2011.
27. *Variation in Body Composition in Genetically Diverse Mice*, poster at Mouse Genetics 2011, Washington, DC, 25 June 2011.
28. *Systems Genetics of Body Composition*, talk at the 2011 National Centers for Systems Biology Annual Meeting, Duke University, 17 June 2011.

29. *Predictive Modeling of Genetic Interactions*, contributed talk at 38th Maine Biological and Medical Sciences Symposium, MDIBL, Bar Harbor, ME, 15 April 2011.
30. *Analyzing Genetic Complexity with Genetic Interaction Networks*, contributed talk at the Ninth Annual Meeting of the Complex Trait Community, Chicago, IL, 10 May 2010.
31. *Maximizing Information from Genetic Data*, invited talk at the MSRI Workshop on Mathematical Genomics, Mathematical Sciences Research Institute, Berkeley, CA, 15 April 2009.
32. *Systems Genetics of Yeast Filamentation*, contributed talk at the EMBO Workshop on Evolutionary and Environmental Genomics of Yeasts, EMBL Heidelberg, 2 October 2008.
33. *Systems Genetics of Yeast Cell Differentiation*, invited talk at the Annual Meeting of the NIGMS National Centers for Systems Biology, Princeton, NJ, 11 July 2008.
34. *Modeling Interactions of Heterogeneous Perturbations*, contributed talk at the 6th International Conference on Pathways, Networks, and Systems Medicine, Chania, Greece, 20 June 2007.
35. *Prediction of Phenotype and Genomic Expression for Combinations of Mutations*, contributed poster at the Joint Meeting for the National Centers of Integrative and Systems Biology, Cambridge, MA, 12 June 2007.
36. *Maximal Extraction of Biological Information from Genetic Interaction Data*, contributed talk at the International Workshop on Network Science (NetSci07), 20 May 2007.
37. *System Genetics of Yeast Cell Differentiation*, contributed talk at the 4th International Conference on Pathways, Networks, and Systems, Mykonos, Greece, 9 October 2006.
38. *Disentangling Information Flow in the Ras/cAMP Signaling Network*, contributed talk at the CSHL/Wellcome Trust Conference on Interactome Networks, Hinxton, UK, 2 September 2005.
39. *Genetic Interaction Networks Inferred from Large-Scale Phenotype Datasets*, contributed poster at the Keystone Symposium on Biological Discovery Using Diverse High-Throughput Data, Steamboat Springs, CO, 30 March 2004.

Physics

1. *Prompt Gluon Production from Instantons*, invited talk at the ECT* Workshop on Coherent Effects at RHIC and LHC: Initial Conditions and Hard Probes, Trento, Italy, 23 October 2002.
2. *Exploding Sphalerons in QCD*, invited talk at the KITP Program on QCD and Gauge Theory Dynamics in the RHIC Era, UC Santa Barbara, 13 June 2002.
3. *Color Superconductivity and Blinking Proto-Neutron Stars*, invited talk at the Conference on Compact Stars in the QCD Phase Diagram, NORDITA (Copenhagen), 17 August 2001.
4. *The Quenching of the Axial Coupling in Neutron Star Matter*, invited talk at the INT Program on Neutron Stars, UW Seattle, 8 August 2001.
5. *Classical Gluon Production in Hadronic Collisions*, invited talk at the Workshop on High Energy QCD: Beyond the Pomeron, Brookhaven National Laboratory (New York), 24 May 2001.
6. *The Color Meissner Effect for Two Flavors*, invited talk at the INT Program on QCD at Finite Baryon Density, UW Seattle, 22 March 2000.
7. *Instanton-Induced Interactions in Finite Density QCD*, contributed talk at XVth Particles and Nuclei International Conference (PANIC 99), Uppsala, Sweden, 12 June 1999.
8. *Quarks in the Instanton Vacuum at Non-zero Matter Density*, invited talk at the Workshop on Heavy-Ion Theory (HIT-99), CERN, 17 May 1999.
9. *Instanton-induced Interactions in Finite Density QCD: from Chiral Symmetry Breaking to Colour Superconductivity*, contributed talk at XIV International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions (Quark Matter 99), Torino, Italy, 12 May 1999.

10. *Symmetry-Breaking Phases of QCD*, invited talk at the International Workshop on Phase Transitions in Nuclear Collisions, Niels Bohr Institute/NORDITA (Copenhagen), 20 November 1998.
11. *Symmetry Breaking by Instantons at Finite Density*, invited talk at the RIKEN/BNL Workshop on QCD Phase Transitions, Brookhaven National Laboratory (New York), 4 November 1998.
12. *Symmetry Breaking by Instantons at Finite Fermion Density*, invited talk at the Workshop on Instantons and Monopoles in the QCD Vacuum, NORDITA (Copenhagen), 25 June 1998.
13. *An Effective Lagrangian with Broken Scale and Chiral Symmetry at Finite Temperature*, contributed talk at the Joint APS/AAPT Meeting, Washington D.C., 18 April 1997.

EDUCATION AND MENTORING

Postdoctoral Mentoring

- Dr. Ravi Pandey, 2017-present.
- Dr. Seda Arat, 2015-present.
- Dr. Xulong Wang, 2013-2016. Scientist at Eisai US.
- Dr. Bo Ji, 2013-2017. Scientist at Washington University in St. Louis.
- Dr. Anna L. Tyler, 2012-present.
- Dr. Robert Valenzuela, 2012. Postdoc at Genome Institute of Singapore.

Graduate Student Advising

- Alexander Fine, Tufts University, 2014-present.

Other Student Mentoring

- Madelyn Adams, Falmouth High School, Falmouth, ME (internship), 2017.
- Catrina Spruce, University of Maine (MSc), 2015-2016.
- Arya Royal, Lafayette High School, Wildwood, MO, (internship), 2016.
- Julia Huesa, North Carolina School of Science and Math (internship), 2016.
- Wendy Pitman, Johns Hopkins University (MSc), 2015.
- Reanna Dona, The Ohio State University (internship), 2015.
- Cai John, University of Edinburgh (internship), 2015.
- Kristoph Naggert, Mount Desert High School (internship), 2015-2016.
- Eraj Khokhar, University of Maine (rotation), 2015.
- Tian-shun Allan Jiang, North Carolina School of Science and Math (internship), 2014.
- Xiaojie Ji, University of Maine (rotation), 2014.
- Justin Hendrick, Cornell University (internship), 2013.
- Patrick Kane, North Carolina School of Science and Math (internship), 2013.
- Wei Lu, Duke University (internship), 2012.
- Justin Hendrick, North Carolina School of Science and Math (internship), 2012.
- Mehmet Umut Caglar, Texas Tech University (visiting graduate student), 2012.
- Leonard Tan, Tufts University (rotation), 2011.
- Yang Zhang, New Mexico State University (visiting graduate student), 2011.
- Kavya Sekar, University of North Carolina (internship), 2011.
- Sangeetha Kumar, North Carolina School of Science and Math (internship), 2011.
- Gokcen Cilingir and Dake Sun (software engineers), 2009-2010.
- Cynthia Rush, UNC (internship), 2009.
- Adam Waite, University of Washington (rotation student), 2008.
- Gina Fridley, MIT (internship), 2008.
- Aaron Brooks, University of Washington (rotation student), 2008.

Graduate Thesis Committee Memberships

- Nicholas Tolman, Tufts University, 2017-present.

Alexander Stanton, Tufts University (committee chair), 2016-present.

Sriramulu Pullagura, University of Maine, 2016-present.

Xiaojie Xie, University of Maine, 2014-present.

Elisabeth Adkins, Tufts University (committee chair), 2012-2016.

Christian Richard, University of Maine, 2012-2014.

Teaching

Short Course on Neurogenetic Tools, The Jackson Laboratory, 2017

Graduate Foundations course on Computational Biology, University of Maine, 2016-2017.

Short Course on 21st Century Mouse Genetics, The Jackson Laboratory, 2016-present.

Short Course on Big Data for Professors, The Jackson Laboratory, 2016-present.

Short Course on Systems Genetics, The Jackson Laboratory, 2010-2016.

Graduate Course on Mammalian Genetics, Tufts University, 2012-present.

Graduate Course on Biological Pathways, University of Maine, 2012-2014.

Introduction to Systems Biology Course, Institute for Systems Biology, 2007-2009.

Computational Biology for summer students, Institute for Systems Biology, 2007-2009.

Electrodynamics, U of Washington, 2002-2003.

Introductory Physics, Stony Brook U and U of Minnesota, 1993-2001.

Educational Software Engineer

Case Western Reserve University, 1991-1993.

PROFESSIONAL SERVICE

Committees

New York Genome Center Scientific and Clinical Steering Committee, 2015-present.

Scientific Steering Committee, University of Connecticut Institute for Systems Genomics, 2014-present.

Scientific Advisory Committee, Jackson Lab, 2012; 2015-2016.

Predoc and Postdoc Training Committee, Jackson Lab, 2014-present.

JAX Scholar Admissions Committee, Jackson Lab, 2015-2016.

Graduate Admissions Committee, Jackson Lab, 2016-present.

Seminar Committee, Jackson Lab, 2014-present.

Faculty Search Committee, Jackson Lab, 2014-present.

Genome Technologies Advisory Committee, Jackson Lab, 2015-2016.

Extended Management Team, Jackson Lab, 2012.

Information Technology/Security Committee, Jackson Lab, 2010-2013.

Center for Inquiry Science Advisory Committee, Institute for Systems Biology, 2008.

Employee Advisory Committee, Institute for Systems Biology, 2005-2006.

Organization and Reviewing

Referee for journals Science Translational Medicine, Physiological Genomics, eLife, Nature Genetics, BMC Bioinformatics, BMC Genetics, Nature Reviews Microbiology, Molecular Systems Biology, PLoS Computational Biology, Genome Biology, Heredity, Genes Chromosomes & Cancer, EURASIP Journal on Bioinformatics and Systems Biology, Pacific Symposium on Biocomputing, Nuclear Physics A and B, Physical Review C, D, and Letters.

Ad hoc Peer Reviewer for NCI, NIGMS, NIAAA, and Pennsylvania Department of Health.

Organizing Committee, BioVis Conference on Biological Data Visualization, 2014-2015.

Program Committee, BioVis Conference on Biological Data Visualization, 2012-2013, 2016-2017.

Program Committee, International Mammalian Genome Conference, 2014.

Program Committee, Fifth ACM Conference on Bioinformatics, 2014.

Session chair, 12th Annual Meeting of the Complex Trait Community, 2012; 15th Annual Meeting of the Complex Trait Community, 2017.

Organizer of joint Nuclear Theory/INT Seminars, University of Washington, 2002-2003.

Organizer of the Nuclear Theory Seminar at the Niels Bohr Institute, 1998-1999.

Society Memberships

Genetics Society of America, International Society of Computational Biology, International Mammalian Genome Society, Human Genome Organization, International Society to Advance Alzheimer's Research and Treatment, International Behavioral and Neural Genetics Society, Society for Neuroscience.