CURRICULUM VITAE

Name: Marylyn DeRiggi Ritchie, PhD
Work Address: Ritchie Lab
University of Pennsylvania
Anatomy/Chemistry Building, 214/215
3620 Hamilton Walk
Philadelphia, PA 19104
215-573-2438

E-mail Address: marylyn@upenn.edu
Website Address: http://ritchielab.org and http://visualization.ritchielab.psu.edu
H-index : 70 (Google Scholar)

EDUCATION

1999, BS University of Pittsburgh at Johnstown (Biology)
2002, MS Vanderbilt University (Applied Statistics)
2004, PhD Vanderbilt University (Statistical Genetics)
Genetic Programming Optimized Neural Networks for Detecting Gene-Gene Interactions

PROFESSIONAL EMPLOYMENT

Academic Appointments

2004-2009 Assistant Professor
Department of Molecular Physiology & Biophysics
Vanderbilt University
2004-2011 Investigator
Center for Human Genetics Research
Vanderbilt University
2009-2011 Associate Professor with tenure
Department of Molecular Physiology & Biophysics
Vanderbilt University
2009-2011 Associate Professor, Secondary Appointment
Department of Biomedical Informatics
Vanderbilt University
2011- 2014 Associate Professor with tenure
Department of Biochemistry and Molecular Biology
Pennsylvania State University
2011-2016 Director, Center for Systems Genomics
The Huck Institutes of the Life Sciences
Pennsylvania State University
2014-2016 Professor with tenure
Department of Biochemistry and Molecular Biology
Pennsylvania State University
2015-2016 Paul Berg Professor

Department of Biochemistry and Molecular Biology
Pennsylvania State University
2015-2017 Director, Biomedical and Translational Informatics Institute
Professor
Geisinger Health System
2016-2017 Chief Research Informatics Officer
Geisinger Health System
2016-present Fixed-term, Part-time Professor
Department of Biochemistry and Molecular Biology
Pennsylvania State University
2017-present Faculty Pending,
Department of Genetics
University of Pennsylvania, Perelman School of Medicine
2017-present Director, Center for Translational Bioinformatics
Institute for Biomedical Informatics
University of Pennsylvania, Perelman School of Medicine
2017-present Associate Director for Bioinformatics
Institute for Biomedical Informatics
University of Pennsylvania, Perelman School of Medicine
2017-present Associate Director, Center for Precision Medicine
University of Pennsylvania, Perelman School of Medicine

Other Professional Positions
2005-2010 Consultant, Boehringer-Ingelheim

Honors and Awards

1999 Graduated Summa Cum Laude, University of Pittsburgh, Johnstown
2000- 2002 NIH Breast Cancer Research Training Grant
2001 Vanderbilt University, Charles R. Park Student Travel Award
2002- 2003 NLM Bioinformatics Training Grant
2002 Vanderbilt University Graduate School Travel Grant
2003 Vanderbilt University Dissertation Enhancement Grant
2003 Vanderbilt University Graduate School Travel Grant
2003 Vanderbilt University, Charles R. Park Student Travel Award
2004 Best Paper Award, Genetic and Evolutionary Computation Conference
2006 *Genome Technology*, Rising Young Investigator Award
2010 Sloan Research Fellow
2011-2014 KAVLI Frontiers in Science fellow, National Academy of Science
Jointly sponsored by the US National Academy of Sciences and The Kavli Foundation, the Kavli Frontiers of Science bring together some of the very best young scientists to discuss exciting advances and opportunities in their fields in a format that encourages informal collective, as well as one-on-one discussions among participants. It is an honor to be selected as a Kavli fellow, and Dr. Ritchie was selected four years in a row.
2014 Member, Thomas Reuters, Most Highly Cited Researchers
2015 Paul Berg Professor of Biochemistry and Molecular Biology, Penn State University
2016 E. Allen Deaver, High Potential Leadership Fellow, Geisinger Health System
2017 First Place, AMIA "Why Informatics" Video Contest

Membership in Professional Societies

American Statistical Association (ASA)
- Middle TN Chapter Representative (2004-2006)

American Society of Human Genetics (ASHG)
International Genetic Epidemiology Society (IGES)
- Member of Education Committee (2009-2013)

International Society for Computational Biology (ISCB)
American Medical Informatics Association (AMIA)
European Society of Human Genetics (ESHG)

Administrative and Service Contributions

Institutional Service

2003-2004 Center for Human Genetics Research Core Oversight Board
Vanderbilt University Medical Center, Nashville, TN

2005 Organizing Committee—CHGR Annual Genetics Symposium
Vanderbilt University Medical Center, Nashville, TN

2006 ACCRE Study Group, co-chair
Vanderbilt University, Nashville, TN

2006 Panel Member—Women in Academe Series
Vanderbilt University Medical Center, Nashville, TN

2008 Faculty Recruitment Committee
Center for Human Genetics Research

2009 Faculty Recruitment Committee, chair
Center for Human Genetics Research

2009 Personalized Medicine Task Force – Vision 2020
Vanderbilt University

2009 IGP Internal Review Administrative Subcommittee
Vanderbilt University

2004-2001 Faculty Director, CHGR Computational Genomics Core
Vanderbilt University Medical Center, Nashville, TN

2007-2011 ACCRE Faculty Advisory Board
Vanderbilt University, Nashville, TN

2008-2011 Director, Program in Computational Genomics
Vanderbilt University, Center for Human Genetics Research

2011 Biobehavioral Health Genetics Faculty Search Committee
The Pennsylvania State University, University Park, PA

2011-2012 PSU Presidential Task Force
The Pennsylvania State University, University Park, PA

2011-2013 BMB Graduate Student Recruitment Committee
The Pennsylvania State University, University Park, PA

2012-2013 Institute of Cyberscience, Search Committee
The Pennsylvania State University, University Park, PA

2012-2013 iBIOS Bioinformatics & Genomics Graduate Program Admissions Committee
The Pennsylvania State University, University Park, PA

2012-2013 Research Data and Computing Committee
The Pennsylvania State University, University Park, PA

2012-2014 IT Strategic Planning Committee
The Pennsylvania State University, University Park, PA

2014-2015 Chair, BMB Promotion & Tenure Committee
The Pennsylvania State University, University Park, PA

2011-2014 BMB Junior Faculty Mentoring Committee
The Pennsylvania State University, University Park, PA

2011-2016 Director, Center for System Genomics
The Pennsylvania State University, University Park, PA

2012-2014 BMB Promotion & Tenure Committee (2014 – Chair)
The Pennsylvania State University, University Park, PA

2014 Research CI Governance Task Force
The Pennsylvania State University, University Park, PA

2014 ICS Coordinating Committee for Advanced CI
The Pennsylvania State University, University Park, PA

2014 Academic Integrity Committee – RA10
The Pennsylvania State University, University Park, PA

2015-2017 Enterprise Data Strategy Steering Committee
Geisinger Health System, Danville, PA

2016-2017 Research Space Committee, Chair
Geisinger Health System Danville, PA

2016-2017 Chief Research Informatics Officer

National / International Service

2002 Grant Reviewer, "Small Grants Program for Cancer Epidemiology." PA-01-021, National Cancer Institute, National Institutes of Health

2004 Workshop Organizer, Biological Applications of Genetic and Evolutionary Computation

2005 Session Organizer, Computational Approaches for Pharmacogenomics, Pacific Symposium on Biocomputing

2005 Program Committee, Biological Applications of Genetic and Evolutionary Computation

2005 Workshop Organizer, Biological Applications of Genetic and Evolutionary Computation

2006 Grant Reviewer, "Toward Maximizing the Scientific Value of the Biologic Specimens from the Women's Health Initiative." RFP-NHLBI-WH-06-09, National Heart, Lung, and Blood Institute, National Institutes of Health

2006 Session Organizer, Computational Approaches for Pharmacogenomics, Pacific Symposium on Biocomputing

2006 Program Committee, Biological Applications of Genetic and Evolutionary Computation

2006 Workshop Organizer, Biological Applications of Genetic and Evolutionary Computation

2006 Program Committee, European Conference on Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics

2006 Workshop Organizer, PGRN Data Analysis Workshop

2007 Program Committee, Genetic and Evolutionary Computation Conference

2007 Program Committee, European Conference on Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics

2007 Grant Reviewer, "Facilitating Interdisciplinary Research via Methodological and Technological Innovation in the Behavioral and Social Sciences (R21)." RFA-RM-07-004, National Institutes of Health

2007 Grant Reviewer, "Small Grants Program in Cancer Epidemiology." PAR-06-294, National Cancer Institute (June and November), National Institutes of Health

2008 Program Committee, Genetic and Evolutionary Computation Conference

2008 Program Committee, International Conference on Intelligent Systems in Molecular Biology

2008 Grant Reviewer, "PA Department of Health Final Performance Reviews." Oak Ridge Associated Universities

2008 Grant Reviewer, "GWA Studies for the Genes, Environment, and Health Initiatives." RFA-HG-07-012, National Human Genome Research Institute, National Institutes of Health

2008 Grant Reviewer, "Toward Maximizing the Scientific Value of the Biologic Specimens from the Women's Health Initiative II." BAA HLBI-WH-09-01, National Heart, Lung, and Blood Institute, National Institutes of Health

2008 Grant Reviewer, "Genomic Parsing of Bipolar Disorder and Schizophrenia: Collaborative R01's (Teleconference)". Special Emphasis Panel/Scientific Review Group 2008/08 ZMH1 ERB-S (08). National Institute of Mental Health, National Institutes of Health

2008 Grant Reviewer, Israel Science Foundation's FIRST (Focal Initiatives in Research in Science and Technology)

2008 Grant Reviewer, "Small Grants Program in Cancer Epidemiology." PAR-06-294, National Cancer Institute (June), National Institutes of Health

2009 Grant Reviewer, "GWAS of Treatment Response in Randomized Clinical Trials – Study Investigators." RFA-HG-08-004, National Human Genome Research Institute, National Institutes of Health

2009 Meeting Participant, "The Challenge of Mapping GWAS Signals." Hosted by the Genes, Environment and Health Initiative (GEI), and National Cancer Institute. National Institutes of Health.

2009 Conference Chair, European Conference on Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics

2010 Conference Chair, European Conference on Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics

2010 Program Committee, Genetic and Evolutionary Computation Conference

2010 Program Committee, The 2010 International Conference on Intelligent Computing (ICIC 2010)

2010 Session Chair, Genetic and Evolutionary Computation Conference

2010 Program Committee, European Conference on Computational Biology

2010 Program Committee, Pattern Recognition in Bioinformatics

2010 Host, P-STAR Analysis Workshop, October 2010, Nashville, TN

2005-2010 Grant Reviewer, Alzheimer's Association

2006-2010 Pharmacogenetics Research Network (PGRN) Analysis Working Group Co-Chair

2011 Workshop Chair, "Systems Pharmacogenomics: Birds of a Feather", Pacific Symposium on Biocomputing 2011

2011 Conference Chair, European Conference on Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics

2011 Program Committee, Asia-Pacific Translational Bioinformatics Conference

2011 External Examiner for Viva, University of Nottingham, Nottingham UK

2011 Program Committee, The 2011 International Conference on Intelligent Computing (ICIC 2011)

2011 Grant Reviewer, "Computational Tool Development and Integrative Data Analysis for LINCS (U01)", RFA- RM-10-005, Special Emphasis Panel, National Institutes of Health

2011 Grant Reviewer, Ad Hoc, Genomics, Computational Biology and Technology (GCAT), National Institutes of Health

2011 Bioinformatics Track Chair, Genetic and Evolutionary Computation Conference

2011 Program Committee, European Conference on Artificial Life 2011

2011 Program Committee, Pattern Recognition in Bioinformatics 2011
2011 Host, P-STAR Analysis Workshop, December 2011, Chicago, IL
2011 Session Chair, "Beyond GWAS: Integrating Transcriptome, Proteome, and Pathway Data in the Genetic Dissection of Complex Traits", International Congress on Human Genetics, October 2011, Montreal, Canada
2012 Workshop Chair, "Systems Pharmacogenomics", Pacific Symposium on Biocomputing 2012
2012 Local Host, Genetic and Evolutionary Computation Conference, Philadelphia, PA
2012 Grant Reviewer, Genome Canada
2012 Program Committee, Asia-Pacific Translational Bioinformatics Conference
2012 External Examiner for PhD, University of Liege
2012 Host, P-STAR Analysis Workshop, December 2012, Austin TX
2012 Grant Reviewer, Special Emphasis Panel 2012/10 ZEY1 VSN, National Eye Institute
2012 Grant Reviewer, Special Emphasis Panel 2012/05 ZAI1 QV-I, National Institute of Allergy and Infectious Disease
2012 Grant Reviewer, Science Foundation Ireland
2012 Organizing Committee, KAVLI Frontiers in Science, American-Indonesian conference
2013 Organizing Committee, KAVLI Frontiers in Science, American-Indonesian conference
2013 Program Committee, Asia-Pacific Translational Bioinformatics Conference
2013 Guest Editor, PLOS Genetics
2013 Guest Editor, Frontiers in Genetics
2013 Program Committee, Translational Bioinformatics Conference
2013 Program Committee, The 2013 International Conference on Intelligent Computing (ICIC 2013)
2013 Program Committee, Pattern Recognition in Bioinformatics 2013
2013 Host, P-STAR Analysis Workshop, December 2013, Nashville TN
2014 Organizing Committee, Pacific Symposium of Biocomputing
2014 Track Chair, Bioinformatics, ACM-BCB
2014 Program Committee, Translational Bioinformatics Conference
2014 Program Committee, ICCABS
2014 Program Committee, World Congress Psychiatric Genetics
2014 Program Committee, Asia-Pacific Translational Bioinformatics Conference
2014 Grant Reviewer, Medical Research Council (MRC), United Kingdom

2015 Organizing Committee, Pacific Symposium on Biocomputing
2015 Program Committee, AMIA
2015 Program Committee, Translational Bioinformatics Conference
2016 Organizing Committee, Pacific Symposium on Biocomputing
2016 Program Committee, Translational Bioinformatics Conference
2017 Organizing Committee, Pacific Symposium on Biocomputing
2017 Vice Chair, AMIA Translational Bioinformatics Conference

2017 Co-Host, Translational Bioinformatics Conference
2017 Grant Reviewer, Canada Excellence Research Chair
2017 Grant Reviewer, Wellcome Trust, Sir Henry Dale Fellowship
2018 Organizing Committee, Pacific Symposium on Biocomputing
2007-2012 Grant Reviewer, Pennsylvania Performance Review, PA Department of Health
2007-2017 Member, Faculty of 1000 Biology
2008-2015 Member, Genetic Epidemiology Scientific Review Committee for the Department of Veterans Affairs
2007-present Managing Editor, BMC BioData Mining
2008-present Member Editorial Board, Pharmacogenomics
2009-present Executive Editor, Pharmacogenomics
2010-present Grant Reviewer, European Research Council
2011-present Member Editorial Board, Pharmacogenetics & Genomics
2012-present Member, Genomics, Computational Biology and Technology (GCAT), National Institutes of Health
2015-present Member, Standing Committee on Biological and Physical Sciences in Space (CBPSS), National Academy of Sciences
2015-present GWAS Catalog Scientific Advisory Board
2016-2018 Member, Parasite Award Committee
2017-present Grant Reviewer, Genome Canada
2017-present Institute for Computational Biology External Advisory Board, Case Western Reserve University
2017-present UCSF PREMIER (Precision Medicine in Rheumatology) External Advisory Committee
2017-present NIH Advisory panel, All of Us Cohort Program

REVIEWER FOR JOURNALS

American Journal of Human Genetics, Annals of Human Genetics, Annals of Neurology, BioData Mining, Bioinformatics, Biometrical Journal, Biostatistics, BMC Bioinformatics, BMC Cancer, BMC Genetics, BMC Medical Genomics, BMC Systems Biology, Briefings in Bioinformatics, British Journal of Cancer, Cancer Epidemiology Biomarkers & Prevention, Cancer Informatics, Cellular and Molecular Life Sciences, Circulation Cardiovascular Genetics, Clinical Cancer, Clinical Genetics, Clinical Pharmacology & Therapeutics, Computer Methos and Programs in Biomedicine, Current Bioinformatics, Epidemiology, Expert Reviews of Molecular Diagnostics, Expret Reviews of Precision Medicine, European Journal of Human Genetics, European Journal of Operational Research, EvoBio, Frontiers in Genetics, Genetic Epidemiology, Human Genetics, Human Genomics, Human Heredity, Human Immunology, Human Molecular Genetics, Human Mutation, IBM Systems Journal, IEEE Transactions in Evolutionary Computation, In Silico Biology, Intelligent Systems in Molecular Biology, International Journal Artificial Intelligence in Medicine, Journal of the American Medical

Association (JAMA), Molecular Psychiatry, Nature, Nature Reviews Drug Discovery, Nature Reviews Genetics, Neoplasia, Neuropsychiatric Genetics, Nucleic Acids Research, OMICS Integrative Biology, Pacific Symposium on Biocomputing, Pharmacogenetics and Genomics, Pharmacogenomics, PLOS Biology, PLOS Computational Biology, PLOS Genetics, PLOS One, PNAS: Proceedings of the National Academy of Science, Psychiatry Research, The Pharmacogenomics Journal, Science, Science Translational Medicine, Source Code for Biology and Medicine, Statistics in Medicine

Teaching activities

Vanderbilt Contributions

2002 IGP Biostatistics Module, Lecturer
Vanderbilt University
2004 Human Genetics—MPB 340, Lecturer
Vanderbilt University
2004 IGP Biostatistics Module, Lecturer
Vanderbilt University
2004 Health Systems Management Organization Course, Lecturer
Vanderbilt University
2005 Human Genetics, HGEN 341, Lecturer
Vanderbilt University
2005 Tutorials in Statistical and Population Genetics, HGEN 371, Co-Organizer
Vanderbilt University
2006 Human Genetics, HGEN 341, Lecturer
Vanderbilt University
2006 Tutorials in Statistical and Population Genetics, HGEN 371, Co-Organizer
Vanderbilt University
2006 Cancer Biology Methodology Course, Lecturer
Vanderbilt University
2007 Human Genetics, HGEN 341, Lecturer
Vanderbilt University
2007 Tutorials in Statistical and Population Genetics, HGEN 371, Co-Organizer
Vanderbilt University
2007 Cancer Biology Methodology Course, Lecturer
Vanderbilt University
2008 Human Genetics, HGEN 341, Lecturer
Vanderbilt University
2008 Organizer, Program in Computational Genomics Journal Club
Vanderbilt University
2009 Human Genetics, HGEN 341, Lecturer
Vanderbilt University
2009 Organizer, Program in Computational Genomics Journal Club
Vanderbilt University
2009 Biomedical Informatics 310, Lecturer
Vanderbilt University
2009 IGP, Human Genetics, Lecturer
Vanderbilt University
2010 Human Genetics, HGEN 341, Lecturer
Vanderbilt University

2010 Biomedical Informatics 310, Lecturer
Vanderbilt University
2011 Human Genetics, HGEN 341, Course Director
Vanderbilt University

The Pennsylvania State University Contributions

2012 Tutorials in Bioinformatics & Genomics, IBIOS 598B FA, Co-director
The Pennsylvania State University, University Park, PA

2012 Genomics, IBIOS/BMMB 551 FA, Lecturer
The Pennsylvania State University, University Park, PA

2013 Tutorials in Bioinformatics & Genomics, IBIOS 598B SP, Co-director
The Pennsylvania State University, University Park, PA

2013 Human Genomics and Biomedical Informatics, BMB498D, Director
The Pennsylvania State University, University Park, PA

2013 Tutorials in Bioinformatics & Genomics, IBIOS 598B FA, Co-director
The Pennsylvania State University, University Park, PA

2013 Genomics, IBIOS/BMMB 551 FA, Lecturer
The Pennsylvania State University, University Park, PA

2014 Critical Analysis in Bioinformatics and Genomics, IBIOS 541 SP, Co-director
The Pennsylvania State University, University Park, PA

2014 Human Genomics and Biomedical Informatics, BMB498D SP, Director
The Pennsylvania State University, University Park, PA

2014 Critical Analysis in Bioinformatics and Genomics, IBIOS 541 FA, Co-director
The Pennsylvania State University, University Park, PA

2014 Genomics, IBIOS/BMMB 551 FA, Lecturer
The Pennsylvania State University, University Park, PA

2015 Genomics, IBIOS/BMMB 551 FA, Lecturer
The Pennsylvania State University, University Park, PA

2016 Genomics, IBIOS/BMMB 551 FA, Lecturer
The Pennsylvania State University, University Park, PA

External Contributions

2009 Course Co-Director, Genetic Analysis of Complex Disease
Miami Institute of Human Genetics, University of Miami
2010 Course Co-Director, Genetic Analysis of Complex Disease
Miami Institute of Human Genetics, University of Miami

2010 Lecturer, Vanderbilt-NARI-NIE Informatics Training Program (VNNIT) Workshop, Pune, India

2010 "A comparison of analytical methods for genetic association studies," CDC Workshop, Atlanta, GA
2011 Course Co-Director, Genetic Analysis of Complex Disease
Miami Institute of Human Genetics, University of Miami
2011 "A comparison of analytical methods for genetic association studies II", CDC Workshop, Atlanta, GA
2011 "Next-generation Sequencing", CDC Workshop, Atlanta, GA
2012 Course Co-Director, Genetic Analysis of Complex Disease
Miami Institute of Human Genetics, University of Miami
2012 "Next-generation Sequencing", CDC Workshop, Atlanta, GA
2013 "Next-generation Sequencing", CDC Workshop, Atlanta, GA
2013 Course Co-Director, Genetic Analysis of Complex Disease
Miami Institute of Human Genetics, University of Miami
2013 "Analysis Tools For Genetic Testing", CDC Workshop, Atlanta, GA
2014 "Public Health Genomics", CDC Workshop, Atlanta, GA
2014 "Gene-gene and Gene-environment interactions", UAB's 4th Annual NIGMS-funded Short Course on Statistical Genetics & Genomics, Birmingham, AL
2014 "Intro to Bioinformatics", CDC Workshop, Atlanta, GA
2014 "Precision Medicine: When Genomics Gets Personal", CDC Workshop, Atlanta, GA
2015 "Next Generation Sequencing: What is it How is it Used and What Can We Learn", CDC Workshop, Atlanta, GA

Advisory and Supervisory Responsibilities

High School Students

2007 Xun Miao
Martin Luther King High School

Undergraduate Students

2005 Gordon Lemmon
Vanderbilt Summer Science Academy

2006 Theresa Fanelli
Vanderbilt Summer Science Academy

2012-2013 Christian Suri
The Pennsylvania State University

2013-2014 Tomek Dobranski
The Pennsylvania State University

2013-2015 Anastasia Lucas
The Pennsylvania State University

Post-doctoral Fellows – Members of Lab

2009-2011 Sarah A. Pendergrass, PhD
Vanderbilt University School of Medicine

2009-2011 Rebecca Zuvich, PhD
Vanderbilt University School of Medicine
2013-2016 DoKyoon Kim, PhD
The Pennsylvania State University

2015-2017 Marta Byrska-Bishop
Geisinger Health System

2016-present Jason Miller
University of Pennsylvania

2017-present Yogasudha Veturi
University of Pennsylvania

Graduate Students – Members of Lab

2004-2007 Alison A. Motsinger
Vanderbilt University, Ph.D. Program in Human Genetics
Currently Tenured Assoc. Prof. at North Carolina State University (Department of Statistics)
2005-2008 Todd L. Edwards
Vanderbilt University, Ph.D. Program in Human Genetics
Currently Tenure Track Asst. Prof. at Vanderbilt University (Department of Medicine, Center for Epidemiology)
2004-2009 William S. Bush
Vanderbilt University, Ph.D. Program in Human Genetics
Currently Tenure Track Asst. Prof. at Case-Western Reserve University (Department of Biostatistics and Epidemiology)
2006-2010 Stephen Turner
Vanderbilt University, Ph.D. Program in Human Genetics
Currently Director Bioinformatics Core, University of Virginia

2008-2012 Benjamin Grady
Vanderbilt University, Ph.D. Program in Human Genetics
2009-2013 Emily Holzinger
Vanderbilt University, Ph.D. Program in Human Genetics
Currently Post-doctoral fellow, National Human Genome Research Institute

2009-2013 Carrie Buchanan
Vanderbilt University, Ph.D. Program in Human Genetics
Currently 4th year Medical Student, MD/PhD program, Vanderbilt University

2011-2013 Neerja Katiyar
Pennsylvania State University, Ph.D. Program in Bioinformatics & Genomics
2011-2015 Molly Hall
Pennsylvania State University, Ph.D. Program in BMMB
Currently Post-doctoral fellow, University of Pennsylvania
2012-2016 Ruowang Li
Pennsylvania State University, Ph.D. Program in Bioinformatics & Genomics

2013-2018 Anna Okula Basile
Pennsylvania State University, Ph.D. Program in BMMB

2014-2018 Anurag Verma
Pennsylvania State University, Ph.D. Program in Bioinformatics & Genomics
2014-2018 Shefali Setia Verma
Pennsylvania State University, Ph.D. Program in Bioinformatics & Genomics
2016-present Binglan Li
University of Pennsylvania, Graduate Group in Genomics and Computational Biology

2016-present Xinyuan (Blair) Zhang
University of Pennsylvania , Graduate Group in Genomics and Computational Biology

Thesis Committees

2005-2006 Zheng (Roger) Liu
Microbiology & Immunology
Vanderbilt University School of Medicine
2005-2006 Tricia Thornton-Wells
Neuroscience Program
Vanderbilt University School of Medicine
2005-2007 Xueying (Sharon) Liang
Human Genetics Ph.D. Program
Vanderbilt University School of Medicine
2006-2008 Digna Velez
Human Genetics Ph.D. Program
Vanderbilt University School of Medicine
2007-2009 Daniel Kinnamon
Statistical Genetics
University of Miami Miller School of Medicine
2008-2009 Rebecca Zuvich
Human Genetics PhD Program
Vanderbilt University School of Medicine
2007-2010 Britney Grayson
Microbiology & Immunology
Vanderbilt University School of Medicine
2008-2010 Logan Dumitriscu
Human Genetics PhD Program
Vanderbilt University School of Medicine
2010-2012 Janina Jeff
Human Genetics PhD Program
Vanderbilt University School of Medicine
2013-2014 Matt Oetgens
Human Genetics PhD Program
Vanderbilt University School of Medicine
2013-2016 Jacob Hall
Human Genetics PhD Program
Vanderbilt University School of Medicine
2013-2017 Claire Reynolds

Biochemistry, Microbiology and Molecular Biology PhD Program
The Pennsylvania State University

2013-2015 Marta Byrska-Bishop
Bioinformatics and Genomics PhD Program
The Pennsylvania State University

2013-2016 Rohit Reja
Bioinformatics and Genomics PhD Program
The Pennsylvania State University

MAJOR RESEARCH INTERESTS

Computational Genomics	Genetic Epidemiology
Bioinformatics	Statistical Genetics
Epistasis	Systems Genomics
Pharmacogenomics	Computational Biology
Big Data	Translational Informatics
Evolutionary Computation	Cardiovascular Disease

SOFTWARE AND PATENTS

2001	Multifactor Dimensionality Reduction (MDR)
2003	MDR-PDT
2002	U.S. Provisional Patent: "Method and Apparatus for Multifactor Dimensionality Reduction"
2006	genomeSIMLA
2009	LD-Plus
2009	LD-Spline
2010	Synthesis-View
2012	ATHENA
2012	Biofilter 2.0
2012	BioBin
2012	PheWAS-view
2013	Phenogram
2016	iPhenogram

RESEARCH FUNDING

Active Funding

5R01 AI077505 (Haas and Ritchie) 07/01/2015-6/30/2020 2.4 calendar months
NIH/NIAID $126,540
Pharmacogenomics of HIV Therapy
The goal of this project is to identify genetic variation associated with adverse reactions to HIV therapy, including PheWAS, epistasis, and gene-environment interaction analyses.

P50GM115318-01 (Krauss, Ritchie PI Informatics Core) 07/01/2015-06/30/2020 1.8 calendar months
NIH $150,000
Pharmacogenomics of Statin Therapy (Informatics Core)
The goal of this proposal is to provide an informatics core to the POST PGRN center.

R01AI116794-01A1 (Moore) 04/01/16 – 03/31/21 1.2 calendar months
NIH $343,833
Biomedical Computing and Informatics Strategies for Infectious Disease Research
The goal of this project is to look for interactions between rare and common genetic variants associated with HIV drug response traits.

Completed Funding

2004-2005 Development award supported by CFAR - P30 AI54999 (PI)
Genetic Basis of NNRTI Toxicity in HIV Patients
2004-2005 Development award supported by CFAR - P30 AI54999 (Co-PI)
A Pilot Study of Mitochondrial Genetics and Peripheral Neuropathy during Antiretroviral Therapy
2004-2008 NIH R01 AG020135 (PI of subcontract)
Revealing Epistasis in Alzheimer Disease
2005-2007 Development award supported by SPORE - P50 CA098131 (PI)
Approaches to Genome-Wide Association in Sporadic Breast Cancer
2006-2009 AVCF- Vanderbilt (Co-investigator)
DNA Capture Project – Dan Roden
9/28/2007-7/31/2011
2006-2009 NIH R21 HL0877226 (Co-investigator)
Iron as a Nutritional Modifier of Toxic Neuropathy in HIV/AIDS – Asha Kallianpur
9/27/06-7/31/09
2007-2009 NIH R01 CA122756 (Co-investigator)
Cell Cycle/Apoptosis Gene Variants and Breast Cancer – Jiyang Cai
12/1/2007-11/30/2011

2007-2009 NIH/NIA R01 AG027944 (Co-investigator)
Genomic Convergence in Alzheimer Disease – Pericak-Vance, Univ. of Miami
12/01/2007-11/30/2012

2008-2009 NCCAM R01 AT004660 (Co-investigator)
Dietary Calcium and Magnesium, Genetics and Colorectal Adenoma – Qi Dai
06/01/2008-05/31/2012

2006-2009 NIH R21 NS059330 (Co-investigator)
Mitochondrial Genomics and Peripheral Neuropathy during HIV Therapy – Todd Hulgan
3/15/2007-6/30/2010

2004-2010 NIH U01 HL065962 (PI of core)
Pharmacogenomics of Arrhythmia Therapy – Dan Roden
9/01/2005-8/31/2010

2007-2011 NIH U01 HG004603-01 (Co-investigator)
Vanderbilt Genome-Electronic Records Project – Dan Roden
9/28/2007-7/31/2011

2007-2011 NIH U01 HG004608 (PI of subcontract)
Genome-Wide Study of Cataract and Low HDL in the Personalized Medicine Research Project – Catherine McCarty
9/30/2007-9/29/2011

2009-2013 NIH/NLM 1R01LM009989-01A1 (Malin)
Technologies to Enable Privacy in Biomedical Databanks
07/01/2009-06/30/2013

2009-2011 NIH/NIGMS 1RC2GM092618-01 (Masys)
VESPA: Vanderbilt Electronic Systems for Pharmacogenomic Assessment
09/30/2009-09/29/2011

2010-2015 NIH U01 HL065962 (PI of core)
Pharmacogenomics of Arrhythmia Therapy – Dan Roden
9/01/2010-8/31/2015

2009-2013 NIH/NLM 1R01 LM010040-01(PI)
Analysis Tool for Heritable and Environmental Network Associations
07/01/2009-06/30/2013

2008-2013 NIH/NIAID 5R01 AI077505-03 (Haas)
Pharmacogenomics of HIV Therapy
07/08/2008-06/30/2013

2009-2013 NIH/NHGRI 5U01 HG004798-03
Epidemiologic Architecture for Genes Linked to Environment (Crawford)
07/17/2008-12/31/2013

2011-2015 NIH/NHGRI 5U01 HG006385 (Haines, Ritchie PI subcontract)

eMERGE II Coordinating Center
08/15/2011-07/31/2015

2013-2014 Geisinger contract (Ritchie PI)
Geisinger Clinic Genetic Studies: Mining Electronic Health Records for Genetic Associations
8/01/2013-7/31/2014

2010-2016 5U01 HL065962 (Roden, Ritchie PI U19-subcontract)
Pharmacogenomics of Arrhythmia Therapy: P-STAR Network Resource
09/01/2010-08/31/2016

2011-2016 5U01 HG006389 (McCarty, Ritchie PI subcontract)
IRIS: Incorporating Research into Sight: eMERGE II
08/15/2011-07/31/2016

2011-2016 3 UL1 RR033184-01 (Sinoway)
CTSA (Clinical and Translational Science Award)
3/1/2011-2/29/2016

2015-2016 R01GM111913 (Mirshahi and Robishaw)
An integrated approach to study GPCR variants associated with complex diseases.
06/01/2015-8/30/2016

2016-2017 1OT2OD024609-01 (Ledbetter and Ritchie)
Precision Medicine at Geisinger
09/27/2016 – 05/31/2017

2015-2017 1 U01 HG008679-01 (Williams and Ritchie)
EMR-Linked Biobank for Translational Genomics (part of eMERGE-III network)
09/01/2015-12/18/2017

2015-2017 SAP 4100070267 (Ritchie) (Pennsylvania Department of Health)
Integrating Big Data for Biomedical Discovery: Methods, Tools, and Applications
6/1/2015-12/18/2017

2013-2017 2 P01 ES011269-11 (Van de Water, Ritchie sub)
EPA: 83543201 (Van de Water, Ritchie sub)
UC. Davis Center for Children's Environmental Health and Disease Prevention (CCEH)
06/01/2013 – 12/18/2017

BIBLIOGRAPHY

Peer-Reviewed Research Papers

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268. Volpi S, Bult CJ, Chisholm RL, Deverka PA, Ginsburg GS, Jacob HJ, Kasapi M, McLeod HL, Roden DM, Williams MS, Green ED, Rodriguez LL, Aronson S, Cavallari LH, Denny JC, Dressler LG, Johnson JA, Klein TE, Leeder JS, Piquette-Miller M, Perera M, Rasmussen-Torvik LJ, Rehm HL, **Ritchie MD,** Skaar TC, Wagle N, Weinshilboum R, Weitzel KW, Wildin R, Wilson J, Manolio TA, Relling MV. Research Directions in the Clinical Implementation of Pharmacogenomics: An Overview of US Programs and Projects. Clin Pharmacol Ther. 2018 Feb 20. doi: 10.1002/cpt.1048. PMID:29460415.
269. Verma SS, Josyula N, Verma A, Zhang X, Veturi Y, Dewey FE, Hartzel DN, Lavage DR, Leader J, **Ritchie MD**, Pendergrass SA. Rare variants in drug target genes contributing to

complex diseases, phenome-wide. Sci Rep. 2018 Mar 15;8(1):4624. doi: 10.1038/s41598-018-22834-4. PMID:29545597; PMCID:PMC5854600

270. Verma A, Lucas A, Verma SS, Zhang Y, Josyula N, Khan A, Hartzel DN, Lavage DR, Leader J, **Ritchie MD**, Pendergrass SA. PheWAS and Beyond: The Landscape of Associations with Medical Diagnoses and Clinical Measures across 38,662 Individuals from Geisinger. Am J Hum Genet. 2018 Mar 19. pii: S0002-9297(18)30062-4. doi: 10.1016/j.ajhg.2018.02.017. PMID:29606303
271. Verma A, Bradford Y, Dudek SM, Verma SS, Pendergrass SA, **Ritchie MD**. A simulation study investigating power of Phenome-Wide Association Studies. BMC Bioinformatics, 2018 Apr 4;19(1):120. doi: 10.1186/s12859-018-2135-0. PMID:29618318

Papers *Submitted*

1. **Ritchie MD**, Van Steen K, Gusareva E. Dimensionality reduction in Genome-Wide Association Interaction Studies (GWAIS): practical considerations. *Annals of Translational Medicine, accepted.*

2. Li R, Kim D, Wheeler HE, Dudek SM, Dolan EM, **Ritchie MD.** Integration of genetic and functional genomics data to uncover chemotherapeutic induced cytotoxicity. *The Pharmacogenomics Journal, accepted*

3. Miller JE, Metpally RP, Person TN, Krishnamurthy SB, Dasari VR, Lavage DR, Cook AM, Smith AL, Nash J, Carey DJ, **Ritchie MD,** Kim D, Gogoi R. on behalf of the DiscovEHR collaboration. Systematic characterization of germline variants from the DiscovEHR study Endometrial Carcinoma population. Submitted

Peer-Reviewed Review Papers

1. Moore JH, **Ritchie MD**. STUDENTJAMA. The challenges of whole-genome approaches to common diseases**.** *JAMA*, 291:1642-1643 (2004). PMID: 15069055
2. **Ritchie MD**. Trends in genomic variation: a view of some of the latest technologies. *Drug Discovery Today*, 10(21):1417-1418 (2005). PMID: 16243260
3. **Ritchie MD**. Bioinformatics approaches for detecting gene-gene and gene-environment interactions in studies of human disease: a neurological focus. *Neurosurgical Focus*, 19(4):E2 (2005). PMID: 16241104
4. **Ritchie MD**, Motsinger AA. Multifactor Dimensionality Reduction for detecting gene-gene and gene-environment interactions in pharmacogenomics studies. *Pharmacogenomics*, 6(8):823-34 (2005). PMID: 16296945
5. McKinney BA, **Ritchie MD**, Moore JH. Machine learning for detecting gene-gene interactions. *Applied Bioinformatics*, 5:77-88 (2006). PMID: 16722772, PMCID: PMC3244050
6. Motsinger A, Haas D, Hulgan T, **Ritchie M**. Human genomic association studies: a primer for infectious disease specialists. *Journal of Infectious Disease,* 195:1737-44 (2007). PMID: 17492588
7. Crawford DC, **Ritchie MD**, Rieder MJ. Identifying the genotype behind the phenotype: a role model found in VKORC1 and its association with warfarin dosing. *Pharmacogenomics*, 8:487-96 (2007). PMID: 17465713, PMCID: PMC3112050
8. **Ritchie MD**, Edwards TL, Fanelli TJ, Motsinger AA. Genetic heterogeneity is not as threatening as you might think. *Genetic Epidemiology*, 31:797-800 (2007). PMID: 17654613
9. Motsinger AA, **Ritchie MD**, Reif DM. Novel methods for detecting epistasis in pharmacogenomics studies. *Pharmacogenomics*, 8:1229-1241 (2007). PMID: 17924838

10. Motsinger AA, **Ritchie MD**. Neural networks for genetic epidemiology: past, present, and future. *BMC BioData Mining*, 1:3 (2008). doi: 10.1186/1756-0381-1-3. PMID: 18822147, PMCID: PMC2553772
11. Vineis P, Brennan P, Canzian F, Ioannidis JPA, Matullo G, **Ritchie M**, Stromberg U, Taioli E, Thompson J. Expectations and challenges stemming from genome-wide association studies. *Mutagenesis*, 23(6):439-44 (2008). doi: 10.1093/mutage/gen042. Epub 2008 Sep 2. PMID: 18765424
12. Srinivasan BS, Chen J, Cheng C, Conti D, Duan S, Fridley BL, Gu X, Haines JL, Jorgenson E, Kraja A, Lasky-Su J, Li L, Rodin A, Wang D, Province M, and **Ritchie MD**. Methods for analysis in pharmacogenomics: Lessons from the Pharmacogenetics Research Network (PGRN) Analysis Group. *Pharmacogenomics*, 10:243-51 (2009). doi: 10.2217/14622416.10.2.243. PMID: 19207025, PMCID: PMC2737060
13. **Ritchie MD**, Bush WS. Genome simulation approaches for synthesizing in silico datasets for human genomics. *Adv Genet*, 72: 1-24 (2010). doi: 10.1016/B978-0-12-380862-2.00001-1. PMID: 21029846
14. Grady BJ and **Ritchie MD**. Statistical optimization of pharmacogenomics association studies: Key Considerations from Study Design to Analysis. *CPPM*, 9:1; 41-66. 2011 PMID: 21887206, PMCID: PMC3163263
15. Holzinger ER, **Ritchie MD**. Integrating heterogeneous high-throughput data for meta-dimensional pharmacogenomics and disease-related studies. *Pharmacogenomics.* 2012 Jan;13(2):213-22. doi: 10.2217/pgs.11.145. PMID: 22256870, PMCID: PMC3350322
16. **Ritchie MD**. The success of pharmacogenomics in moving genetic association studies from bench to bedside: study design and implementation of precision medicine in the post-GWAS era. *Hum Genet.* 2012 Oct;131(10):1615-26. doi: 10.1007/s00439-012-1221-z. Epub 2012 Aug 25. PMID: 22923055, PMCID: PMC3432217
17. Chhibber A, Kroetz DL, Tantisira KG, McGeachie M, Cheng C, Plenge R, Stahl E, Sadee W, **Ritchie MD**, Pendergrass SA. Genomic architecture of pharmacological efficacy and adverse events. *Pharmacogenomics.* 2014 Dec;15(16):2025-48. doi: 10.2217/pgs.14.144. PMID: 25521360, PMCID: PMC4308414.
18. **Ritchie MD**, Holzinger ER, Li R, Pendergrass SA, Kim D. Methods of integrating data to uncover genotype-phenotype interactions. *Nat Rev Genet.* 2015 Feb;16(2):85-97. doi: 10.1038/nrg3868. Epub 2015 Jan 13. Review. PMID: 25582081
19. Klein TE, **Ritchie MD**. PharmCAT: A Pharmacogenomics Clinical Annotation Tool. Clin Pharmacol Ther. 2017 Dec 1. PMID: 29194583
20. Verma A, **Ritchie MD**. Current Scope and Challenges in Phenome-Wide Association Studies. Current Epidemiology Reports. December 2017, Volume 4, Issue 4, pp 321-329. PMID:29545989; PMCID:PMC5846687
21. Verma SS, **Ritchie MD.** Another Round of "Clue" to Uncover the Mystery of Complex Traits. Genes (Basel). 2018 Jan 25;9(2). pii: E61. PMID: 29370075
22. Basile AO, **Ritchie MD**. Informatics and machine learning to define the phenotype. Expert Rev Mol Diagn. 2018 Mar;18(3):219-226. doi: 10.1080/14737159.2018.1439380. Epub 2018 Feb 16. PMID:29431517

Non-Peer Reviewed Papers/Chapters

1. Moore JH, Thornton TA, **Ritchie MD**. Basic statistics. In: Dracopoli NC, Haines JL, Korf BR, Moir DT, Morton CC, Seidman CE, Seidman JG, Smith DR. (eds). *Current Protocols in Human Genetics*. Wiley-Liss, Inc., New York, A.3M.1-A.3M.10 (2003).
2. **Ritchie MD**, White BC, Parker JS, Hahn LW, Moore JH. Optimization of neural networks using genetic programming improves detection and modeling of gene-gene interactions in studies of

human diseases. *Genetic and Evolutionary Computation Conference Proceedings* (2003). PMID: 12846935, PMCID: PMC183838

3. **Ritchie MD**, Moore JH. Biological applications of genetic and evolutionary computation. *Genetic and Evolutionary Computation Conference Workshop Proceedings* (2004).
4. **Ritchie MD**. Model Validation in Biological Applications of Genetic and Evolutionary Computation. *Genetic and Evolutionary Computation Conference Workshop Proceedings* (2004).
5. **Ritchie MD**. A review of computational approaches for detecting interactions. Educational Program. *American Association of Cancer Research* (2005).
6. Wilke RA, Carrillo MW, **Ritchie MD**. Pacific symposium on biocomputing - computational approaches for pharmacogenomics. *Pharmacogenomics*, 6(2):111-3 (2005). PMID: 15882130
7. **Ritchie MD**, Carillo MW, Wilke RA. Computational approaches for pharmacogenomics. *Pacific Symposium on Biocomputing Proceedings.* 2005:245-7. PMID: 15759630
8. Carillo MW, Wilke RA, **Ritchie MD**. Computational approaches for pharmacogenomics. *Pacific Symposium on Biocomputing Proceedings*, 11:544-546 (2006). PMID: 15759630
9. Williams SM, Canter JA, Crawford DC, Moore JH, **Ritchie MD**, Haines JL. Problems with genome-wide association studies. *Science.* 2007 Jun 29;316(5833):1840-2. PMID: 17605173
10. Aguilar-Ruiz J, Moore JH, **Ritchie MD**. Filling the gap between Biology and Computer Science. *BioData Mining*, 1:1 (2008). doi: 10.1186/1756-0381-1-1. PMID: 18822148, PMCID: PMC2547862
11. Haines JL, Crawford DC, **Ritchie MD**. A Primer in Statistical Methods in Genetics. In: Roden DM (ed), *Cardiovascular Genetics and Genomic*s, Blackwell publishing (2009).
12. Pizzuti C, **Ritchie MD**, Giacobini M (eds). *Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics: 7th European Conference, Proceedings EvoBIO 2009*. Springer publishing (2009).
13. Moore JH, Clegg J, Marchiori E, **Ritchie MD**, and Smith S. Artificial Evolution Methods in the Biological and Biomedical Sciences. *JAEA*. 2009.
14. Pizzuti C, **Ritchie MD**, Giacobini M (eds). *Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics: 8th European Conference, Proceedings EvoBIO 2010*. Springer publishing (2010).
15. **Ritchie MD**, Bush WS. Genome Simulation: Approaches for Synthesizing *In Silico* Datasets for Human Genomics. In: *Advances in Genetics, Vol. 72*, Elsevier Inc (2010). doi: 10.1016/B978-0-12-380862-2.00001-1. PMID: 21029846
16. Moore JH, **Ritchie MD**. The central role of biological data mining in connecting diverse disciplines. *BioData Mining* 2013, 6:14. doi: 10.1186/1756-0381-6-14. PMID: 23937773, PMCID: PMC3765075
17. **Ritchie MD,** Reducing Dimensionality in the Search for Gene-Gene Interactions. In: Between the Lines of Genetic Code. *Elsevier Inc* (2014).
18. **Ritchie MD.** Finding the Epistasis Needles in the Genome-Wide Haystack. In: Epistasis: Methods and Protocols, *Methods Mol Biol.* 2015;1253:19-33. doi: 10.1007/978-1-4939-2155-3_2. PMID: 25403525
19. **Ritchie MD,** Study design and analysis approaches in pharmacogenomics research. In: *Pharmacogenomics: Applications to Patient Care*, Third Edition. ACCP (2015).

ABSTRACT CONTRIBUTED PRESENTATIONS

2003 "Optimization of Neural Networks using Genetic Programming to Improve Detection and Modeling of Gene-Gene Interactions in Studies of Human

Diseases," Biological Applications in Genetic and Evolutionary Computation, Chicago, IL (Host: Wolfgang Banzhaf, peer-reviewed)
2003 "Optimization of Neural Networks using Genetic Programming to Improve Detection and Modeling of Gene-Gene Interactions in Studies of Human Diseases," Genetic and Evolutionary Computation Conference, Chicago, IL (Host: James Foster)
2004 "How Can We Detect Gene-Gene Interactions in Pharmacogenomic Studies?" Pharmacogenetics Research Network - Statistics Workshop, Los Angeles, CA (Host: Mike Province)
2004 "Model Validation Strategies in Biological Applications of Genetic and Evolutionary Computation," Biological Applications of Genetic and Evolutionary Computation Workshop, Seattle, WA (Host: Jason Moore, peer-reviewed)
2004 "GPNN as a Bioinformatics Tool for Human Genetics," Genetic and Evolutionary Computation Conference, Seattle, WA (Host: James Foster, peer reviewed)
2004 "MDR Reveals Gene-Gene Interactions Associated with Multiple Sclerosis," American Society of Human Genetics, Toronto, Canada, peer-reviewed
2004 "Gene-Gene Interaction Associated with Response to Treatment of Unipolar Major Depression Disorder," Cold Spring Harbor Laboratory: Pharmacogenomics, Cold Spring Harbor, NY, Peer-reviewed
2005 "Computational Approaches for Pharmacogenomics," Session Introduction at the Pacific Symposium on Biocomputing, The Big Island, HI (Host: Russ Altman, peer-reviewed)
2005 "Computational Approaches for Pharmacogenomics," Leader of Discussion Session at the Pacific Symposium on Biocomputing, The Big Island, HI (Host: Russ Altman)
2005 "Can Neural Network Constraints in GP Provide Power to Detect Genes Associated with Human Disease?" European Workshop on Evolutionary Computation and Bioinformatics, Lausanne, Switzerland (Host: Elena Marchiori, peer-reviewed)
2005 "Multifactor Dimensionality Reduction and the Power to Detect Pharmacogenomic Effects in Treatment of Tenureitis," Pharmacogenetics Research Network Statistics Workshop, Chicago, IL (Host: Nancy Cox and Mike Province, peer-reviewed)
2005 "Challenges and Strategies for Whole Genome Association Studies," American Society of Human Genetics, Salt Lake City, UT (Host: David Cox, peer-reviewed) *Given by Dr. Jonathan Haines due to maternity leave*
2006 "Tutorial on Computational Approaches for Pharmacogenomics," Pacific Symposium on Biocomputing, Maui, Hawaii (Host: Larry Hunter, peer-reviewed) *Given by Alison A. Motsinger due to maternity leave*
2006 "GenomeSim: Data Simulation Software for Whole-Genome Association Studies," Pacific Symposium on Biocomputing, Maui, HI (Host: Russ Altman, peer-reviewed) *Given by Alison A. Motsinger due to maternity leave*
2006 "Grammatical Evolution Neural Networks: A Powerful Gene-Gene Interaction Detection Method," Genetic Analysis Workshop Special Session, St. Petersburg, FL (Host: Jean MacCleur, peer-reviewed)

2006 "The Potential of a Sequential Replication Approach for Whole Genome Association Studies," International Genetic Epidemiology Society, Tampa, FL (Host: Jeanne Cashman, peer-reviewed)
2006 "PLATO: A Platform for the Analysis, Translation, and Organization of Large Scale Data," Pharmacogenetics Research Network Analysis Workshop, Nashville, TN (Host: Mike Province, peer-reviewed)
2008 "Thinking about Epistasis in Whole Genome Association Studies," Pharmacogenetics Research Network Analysis Workshop, Memphis, TN (Host: Mary Relling, peer-reviewed)
2009 "Genome-wide association study identifies novel genomic regions associated with drug-induced Long QT Syndrome," CSHL-Wellcome Trust Pharmacogenomics Meeting, Hinxton, UK. (Host: Steve Leeder, peer-reviewed)
2009 "Genome-wide association study identifies novel genomic regions associated with drug-induced Long QT Syndrome," American Society for Human Genetics, Honolulu, HI. (peer-reviewed)
2010 "Using Biological Knowledge to Guide the Search for Epistasis in Genome-Wide Association Studies", American Society of Human Genetics, Washington DC. peer-reviewed
2010 "Chromosome 4q25 variants are genetic modifiers of rare ion channel mutations associated with familial atrial fibrillation", American Society of Human Genetics, Washington DC. peer-reviewed
2010 "Rare and Common Variants for Atrial Fibrillation", PGRN Statistical Analysis Workshop, Nashville, TN. peer-reviewed
2011 "Meta-dimensional analysis of phenotypes", International Congress on Human Genetics, Montreal, Canada, peer-reviewed
2012 "Meta-dimensional Analysis Of Complex Biological Traits Using ATHENA", Genetic Programming Theory in Practice, Ann Arbor, MI. peer-reviewed
2013 "Using Biological Knowledge in Modern Genomic Analysis of Complex Traits", Epistasis Discovery in Genetic Epidemiology (EDGE) 2013 Workshop, Key West, FL
2013 "Next generation analysis of human genome sequence", Pharmacogenomics Research Network Scientific Meeting, Chicago IL. peer-reviewed
2014 "Rare Variants in the Pharmacogenomics Studies ", American Society of Clinical Pharmacology and Therapeutics (ASCPT), Atlanta, GA
2015 "Binning Somatic Mutations based on Biological Knowledge for Predicting Survival: an Application in Renal Cell Carcinoma", Pacific Symposium on Biocomputing (PSB), Big Island, Hawaii
2016 "The Public Sharing of Genomic Data from the DiscovEHR Collaboration", American Society of Human Genetics, Vancouver, Canada

INVITED PRESENTATIONS

2001 "Approaches to Detecting Epistasis in Sporadic Breast Cancer," The Second Annual Genetics Symposium, Meharry Medical College, Nashville, TN (Host: Ellen Wright Clayton)
2001 "An Introduction to Neural Network Models for Statistical Data Analysis," Quantitative Brown Bag Seminar Series, Vanderbilt University, Nashville, TN (Host: Niels Waller)

2001 "Quantitative Resources on the WWW," Quantitative Brown Bag Seminar Series, Vanderbilt University, Nashville, TN (Host: Niels Waller)
2001 "Gene-Gene Interactions in Common, Complex Diseases," Molecular Physiology and Biophysics Seminar Series, Vanderbilt University, Nashville, TN (Host: Alan Cherrington)
2002 "Genetic Programming Optimization of Neural Network Architecture for the Detection of Gene-Gene Interactions," Biomathematics Seminar Series, Vanderbilt University, Nashville, TN (Host: Peter Hinow)
2002 "Neural Networks for Detecting Gene-Gene Interactions," Molecular Physiology and Biophysics Seminar Series, Vanderbilt University, Nashville, TN (Host: Alan Cherrington)
2003 "Data Reduction and Pattern Recognition Approaches for Complex Genetic Analysis," Statistical Genetics Seminar Series, Rockefeller University, New York, NY (Host: Jurg Ott, invited)
2003 "Data Reduction and Pattern Recognition Approaches for Complex Genetic Analysis," Clinical Epidemiology and Biostatistics Faculty Candidate Seminar, University of Pennsylvania, Philadelphia, PA (Host: Tim Rebbeck, invited)
2003 "Data Reduction and Pattern Recognition Approaches for Complex Genetic Analysis," Bioinformatics Faculty Candidate Seminar, Medical University of South Carolina, Charleston, SC (Host: Eberhard Voit, invited)
2003 "Data Reduction and Pattern Recognition Approaches for Complex Genetic Analysis," Human Genetics Faculty Candidate Seminar Series, Wake Forest University, Winston-Salem, NC (Host: Stephen Rich, invited)
2003 "Computational Approaches for Detecting Gene-Gene Interactions," Intelligent Systems for Molecular Biology Conference, Brisbane, Australia (Host: Mark Ragan, invited)
2003 "Optimization of Neural Networks using Genetic Programming to Improve Detection and Modeling of Gene-Gene Interactions in Studies of Human Diseases," National Library of Medicine Training Directors' Conference, Bethesda, MD (Host: Carol Bean, invited)
2003 "Neural Networks for Detecting Gene-Gene Interactions," Epidemiology Faculty Candidate Seminar Series, Wake Forest University, Winston-Salem, NC (Host: Lynne Wagenknecht, invited)
2003 "Data Mining and Pattern Recognition Approaches for Detecting Gene-Gene Interactions," Statistical Genetics Interview Seminar, Bristol-Myers Squibb, Hopewell, NJ (Host: Kim Zerba, invited)
2003 "Computational Approaches for Detecting Gene-Gene Interactions," Molecular Physiology & Biophysics Faculty Candidate Seminar Series, Vanderbilt University, Nashville, TN (Host: Alan Cherrington, Jonathan Haines)
2003 "Neural Networks for Detecting Gene-Gene Interactions," Department of Human Genetics, University of Pittsburgh, Pittsburgh, PA (Host: Bob Ferrell, invited)
2004 "Analysis of Genome-Wide Epistasis via Dimensionality Reduction Procedures," International Biometric Society, Eastern North American Region 2004, Pittsburgh, PA (Host: David Allison, invited)
2004 "How to Look for Gene-Gene Interactions using Multifactor Dimensionality Reduction," Vanderbilt University GCRC Skills Workshop, Nashville, TN (Host: Dan Byrne)

2004 "Genome-Wide Association Studies: Challenges, Strategies, and MDR," Vanderbilt University Genetic Interest Group Seminar Series, Nashville, TN (Host: Kelly McDermott)
2004 "Neural Networks Approaches for Genetic Studies," Marshfield Clinic Research Foundation Scientific Seminar Series, Marshfield, WI (Host: Russell Wilke, invited)
2004 "Dissecting the Genetics of Complex Disease," National Society of Genetic Counselors, Washington, DC, invited
2005 "Parallel Multifactor Dimensionality Reduction: Applications in Rheumatoid Arthritis," Invited Presentation, Universitat Politechnica, Barcelona, Spain (Host: Sara Marsal, invited)
2005 "Computational Approaches to Detecting Interactions," Educational Session on Gene-Gene Interactions in Cancer Etiology at the AACR, Anaheim, CA (Host: Jason Moore, invited)
2005 "Multifactor Dimensionality Reduction for Detecting Epistasis," Joint Conference of the Classification Society of North America and the Interface Foundation of North America, St. Louis, MO (Host: Rob Culverhouse, invited)
2005 "Multifactor Dimensionality Reduction for the Analysis of Pharmacogenomics Data," Beyond Genome 2005: Genomic Variation, San Francisco, CA (Host: Catherine Lisciandra, peer-reviewed)
2005 "Detecting Gene-Gene Interactions Using Multifactor Dimensionality Reduction," Joint Statistical Meetings, Minneapolis, MN (Host: Cheng Cheng, invited)
2005 "Multifactor Dimensionality Reduction for the Analysis of Epistasis in Studies of Human Disease and Pharmacogenomics," Boehringer-Ingelheim Invited Special Seminar, Danbury, CT (Host: Supriya Jayadev, invited)
2005 "Data Mining Approaches in Biological Sciences," Fields Institute on Data Mining, Toronto, Canada (Host: Helmut Kroger, invited)
Given by Will Bush due to maternity leave
2006 "The Complexities of Data Analysis in Human Genetics," Complex Data Conference, Vanderbilt University Kennedy Center, Nashville, TN (Host: Jennifer Blackford, invited)
2006 "Multifactor Dimensionality Reduction for Detecting Gene-Gene and Gene-Environment Interactions," Vanderbilt University Center for AIDS Research, Nashville, TN (Host: Todd Hulgan, invited)
2006 "Challenges and Strategies for Whole-Genome Association Studies," Boehringer Ingelheim Invited Speaker, Danbury, CT (Host: Jing Yuan, invited)
2007 "Computational Genetics Approaches in Cancer Epidemiology," University of Miami Bio-behavioral Oncology and Cancer Control Program Meeting, Miami, FL (Host: Jennifer Hu, invited)
2007 "The MDR Approach," ECNIS WP 7-8 Workshop, "AFTER GWAS: an Exercise in Problem Solving," Venice, Italy (Host: Paolo Vineis, invited)
2007 "Computational Genomics in the Whole Genome Era," University of Virginia, Charlottesville, NC (Host: Stephen Rich, invited)
2008 "Computational Genomics in the Whole Genome Era," Washington University in St. Louis, St. Louis, MO (Host: Mike Province, invited)
2008 "A Bio-filter for Systems Biology," NEWGENERIS Workshop, Athens, Greece (Host: S.A. Kyrtopoulos, invited)

2008 "Epistasis Modeling," Keystone Symposium on Towards Identifying the Pathophysiology of Autistic Syndromes, Santa Fe, NM (Host: Joseph Piven and Pat Levitt, invited)
2008 "Epistasis, Stratification, and Confounding: Lessons from Genomic Analyses," ASCPT, Orlando, FL (Host: Issam Zineh, invited)
2008 "Computational Genomics in the GWAS Era," NIEHS, Raleigh-Durham, NC (Host: Gregg Dinse, invited)
2009 Invited Seminar, University of Alabama Department of Genetics, Birmingham, AL (Host: Hemant Tiwari, invited)
2009 "Computational Strategies for Genome-Wide Association Studies," Korea Pharmacogenetics Research Network Annual Symposium, Seoul, Korea (Host: Ju Han Kim, invited)
2009 "Individual Opt-Out: Efficacy, Challenges, and Concerns," American Society for Human Genetics, Honolulu, HI. (Host: Laura Rodriguez, invited)
2009 "Genome Wide Association Studies," Annual Education Conference of the National Society of Genetic Counselors, Atlanta, GA.
2010 "Summary of the state-of-the-art for gene-gene interaction analysis," CDGCA, Belgium, Host: Kristel Van Steen, invited
2010 "Beyond GWAS: Integrating Transcriptome, Proteome, and Pathway Data in the Genetic Dissection of Complex Traits", Huck Institutes of Life Sciences, Pennsylvania State University, State College, PA
2011 "Pharmacogenetics using the electronic medical record and a large institutional biobank", Dartmouth Medical School, Lebanon, NH
2011 "Bringing Biology Back to Human Genomics", University of Nottingham, Nottingham, UK
2011 "Surfing the Tsunami of Human Genetic Data", University of Idaho, Moscow, ID
2011 "Phenotype-Genotype Associations in DNA Biobanks Linked to Electronic Medical Records", Asia-Pacific Translational Bioinformatics Conference, Seoul, Korea
2011 "Using Biological Knowledge in Modern Genomic Analysis of Complex Traits", University of California at Davis (Host: Isaac Pessah)
2011 "Using biological knowledge to inform complex genetics analysis", NIEHS meeting Bioinformatics and Computational Approaches to Integrate Genes and Environment in Autism Research, Durham, NC
2011 "Beyond GWAS: Integrating Transcriptome, Proteome, and Pathway Data in the Genetic Dissection of Complex Traits", Flash Poster Talk, Kavli Frontiers in Science, National Academy of Science, Irvine, CA
2011 "Genomics and Pharmacogenomics using the electronic medical record and a large institutional biobank", Geisinger Clinic, Weis Center for Research, Danville, PA (Host: David Carey)
2012 "Meta-Dimensional Analysis of Phenotypes to Dissect the Architecture of Complex Traits", Keystone Symposium, Complex Traits: Genomics and Computational Approaches, Breckenridge, CO
2012 "Mining electronic health records for genomic research – experiences of the eMERGE network". Inaugural Symposium of Penn State Hershey Institute for Personalized Medicine, Hershey, PA

2012 "Searching for the missing heritability in gene-gene and gene-environment interactions", University of Georgia Symposium, Methodological and Statistical Issues in Gene-Environment and Gene-Gene Interaction Research, Atlanta, GA
2012 "The phenome and pleiotropy: Dissecting the architecture of complex traits", AACR-MEG Special Conference on Post-GWAS Horizons in Molecular Epidemiology: Digging Deeper into the Environment, Hollywood, FL
2012 "Meta-Dimensional Analysis for Dissecting the Architecture of Complex Traits", University of Liege, Liege, Belgium
2013 "Overview of pharmacogenomics, gene-gene interactions, system genomics", Eastern North America Region International Biometric Society 2013, Orlando, FL
2013 "Analytic approaches for complex trait analysis", American Association of Cancer Research Educational Session, Washington DC
2013 "The Next Frontier in Genomics: Data Analysis Strategies", Ohio State University Comprehensive Cancer Center Annual Scientific Meeting, Columbus OH
2013 "Complex genetic analysis: Searching for the missing heritability", Ohio State University, Columbus OH
2013 "Analysis technologies to go beyond a single gene: the quest for understanding genetic architecture", University of Maryland, Baltimore MD
2013 "Bioinformatics tools for incorporating biological knowledge into genetic analysis", Advances in Statistical Methods for Cancer Genetic Epidemiology. Memorial Sloan-Kettering, New York, NY. Host: Sanjay Shete.
2013 "Bringing Biology back to Genomics". University of Pittsburgh, Pittsburgh, PA. Host: Robert Ferrell.
2013 "The quest for understanding genetic architecture", University of Chicago, Chicago IL. Host: Barbara Stranger.
2014 "Challenges in Modeling Interactions", EDGE: Epistasis Discovery in Genetic Epidemiology, Key West, Florida, Host: Jason Moore.
2014 "Top Ten Challenges in Data Simulations", Genetic Simulation Tools Post-GWAS, National Cancer Institute Workshop, Host: Elizabeth Gillanders and Leah Mechanic
2014 "Making sense of genome-phenome relationships", The Biology of Genomes, Cold Spring Harbor, NY, Host: Carlos Bustamante
2014 "Mining the EMR for genome-phenome associations", Big Data in Biomedicine, Stanford University, Host: Russ Altman
2014 "Data fusion in the omic universe", Mid-Atlantic Genetic Epidemiology & Statistics (MAGES), Children's Hospital of Philadelphia-U Penn, Host: Marcella Devoto
2014 "Big Data", KAVLI Frontiers in Science, Medan Indonesia, Host: Edward Patte
2014 "Exploring the Genetic Architecture of Complex Traits ", UC Davis, Host: Irva Hertz-Piccoto
2014 "Exploring Genome-Phenome Relationships in an Electronic Health Record", CTSI Lecture, Penn State Medical Center, Hershey, PA, Host: Larry Sinoway
2014 "Mining electronic health records and genomics", KOSMI, Pusan S. Korea, Host: Ju Han Kim

2015 "Significance of Gene-Gene Interactions/Epistasis", Pacific Symposium on Biocomputing (PSB), Big Island, Hawaii, Host: Sarah Pendergrass
2015 "Exploration of the EHR Universe: Big Data for Predictive Genomics", Indo-US Bilateral Conferences-cum-Workshop: Big Data Analysis and Translation in Disease Biology (Big Data and Disease)-2015, New Delhi, India, Host: Indira Ghosh
2015 "Genomics and the Electronic Health Record - a dynamic duo made for Precision Medicine", Biomedical Informatics Annual Retreat keynote, Ohio State University, Columbus, Ohio, Host: Phillip Payne
2015 "Genomics and the Electronic Health Record - a dynamic duo made for Precision Medicine", Institute for Computational Biology Symposium, Case-Western Reserve University, Host: Dana Crawford
2015 "A game of Clue – which 'omics are guilty?" IGES-ASHG Joint Symposium, Baltimore, Maryland
2015 "Electronic health records and genomics: A dynamic duo for precision medicine", Presidential Symposium, American Society of Human Genetics, Baltimore, Maryland, Host: Neil Risch
2015 "Using genomics and electronic health records for precision medicine - thinking about the future", Pharmacogenomics Research Network: Research in Progress seminar series, Webinar, Host: Kathy Giacomini
2015 "Exploring the Use of Electronic Health Records and Genomics for Precision Medicine", Biotech Symposia, Simons Foundation and the New York Bioinformatics Group, New York, New York, Host: Doron Betel

2015 "Electronic health records and genomics – a dynamic duo for precision medicine", Integrative Biostatistics Research for Imaging, Genomics, & High-throughput Technologies in Precision Medicine (iBRIGHT), Houston, Texas, Host: Pei Weng

2015 "Electronic health records and genomics – a dynamic duo for precision medicine", Translational Bioinformatics Conference (TBC), Tokyo, Japan, Host: Tomohiro Sawa
2016 "Integrating Genomics into the Electronic Health Record for Precision Medicine", HCSRN Precision Oncology Symposium, Atlanta, Georgia, Host: Larry Kushi
2016 "Precision Medicine – The Beginning of a Long Voyage", Keynote at Annual Retreat, Institute for Biomedical Informatics (IBI) and the Graduate Group in Genomics and Computational Biology (GCB), University of Pennsylvania, Philadelphia, Pennsylvania, Hosts: Li-San Wang and Ben Voight

2016 "Methods for Integrating Data to Uncover Genotype-phenotype Interactions", American Society for Bone and Mineral Research (ASBMR), Atlanta, Georgia, Host: Fernando Rivadeneira

2016 "DNAnexus: The Geisinger Experience", DNAnexus Connect, San Francisco, California, Host: Angela Anderson
2016 "Genomics and Precision Medicine: approaches and challenges", University of Pennsylvania, Philadelphia, Pennsylvania, Host: Dan Rader

2017 "Applications in Multi-omics data integration", No Boundary Thinking Workshop, Pacific Symposium on Biocomputing, Big Island, Hawaii, Host: Jason Moore
2017 "Phenotypes: The next frontier for precision medicine" Precison Medicine Fusion Conference, Cancun, Mexico (my talk by video broadcast), Host: Michael Snyder
2017 "PharmCAT: Pharmacogenomics Clinical Annotation Tool", Precison Medicine Fusion Conference, Cancun, Mexico (my talk by video broadcast), Host: Michael Snyder
2017 "PharmCAT: A Tool for Pharmacogenomics Implementation", Clinical Pharmacogenetics Implementation Consortium Meeting, Washington DC, Host: Mary Relling
2017 "PharmCAT: A Tool for Pharmacogenomics Implementation", NHGRI Genomic Medicine X: Pharmacogenomics, Silver Spring, Maryland, Host: Teri Manolio
2017 "Machine Learning Strategies in the Genome and the Phenome – Toward a Better Understanding of Complex Traits", Department of Biomedical Informatics, Harvard Medical School, Boston, Massachusetts, Host: Isaac Kohane
2017 "Multi-omics data integration", European Society of Human Genetics annual meeting, Copenhagen, Denmark
2017 "Meta-dimensional methods for 'omics data integration", Retreat talk, Department of Genetics, University of Pennsylvania
2017 "Precision Medicine: Study Designs, Tools, and Applications", Tutorial, Translational Bioinformatics Conference, Long Beach, CA, Host: Dokyoon Kim
2017 "What does the future hold in precision medicine?", Illumina workshop, American Society of Human Genetics annual meeting, Orlando, FL. Host: Jay Kaufman
2017 "Machine learning strategies in the Genome and the Phenome", University of Virginia seminar, Host: Charles Farber
2017 "It's All in the Genes: The Science Behind Customizing Patient Care", ASHP midyear clinical meeting and exposition, Ornaldo, FL. Host: Cynthia Von Heerigan
2018 "Machine Learning in the Genome and Phenome to Understand Complex Traits:
Discovery Science for Precision Medicine", University of California, San Francisco, PREMIER Symposium. Host: Lindsey Criswell
2018 "PheWAS in Populations: Exploring the relationship between the genome and the phenome", Lorne Genome Conference 2018, Lorne Australia. Host: Traude Beilharz
2018 "Exploring the relationship between the genome and the phenome", Melbourne Integrative Genomics (MIG) at The University of Melbourne. Host: Andrew Siebel
2018 "PheWAS in Populations: Exploring the relationship between the genome and the phenome", Institute for Computational Biomedicine (ICB) seminar, Weill Cornell. Hosts: Drs. Doron Betel and Olivier Elemento
2018 "TBD", Informing Environmental Health Decisions Through Data Integration Workshop, National Academy of Science, Washington DC, Host: Ben Wender

2018 "Exploring the Genome and the Phenome – Toward a Better Understanding of Complex Traits", Academic Health Center, University of Minnesota, Duluth campus. Host: Catherine McCarty

2018 "Exploring the Genome and the Phenome – Toward a Better Understanding of Complex Traits", 3rd Midwest Bioinformatics Conference, University of Missouri, Columbia, MO. Host: Mark Hoffman.

2018 "TBD", Copenhagen Novo Nordisk Foundation (NNF) symposium. Copenhagen, Denmark. Host: Ramneek Gupta

2018 "TBD" Keynote at Penn 2nd annual precision medicine symposium, Philadelphia PA, Host: David Roth