Zachary Ryan McCaw

Curriculum Vitae

July 4th, 2019

Education

HARVARD UNIVERSITY
08/2014 – 05/2019

PHD IN BIOSTATISTICS, AM IN BIOSTATISTICS

- DISSERTATION: Transformation and multivariate methods for improving power in genome-wide association studies.
- ADVISOR: Xihong Lin, Ph.D.
- COMMITTEE: Martin Aryee, Ph.D. and Jeffrey Miller, Ph.D.

UNC CHAPEL HILL
08/2009 – 05/2013

BSPH IN BIOSTATISTICS, BS IN QUANTITATIVE BIOLOGY

- Graduate with highest distinction.
- GPA: 4.00 of 4.00; Dean's List: 8 of 8 Semesters.

Experience

BROAD INSTITUTE
06/2019 – 09/2019

VISITING SCIENTIST

- DEPARTMENT: Medical and Population Genetics.
- PRINCIPAL INVESTIGATOR: Hilary Finucane, Ph.D.
- PROJECT: Cross-population fine-mapping to identify shared and population-specific causal effects.

HARVARD SCHOOL OF PUBLIC HEALTH
02/2016 – 05/2019

GRADUATE STUDENT

- DEPARTMENT: Biostatistics.
- PRINCIPAL INVESTIGATOR: Xihong Lin, Ph.D.
- PROJECT 1: Omnibus inverse normal transformation based association test improves power in genome wide association studies.
- PROJECT 2: Cross-tissue eQTL calling via surrogate expression analysis.
- PROJECT 3: Synthetic surrogate analysis for genetic association testing with a partially missing target outcome.

BROAD INSTITUTE
07/2016 – 07/2017

GRADUATE STUDENT

- DEPARTMENT: Computational Methods for Genomics and Epigenomics Lab.
- PRINCIPAL INVESTIGATOR: Martin Aryee, Ph.D.
- PROJECT: Identifying differential chromatin boundaries across cell lines.

Dana Farber Cancer Institute   06/2015 – 08/2015
Research Student

- Department: Biostatistics and Computational Biology.
- Principal Investigator: John Quackenbush, Ph.D.
- Project: Network analysis of eQTL.

National Institute of Environmental Health Sciences
Research Student   05/2012 – 08/2014

- Department: Environmental Genetics Group.
- Principal Investigator: Steven Kleeberger, Ph.D.
- Project 1:   Identifying genetic signatures of respiratory syncytial virus (RSV) disease susceptibility in mice.
- Project 2:   Role of Notch receptors in ozone-induced lung injury.
- Project 3:   Mitochondrial determinants of susceptibility to oxidative stress in mice.

UNC Chapel Hill   08/2012 – 12/2012
Undergraduate Research Student

- Department: RNA Folding Bioinformatics Group.
- Principal Investigator: Alain Laederach, Ph.D.
- Project: Quantifying eQTL enrichment of mRNA protein binding sites.

UNC Chapel Hill   08/2010 – 12/2012
Undergraduate Research Student

- Department: Nanoscale Science Research Group.
- Principal Investigator: Michael Falvo, Ph.D.
- Project: Analysis of fibrin clot structure *in vitro*.

Teaching Experience

Harvard University

- Class: Inference II (BST 241)   02/2019 – 05/2019
  Instructor: Rui Wang, Ph.D.

- Class: Introduction to Biostatistics   02/2019
  Instructor: Lori Chibnik, Ph.D.
  Location: University of KwaZulu-Natal, Durban, SA

- Class: Multivariate and Longitudinal Analysis (BST 245)   02/2018 – 05/2018
  Instructor: Sebastien Haneuse, Ph.D.

- Class: Inference I (BST 231)   02/2017 – 05/2017
  Instructor: Judith Lok, Ph.D.

- Class: Statistical Genetics (BST 227)   10/2016 – 12/2016
  Instructor: Martin Aryee, Ph.D.

- Class: Computational Biology (STAT 215)   02/2016 – 05/2016
  Instructor: X. Shirley Liu, Ph.D.

UNC Chapel Hill

- Class: General Chemistry I (CHEM 101)   08/2012 – 12/2012
  Instructor: Jennifer Krumper, Ph.D.

- Class: Organic Chemistry II (CHEM 262)   08/2011 – 12/2011
  Instructor: Jennifer Krumper, Ph.D.

Awards and Distinctions

- **Distinguished Student Paper Award**   07/2019
  Joint Statistical Meeting, Section in Genetics and Genomics.
- **Stellar Abstract Award**   11/2018
  Program in Quantitative Genomics
- **Ruth L. Kirschstein National Research Service Award (F31)**   03/2018
  Title: Innovations in Genome Wide Association Testing Inspired by Obstructive Sleep Apnea Phenotypes.
- **Teaching Fellow**   11/2017
  Global Initiative for Neuropsychiatric Genetic Education in Research
- **NIH Pre-Doctoral Training Grant**   08/2016
  Statistical and Quantitative Training in Big Data Health Science
- **NIH Pre-Doctoral Training Grant**   08/2014
  Interdisciplinary Training Grant in Biostatistics and Computational Biology
- **NIH Post-Baccalaureate Research Fellow**   09/2013
  National Institute of Environmental Health Sciences
- **Undergraduate Academic Achievement Award**   04/2013
- **Phi Beta Kappa National Honors Society**   11/2011
- **NIH Summer Internship**   05/2011
  National Institute of Environmental Health Sciences   05/2010

Articles

[1] ZR McCaw et al. "Omnibus Inverse Normal Transformation Based Association Test Improves Power in Genome-Wide Association Studies of Quantitative Traits". In: *bioRxiv* (2019). DOI: 10.1101/635706.

[2] ZR McCaw et al. "Applying Evidence-Based Medicine to Shared Decision Making: Value of Restricted Mean Survival Time". In: *The American Journal of Medicine* 132.1 (2019), pp. 13–15.

[3] M High et al. "Determinants of host susceptibility to murine respiratory syncytial virus (RSV) disease identify a role for the innate immunity scavenger receptor MARCO gene in human infants". In: *EBioMedicine* S2352-3964.16 (2016), pp. 30360–7.

[4] JM Ciencewicki et al. "Effects of mannose-binding lectin on pulmonary gene expression and innate immune inflammatory response to ozone". In: *American Journal of Physiology-Lung Cellular and Molecular Physiology* 311.2 (2016), pp. 280–91.

[5] BP Kleinstiver et al. "Genome-wide specificities of CRISPR-Cas Cpf1 nucleases in human cells". In: *Nature Biotechnology* 34.8 (2016), pp. 869–74.

[6] KC Verhein et al. "Novel Roles for Notch3 and Notch4 Receptors in Gene Expression and Susceptibility to Ozone Induced Lung Inflammation in Mice". In: *Environmental Health Perspectives* 123.8 (2015), pp. 799–805.

[7] J Krishnaswamy et al. "Coincidental loss of DOCK8 function in NLRP10-deficient and C3H/HeJ mice results in defective dendritic cell migration". In: *PNAS* 112.10 (2015), pp. 3056–61.

[8] H Cho et al. "Association of Nrf2 polymorphism haplotypes with acute lung injury phenotypes in inbred strains of mice". In: *Antioxidants and Redox Signaling* 22.4 (2015), pp. 325–38.

[9] KC Verhein et al. "Genetic Factors Involved in Susceptibility to Lung Disease". In: *The Lung Second Edition: Development, Aging and the Environment.* Ed. by Plopper CG Harding R Pinkerton KE. London: Academic Press, 2014.

Correspondence

[1] ZR McCaw, LJ Wei, and DH Kim. "Effects of Aspirin in the Healthy Elderly". In: *New England Journal of Medicine* 380.18 (May 2019), pp. 1775–1776. DOI: 10.1056/NEJMc1901774.

[2] Z Yang, ZR McCaw, and G Yin. "Caplacizumab for Acquired Thrombotic Thrombocytopenic Purpura". In: *New England Journal of Medicine* 380.18 (May 2019), e32. DOI: 10.1056/NEJMc1902336.

[3] ZR McCaw, LJ Wei, and DH Kim. "Interpreting the Prognostic Value of Unrecognized Myocardial Infarction Among Older Adults". In: *JAMA Cardiology* (Mar. 2019). DOI: 10.1001/jamacardio.2019.0184.

[4] ZR McCaw and LJ Wei. "Interpreting the Survival Benefit From Neoadjuvant Chemoradiotherapy Before Surgery for Locally Advanced Squamous Cell Carcinoma of the Esophagus". In: *Journal of Clinical Oncology* (Mar. 2019). DOI: 10.1200/JCO.18.01164.

[5] Z Yang, ZR McCaw, and G Yin. "Radical Surgery or Watchful Waiting in Prostate Cancer". In: *New England Journal of Medicine* 380.11 (Mar. 2019), pp. 1083–1084. DOI: 10.1056/NEJMc1900410.

[6] ZR McCaw, DH Kim, and LJ Wei. "Evaluating Treatment Effect of Transcatheter Interatrial Shunt Device Using Heart Failure Event Rates". In: *JAMA Cardiology* (Feb. 2019). DOI: 10.1001/jamacardio.2019.0001.

[7] ZR McCaw, JL Vassy, and LJ Wei. "Palbociclib and Fulvestrant in Breast Cancer". In: *New England Journal of Medicine* 380.8 (Feb. 2019), p. 796. DOI: 10.1056/NEJMc1816595.

[8] ZR McCaw et al. "Trifluridine/tipiracil in metastatic gastric cancer". In: *Lancet Oncology* 20.1 (Jan. 2019), e8. DOI: 10.1016/S1470-2045(18)30908-2.

[9] ZR McCaw, F Jiang, and LJ Wei. "Trastuzumab Therapy for 9 Weeks vs 1 Year for Human Epidermal Growth Factor Receptor 2-Positive Breast Cancer". In: *JAMA Oncology* (Dec. 2018). DOI: 10.1001/jamaoncol.2018.5730.

[10] ZR McCaw, D Liu, and LJ Wei. "Body Composition and Overall Survival in Patients With Nonmetastatic Breast Cancer". In: *JAMA Oncology* (Nov. 2018). DOI: 10.1001/jamaoncol.2018.5290.

[11] ZR McCaw, S Piantadosi, and LJ Wei. "Quantifying the Added Value of Low-Molecular-Weight Heparin to Intermittent Pneumatic Compression for Preventing Venous Thromboembolic Events Under the Risk-Benefit Perspective". In: *JAMA Surgery* (Nov. 2018). DOI: 10.1001/jamasurg.2018.4294.

[12] ZR McCaw et al. "Interpreting Clinical Benefits of Neoadjuvant Chemoradiation With Gemcitabine Versus Upfront Surgery in Patients With Borderline Resectable Pancreatic Cancer (BRPC)". In: *Annals of Surgery* (Nov. 2018). DOI: 10.1097/SLA.0000000000003115.

[13] ZR McCaw, LJ Wei, and DH Kim. "Gene Expression-Guided Adjuvant Chemotherapy in Breast Cancer". In: *New England Journal of Medicine* 379.17 (Oct. 2018), p. 1681. DOI: 10.1056/NEJMc1810515.

[14] BL Claggett et al. "Sex as a predictor of response to cancer immunotherapy". In: *Lancet Oncology* 19.8 (Aug. 2018), e377. DOI: 10.1016/S1470-2045(18)30517-5.

Presentations

- **Joint Statistical Meeting** 07/2019
  Cross-tissue eQTL Calling via Surrogate Expression Analysis
- **Program in Quantitative Genomics** 11/2018
  Leveraging the UKB to Empower Association Testing on Scarce Phenotypes.
- **Joint Statistical Meeting** 07/2018
  Leveraging Surrogate Phenotypes to Improve Inference on a Partially Missing Target Phenotype.
- **Joint Statistical Meeting** 07/2017
  Inverse Normal Transformation for Genome Wide Association Testing of Quantitative Traits.
- **American Thoracic Society** 05/2014
  Gene Expression Profiling Predicts Response to Respiratory Syncytial Virus (RSV) in Mice.
- **NIEHS** 07/2011
  Identifying Candidate Susceptibility Genes for Respiratory Syncytial Virus (RSV) Disease Severity.
- **NIEHS** 07/2010
  Characterization of Transcriptional Networks Underlying Tlr4-Mediated Respiratory Syncytial Virus (RSV) Disease in

Professional Activities

- **JSM Section Chair** 07/2019
  Regression Methods for Longitudinal Data
- **JSM Section Chair** 07/2018
  Gene-Gene and Gene-Environment Interactions