Zhiguang Huo

Contact Information	4600 Bayard ST, APT 308 Pittsburgh, PA 15213	412-979-0592 zhh18@pitt.edu

Research Interests

Omics data integration, Machine learning and statistical learning, Genomics and epigenetics algorithms and applications, Bioinformatics, Optimization, Graphical model

Education

University of Pittsburgh, Pittsburgh, PA, US

Ph.D., Biostatistics, *Expected:* Summer 2017

- Thesis Topic: *Statistical integrative omics methods for disease subtype discovery and single cell methylation methods*
- GPA: *3.93/4.00*
- Advisors: George C. Tseng, ScD and Yong Seok Park, PhD

M.S., Physics, Apr 2012

- *GPA: 3.86/4.00*

Harbin Institute of Technology, Harbin, Heilongjiang, China

B.S., Physics, June 2011

- GPA: *90.43/100*

Research Experience

Research Assistant Dec 2011 to present
Department of Biostatistics,
University of Pittsburgh
Supervisor: George C. Tseng, ScD

Research Assistant Aug 2014 to present
Department of Biostatistics,
University of Pittsburgh
Supervisor: Yong Seok Park, PhD

Collaboration Feb 2016 to present
Department of Psychiatry,
University of Pittsburgh
Superviser: George C. Tseng, ScD
Collaborator: Colleen A. McClung, Ph.D, Marianne Seney, PhD, Ryan Logan, PhD

Collaboration Oct 2015 to present
Department of Pediatrics,
University of Pittsburgh
Supervisor: George C. Tseng, ScD
Collaborator: Nader Shaikh , MD, MPH

Collaboration Jul 2014 to Feb 2016
Department of Psychiatry,
University of Pittsburgh
Supervisor: George C. Tseng, ScD
Collaborator: David A. Lewis, MD, John F. Enwright, Ph.D., Dominique Arion, Ph.D.

Collaboration Jul 2014 to Sep 2015
Department of Pharmacology and Chemical Biology,
Magee-Womens Research Institute
Supervisor: George C. Tseng, ScD Collaborator: Steffi Oesterreich, PhD

Collaboration Jan 2013 to Sep 2014

Department of Pathology,
University of Pittsburgh
Supervisor: George C. Tseng, ScD Collaborator: Jianhua Luo, MD, PhD, Yan Ping
Yu, MD, PhD

Collaboration   Dec 2012 to Nov 2013
Department of Anesthesiology and Neurobiology,
University of Pittsburgh
Supervisor: George C. Tseng, ScD Collaborator: William R. Lariviere, PhD

Collaboration   Mar 2012 to Aug 2012
Department of Environmental and Occupational Health,
University of Pittsburgh
Supervisor: George C. Tseng, ScD Collaborator: George D Leikauf, PhD

REFEREED JOURNAL PUBLICATIONS (STATISTICAL)

1. **Zhiguang Huo**, Ying Ding, Silvia Liu, Steffi Oesterreich, and George Tseng. Meta-Analytic Framework for Sparse K-Means to Identify Disease Subtypes in Multiple Transcriptomic Studies. *Journal of the American Statistical Association*, 111, no. 513 (2016): 27-42.

REFEREED JOURNAL PUBLICATIONS (APPLICATION)

1. Silvia Liu, Wei-Hsiang Tsai, Ying Ding, Rui Chen, Zhou Fang, **Zhiguang Huo**, SungHwan Kim, Tianzhou Ma, Ting-Yu Chang, Nolan Michael Priedigkeit, Adrian V. Lee, Jianhua Luo, Hsei-Wei Wang, I-Fang Chung, George C. Tseng. (2015). Comprehensive evaluation of fusion transcript detection algorithms and a meta-caller to combine top performing methods in paired-end RNA-seq data. *Nucleic Acids Research*, 10.1093/nar/gkv1234.

2. Tiffany A. Katz, Serena G. Liao, Vincent J. Palmieri, Robert K. Dearth, Thushangi Pathiraja, **Zhiguang Huo**, Patricia Shaw, Sarah Small, Nancy E. Davidson, David G. Peters, George C. Tseng, Steffi Oesterreich, Adrian V. Lee. (2015) Targeted DNA methylation screen in the mouse mammary genome reveals a parity-induced hypermethylation of igf1r which persists long after parturition. *Cancer Prevention Research*, pages canprevres-0178.

3. Yan P. Yu, Silvia Liu, **Zhiguang Huo**, Amantha Martin, Joel B. Nelson, George C. Tseng and Jian-Hua Luo. (2015) Genomic copy number variations in the genomes of leukocytes predict prostate cancer clinical outcomes. *PloS one*, 10(8):e0135982.

4. Xingbin Wang, Dongwan Kang, Kui Shen, Chi Song, Shuya Lu, Lunching Chang, Serena G. Liao, **Zhiguang Huo**, Naftali Kaminski, Etienne Sibille, Yan Lin, Jia Li and George C. Tseng. (2012) A Suite of R Packages for Quality Control, Differentially Expressed Gene and Enriched Pathway Detection in Microarray Meta-analysis. *Bioinformatics*, 28:2534-2536.

SUBMITTED JOURNAL PUBLICATIONS (IN REVISION)

1. **Zhiguang Huo**, Chi Song, George C. Tseng. (2016) Bayesian latent hierarchical model for transcriptomic meta-analysis to detect biomarkers with clustered meta-patterns of differential expression signals. Submitted to *Annals of Applied Statistics* (under second round of review).

2. **Zhiguang Huo**, George C. Tseng. (2016) Integrative Sparse K-means for disease subtype discovery using multi-level omics data. Submitted to *Annals of Applied Statistics* (under second round of review).

3. Dominique Arion, **Zhiguang Huo**, John F. Enwright, John P. Corradi, George Tseng and David A. Lewis. Transcriptome alterations in prefrontal pyramidal neurons distinguish schizophrenia from bipolar and major depressive disorders. Submitted to *Biological Psychiatry*, (under second round of review).

SUBMITTED JOURNAL PUBLICATIONS	1. SungHwan Kim, Dongwan Kang, **Zhiguang Huo**, Yongseok Park, George C. Tseng. (2016) Meta-analytic principal component analysis. Submitted to *Annals of Applied Statistics*.
	2. Li Zhu, Ying Ding, Cho-Yi Chen, Lin Wang, **Zhiguang Huo**, SungHwan Kim, Christos Sotiriou, Steffi Oesterreich and George C. Tseng. (2016) MetaDCN: meta-analysis framework for differential coexpression network detection with an application in breast cancer Submitted to *Bioinformatics*.

PUBLISHED ABSTRACT	1. Oesterreich, S., Katz, T.A., Logan, G., Levine, K., Nagle, A., **Huo, Z.**, Tseng, G.C., Rui, H., Lee, A.V. and Butler, L.M., 2016. Abstract PD2-08: Potential role of prolactin signaling in development and growth of the lobular subtype of breast cancer. *Cancer Research*, 76(4 Supplement), pp.PD2-08.
	2. Enwright, John, Dominique Arion, John Corradi, Aiqing He, **Zhiguang Huo**, George Tseng, and David Lewis. (2015) Transcriptome Profiling of Layer 3 Parvalbumin Neurons from the Dorsolateral Prefrontal Cortex of Schizophrenia Subjects. *NEUROPSYCHOPHARMACOLOGY*, vol. 40, pp. S400-S401.

PAPERS IN PREPARATION	1. John Enwright, Dominique Arion, **Zhiguang Huo**, George Tseng and David A. Lewis. Transcriptome alterations in layer 3 parvalbumin neurons in the dorsolateral prefrontal cortex in schizophrenia differ from those in layer 3 pyramidal cells.
	2. **Zhiguang Huo**, Shaowu Tang, YongSeok Park and George Tseng. Biomarker categorization and fast computing of adaptively weighted Fisher's method for meta-analysis in omics applications.
	3. MetaOmics software paper

BOOK AND BOOK CHAPTER	1. George C. Tseng, **Zhiguang Huo** and Tianzhou Ma. Foundations for High-Throughput Omics Data Analysis: Methods, Theories and Applications. Chapman & Hall/CRC.
	2. **Zhiguang Huo**, Shaowu Tang, YongSeok Park and George Tseng. (2015) MetaOmics: transcriptomic meta-analysis methods for biomarker detection, pathway analysis and other exploratory purposes. Book chapter in Integrating omics data: statistical and computational methods.

AWARDS

Student Awards – American Statistics Association (ASA) Pittsburgh chapter
- Student of the year   March 2016

Travel Awards – SAMSI Research Triangle Park, NC
- Optimization Summer School   Aug 2016
- Epigenetics Workshop   Mar 2015
- Beyond Bioinformatics Workshop   June 2014

Student Awards – Department of Physics, Harbin Institute of Technology
- National Scholarship of P.R. China.   May 2009
  (Awarded to the top 2 students in my Bachelors degree.)

TEACHING EXPERIENCE	**Lecture**

Lecture
- Lecture on BIOST2094 - Advanced R Computing   Jan 2017
  (6 lectures on Advanced R Computation)
- Lecture on BIOST2025 - Special Studies in Bayesian Data Analysis   Sep 2016
  (4 lectures on Advanced Bayesian Computation)

Guest lecture
- Guest lecture on BIOST 2021 - Special Studies in Bayesian Data Analysis Nov 2016
  (TBD)
- Guest lecture on BIOST2055 - Introductory high-throughput genomic data analysis I: data mining and applications   Mar 2016
  (Differential and isoform analysis of RNA-seq data)
- Guest lecture on BIOST2078 - Introductory high-throughput genomic data analysis II: theories and algorithms   Dec 2015
  (Reproducible research and parallel computing in R)
- Guest lecture on BIOST2078 - Introductory high-throughput genomic data analysis II: theories and algorithms   Dec 2014
  (Reproducible research)

Teaching assistant
- BIOST 2078 - Introductory high-throughput genomic data analysis II: theories and algorithms   Sep 2014 - Dec 2014
  with George C. Tseng
  Department of Biostatistics, University of Pittsburgh
- PHYS 0212 - Introduction to Laboratory Physics   Jan 2012 - Apr 2012
  with Russell J. Clark
  Department of Physics and Astronomy, University of Pittsburgh
- PHYS 0212 - Introduction to Laboratory Physics   Aug 2011 - Dec 2011
  with Russell J. Clark
  Department of Physics and Astronomy, University of Pittsburgh

PRESENTATIONS

Statistical Meetings
- Poster, SAMSI optimization summer school, Research Triangle Park, NC Aug 2016
  Topic: Integrative Sparse K-means for disease subtype discovery using multi-level omics data.
- Poster, Pittsburgh ASA banquet, Pittsburgh, PA   Mar 2016
  Topic: Integrative Sparse K-means for disease subtype discovery using multi-level omics data.
- Oral Presentation, JSM, Seattle, WA   Aug 2015
  Topic: Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.
- Poster, Pittsburgh ASA banquet, Pittsburgh, PA   Apr 2015
  Topic: Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.
- Oral Presentation, ENAR Conference, Miami, FL   Mar 2015
  Topic: Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.
- Poster, Dean's Day's competition, GSPH, University of Pittsburgh   Mar 2015
  Topic: Discover and Characterize Invasive Lobular Breast Carcinoma Subtypes.
- Oral Presentation, ENAR Conference, Baltimore, MA   Mar 2014
  Topic: Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.
- Poster, Dean's Day's competition, GSPH, University of Pittsburgh   Mar 2014
  Topic: Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.

Department of Biostatistics, University of Pittsburgh
- Seminar talk (How to use Latex to make slides)   Nov 2015

REFERENCES   George C. Tseng

Professor   Phone: 412-624-5318
Department of Biostatistics (primary appointment)
Department of Human Genetics
Department of Computational & Systems Biology   E-mail: ctseng@pitt.edu
University of Pittsburgh

Yong Seok Park

Assistant Professor   Phone: 412-624-3028
Department of Biostatistics   E-mail: yongpark@pitt.edu
University of Pittsburgh

David A. Lewis, MD

Distinguished Professor of Psychiatry and Neuroscience,
Thomas Detre Professor of Academic Psychiatry, Chair   Phone: 412-246-6010
Department of Psychiatry   E-mail: lewisda@upmc.edu
University of Pittsburgh

Steffi

Colleen

Luo

SKILLS   Computer Programming:
- gitbub (1 years),
- R (5 years),
- Linux (5 years),
- Matlab (2 year),
- Python (1 year),
- Java, C++, C (1 year).

RUNNING
- Bank of America Chicago Marathon, Chicago, IL   10/09/2016
  TIME 04:08:27
- First National Bank Pittsburgh Triathlon (Sprint), Pittsburgh, PA   08/14/2016
  TIME 1:10:30   (only biking + running)
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/01/2016
  TIME 3:58:46
- First National Bank Pittsburgh Triathlon (Olympic standard), Pittsburgh, PA 08/09/2015
  Time 3:29:24
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/03/2015
  TIME 3:49:38
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/04/2014
  TIME 4:07:44
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/05/2013
  TIME 4:48:49