ZHIGUANG (CALEB) HUO

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EDUCATION

University of Pittsburgh,   Pittsburgh, PA, US

- Ph.D. in Biostatistics, *Expected:*   *Summer 2017*
  - Dissertation: *Statistical integrative omics methods for disease subtype discovery and methods for single cell methylation*
  - GPA: *3.93/4.00*
  - Advisors: George C. Tseng, ScD and Yong Seok Park, PhD
- M.S. in Physics,   *Apr 2012*
  - *GPA: 3.86/4.00*

Harbin Institute of Technology,   Harbin, Heilongjiang, China

- B.S. in Physics,   *June 2011*
  - GPA: *90.43/100*

RESEARCH INTEREST

My research interest lies in both statistical methodology and application on genomics and bioinformatics. I am particularly interested in genomic data integration, modeling and variable selection in high-dimensional data, graphical model, Bayesian methods, optimization and statistical computing. I have collaborated with biologists in the fields of cancer and psychiatry to analysis a broad range of genomic data, which motivates me to develop practical methodology and user-friendly software.

PUBLICATIONS

Methodology

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.
2. **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).
3. **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).
4. 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. *Bioinformatics* (accepted).
5. SungHwan Kim, Dongwan Kang, **Zhiguang Huo**, Yongseok Park, George C. Tseng. (2016) Meta-analytic principal component analysis in integrative omics application. (Submitted).
6. 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.

7. 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.

Application

8. Dominique Arion, **Zhiguang Huo**, John F. Enwright, John P. Corradi, George Tseng and David A. Lewis. (2016) Transcriptome alterations in prefrontal pyramidal neurons distinguish schizophrenia from bipolar and major depressive disorders. Submitted to *Biological Psychiatry*, (under second round of review).
9. 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 That Persists Long after Parturition. *Cancer Prevention Research* 8, no. 10 (2015): 1000-1009.
10. 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.

Manuscript in Preparation

- **Methodology**

11. **Zhiguang Huo**, Shaowu Tang, YongSeok Park and George Tseng. (2017) Biomarker categorization and fast computing of adaptively weighted Fisher's method for meta-analysis in omics applications.
12. Li Zhu, **Zhiguang Huo**, Tianzhou Ma, George Tseng. (2017) Bayesian indicator variable selection model with multi-layer overlapping groups.
13. Tianzhou Ma*, **Zhiguang Huo***, Anche Kuo*, Xiangrui Zeng, Li Zhu, Ark Fang, Lin Wang, Chien-Wei Lin, Tanbin Rahman, Shuchang Liu, YongSeok Park, Sunghwan Kim, George Tseng. (2017) MetaOmics - a Comprehensive Software Suite with Interactive Visualization for Transcriptomic Meta-Analysis. (*: co-first author).

- **Application**

14. Enwright, John, Dominique Arion, John Corradi, Aiqing He, **Zhiguang Huo**, George Tseng, and David Lewis. (2017) Transcriptome Profiling of Layer 3 Parvalbumin Neurons from the Dorsolateral Prefrontal Cortex of Schizophrenia Subjects.
15. Logan, R.W., Ozburn, A.R., **Huo, Z.**, Zhu, X., Fitzgerald, E., Arey, R.N., Jarpe, M., Tseng, G. and McClung, C.A. (2017) Valproic acid targets HDAC2 to normalize mania-like behaviors in mice. In preparation.
16. Rachel Puralewski, **Zhiguang Huo**, George Tseng, Ryan Logan, Marianne Seney. (2017) Sex differences in basolateral amygdala transcriptome associated with effects of chronic stress. In preparation.
17. **Zhiguang Huo**, Rachel Puralewski, George Tseng, Ryan Logan, Marianne Seney. (2017) Circuit-wide transcriptional profiling reveals sex differences in coherence patterns across brain regions. In preparation.

Book

18. George C. Tseng, **Zhiguang Huo** and Tianzhou Ma. (2017) Foundations for High-Throughput Omics Data Analysis: Methods, Theories and Applications. *Chapman & Hall/CRC*. (Under preparation).

Book Chapter

19. SungHwan Kim, **Zhiguang Huo**, 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. Edited by George C. Tseng, Debashis Ghosh, Xianghong Jasmine Zhou. *Cambridge University Press*. Page 39-67.

AWARD

Student Awards

- American Statistics Association (ASA) Pittsburgh chapter — March 2016
  - Student of the year
- Department of Physics, Harbin Institute of Technology — May 2009
  - National Scholarship of P.R. China.
    (Awarded to the top 2 students in my Bachelors degree.)

Travel Awards

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

TEACHING EXPERIENCE (UNIVERSITY OF PITTSBURGH)

Main Lecturer (teaching fellow)

- BIOST2094 - Advanced R Computing – (with Tianzhou Ma) — Spring 2017
- BIOST2025 - Special Studies in Bayesian Data Analysis — Fall 2016
  - (with George Tseng, Tianzhou Ma and Li Zhu)

Guest Lecturer

- BIOST2055 - Introductory high-throughput genomic data analysis I: data mining and applications — Mar 2016
  - Differential and isoform analysis of RNA-seq data
- BIOST2078 - Introductory high-throughput genomic data analysis II: theories and algorithms — Dec 2015
  - Reproducible research and parallel computing in R
- 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 — Fall 2014
- PHYS 0212 - Introduction to Laboratory Physics — Spring 2012
- PHYS 0212 - Introduction to Laboratory Physics — Fall 2011

PRESENTATIONS

Poster and Oral Presentation

- Poster, SAMSI optimization summer school, Research Triangle Park, NC — Aug 2016
  - Integrative Sparse K-means for disease subtype discovery using multi-level omics data.
- Poster, Pittsburgh ASA banquet, Pittsburgh, PA — Mar 2016

- Integrative Sparse K-means for disease subtype discovery using multi-level omics data.
- Oral Presentation, JSM, Seattle, WA   Aug 2015
  - Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.
- Poster, Pittsburgh ASA banquet, Pittsburgh, PA   Apr 2015
  - Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.
- Oral Presentation, ENAR Conference, Miami, FL   Mar 2015
  - 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
  - Discover and Characterize Invasive Lobular Breast Carcinoma Subtypes.
- Oral Presentation, ENAR Conference, Baltimore, MA   Mar 2014
  - 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
  - Meta-analytic framework for sparse K-means to identify disease subtypes in multiple transcriptomic studies.

Seminar Talk

- Department of Biostatistics, University of Pittsburgh   Nov 2015
  - How to use Latex to make slides

HOBBIES

Running, skiing, other endurance activities.

Running Record

- Bank of America Chicago Marathon, Chicago, IL.   10/09/2016
- First National Bank Pittsburgh Triathlon (Sprint), Pittsburgh, PA   08/14/2016
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA.   05/01/2016
- First National Bank Pittsburgh Triathlon (Olympic standard), Pittsburgh, PA   08/09/2015
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/03/2015
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/04/2014
- Dick's Sporting Goods Pittsburgh Marathon, Pittsburgh, PA   05/05/2013