JUNRUI DI

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STATISTICAL METHODS RESEARCH INTERESTS

feature engineering from accelerometry signals, matrix and tensor decompositions, dimension reduction, functional data analysis, integration of multiple modalities.

SCIENTIFIC RESEARCH INTERESTS

wearable devices and their applications in public health (e.g. mental health and aging), physical activity assessment, sleep, circadian rhythmicity.

EDUCATION

Johns Hopkins Bloomberg School of Public Health Expected: *May 2019*
Ph.D. in Biostatistics

Advisor: Vadim Zipunnikov, Ph.D.

Georgetown University *Dec 2013*
M.S. in Biostatistics

Thesis: *Robust Integrative Analysis of Multi-Block Contaminated Datasets*

Advisor: Valeriy Korostyshevskiy, Ph.D.

University of California, Berkeley *May 2012*
B.A. in Applied Mathematics

High Distinction General Scholarship (roughly equivalent to Magna Cum Laude)

EXPERIENCE

Biostatistician Intern *Jun 2018 - Present*
Takeda Pharmaceuticals *Cambridge, MA*

· Provided theoretical and analytic evidence that digital endpoints measured by wearable devices are more sensitive than traditional measurement.
· Analyzed/visualized a study with a chest-worn device to measure cardiovascular abnormalities and identified potential reasons that this device registered too many "false positive" events.

Research Assistant *Jun 2015 - Present*
Johns Hopkins Bloomberg School of Public Health *Baltimore, MD*

· Developed statistical methods to extract features from noisy accelerometry signal, to reduce dimensionality of multivaraite accelerometry features, and to integratively analyze features generated by multiple devices from multiple days.
· Conducted data processing and statistical analysis to multiple studies with measurements of sleep, activity, and circadian rhythms using wearable devices.

Research Assistant *May 2013 - Apr 2014*
Georgetown University, Medicine *Washington, DC*

· Supported the Multicenter AIDS Cohort Study (MACS) site PI by providing data analysis, visualization and tabulation on data generated from the 30-year nationwide longitudinal cohort study involving four sites, and over two hundred tested variables.

· Quantified satisficing in MACS online survey based on the group-based trajectory analysis of average response time across visits.

Research Assistant *Sep 2012 - May 2013*
Georgetown University, Biostatistics *Washington, DC*

· Refined Joint and Individual Variation Explained (i.e. JIVE), a recently developed integrative analysis method of multi-block datasets of different types, to be robust to outliers using low-rank approximation based on robust singular value decomposition.
· Selected metabolomics biomarkers to develop clinical assays for diagnosis and prognosis of Pancreatic Ductal Adenocarcinoma (PDAC) by applying various variable selection techniques.

PUBLICATIONS

Published / In Press

1. Johns, J., **Di, J.**, Merikangas, K., Cui, L., Swendsen, J., and Zipunnikov, V.. Fragmentation as a novel measure of stability in normalized trajectories of mood and attention assessed by electronic diaries. Accepted by *Physiological Measurement*. 2018.

2. Schmidt, A., Bosse, M., Frey, K., **Di, J.**, OToole, R., Stinner, D., Westberg, G., Scharfstein, D., Zipunnikov, V., MacKenzie, E., and METRC. Is continuous near-infrared spectroscopy a reliable method to monitor development of acute compartment syndrome in patients with lower leg injuries? Accepted by *The Journal of Bone & Joint Surgery*. 2018.

3. Grigsby, M., **Di, J.**, Leroux, A., Xiao, L., Zipunnikov, V., Crainiceanu, C., and Checkley, W.. Novel metrics for growth model selection. *Emerging Themes in Epidemiology*. 2018; 15(1): 4.

4. Urbanek, J., Spira, A., **Di, J.**, Leroux, A., Crainiceanu, C., and Zipunnikov, V.. Epidemiology of objectively measured bedtime and chronotype in US adolescents and adults: NHANES 2003-2006. *Chronobiology International*. 2018; 35(3): 416-434.

5. Varma, V., Dey D., Leroux A., **Di, J.**, Urbanek, J., Xiao, L., and Zipunnikov, V.. Total volume of physical activity: TAC, TLAC or TAC(λ). *Preventive Medicine*. 2018; 106: 233-235.

6. Varma, V., Dey D., Leroux A., **Di, J.**, Urbanek, J., Xiao, L., and Zipunnikov, V.. Re-evaluating the effect of age on physical activity over the lifespan. *Preventive Medicine*. 2017; 101: 102-108.

7. **Di, J.**, Li, Y., Friedman, MR., Reddy, S., Surkan, PJ., Shoptaw, S., and Plankey, M.. Determining survey satisficing of online longitudinal survey data in the Multicenter AIDS Cohort Study using a Group-Based Trajectory Analysis. *Journal of Medical Internet Research Public Health and Surveillance*. 2016; 2(2): e150.

Preprints

8. **Di, J.**, Leroux, A., Urbanek, J., R., Varadhan, Spira, A., Schrack, J., and Zipunnikov, V.. Patterns of sedentary and active time accumulation are associated with mortality in US adults: The NHANES study. *bioRxiv: 182337*. (Under review *Preventive Medicine*).

Under Review / Revision

9. Zipunnikov, V., Dey, D., Leroux, A., **Di, J.**, Urbanek, J., Harris, T., and Crainiceanu, C.. Objectively measured late-morning physical activity predicts mortality in the NHANES 2003-2006 cohorts. Resubmitted to *PLoS ONE* after revision.

10. **Di, J.**, Spira, A., Bai, J., Urbanek, J., Leroux, A., Wu, M., Resnick, S., Simonsick, E., Ferrucci, L., Schrack, J., and Zipunnikov, V.. Joint and individual representation of domains of physical activity, sleep, and circadian rhythmicity. Under review *Statistics in Biosciences*.

11. Leroux, A., **Di, J.**, Smirnova, E., Mcguffey, E., Cao, Q., Bayatmokhtari, E., Tabacu, L., Zipunnikov, V., Urbanek, J., Crainiceanu, C.. Organizing and analyzing the activity data in NHANES. Under review *Statistics in Biosciences*.

12. Schrack, J., Kuo, P., Wanigatunga, A., **Di, J.**, Spira, A., Ferrucci, L., Zipunnikov, V.. Active-to-Sedentary behavior transitions, fatigability, and physical functioning in older adults. Under review *Journal of Gerontology: Medical Sciences*.

13. Schmidt, A., **Di, J.**, Zipunnikov, V., Frey, K., Scharfstein, D., O'Toole, R., Bosse, M., Obremskey, W., Stinner, D., Hayda, R., Karunakar, R., Hak, M., Carroll, E., Collins, S., MacKenzie, E.. Is perfusion pressure a reliable indicator of the need for fasciotomy? Under review *The Journal of Bone & Joint Surgery*.

In Preparation

14. Capturing enhanced information with higher-order tensorian statistics and its application in accelerometry-measured physical activity.

SOFTWARES

1. **actigraphy** (R package). Feature extraction from minute level actigraphy/accelerometry data.

   https://github.com/junruidi/actigraphy.

2. **cdHOTS** (R package). Construct and decompose higher order tensorian statistics.

   https://github.com/junruidi/cdHOTS.

PRESENTATIONS

1. Integrative Analysis of Multi-Block Contaminated Datasets (topic contributed). *2013 JSM, Montreal, Canada*

2. Fragmentation of Physical Activity and Its Application (poster). *2016 Baltimore Aging Showcases, Baltimore, MD*

3. Novel Statistical Framework to Quantify Fragmentation of Physical Activity (contributed). *2017 ENAR, Washington, DC.*

4. Fragmentation of Physical Activity and Its Application (oral). *2017 ICAMPAM, Bethesda, MD.*

5. Fragmentation of Daily Physical Activity: Prediction of Mortality in NHANES 2003-2006 (oral). *2017 IAGG, San Francisco, CA.*

6. Analysis of Tensor Cumulants and Its Application to NHANES (contributed). *2018 ENAR, Atlanta, GA.*

7. Capturing enhanced information with higher-order tensorian statistics and predicting mortality from accelerometry-measured physical activity. *2018 JSM, Vancouver, BC, Canada.*

8. Joint and Individual Representation of Domains of Physical Activity, Sleep, and Circadian Rhythmicity Collected by Wearables (invited). *2018 BigDIA, Houston, TX.*

EDITORIAL ACTIVITIES

Referee for:

Journal of Statistical Software (JSS) [1]

International Association of Gerontology and Geriatrics 2017 World Congress (IAGG) [1]

Journal of Medical Internet Research Cardio (JMIR Cardio) [1]

Journal of Medical Internet Research Mental Health (JMIR Mental Health) [1]

Journal of Medical Internet Research mHealth and uHealth (JMIR mHealth and uHealth) [1]

Interactive Journal of Medical Research [1]

Statistics in Biosciences (SIB) [1]

PROFESSIONAL ACTIVITIES

Session chair, JSM 2018

Session chair, JSM 2017

Organizer of the JHSPH Biostatistics Computing Club 2015 - 2016

HONORS & AWARDS

The June B. Culley Award *Dec 2017*

This award honors outstanding achievement by a Biostatistics student on his or her schoolwide examination paper.

The Louis I. and Thomas D. Dublin Award *Mar 2017*

This award, which is for the Advancement of Epidemiology and Biostatistics, supports those students whose research focuses on the effective use of statistical reasoning and methods in epidemiology.

Washington Statistical Society Outstanding Graduate Student Award *Jun 2013*

This award is presented by the Washington Statistical Society to the outstanding full-time graduate student of statistics/biostatistics at each university in the Washington metropolitan area with a graduate statistics/biostatistics program.

Phi Beta Kappa Honor Society Inductee *May 2012*

Phi Beta Kappa Honor Society

TEACHING EXPERIENCE

PH.140.623 - **Lab Instructor** Statistical Methods in Public Health III *Spring 2019*

PH.140.621 - **Lab Instructor** Statistical Methods in Public Health I *Fall 2018*

PH.140.623 - **Lab Instructor** Statistical Methods in Public Health III *Spring 2018*

PH.140.621 - **Lab Instructor** Statistical Methods in Public Health I *Fall 2017*

PH.140.623-4 - **TA** Statistical Methods in Public Health III-IV *Spring 2017*

PH.140.621-2 - **TA** Statistical Methods in Public Health I-II *Fall 2016*

PH.140.753-4 - **TA** Advanced Methods in Biostatistics III-IV *Spring 2016*

PH.140.751-2 - **TA** Advanced Methods in Biostatistics I-II *Fall 2015*

BIST 514 - **TA** Linear Modeling & Multivariate Analysis *Spring 2014*

PROFESSIONAL MEMBERSHIP

Americal Statistical Association (ASA)

Washington Statistical Society (WSS)

International Biometric Society (ENAR)

CERTIFICATIONS

SAS Certified Advanced Programmer for SAS 9 *Aug 2013*

SAS Certified Base Programmer for SAS 9 *Jul 2013*

COMPUTING SKILLS

Proficient: R, SAS

Experience with: Matlab, MySQL, and Python