

# Pei Zhang

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## Education

- 2019/09 - 2025/05 📖 **Ph.D. in Mathematical Statistics, University of Maryland, College Park (UMD)**  
Dissertation title: *Mixed Modeling Approaches for Characterizing Genetic Effects and Heritability Metrics in Longitudinal Phenotypes* (NIH Outstanding Graduate Research)  
Primary Advisors: *Drs. Paul S. Albert (NIH Biostatistics) and Doron Levy (UMD Applied Mathematics)*  
Co-advisors: *Drs. Jianxin Shi (NIH Biostatistics) and Hyokyoung G. Hong (NIH Biostatistics)*
- 2014/09 - 2016/06 📖 **M.S. in Mathematics, University of Science and Technology of China (USTC)**  
Dissertation title: *Ekeland Index Theory for Periodic Solutions and Symmetric Periodic Solutions of Convex Hamiltonian Systems*  
Advisor: *Dr. Xinan Ma*  
Co-advisor: *Dr. Hui Liu*
- 2010/09 - 2014/06 📖 **B.S. in Mathematics and Applied Mathematics (Teacher Education Program), Nanjing Normal University (NNU)**  
Dissertation title: *Some Problems in Hamiltonian Systems* (NNU Outstanding Graduation Thesis)  
Advisor: *Dr. Yujun Dong*
- 2009/09 - 2010/06 📖 **Undergraduate in Computer Science, NNU**

## Employment History




- 2025/05 - present 📖 **Postdoctoral Fellow (Mentored by Drs. Paul S. Albert and Jianxin Shi)**  
*Biostatistics Branch (BB), Division of Cancer Epidemiology & Genetics (DCEG)  
National Cancer Institute (NCI), National Institutes of Health (NIH)*
- 2021/09 - 2025/05 📖 **Predocctoral Fellow (Mentored by Drs. Paul S. Albert and Jianxin Shi, and Hyokyoung G. Hong)**  
*BB, DCEG  
NCI, NIH*
- 2019/08 - 2021/08 📖 **Teaching Assistant**  
*Department of Mathematics, UMD*

## Employment History (continued)

2016/08 - 2017/04  **Mathematics Teacher**  
NO.1 Middle School Affiliated to Central China Normal University, Wuhan, China

2014/09 - 2016/06  **Teaching Assistant**  
Department of Mathematics, USTC

## Research Interests

-  **Longitudinal and correlated data methodology**, with emphasis on repeated-measures analysis, biomarker studies, and complex dependent data structures.
-  **Statistical and computational methods in genetics and genomics** for analyzing electronic health records (EHR), real-world data (RWD), and large-scale population studies (e.g., the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial), with applications to prostate cancer risk stratification, early detection, and prediction.
-  **Statistical and machine learning approaches in epidemiology**, including machine learning and deep learning for cancer genetic epidemiology, nutritional epidemiology, and metabolomics.

## Publications

\* corresponding author   † co-first / equal contribution   ‡ alphabetical order

### Methodological / Statistical Papers

- 1** **Zhang, Pei**, X. Wang, Shi, Jianxin<sup>\*</sup>, and Albert, Paul S.<sup>\*</sup>, “Estimating the heritability of longitudinal rate-of-change: Genetic insights into PSA velocity in prostate cancer-free individuals,” *Biostatistics*, 2026, *Biostatistics* (Accepted), preprint on arXiv [[arXiv](#)].
- 2** **Zhang, Pei**, Albert, Paul S.<sup>\*</sup>, and Hong, Hyokyung G.<sup>\*</sup>, “Mixed modeling approach for characterizing the genetic effects in a longitudinal phenotype,” *Annals of Applied Statistics*, vol. 19, no. 3, pp. 2070–2087, 2025, [[PDF](#)].

### Collaborative / Applied Papers

- 1** H. Fan, H. Zhao, **Zhang, Pei**, P. Yu, Y. Ji, G. Chen, H. Jin, Y. Liu, J. Liu, Z.-S. Chen, Lyu, Aiping<sup>\*</sup>, Liang, Xinmiao<sup>\*</sup>, and Chen, Yang<sup>\*</sup>, “Homisoflavanone delays colorectal cancer progression via DNA damage-induced mitochondrial apoptosis and parthanatos-like cell death,” *Advanced Science*, e11406, 2026, [[PDF](#)].
- 2** H. Fan, H. Zhao, L. Gao, Y. Dong, **Zhang, Pei**, P. Yu, Y. Ji, Z.-S. Chen, X. Liang, and Chen, Yang<sup>\*</sup>, “CCN1 enhances tumor immunosuppression through collagen-mediated chemokine secretion in pancreatic cancer,” *Advanced Science*, e2500589, 2025, [[PDF](#)].
- 3** Loftfield, Erika<sup>†\*</sup>, **Zhang, Pei**<sup>†</sup>, C. P. O’Connell, L. L. Kahle, K. Herrick, L. Abar, N. Khandpur, E. M. Steele, and H. G. Hong, “Performance of a food frequency questionnaire for estimating ultraprocessed food intake according to the NOVA classification system in the United States NIH-AARP diet and health study,” *Journal of Nutrition*, vol. 155, no. 7, pp. 2376–2384, 2025, [[PDF](#)].
- 4** Wu, Yetian<sup>†</sup>, **Zhang, Pei**<sup>†</sup>, H. Fan, C. Zhang, P. Yu, X. Liang, and Chen, Yang<sup>\*</sup>, “GPR35 acts a dual role and therapeutic target in inflammation,” *Frontiers in Immunology*, vol. 14, no. 1254446, 2023, [[PDF](#)].

### Preprints / Under Review

- 1 Lim, Jungeun\*, **Zhang, Pei**, J. Rhee, M. C. Playdon, A. J. Cross, R. Stolzenberg-Solomon, V. L. Roger, M. P. Purdue, Albanes, Demetrius\*, Hong, Hyokyong G.\*, and Wong, Jason Y. Y.\*, “Metabolomic profile score for predicting serum per- and polyfluoroalkyl substance (PFAS) levels: A novel application of machine learning to enhance detection of environmental pollutants,” Under review at *International Journal of Hygiene and Environmental Health*, 2026.

## PhD Thesis

- 1 **Zhang, Pei**, “Mixed modeling approaches for characterizing genetic effects and heritability metrics in longitudinal phenotypes,” [\[PDF\]](#), Ph.D. dissertation, University of Maryland, College Park, 2025.

## Honors

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|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2026        | <ul style="list-style-type: none"> <li>📌 NCI Early K99/R00 Grant Application — Rated as “Competitive, Not Discussed”</li> <li>📌 National Science Foundation (NSF) Travel Support Award, USA</li> <li>📌 Institute of Mathematical Statistics (IMS) New Researcher Travel Award, USA</li> </ul>                                                                                                                                                                                                                                                                                                                |
| 2025 & 2026 | <ul style="list-style-type: none"> <li>📌 NIH Postdoctoral Fellowship (twice)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2025        | <ul style="list-style-type: none"> <li>📌 NCI-DCEG Institutional Nominee for NCI Pathway to Independence Award for Outstanding Early Stage Postdoctoral Researchers (K99/R00) <a href="#">[about "Early K99" Grant - NIH]</a>   <a href="#">[about "Early K99" Grant - Stanford Medicine]</a>   <a href="#">[Notice of Funding Opportunity Number: PAR-23-286]</a></li> <li>📌 NIH Fellows Award for Research Excellence (FARE) 2026 (top 25% of all applicants) <a href="#">[List of FARE 2026 Awardees Abstracts]</a>   <a href="#">[about FARE]</a></li> <li>📌 NIH Outstanding Graduate Research</li> </ul> |
| 2023 & 2024 | <ul style="list-style-type: none"> <li>📌 Women in Statistics and Data Science Conference Student Travel Award (twice)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2023        | <ul style="list-style-type: none"> <li>📌 UMD Jacob K. Goldhaber Travel Grant</li> <li>📌 UMD International Conference Student Support Award</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2022 & 2023 | <ul style="list-style-type: none"> <li>📌 UMD Graduate Student Travel Fellowship (twice)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2022        | <ul style="list-style-type: none"> <li>📌 Rutgers University Travel Award for Conference on Advances in Bayesian and Frequentist Statistics</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2021 - 2024 | <ul style="list-style-type: none"> <li>📌 UMD Tuition Award for External Fellowship (4 times)</li> <li>📌 NIH Predoctoral Fellowship (4 times) <a href="#">[about NIH Graduate Partnerships Program (GPP)]</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      |
| 2019 & 2020 | <ul style="list-style-type: none"> <li>📌 UMD Dean’s Fellowship (twice)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2017        | <ul style="list-style-type: none"> <li>📌 First Award in Thesis Contest on Deep Integration of Key Competence and Classroom Teaching (NO.1 Middle School Affiliated to Central China Normal University)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                            |
| 2016        | <ul style="list-style-type: none"> <li>📌 USTC Outstanding Graduate</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2014 & 2015 | <ul style="list-style-type: none"> <li>📌 USTC First Award of Academic Scholarship (twice)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2014        | <ul style="list-style-type: none"> <li>📌 NNU Outstanding Graduate</li> <li>📌 NNU First Award of Feng Ruer Scholarship</li> <li>📌 NNU Outstanding Dissertation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2013        | <ul style="list-style-type: none"> <li>📌 Certificate of Recommendation for Exemption from Entrance Examination—USTC Graduate Program</li> <li>📌 Eligibility for Recommended Admission (top 5% in Mathematics Teacher Education Program, NNU)</li> <li>📌 Second Award of Jiangsu Teaching Professional Skills Contest (ranked 4th in Mathematics across the Jiangsu Province)</li> </ul>                                                                                                                                                                                                                      |
| 2012        | <ul style="list-style-type: none"> <li>📌 NNU Second Award in Mathematical Modeling Contest</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Honors (continued)

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- 2010 & 2011 ■ NNU Outstanding Debate Team Award, Debate Competition on “Is Beauty Subjective or Objective?” Member of the award-winning team arguing that beauty is objective.
- 2009 ■ NNU First Award of Rolling Scholarship (twice)
- 2009 ■ NNU First Award in Computer Contest

## Academic Activities

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### Invited Talks / Seminars

- 2026 ■ International Biometric Conference (IBC), Seoul, South Korea
- Biostatistics Branch of NCI-DCEG Works in Progress, Rockville, Maryland, USA

### Invited Posters / Panel Invitations

- 2026 ■ STATGEN 2026: Conference on Statistics in Genomics and Genetics, Emory University, Atlanta, Georgia, USA (Invited Poster)
- 2024 ■ Women in Statistics and Data Science (WSDS), Reston, Virginia, USA (Invited Panelist)

### Contributed Presentations










- 2026 ■ The American Society of Human Genetics (ASHG) Annual Meeting, Montreal, Canada
- Joint Statistical Meetings (JSM), Boston, Massachusetts, USA
- The 11th Workshop on Biostatistics and Bioinformatics, Georgia State University, Atlanta, Georgia, USA (Contributed Poster as a recipient of the IMS New Researchers Travel Award and NSF Travel Support Award)
- 2025 ■ Joint Statistical Meetings (JSM), Nashville, Tennessee, USA
- The 17th Annual NCI-DCEG Fellows’ Training Symposium, Rockville, Maryland, USA
- 2024 ■ Joint Statistical Meetings (JSM), Portland, Oregon, USA
- AI Day for Federal Statistics, National Academy of Sciences, Washington DC, USA
- Probability and Statistics Day, University of Maryland, Baltimore County (UMBC), Baltimore, Maryland, USA
- NIH Annual Graduate Student Research Symposium, Bethesda, Maryland, USA
- 2023 ■ Women in Statistics and Data Science (WSDS), Seattle, Washington, USA
- Joint Statistical Meetings (JSM), Toronto, Canada
- Probability and Statistics Day, University of Maryland, Baltimore County (UMBC), Baltimore, Maryland, USA
- 2022 ■ Conference on Advances in Bayesian and Frequentist Statistics with a Celebration of the 80th Birthday of Professor William E. Strawderman, Rutgers University, New Brunswick, New Jersey, USA
- Annual Conference on Quantitative Approaches in Biology, Northwestern University, Chicago, Ohio, USA

### Attendant




- 2026 ■ Artificial Intelligence (AI) Expo, The Department of Health and Human Services (HHS), Washington D.C., USA

## Academic Activities (continued)

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- 2025  NIH Library Artificial Intelligence (AI) Trainings led by OpenAI experts, Bethesda, Maryland, USA
- 2025  Biostatistics Symposium of South California (BSSC), Newport Beach, California, USA
- 2024  Eastern North American Region (ENAR), New Orleans, Louisiana, USA
- 2024  Statistics in the Age of AI Conference, The George Washington University (GWU), Washington DC, USA
- 2023  Eastern North American Region (ENAR), Baltimore, Maryland, USA
- 2023  National Heart, Lung, and Blood Institute (NHLBI) Biostatistics Workshop on Clinical Trial Designs: Innovative Endpoints and Futility Monitoring, Bethesda, Maryland, USA
- 2022  International Small Area Estimation (SAE) Annual Conference, UMD, College Park, Maryland, USA
- 2016  National Tianyuan Foundation Summer School on Pure Mathematics, Summer Seminar on Pure Mathematics, Zhejiang University, Hangzhou, China
- 2013  Yangtze River Delta Symposium on Partial Differential Equations and Doctoral Student Forum, Tongji University, Shanghai, China




### Grant Writing Workshop

- 2026  NCI K Grant Writing Workshop, Bethesda, Maryland, USA
-  NCI-DCEG Writing Your Specific Aims Session, Rockville, Maryland, USA
- 2025  NCI-DCEG Grant Writing Workshop, Rockville, Maryland, USA


## Software

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### R Packages and Research Code

-  **Heritability-Velocity** — Author and Maintainer. Reproducible framework for joint estimation of static and dynamic heritability components in longitudinal phenotypes, featuring scalable AI-REML and REHE algorithms for genome-wide data. [\[GitHub\]](#) | [\[arXiv\]](#)
-  **PLCO** — Author and Maintainer. Mixed-effects modeling framework with crossed genetic and individual-specific random effects to quantify genetic influences on PSA trajectories in large-scale prostate cancer screening studies. [\[GitHub\]](#) | [\[Paper\]](#)
-  **AARP** — Author and Maintainer. Implementation of measurement error models for bias correction in food frequency questionnaire-based dietary intake assessment. [\[GitHub\]](#) | [\[Paper\]](#)

### Programming and Statistical Computing

-  R | Python | C/C++ | SQL | Jupyter Notebook

### Research Infrastructure

-  NIH Biowulf High-Performance Computing Cluster | All of Us Research Hub | UK Biobank

### Scientific Writing and Reproducibility

-   $\LaTeX$  | Microsoft Word | R Markdown | Git

## Teaching

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### Teaching Assistant / Grader

- Fall 2019 ■ **Sampling Theory (STAT440)**, Undergraduate/master-level.  
*Grader, UMD*
- Spring 2020 ■ **Introduction to Linear Algebra (MATH240)**, Undergraduate-level.  
*Teaching Assistant, UMD*
- Summer 2020 ■ **Introduction to Mathematical Proof (MATH310)**, Undergraduate-level.  
*Grader, UMD*
- **Introduction to Probability Theory (STAT410)**, Undergraduate/master-level.  
*Grader, UMD*
- Fall 2020 & Spring 2021 ■ **Elementary Probability and Statistics (STAT100)**, Undergraduate-level.  
*Teaching Assistant, UMD*
- Spring 2015 & 2016 ■ **Calculus II**, Undergraduate-level.  
*Teaching Assistant, USTC*
- Fall 2016 ■ **Calculus I**, Undergraduate-level.  
*Teaching Assistant, USTC*

### Mathematics Teacher (Internship)

- 2013/09 - 2013/11 ■ **High School Mathematics**. High school level.  
*Mathematics Teacher Intern, Jinling High School, Nanjing, China*

## Service

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### Journal Reviewer

- 2021 - present ■ Biometrics (1); Statistics in Medicine (2); Journal of Biopharmaceutical Statistics (1); Frontiers in Oncology (1); LabMed Discovery (1)

### Judging

- 2026 ■ Chief Judge, NIH Fellows Award for Research Excellence (FARE) 2027 Competition

### Conference / Seminar Organizer

- 2024 ■ Co-organizer of the panel "Discussion of Mentoring Program and Participant Experiences" at WSDS 2024
- Chair of the session "Rethinking Current Modeling Strategies: Advances and Applications" at JSM 2024
- 2023 ■ Chair of the session "Concurrent - Statistical Insights into Mortality and Inference: From Choquet Capacities to Demographic Patterns" at WSDS 2023





### Mentoring

- 2025-present ■ Co-mentor (with **Paul S. Albert, PhD**) of postbaccalaureate fellow **Sumaja Bandreddi** (M.S., B.A., University of Virginia), Biostatistics Branch, DCEG, NCI, NIH
- Spring 2021 ■ Directed Reading Program mentor for undergraduate **Andrew Craun**, Department of Mathematics, University of Maryland, College Park





## Service (continued)

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### Leadership











- 2026  Member, NIH Fellows Award for Research Excellence (FARE) 2027 Committee
- 2022–2023  Vice President, Women in Mathematics, University of Maryland, College Park
- 2020–2021  Representative, Graduate Student Government, University of Maryland, College Park
- 2010–2011  Team Leader, Volunteer Interpreters Group, Nanjing Yunjin Museum, Nanjing, China

### Volunteer Service

- 2026  Volunteer, The Chinese Biopharmaceutical Association-USA (CBA)
- 2025  Volunteer, Sino-American Pharmaceutical Professionals Association (SAPA)-DC
- 2022  Volunteer Interviewee, The Center for Mathematics Education, University of Maryland, College Park
- 2009–2010  Volunteer Teacher, Nanjing Hongshan Primary School for Children of Migrant Workers, Nanjing, China

## Memberships

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- 2026 - present  American Society of Human Genetics
- 2024 - present  Washington Statistical Society
-  International Chinese Statistical Association
-  Section of Statistics in Genetics and Genomics
- 2023 - present  American Statistical Association
-  Institute of Mathematical Statistics
-  Society for Mathematical Biology
-  Caucus for Women in Statistics and Data Science
-  Eastern North America Region/International Biometric Society
- 2019 - 2025  American Mathematical Society

## References

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### **Paul S. Albert**

Senior Investigator  
Director, Biostatistics Branch  
Division of Genetic Epidemiology & Genetics  
National Cancer Institute  
Rockville, MD 20850, USA  
[albertp@mail.nih.gov](mailto:albertp@mail.nih.gov)

### **Jianxin Shi**

Senior Investigator  
Biostatistics Branch  
Division of Genetic Epidemiology & Genetics  
National Cancer Institute  
Rockville, MD 20850, USA  
[jianxin.shi@nih.gov](mailto:jianxin.shi@nih.gov)

### **Doron Levy**

Professor of Mathematics  
Chair, Department of Mathematics  
Director, Brin Mathematics Research Center  
Co-director, the NCI-UMD Partnership for Integrative Cancer Research  
Fellow of the Society for Industrial and Applied Mathematics (SIAM)  
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