# Yuansheng Zhang

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## EDUCATION

**Doctoral Studies at the University of Zurich** — Zurich, Switzerland
*PhD Program in Biomedicine, Supervisor: Prof. Vartan Kurtcuoglu* — 2021–Present

**Master's Studies at the Beijing Institute of Genomics, Chinese Academy of Sciences** — Beijing, China
*Master's Degree in Bioengineering, Supervisor: Prof. Zhang Zhang* — 2018–2021
- Master thesis: Multi-species Single Cell Transcriptome Landscape Construction and Database Development
- GPA: 3.93/4.0

**Master's Studies at the University of Southern California, Keck School of Medicine** — Los Angeles, USA
*Master's Program in Translational Biotechnology* — 2017

**Undergraduate Studies at the Beijing Forestry University** — Beijing, China
*Bachelor's Degree in Bioengineering, Supervisor: Prof. Weidong Bao* — 2012–2017
- Master thesis: The function of allogrooming in captive Sichuan golden snub-nosed monkeys
- Cumulative GPA: 87.56/100, Major GPA: 91.83/100

## RESEARCH EXPERIENCE

**Development of ML-based Cardiovascular (CV) Risk Prediction Model in Renal Transplant Recipients** — 09/2023-Present
*As Project Leader, Supervisor: Prof. Vartan Kurtcuoglu & Dr. Diane de Zélicourt*
- Conduct machine learning-based survival analysis for cardiovascular risk prediction after renal transplantation.
- Apply data-centric AI approaches to characterize, evaluate the clinical data used to train and evaluate the models. For example, data-centric identification of in-distribution incongruous examples, and characterizing subgroups with heterogeneous outcomes.
- Use Explainable AI to investigate the relationship between cardiovascular risk factors and their importance.
- Evaluate performance and fairness of current cardiovascular risk prediction models in renal transplant recipients.

**Development of Physiology-Informed Neural Network for the cardio-renal interaction** — 03/2024-Present
*As Project Leader, Supervisor: Prof. Vartan Kurtcuoglu & Dr. Diane de Zélicourt*
- Conduct literature review on physiological modeling or cardio-renal system and validate the model in healthy states.
- Perform sensitivity analysis for dimensionality reduction to optimize model performance and interpretability.
- Develop an interactive visualization tool to illustrate interconnections and coupling dynamics among a large set of ODEs.
- Design and implement physiology-informed neural networks, integrating physiological knowledge into data-driven approaches.

**Investigation of Cardiac Structural and Functional Changes in Swiss Renal Transplant Recipients** — 12/2022-11/2024
*As Project Leader, Supervisor: Prof. Vartan Kurtcuoglu & Dr. Diane de Zélicourt*
- Visualized the trajectories of echocardiogram-derived cardiac functional and structural parameters following renal transplantation.
- Conducted biostatistical analysis to evaluate echocardiographic changes in patients with abnormal baseline measurements.
- Examined the prognostic value of cardiovascular risk factors on cardiac remodeling and changes in cardiac function.
- Investigated the impact of immunosuppressive therapy on reverse and *de novo* cardiac remodeling.

**Patient survival and cardiorenal outcomes following renal transplantations** — 09/2021-10/2024
*As Project Leader, Supervisor: Prof. Vartan Kurtcuoglu & Dr. Diane de Zélicourt*

- Conducted a comprehensive survival analysis to evaluate patient, graft survival, and major adverse cardiovascular events (MACE)-free survival rates both at the population level and across various subgroups stratified by sex, age and race.
- Compared patient survival and cardiorenal outcomes with international cohorts to identify regional and demographic differences.
- Assessed prognostic value of cardiovascular risk factors for post-transplant MACE in the Swiss population.

**Building a Longitudinal Clinical Dataset on Renal Transplant Recipients in Switzerland** 12/2022-10/2024

*As Project Leader, Supervisor: Prof. Vartan Kurtcuoglu & Dr. Diane de Zélicourt*

- Data Acquisition: Collaborated with the Swiss Transplant Cohort Study (STCS, nested project number FUP121rev) to access data registry from 3,000 renal transplant recipients (2008–2019) across Switzerland.
- Data Collection: Initiated data collection with local PIs and other stakeholders at all six transplant centers, navigated administrative protocols to facilitate seamless data sharing, collected over 10K echocardiographic reports from electronic health records.
- Data Processing: Developed scripts for data de-identification and echocardiographic parameter extraction from reports in German and French, categorized MACE and causes of death based on free-text diagnostic records.
- Data Validation: Led a medical expert team in validating dataset quality to ensure high accuracy and reliability.
- Data Preparation: Performed data cleaning, preprocessing, and integration to prepare the dataset for longitudinal analysis.

**Construction of Bulk and Single Cell Transcriptome Landscape and Database Development** 07/2019-08/2021

*As Project Leader, Supervisor: Prof. Zhang Zhang & Asst. Prof. Lili Hao*

- Built a standardized pipeline for bulk and single cell RNA-seq data analysis with optimized parameters.
- Designed a semi-automatically curated meta-information system based on a structured curation model.
- Established Gene Expression Nebulas (https://ngdc.cncb.ac.cn/gen/), a data portal of comprehensive gene expression profiles with over 300 datasets across 30 species under various biological conditions.
- Developed a suite of online tools (https://ngdc.cncb.ac.cn/gen/analysis) with user-friendly web interfaces, including differential gene expression analysis, functional enrichment, regulatory network inference, and cell-type annotation.
- Led a team of 3 PhD students and 4 master students, organizing meetings, assigning tasks, solving problems, and reporting results.
- Collaborated with researchers and engineers from the China National Center for Bioinformation on database development.

**Biodiversity and Animal Conservation Field Work and Lab Research** 10/2015-06/2017

*As Research Core Group Member, Supervisor: Prof. Weidong Bao*

- Organized ecological investigations of mammals and avian species at several Chinese national nature reserves.
- Analyzed over 50K camera trap images for biodiversity monitoring and behavioral and activity pattern study.
- Analyzed animal fecal samples from endangered herbivorous ungulates, including DNA extraction, mitochondrial DNA sequencing, sex hormone extraction and analysis, food habits determination, etc.
- Worked with different wildlife and behavioral ecology research group in Institute of Zoology, Chinese Academy of Sciences (CAS), Institute of Tibetan Plateau Research (ITP), CAS, Sun Yat-sen University, etc.

## TEACHING ACTIVITIES

**Supervising 5 Master's Thesis Projects and 1 Bachelor's Project**

- Amiel Meir Conen, Immunosuppressive agents effect estimation on blood pressure in renal transplant recipients 11/2024-Present
- Ardian Sejdiu, Meta-analysis on the performance of CV prediction models in renal transplant recipients 10/2024-Present
- Lukas Brummer, Post-transplant MACE prediction based on longitudinal cardiac structural and functional data 10/2023- Present
- Anett Romancuk, The prognostic effect of echocardiography parameters for MACE after renal transplantation 11/2022- Present
- Marc Fabrian Fischer, The extent of reverse cardiac remodeling after renal transplantation 10/2022-10/2024
- Marlo Stadler, Incidence and prognostic markers of MACE in ESRD patients following renal transplantation 09/2021-01/2023

**Served as a Teaching Assistant for Laboratory Practicals in Physiology** 03/2022-02/2024

- Assisted lectures with preparation of syllabus material and setting up experiments for medical student laboratory practicals.
- Guided students through laboratory practicals, ensuring accurate execution and addressing technical challenges as they arose.
- Answered questions regarding experiment results and fostered student understanding of key concepts.

## PUBLICATIONS (#: first author, *: corresponding author)

**In the Process of Submission**

- **Zhang YS**#, Fischer MF, Brummer L, Romancuk A, Rho E, Golshayan D, de Seigneux S, Huynh-Do U, Amico P, Schnyder A, Müller T, Kurtcuoglu V*, de Zélicourt D*. Clinical evolution of cardiovascular structure and function after renal transplantation. Submission is foreseen for January 2025.
- **Zhang YS**#, Stadler M, Rho E, Golshayan D, de Seigneux S, Huynh-Do U, Amico P, Schnyder A, Müller T, Kurtcuoglu V*, de Zélicourt D*. Patient survival and cardiorenal outcomes after renal transplantations: a nationwide cohort study in Switzerland. It is with the co-authors for review before submission, which is scheduled for early December 2024.

**2024**

- **Zhang YS** as the co-author in CNCB-NGDC Members and Partners: Database Resources of the National Genomics Data Center, China National Center for Bioinformation in 2023. Nucleic Acids Research, 2024, 52: (D1): D18-D32.
- Chen M#, Xia L#, Tan XY, Gao SH, Wang S, Li M, **Zhang YS**, Xu TY, Cheng YY, Chu Y, Hu SN, Wu SY, Zhang Z*. Seeing the unseen in characterizing RNA editome during rice endosperm development. Nucleic Acids Research, 2024, 7: 1314.

**2023**

- **Zhang YS** as the co-author in CNCB-NGDC Members and Partners: Database Resources of the National Genomics Data Center, China National Center for Bioinformation in 2023. Nucleic Acids Research, 2023, 51: (D1): D18-D28.
- Jiang S#, Qian QH#, Zhu TT#, Zong WT, Shang YF, Jin T, **Zhang YS**, Chen M, Wu ZS, Chu Y, Zhang RQ, Luo SC, Jing W, Zou D, Bao YM, Xiao JF*, Zhang Z*. Cell Taxonomy: a curated repository of cell types with multifaceted characterization. Nucleic Acids Research, 2023, 51: (D1): D853-D860. https://ngdc.cncb.ac.cn/celltaxonomy
- Zhu TT, Niu GY, **Zhang YS**, Chen M, Li CY, Hao LL*, Zhang Z*. Host-mediated RNA editing in viruses. Biology Direct, 2023, 18:12.

**2022**

- **Zhang YS**# as the co-first author in CNCB-NGDC Members and Partners: Database Resources of the National Genomics Data Center, China National Center for Bioinformation in 2022. Nucleic Acids Research, 2022, 50: (D1): D27-D38.
- **Zhang YS**#, Zou D#, Zhu TT#, Chen M, Niu GY, Liu C, Xiong YJ, Hao LL*, Zhang Z*: Gene Expression Nebulas (GEN): a data portal of comprehensive gene expression profiles of normal and diseased tissues and cells in multiple species. Nucleic Acids Research, 2022, 50: (D1): D1016-D1024. https://bigd.big.ac.cn/gen/
- Liu L#, Zhang Y#, Niu GY#, Li QP, Li Z, Zhu TT, Feng CR, Liu XN, **Zhang YS**, Xu TY, Chen RR, Teng XF, Zhang RQ, Zou D, Ma LN*, Zhang Z*. BrainBase, a curated knowledgebase of brain diseases. Nucleic Acids Research, 2022, 50: (D1): D1131-D1138. https://bigd.big.ac.cn/brainbase

**2021**

- **Zhang YS**# as the co-first author in CNCB-NGDC Members and Partners: Database Resources of the National Genomics Data Center, China National Center for Bioinformation in 2021. Nucleic Acids Research, 2021, 49: (D1): D18-D28.

**2020**

- **Zhang YS**# as the co-first author in National Genomics Data Center Members and Partners: Database Resources of the National Genomics Data Center in 2020. Nucleic Acids Research, 2020, 48: D24-D33.
- Teng XF#, Li QP#, Li Zhao#, **Zhang YS**#, Qiu WM, Zhang M, Xiao JF, Yu J*, Zhang Z*, Song SH*: Compositional Variability and Mutation Spectra of Monophyletic SARS-CoV-2 Clades. Genomics, Proteomics & Bioinformatics, 2021, 18 (6): 648-663.
- Sang J#, Zou D#, Wang ZN#, Wang F, **Zhang YS**, Xia L, Li ZH, Ma LN, Li MW, Xu BX, Liu XN, Wu SY, Hu SN, Hao LL, Zhang Z*: Rice Genome Reannotation Using Massive RNA-seq Data. Genomics Proteomics & Bioinformatics, 2020, 18(2):161-172. http://ic4r.org

**2019**

- **Zhang YS**# as the co-author in BIG Data Center Members: Database Resources of the BIG Data Center in 2019. Nucleic Acids Research, 2019, 47: D8-D14.
- **Zhang YS**#, Song TJ, Huang YK, Chen MX, Tang XM, Sun XH, Liu FM, Wang C, Bao WD. Status of an alien turtle in city park waters and its potential threats to local biodiversity: the red-eared slider in Beijing. Urban Ecosystems, 2019 11.
- **Zhang YS**#, Bao WD, Jiang ZG. The function analysis of allogrooming in captive Sichuan snub-nosed monkeys (*Rhinopithecus roxellana*). Acta Theriologica Sinica. 2019 (3).
- Li M#, Xia L#, **Zhang YS**, Niu GY, Li M, Wang P, Zhang Y, Sang J, Zou D, Hu S, Hao LL, Zhang Z. Plant Editosome Database: a curated database of RNA editosome in plants. Nucleic Acids Research, 2019, 47: D170-D174. http://bigd.big.ac.cn/ped

- Niu GY#, Zou D#, Li MW#, **Zhang YS**, Sang J, Xia L, Li M, Liu L, Cao JB, Hu SN, Hao LL, Zhang Z. Editome Disease Knowledgebase (EDK): A curated knowledgebase of editome-disease associations in human. Nucleic Acids Research, 2019, 47: D78-D83. http://bigd.big.ac.cn/edk
- Li MW#, Zou D#, Li ZH#, Gao R, Sang J, **Zhang YS**, Li RJ, Xia L, Zhang T, Niu GY, Bao YM, Zhang Z. EWAS Atlas: a curated knowledgebase of epigenome-wide association studies. Nucleic Acids Research, 2019, 47: D983-D988. http://bigd.big.ac.cn/ewas

**2018**

- **Zhang YS**#, Xia L, Sang J, Li M, Liu L, Li MW, Niu GY, Cao JB, Teng XF, Zhou Q, Zhang Z. The BIG Data Center's Database Resources. Hereditas (Beijing), 2018, 40(11): 1039-1043.

**2017**

- **Zhang YS**#, Jiang WJ, Jiang J, Wang D, Wu JG, Liu FM, Bao WD, Biodiversity Monitoring of Undergrowth Birds and Mammals in Beijing Songshan National Nature Reserve, Chinese Journal of Wildlife, 2017,38(03):367-375.
- **Zhang YS**#, Jiang J, Jiang WJ, Wang D, Fan YQ, Tang XM, Bao WD, Activity Patterns of Mammals in Beijing Songshan National Nature Reserve, Sichuan Journal of Zoology, 2017,36(04):460-467.

**2016**

- Tang XM, Zhang DH, Ma ZH, Wu TL, **Zhang YS**, Bao WD (2016) Camera trapping survey on ground-dwelling birds and mammals of spring and winter in Beijing Wulingshan Nature Reserve. Chinese Journal of Zoology, 51, 751–760.

## ORAL PRESENTATIONS

1. **Zhang YS**, A retrospective study of cardiac remodeling in Swiss renal transplant recipients, 55th Annual Congress of the Swiss Society of Nephrology, Lausanne, Switzerland, December 2023.
2. **Zhang YS**, Kidney Transplantation and its Outcomes in Switzerland, 54th Annual Meeting of the Swiss Society of Nephrology, Interlaken, Switzerland, December 2022.

## POSTER CONTRIBUTIONS

1. **Zhang YS**, Structural and functional echocardiographic changes after renal transplantation, 54th Annual Congress of the Swiss Society of Nephrology, Lausanne, Switzerland, December 2023.
2. **Zhang YS**, Risk Prediction Model of MACE and Graft Loss after Kidney Transplantation, NCCR Kidney.CH Retreat, Zurich, Switzerland, April 2022.
3. **Zhang YS**, EWAS Atlas: A Curated Knowledgebase of Epigenome-wide Association Studies. Otto Warburg International Summer School and Research Symposium on Cell-Type Heterogeneity and Single-Cell Analysis, Shanghai, China, August 2019.
4. **Zhang YS**, Plant Editosome Database: A Curated Database of RNA Editosome in Plants, The 20th Plant Genomics in China, Nanchang, China, August 2019.
5. **Zhang YS**, Basic Investigation on the *Trachemys scripta elegans*' Invasion in the Waters of Beijing Urban Park System, The 12th National Symposium on Animal Ecology and Resource Management, Guangzhou, China, November 2016.
6. **Zhang YS**, Fundamental Investigation on the red-eared slider' Invasion of Urban Ecosystem in Northern China, The 12th National Symposium on Biodiversity Science and Conservation, Beijing, China, October 2016.

## GRANT

**UZH Candoc Grant (CHF 40'000)** 2023-2024

## HONOR/AWARD

**China National Scholarship (top 2%)** 2020

**Merit Student, University of Chinese Academy of Sciences** 2018-2019, 2019-2020

**Beijing Outstanding Graduate Award (top 2%)** 2017

**Merit Student, Beijing Forestry University** 2014-2015, 2015-2016

## LEADERSHIP/ACTIVITIES

**Committee member, BioMed PhD Program Retreat Organization Committee** 04/2022-09/2022

- Developed a website to automatically collect registration information and presentation slides.
- Created a timetable and an abstracts booklet for the retreat event.
- Decorated the conference room and organized the seminar.

**Head of the Data Analysis Group, Workplace Diversity Initiative, Beijing LGBT Center** 08/2019-08/2021

- Conducted survey research on corporate LGBT Diversity & Inclusion from academy, enterprise, and employees.
- Evaluated LGBT+ Inclusion index and established corporate LGBT Diversity & Inclusion certification standard for companies.
- Organized training workshop for enterprises to build LGBT+ friendly workplaces and encouraged more companies to adopt inclusive policies by collaborating with researchers, HR professionals, psychologists, journalists and lawyers.

**Head of Volunteers, Friend of National Parks Foundation, Indonesia** 08/2015-09/2015

- Led 20 volunteers from all over the world to conduct detection and protection work for Bali Starlings and sea turtles.
- Assisted local wildlife conservation organizations to monitor habitat use and behavior patterns of Bali Starlings and sea turtles and further provided the scientific basis for local protection work

**Member, Beijing Forestry University Red Cross Association** 10/2012-06/2017

- Organized first aid training, blood donation activities, etc.

## PERSONAL SKILLS

**Languages:** Chinese (native), English (full professional proficiency), German (limited proficiency)
**Programming Skills:** R, Python, Shell, Java, C++, MySQL