Shuo Zong

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I'm a postdoctoral researcher specializing in earth observation and machine learning for ecological and biodiversity monitoring.

Education

- **Eidgenössische Technische Hochschule Zürich (ETH Zürich)** Zürich, Switzerland
  PhD in Ecology and remote sensing *Dec. 2020 - Apr. 2025*
  Thesis : Biodiversity monitoring in large rivers with environmental DNA and remote sensing
- **Beijing Normal University** Beijing, China
  Master of Geomatics *Aug. 2017 – July. 2020*
- **China University of Mining and Technology** Beijing, China
  Bachelor of Engineering in Surveying and Mapping *Aug. 2013 – July. 2017*

Experience

- **ETH Zürich** Zürich, Switzerland
  PostDoc Researcher *May 2025 - Present*
  - **MaLeFiX- Machine Learning aided ForecastIng of drought related eXtremes**: Analyze river wildness and river water surface temperature relation and their contribution to local Biodiversity in Switzerland
- **ETH Zürich** Zürich, Switzerland
  PhD Student *Dec 2020 - Apr. 2025*
  - **eDNA field campaign and sampling design**: Led a comprehensive river environmental DNA (eDNA) field campaign, optimized the sampling design using random stratification based on remote sensing data; Coordinated logistics, personnel, for the campaign across locations in 13 countries and 5 continents; Ran and adjusted multiple bioinformatic pipelines to obtain taxonomic assignment for DNA sequences detected in these environmental samples
  - **Species and Biodiversity Modeling**: Utilizing biodiversity metrics and species occurrences from eDNA as labels to train machine learning models with co-variables from remote sensing for estimating fish richness in large rivers
  - **Citizen Science Web Development**: Launched and coordinated a citizen science initiative "Find Wild River with AI", engaging participants in data collection, developing strategies for promoting public awareness and engagement in the project, Co-developed a citizen science web platform for participants to annotate satellite images, contributed to the design and implementation of user-friendly interfaces and functionality via Javascript (URL: https://lab.citizenscience.ch/en/project/761)
  - **Machine Learning**: Trained vision deep learning models for wild river estimation at global scale using Sentinel-2 multi-spectral images (Handling more than 20 TB time series image data on slurm cluster)
- **Riverkin** Zürich, Switzerland
  Scientific Advisor *May 2023 - Present*
  - **Grant Application**: Contributed remote sensing expertise for Innosuisse (25,000 CHF), I4N grant (50,000 CHF) and ESA BIC CH (50,000 CHF) application, made to the final stage, and granted by ESA BIC CH

- **Strategy**: Provided expert advice on leveraging remote sensing and machine learning techniques to enhance river sediment data collected by Riverkin's highly integrated sensor

- **Wildinsync** Zürich, Switzerland
  Remote Sensing Specialist *June 2023 - Present*
  - **Habitat Indices**: Developed Habitat Indices to monitor vegetation, climate, human impact, topography, and water properties across various habitats, including marine, large river, and mountain catchment areas

- **Chair of Entrepreneurial Risks, ETH Zürich** Zürich, Switzerland
  Intern *Aug 2019 - Dec 2019*
  - **Typhoon Risk Management**: Applied Dragon-King Theory into Super Extreme Typhoon (Hurricane) risk analysis, and found the pattern of existence of the Super Extreme Typhoon

- **Beijing Normal University** Beijing, China
  Graduate Student *Aug. 2017 - July. 2020*
  - **Disaster Index Insurance**: Assessed the livestock industry risk of snowstorms on the Qinghai-Tibet Plateau, built vulnerability model based on historical livestock death dataset with Random Forest and Boost Regression Tree; Also developed a Drought-Snowstorm Disaster Index Insurance for Tibetan livestock industry.
  - **Climate Change on Phenology of Paddy Rice**: Analyzed the impact of climate change, planting dates, cultivar on rice growth period length in China after removal of seasonal shifts using station observation data and remote sensing (MODIS)
  - **Economic Risk under Climate Change**: Analyzed the economic risk of energy and manufacturing industry added value loss under climate change scenarios (water variability)
  - **Fieldwork in Tibet**: Field trip to Tibet, collected air and soil samples (elevation up to 5231m)

- **Peking University — Dragon Software Technology** Beijing, China
  Research Assistant *Summer 2015 and 2016*
  - **Elevation Model**: Developed programs for generating contours and TIN Network from 3D elevation points (with 3D coordinates) input via C++.
  - **Server Development**: Developed a computing server for smartphone-based real-time traffic collection and distribution system using VGI (Volunteered geographic information) data via Java.

Teaching and Supervision

- **Landscape Patterns and Processes, ETH**: Prepared course and exercise materials from scratch for remote sensing part, and supervised students in exercise session
- **Environmental Systems Data Science: Machine Learning, ETH**: Wrote and developed exercise tutorial for deep learning in multi-species distribution models using Renku
- **Landscape Modelling, ETH**: Prepared course project materials, supervised a group of students to develop the course project
- **Applied Forest and Landscape Management Lab, ETH**: Supervised 3 bachelor students for selecting and reading peer-reviewed paper
- **Disaster Economics (Micro), BNU**: Graded assigned homework and organized the opening, middle, and closing reports of the course project. Led graduate students in field and research work on willingness to pay for earthquake donations
- **Supervision for master thesis** : Decoding biodiversity patterns and community structure of the lower Magdalena River (Colombia) using environmental DNA
- **Supervision for bachelor thesis** : Combining environmental DNA and remote sensing variables to model fish biodiversity in tropical river ecosystems

Conferences and Talks

- **Demonstrating speaker at Citizen Science Winter School Science Fair, Zurich**: Workshop organizing and presenting
- **Talk at RGS-IBG Annual International Conference 2024, London**: Estimation of river wildness with Artificial Intelligence, Remote Sensing and Citizen Science
- **Talk at SEED Group, Zurich**: Biodiversity monitoring with remote sensing, eDNA and deep learning
- **Talk at Biodiversity Day WSL, Zurich**: Biodiversity monitoring with remote sensing, eDNA and deep learning
- **Poster at Biology Conference 2024, Zurich**: Combining remote sensing and eDNA for large river biodiversity monitoring
- **Talk at Altermatt lab, Zurich**: Combining remote sensing and eDNA for large river biodiversity monitoring
- **Talk at ECEO laboratory EPFL, Sion**: Biodiversity monitoring with remote sensing, eDNA and deep learning
- **Poster at GEOBON Conference 2023, Montreal**: Combining remote sensing and eDNA for large river biodiversity monitoring
- **Talk at EGU Conference 2022, Vienna**: Combining remote sensing and eDNA for mapping of fish distribution in large rivers
- **Poster at EGU Conference 2018, Vienna**: Impacts of climate warming, cultivar shifts, and phenological dates on rice growth period length in China after correction for seasonal shift effects

Programming Skills

- **Languages**: Python, Javascript, R, C++, Matlab, Bash **Technologies and Software**: AWS, PyTorch, Slurm, Linux, Google earth engine, ArcGIS, Latex, Git