# Shuo Zong

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## Education

- **Eidgenössische Technische Hochschule Zürich (ETH Zürich)** — Zürich, Switzerland
  *PhD in Ecology and remote sensing* — *Dec. 2020 - Present*
  Thesis : Biodiversity monitoring in large rivers with environmental DNA and remote sensing
- **Beijing Normal University** — Beijing, China
  *Master of Geomatics; GPA: 89.9/100* — *Aug. 2017 – July. 2020*
- **China University of Mining and Technology** — Beijing, China
  *Bachelor of Engineering in Surveying and Mapping; GPA: 88.1/100 (top 2%)* — *Aug. 2013 – July. 2017*

## Experience

- **ETH Zürich** — Zürich, Switzerland
  *PhD Student* — *Dec 2020 - Present*
  - **Sentinel River eDNA campaign**: Led a comprehensive river environmental DNA (eDNA) field campaign, ensuring data collection and quality control. Coordinated logistics, personnel, and equipment for the campaign across multiple locations in Colombia, USA, Central Africa Republic, Gabon, and Brazil. Ran and adjusted multiple bioinformatics pipelines to obtain taxonomic assignment for sequences in these environmental samples
  - **Biodiversity Modeling**: Utilizing biodiversity metrics from eDNA as labels to train a machine learning model for estimating fish richness in large rivers
  - **Species Distribution Modeling**: Developed a fish species distribution model using environmental DNA for species identification and remote sensing data as covariates
  - **eDNA Sampling Design**: Designed and developed a web application using Google Earth Engine to optimize large river environmental DNA sampling design using random stratification in a more effective manner based on remote sensing data
  - **Citizen Science Initiative**: Launched and coordinated a citizen science initiative "Find Wild River with AI", engaging participants in data collection and analysis, and developing strategies for promoting public awareness and engagement in the project
  - **Web Development**: 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)
  - **Wild River Estimation**: Trained a vision deep learning model for wild river estimation at global scale using Sentinel 2 multi-spectral images (Handling more than 20 TB time series image data on 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++, Julia, Bash **Technologies and Software**: AWS, PyTorch, Slurm, Linux, JAX, Google earth engine, ArcGIS, Latex, Git