

# Tengyingzi(Sophia) Perrin

## Curriculum Vitae

✉ [tengyingzi.ma@math.ethz.ch](mailto:tengyingzi.ma@math.ethz.ch)  
📁 [GitHub/~Eiko58](https://github.com/~Eiko58)



## Education

- 2023–present **Ph.D student in Insurance Mathematics and Stochastic Finance, ETH Zurich, Zurich, Switzerland.**
- 2018–2022 **M.Sc. Mathematics(major) & Neuroinformatics(minor), University of Zurich, Zurich, Switzerland.**
- 2014–2015 **German Language School, Heidelberg, Germany.**
- 2010–2014 **B.Sc. Applied Mathematics, Lanzhou University , Lanzhou, China.**

## Working Experience

- 2023–present **Scientific Assistant, Department of Mathematics, ETH Zurich, Zurich, Switzerland, Reinforcement Learning, Financial Mathematics.**
  - Developing Markov decision process with observation cost method and applying it in food production chain.
  - Applying game theory and multi-agent Reinforcement learning in risk negotiation framework of food safety.
- 2022–2023 **Machine Learning Engineer Internship, AI Medical AG, Zurich, Switzerland, Neuroimaging, Computer Vision.**
  - Improved dice score for Metastasis lesion segmentation from 0.51 to 0.83 using UNet implemented by Tensorflow.
  - Built pipeline to support software including checking data validity, imaging coregistration and preprocessing.
  - Built synthetic lesion database to address imbalanced data problem.
- 2015–2017 **Mathematical Olympiad Teacher, Xinshiji Mathematical Olympiad School, Lanzhou, China.**

Teached mathematical olympiad content to middle school students.

## Academic Projects

- 2023–present **MicRISK2030**, *Stochastic Finance Group, Department of Mathematics, ETH Zurich*, Supervisors: Prof. Josef Teichmann, Florian Krach.
- Transferring risk management concepts from Stochastic Finance to the microbial risk analysis context and harnessing existing data, models and concepts for microbial risk assessment and management.
  - Developing AI-assisted risk assessment and management concepts by building upon established tools from game theory and decision making and implementation in a food production facility.
  - Proposing an overarching microbial risk assessment and management scheme for multi-criteria decision support that integrates the novel AI-assisted concepts in a modular design.
- 2021–present **Visual Streak Localization in Spectral Domain Optical Coherence Tomography Images of Minipigs**, *Applied Statistics Group, Institute of Mathematics, University of Zurich*, Supervisors: Prof. Reinhard Furrer, Prof. Simon Pot.
- Writing academic paper for publication in ophthalmology journal.
  - Adapted the Bayesian scale-space multi-resolution analysis to OCT data for the task.
  - Provided an effective method for denoising and filling in the missing area of the OCT scans.
  - Provided the first automatized implementation of visual streak localization in minipigs.
  - Improved computational efficiency.
- 2022–2022 **Towards Realistic Markets**, *Stochastic Finance Group, Department of Mathematics, ETH Zurich*, Supervisors: Prof. Josef Teichmann, Florian Krach.
- Implemented two different models to generate synthetic Limited Order Book time series data using Conditional WGANs in PyTorch.
  - Achieved the same performance as in the article and made it open source.
  - Introduced sliced-wasserstein distance as effective metric for model evaluation.
  - Explored other possible methods to make synthetic data with high variability.

## Skills

- Programming Python (PyTorch, TensorFlow, Pandas, Scikit-learn, OpenCV), R (EBImage, spam, ggplot, dplyr, fields, pracma), SQL (MySQL).
- Language Mandarin (Native), English (Proficient), German (Intermediate), French (Elementary)

## Summer Schools

- 2022 May **EBRAINS Brain Simulation School**, *Human Brain Project, Palermo, Italy*. Presented master project during Students' Presentation session.
- 2022 Sep **AI and Machine Learning in Healthcare Summer School**, *Cambridge University, Online*. Presented master project during Exhibition session.