

Tengyingzi(Sophia) Perrin

Curriculum Vitae

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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.

Teaching Experience

- 2024–Present **Coordinator and/or Teaching Assistant, Department of Mathematics, ETH Zurich, Zurich, Switzerland.**
Mathematics of New Technologies in Finance.
- 2015–2017 **Competition Coaching, Xinshiji Mathematical Olympiad School, Lanzhou, China.**
Preparing students for Mathematical Olympiad competitions in China.

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 and Workshops

- 2024 April **Oxford ETH workshop**, *Zurich, Switzerland*.
Presented project 'Reinforcement Learning in Microbial Risk Management'.
- 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.