Niccolo' Fineschi

niccofine@gmail.com | niccofine.github.io | niccofine | niccofine | 0009-0006-9613-3159

About

Experience in representation and longitudinal medical modeling. Research interests:

- Irregular and longitudinal continuous-time modeling;
- Uncertainty and probabilistic learning; causal and counterfactual modeling;
- Multimodal integration and fusion.

Education

MSc in Biomedical Engineering (eHealth) Mar 2024 – Sep 2026
Politecnico di Torino *Turin, Italy*

- Thesis: *"Through the eyes of a Vision-Language Model: Age-related Macular Degeneration analysis using fundus images"*
- Supervisors: *J. Panic, S. Rosati, and G. Balestra*

BSc in Biomedical Engineering Sep 2019 – Mar 2024
Politecnico di Torino *Turin, Italy*

Research Experience

Guest Researcher (MSc thesis) Feb 2026 – Aug 2026
The University of Osaka *Osaka, Japan*
Intelligence and Sensing Lab – WPI-PRIMe

Analyzed *Age-related Macular Degeneration* (AMD) using fundus images.

Latent analysis and classification *[partly in IEEE BHI 2026]* ***[Code]***

- Probed multiple frozen CLIP-based visual encoders on AREDS fundus images.
- Linked clinical AMD phenotypes to latent dimensions via statistical analysis.
- Implemented several current- and future-status AMD classifiers and few-shots approaches.
- Interpreted the results using SHAP and attention-feature maps.

Trajectory forecasting *[partly submitted to IEEE ISBI 2027]* ***[Code]***

- Benchmarked Neural ODEs, SDEs, delayed-ODEs, Neural Operators and closed-form Liquid Neural Networks (LNN) for AMD disease trajectory forecasting from irregularly sampled visits.
- Combined image representations with clinical covariates for trajectory forecasting.
- Compared against Cox survival, RNN/LSTM and classical baselines (SVM, logistic regression).
- Robust analysis using patient-level splits, cross-validation, bootstrap and statistical testing.
- Interpreted the results using Monte Carlo dropout uncertainty and attention maps.
- Explored sparse variational Gaussian Process ODEs, obtaining a posterior over the dynamics.
- Probed Treatment Effect Neural Controlled ODEs on smoking counterfactuals.

Publications

- **Fineschi N.**, Panic J., Watanabe A., Hayashi H., Nishimura K., Maeno Y., Rosati S., Balestra G., Nishida K., Nagahara H. *"Exploring the Latent Structure of AMD Severity Using Retinal Foundation Models"*. IEEE EMBS International Conference on Biomedical and Health Informatics (BHI), Hong Kong, 2026. **Accepted.** arXiv:2610.14138.
- Panic J., **Fineschi N.**, Maeno Y., Hayashi H., Nishimura K., Watanabe A., Rosati S., Balestra G., Nishida K., Nagahara H. *"A GLANCE into the Future: Grade-Guided Longitudinal AMD Networks for Continuous-Time Evolution of AMD Progression from Fundus Images"*. **Under review** at IEEE International Symposium on Biomedical Imaging (ISBI), 2027.

Academic Service

Program Committee Member 2026
MultiMedia Modeling 2027 conference *Siem Reap, Cambodia*
Special Session – Multimodal Computer Vision in Medicine

Selected Academic Projects

Imaging

- **Rectal cancer CAD systems from MRI/ADC images.** *MATLAB*
  Development of two CAD systems for segmentation and treatment response prediction using radiomics features on T2-weighted MRI images and ADC maps. Investigated volumetric prediction fusion approaches from per-slice information.
- **Cardiosphere cell segmentation from microscopy images.** ***[Code]*** *Python*
  Implementation of a deep learning pipeline for cell segmentation from fluorescence microscopy images, using transfer learning (MMSegmentation, Detectron2).
- **Spine segmentation from CT-scan images.** *Python*
  Implementation of a deep learning pipeline for spine segmentation from CT-scan images. Using transfer learning (MMSegmentation), the UNet model yielded a Dice score of 0.82, placing at fifth position on an internal academic contest.

Physiological signals

- **Gait status prediction from lower-limb EMG signals.** ***[Code]*** *MATLAB*
  Development of a classifier for walk/run prediction using muscle synergies extracted from EMG signals. Trained on just 30 subjects, testing on a 17-times bigger external independent dataset allowed to obtain a balanced accuracy of 0.92, demonstrating generalization across subjects.

Clinical data

- **Prediction of ventilation weaning using clinical data.** *MATLAB*
  Implementation of multiple classifiers and data reduction strategies to predict successful weaning from mechanical ventilation using tabular clinical data.

Other Experience

Intern – Quality Control Department Oct 2022 – Dec 2022
Gradenigo Hospital *Turin, Italy*

- Acquired and analyzed data for Joint Commission International hospital accreditation;
- Surveyed and summarized Emergency Room flows and customer satisfaction data;
- Assessed GDPR compliance on connected clinical providers.

Skills

Coding	Python, MATLAB, R
DL/ML	PyTorch, Hugging Face, TensorFlow, torchdiffeq, torchsde, ncps, scikit-learn, scikit-survival
Tools	Git, Python packaging, WebDataset, GNU/Linux, Docker (basic), LaTeX
Modalities	Imaging (fundus, MRI, CT, microscopy), clinical tabular data, physiological signals
Languages	Italian (native), English (C1, IELTS Academic 8.0, 2022), Japanese (A1)