Prisca Dotti

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PROFESSIONAL SUMMARY

PhD-trained machine learning scientist with a strong mathematical background (MSc Mathematics, EPFL) and experience developing deep learning methods for complex biomedical imaging and genomic datasets. Skilled in convolutional and graph neural networks, reproducible workflows, and collaborative software development (Git/GitHub). First-author in *Cell Calcium* with international conference presentations in Europe and the US. Fluent in Python (PyTorch, TensorFlow, PyTorch Geometric) and experienced in high-performance computing. Effective at bridging computational and biological domains within interdisciplinary teams.

UNIVERSITY EDUCATION

Doctor of Philosophy (PhD) in Biomedical Engineering
University of Bern, Bern, Switzerland | September 2022 – July 2024
Thesis Title: Detection, Localization, and Classification of Subcellular Ca^{2+} Release Events: Using a Deep Learning Approach
Supervisors: Prof. Marcel Egger and Prof. Raphael Sznitman

Master of Science (MSc) in Mathematics
EPFL, Lausanne, Switzerland | September 2014 – February 2016
Thesis Title: The Convex Lattice
Supervisor: Prof. Nicolas Monod

Bachelor of Science (BSc) in Mathematics
EPFL, Lausanne, Switzerland | September 2011 – July 2014

PROFESSIONAL EXPERIENCE

Data Analyst
Translational Data Science – Facility, SIB Swiss Institute of Bioinformatics, Lausanne, Switzerland | May 2025 – Present
- Designing and evaluating **ML/AI** strategies for feature selection and classifier development on genomic datasets.
- Contributing with **Git** to development of the bioinformatics package PAGEpy (forked GitHub repository).

Visiting Research Scientist
University of Melbourne (*Cell Systems and Mechanobiology Laboratory*), Melbourne, Australia | June 2024
- Validated deep learning models leveraging **mechanistic models** and **synthetic datasets** to enhance segmentation accuracy.
- Engaged in international research networks, contributing to cross-disciplinary **collaboration, innovation, and knowledge exchange**.

Research Assistant
University of Bern, Bern, Switzerland | August 2018 – August 2024
- Curated a publicly available **annotated dataset** (Zenodo dataset) of subcellular calcium events in isolated cardiac cells in noisy confocal imaging data.
- Designed and implemented an **AI-driven framework** for detection, segmentation, and classification of subcellular calcium release events, reducing annotation time from days to under five minutes. Published as first-author in *Cell Calcium*.
- Coordinated project tasks across **interdisciplinary teams** of physiologists, engineers, and data scientists to bridge computational-biology gaps and facilitate effective communication.
- Presented work at international conferences (Europe, USA) and Swiss industry/academia events, demonstrating effective **communication skills**.
- Developed strong **analytical skills** applicable to multidisciplinary **problem-solving** in data science and machine learning and project management competences.

Graduate Research and Teaching Assistant
University of Fribourg, Fribourg, Switzerland | February 2017 – August 2022
- **Taught and mentored** students in advanced computer science topics (cyber-physical systems, automata theory), developing strong communication, presentation, and interpersonal skills directly transferable to client-facing consulting roles.

- Conducted doctoral research on **graph neural networks** (including graph convolution) for formal verification developing expertise in mathematical logic, formal verification, and functional programming, alongside strong organisational skills.

Teaching Assistant
University of Fribourg, Fribourg, Switzerland | September 2016 – December 2017 (*Mathematical Methods for Computer Science*)
EPFL, Lausanne, Switzerland | September 2015 – December 2015 (*Linear Algebra*)

Private Mathematics Teacher
Centre Vaudois d'Aide à la Jeunesse (CVAJ), Lausanne, Switzerland | March 2016 – August 2016

PROFESSIONAL DEVELOPMENT

Introduction to Sequencing Data Analysis | SIB Swiss Institute of Bioinformatics | April 2025
Fundamentals of Confocal Microscopy (Hands-on) | PhD Program Cutting Edge Microscopy, University of Bern | September 2024
Fundamentals of Bayesian Inference | Conférence universitaire de Suisse occidentale (CUSO) | May 2021

SKILLS

- **Programming:** Python (PyTorch, TensorFlow, scikit-learn, SciPy, pandas, scikit-image, PyTorch Geometric, matplotlib, seaborn), Git, ImageJ, Slurm (HPC), Bash/CLI, working knowledge of C++, R, and MATLAB.
- **Data Science:** Deep learning, machine learning, reinforcement learning, data collection and curation, feature extraction, model development, pipeline implementation, quantitative analysis, data visualisation, data-driven methods.
- **Bioinformatics/Computational Biology:** genomic data processing, image analysis, confocal microscopy.
- **Mathematics:** Mathematical analysis, topology, statistics, algorithm design, linear algebra, graph theory, signal processing.
- **Languages:** Italian (fluent, native), English (fluent), French (fluent), German (intermediate, improving).

PUBLICATIONS

Prisca Dotti, Miguel Fernandez-Tenorio, Radoslav Janicek, Pablo Márquez-Neila, Marcel Wullschleger, Raphael Sznitman, Marcel Egger. *A deep learning-based approach for efficient detection and classification of local Ca^{2+} release events in Full-Frame confocal imaging*. Cell Calcium (2024). https://doi.org/10.1016/j.ceca.2024.102893

- **Keywords**: AI-driven biomedical imaging, 3D U-Net, reproducible workflows, model validation, inter-rater variability.
- **GitHub Repositories**: Deep Learning Model |Graphical Interface.

CONFERENCES

Detection and Classification of Local Ca^{2+} Release Events in Cardiomyocytes Using 3D-UNet Neural Network

- Annual Meeting of the ESC Working Group on Cardiac Cellular Electrophysiology | Toledo, Spain, June 2022
- Biophysical Society Annual Meeting 2023 | San Diego, California, United States, February 2023
- Presented an **annotated dataset** of calcium release events and a **novel deep learning framework** for automatic segmentation and classification.

Validation of a deep learning model for the detection and classification of Ca^{2+} release events in cardiomyocytes using inter-observer variability

- Bern Data Science Day | Bern, Switzerland, May 2023
- Swiss Physiology and Ion Channels and Membrane Transporters Joint Meeting | Bern, Switzerland, September 2023
- Demonstrated **robustness** of the AI framework through expert annotations.

Automatic detection localization and classification of Ca^{2+} release events in cardiomyocytes with a deep learning-based approach

- Annual Meeting of the German Physiological Society | Freie Universität, Berlin, Germany, September 2023
- Highlighted advancements in the model's development and **generalisability** for research application.

VOLUNTEERING

Volunteer at Ticino Association of Parents and Friends of Children in Need of Special Education (ATGABBES)
Ticino, Switzerland | August 2012 – Present

- Planned and led inclusive summer camps that brought together neurodiverse and neurotypical participants, promoting **diversity**, **inclusion**, and a **respectful environment** while strengthening interpersonal and organisational skills.