

Éléa Gros

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Currently in the last year of my Ph.D. at the Institute of Tissue Medicine and Pathology in Bern, I specialize in image processing and hands-on laboratory work. My research is part of a consortium aiming to build a new intraoperative tool for neurooncological surgeries. With a keen interest in applying my skills beyond academia, I am actively seeking opportunities to leverage my expertise in a professional setting. Eager to explore potential job prospects in the summer of 2026, I am committed to contributing my knowledge and skills to innovative projects and initiatives.

EDUCATION

UNIVERSITY OF BERN, Institute of tissue medicine and pathology **May 2022 - currently**

Ph.D. in Cellular and Biomedical Sciences

Supervisors (Dr. med. Theoni Maragkou & Prof. Dr. pharm. Erik Vassella)

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE **Sep 2019 - Feb 2022**

Master in Life Sciences Engineering

- Master's program focusing on the research and development of technologies applied to life sciences
- Main topics: Neuroscience & Data science
- Degree obtained with "Mention d'excellence" (mention of excellence)

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE **Sep 2016 - July 2019**

Bachelor in Life Sciences Engineering

EXPERIENCE

UNIVERSITY OF BERN, Institute of tissue medicine and pathology - Bern, Switzerland **May 2022 - present**

Ph.D. student - polarimetric visualisation of healthy brain fiber tracts for tumor delineation during neurosurgery

- Development of a comprehensive standard protocol including the specifications for optical measurements and the co-registration process using Python/MATLAB for clinical/imaging, polarimetric, histopathological and molecular data
- Tissue processing and histological sectioning
- Analysis of DNA methylation data for two projects
- Quantitative analysis of the collected medical images using Python and identification of patterns in the data to help in the clinical diagnosis and the establishment of the method
- Development of data visualization tools based on Python or Javascript allowing healthcare professionals and other researchers to interactively explore and interpret complex medical datasets

NESTLE - Lausanne, Switzerland **Jul 2021 - Dec 2021**

Master thesis - development of a workflow for annotating small molecules in mass spectrometry-based metabolomics

- Build a database of metabolomics including various information and the biological origin of the molecules
- Re-implementation of an existing method allowing to increase the precision of the molecule identification
- Design an exploration of different options to improve the method

EPFL GRAEFF'S LAB - Lausanne, Switzerland **Jul 2019 - Jan 2021**

Laboratory assistant **Jul 2019 - Aug 2019 & Sep 2020 - Jan 2021**

- Participation in the investigation of areas involved in post traumatic memories
- Implemented different immunofluorescence staining and performing histological sectioning
- Analysis of the digital image and quantification of the markers of interest

EPFL NAVEIRA'S LAB - Lausanne, Switzerland **Sep 2019 - Jun 2020**

Laboratory assistant

- Optimization of a standard differentiation protocol for HSCs (Hematopoietic Stem Cells) from different methods in the literature
- Building an assay to determine the efficiency of the different protocols tested

CONTRIBUTION IN INTERNATIONAL CONFERENCES

- Contributed talk: "Whole-brain section image reconstruction for deciphering tumor margin using Mueller polarimetry imaging", SPIE Photonics West, San Francisco, USA (2025)
- Contributed talk: "Assessment of Polarimetric Properties in Brain Tumors Employing Wide-Field Imaging Mueller Polarimetry", SPIE Photonics Europe, Strasbourg, France (2024)
- Poster: "Evolution of Polarimetric Properties of Brain Tissue With Time Following Formalin Fixation", EANS, Barcelona, Spain (2023)
- Poster: "Assessment over Time of the Evolution of Brain Tissue Polarimetric Parameters induced by Formalin Fixation", BIOAM, Palaiseau, France (2023)
- Contributed talk: "Evolution of polarimetric parameters of cadaver brain tissue with time and formaldehyde fixation in wide-field Mueller matrix images", SPIE Photonics West, San Francisco, USA (2023)

AWARDS

- Best student paper awards for the paper on "Assessment of Polarimetric Properties in Brain Tumors Employing Wide-Field Imaging Mueller Polarimetry" (2024)
- Paper "Effects of formalin fixation on polarimetric properties of brain tissue: fresh or fixed?" selected as Editor's pick (2023)
- Best student paper awards for the paper on "Evolution of polarimetric parameters of cadaver brain tissue with time and formaldehyde fixation in wide-field Mueller matrix images" (2023)
- Novartis scholarship for excellence (2019)
- Award from amicale des anciens élèves de l'École Nationale d'Horlogerie - Cluses (2016)

SUPERVISION

- Co-supervision of Master Student for analysis of errors in deep learning models predicting the presence of tumor in polarimetric tissue images.

ADDITIONAL

- Programmation Skills: R, Python, MATLAB, C++, Javascript, Web development, QuPath
- Laboratory Skills: Immunohistochemistry, Cell culture, Histo(patho)logy
- Data science Skills: Data analysis, Image processing, Bio-statistics
- Language: French (native), English (fluent), Italian (intermediate), German (intermediate), Bulgarian (intermediate)

RELEVANT PUBLICATIONS

- Gros, Éléa**, Omar Rodríguez-Núñez, Stefano Moriconi, Richard McKinley, Ekkehard Hewer, Erik Vassella, Philippe Schucht, et al. "Alignment of Histological and Polarimetric Large-Scale Imaging for Brain Tissue Characterization." *Submitted in Neuroimage: Reports*, 2025.
- Gros, Éléa**, Omar Rodríguez-Núñez, Leonard Felger, Stefano Moriconi, Richard McKinley, Angelo Pierangelo, Tatiana Novikova, et al. "Characterization of Polarimetric Properties in Various Brain Tumor Types Using Wide-Field Imaging Mueller Polarimetry." *IEEE Transactions on Medical Imaging* 43, no. 12 (2024): 4120–4132. <https://doi.org/10.1109/TMI.2024.3413288>.
- Gros, Éléa**, Omar Rodríguez-Núñez, Leonard Felger, Stefano Moriconi, Richard McKinley, Angelo Pierangelo, Tatiana Novikova, et al. "Effects of formalin fixation on polarimetric properties of brain tissue: fresh or fixed?" *Neurophotonics* 10, no. 02 (May 2023). issn: 2329-423X. <https://doi.org/10.1117/1.nph.10.2.025009>.
- Felger, Leonard, Omar Rodríguez-Núñez, **Gros, Éléa**, Theoni Maragkou, Richard McKinley, Stefano Moriconi, Michael Murek, et al. "Robustness of the wide-field imaging Mueller polarimetry for brain tissue differentiation and white matter fiber tract identification in a surgery-like environment: an ex vivo study." *Biomedical Optics Express* 14, no. 5 (May 2023). issn: 2156-7085. <https://doi.org/10.1364/boe.486438>.