### Franco Matzkin

ML Research Specialist   Computer Engineer vfmatzkin@gmail.com   www.linkedin.com/in/matzkin   vfmatzkin.github.io		
PROFILE	Computer Engineer and PhD Candidate with over 5 years of experience in AI, specializing in medical imaging. Expertise includes deep learning, computer vision, and uncertainty quantification, with a focus on CT and MRI data. Developed AI-driven diagnostic models, contributed to research published in top conferences, and worked across the full ML pipeline, from data analysis and preparation to releasing high-quality research codebases. Strong foundation in healthcare AI, open to contributing to other fields where machine learning and data analysis can offer impactful solutions. Fluent in English, Spanish and Italian.	
SKILLS & TECHNOLOGIES	Programming Languages: Python, R,	MLflow, Slurm Workload Manager
	MATLAB, C, C++, Java, JavaScript, HTML5, CSS3, SQL, XML, JSON, LaTeX, Scheme, Prolog, VHDL	<b>Machine Learning &amp; AI:</b> Deep Learning, CNNs, RNNs, Transformer Models, Unsu- pervised Learning Semi-supervised Learn-
	<b>Databases:</b> PostgreSQL, MySQL, SQLite, SQLServer	ing, Self-supervised Learning, Ensemble Methods, Uncertainty Quantification
	<b>Operating Systems:</b> Windows, Linux, Android	Image Processing & Analysis: Image Segmentation, Image Registration, Object
	Frameworks & Libraries: PyTorch, Ten- sorFlow, Keras, Scikit-learn, NumPy, Pan-	Detection, Image Classification, Image Gen- eration, Medical Image Analysis
	das, SciPy, Matplotlib, Seaborn, OpenCV, SimpleITK, SimpleElastix, ANTs, Beautiful Soup, Scrapy	<b>Development Practices:</b> CI/CD, Unit Testing, Version Control, High- Performance Computing
	<b>Tools and IDEs:</b> Jupyter Notebook, Google Colab, PyCharm, Visual Studio Code, Git, GitHub, GitLab, Docker, AWS,	<b>Other Skills:</b> Data Visualization, Dimensionality Reduction, Scientific Writing
EXPERIENCE	<ul> <li>Postgraduate Researcher in Engineering 2019 - Present</li> <li>Machine Learning for Biomedical Image Computing group, sinc(i), Santa Fe, Argentina</li> <li>Led the developement of innovative strategies for automatic skull reconstruction and implant generation in CT images, creating a rapid prototyping tool that cuts cranio-plasty surgical planning time.</li> </ul>	
	• Collaborated with medical professionals and technical experts to translate complex image segmentation and implant design requirements into practical, data-driven solutions.	
	• Enhanced the reliability of AI-assisted medical diagnoses by implementing cutting-edge uncertainty quantification methods, leading to improved clinical outcomes.	
	• Collaborated with international research teams, culminating in multiple publications in top-tier conferences and journals, including MICCAI and IEEE TMI.	
	• Mentored junior researchers, guiding them in AI and medical imaging projects, thereby strengthening the research community's capacity.	
	• Led the setup and optimization of GPU- research, enhancing efficiency and onboar as seminars and events. Collaborated on o	based computing servers for Deep Learning ding new users. Coordinated initiatives such enhancing the institute's digital presence.

Jan 2023 - Jul 2023

2022 - Present

#### **Research Intern**

LIVIA Laboratory, École de technologie supérieure (ÉTS), Montreal, Canada

- Collaborated with international research teams to implement advanced deep learning techniques for uncertainty quantification, improving model robustness and reliability in healthcare applications, which positively impacts clinical decision-making in AI-assisted diagnosis.
- Developed efficient training pipelines using PyTorch Lightning and utilized MLflow to improve project transparency, productivity, and collaboration through effective experiment tracking and model version control.

#### Teaching Assistant

Facultad de Ingeniería y Ciencias Hídricas (UNL), Santa Fe, Argentina

- Lead instructor for the Programming Technologies course, delivering advanced concepts in Object-Oriented, Functional, and Logic programming.
- Created comprehensive educational materials and practical guides, improving student engagement and comprehension of complex programming paradigms.
- Managed student evaluations and course planning, ensuring a structured and effective learning environment.

#### **Computer Vision Developer Intern**

Auravant, Buenos Aires, Argentina

- Developed a prototype for automated kernel counting in maize images using deep learning and computer vision techniques, aiming to reduce reliance on manual counting methods.
- Managed the entire project lifecycle, from gathering requirements to delivering a documented prototype, providing a basis for potential future improvements.

#### Software Developer

Eniac Soluciones, Rafaela, Argentina

- Collaborated with the development team to analyze user requirements and deliver tailored solutions to financial institutions.
- Managed existing and new databases, and implemented feature improvements under Visual FoxPro, collaborating with the research team on various stages of the software development process.
- Executed software repairs and maintenance tasks, ensuring smooth operational continuity.

## **EDUCATION Ph.D. in Engineering** | (FICH UNL, Argentina) 2019 - 2025 (Expected) *Specialization: Signals, Systems, and Computational Intelligence*

**Relevant coursework:** Software Design for Scientific Computing, Computer Vision, Selected Topics in Machine Learning, Applied Statistics, Matrix Algebra for Data Science, Applied Mathematics, Advanced Signal Processing

**B.Eng. in Computer Engineering** | (FICH UNL, Argentina) 2013 - 2019 **Relevant coursework:** Software Engineering, Computer Graphics, Computational Intelligence, Digital Electronics, Image Processing, Digital Signal Processing, Computational Mechanics

# ACHIEVEMENTSResearch Internship Scholarship ELAP, Montreal, Canada2022& RECOGNITIONEmerging Leaders in the Americas Program. Awarded by the Canadian Federal Govern-

Jan 2019 - Feb 2019

Jun 2012 - Dec 2012

	ment to support research internships at the LIVIA Laboratory at École de technologie supérieure (ÉTS).
	Best Paper Award: AutoImplant 2020, MICCAI, Lima, Peru2020Cranial Implant Design via Virtual Craniectomy with Shape Priors2020Authors: Franco Matzkin, Virginia Newcombe, Ben Glocker, Enzo Ferrante2020
	PhD Scholarship CONICET2019 - PresentAwarded by the National Scientific and Technical Research Council (CONICET), Argentina, for PhD studies in Engineering.
RELEVANT PROJECTS	HeadCTools Project, FICH - UNL2020Impact: Launched a toolkit for CT image preprocessing, skull reconstruction, and brainsegmentation, integrating PyTorch-based U-Net models and image registration techniques.Skills & Technologies: Python, PyTorch, Medical Imaging, Image Processing, FSL
	Software Design for Scientific Computing, FAMAF - UNC (Argentina)2020Project: Educational Python Tool for the Finite Element Method (FEM)Impact: Developed an educational Python tool that automates the generation of FEMcode templates and provides a code execution framework, assisting students and professorsin effectively implementing simulations while saving time on manual coding.Skills & Technologies: Python, MATLAB, Computational Mechanics, Finite ElementMethodSource Code: Pyrrha (Gitlab).Source Code: Pyrrha (Gitlab).
	<ul> <li>Engineering Final Project, FICH - UNL (Argentina) 2019</li> <li>Project: Open and Robust Tool for Skull Cavity Segmentation</li> <li>Impact: Developed a deep learning tool to segment skull cavities in CT images, enabling more accurate assessments for medical professionals and potentially improving patient outcomes.</li> <li>Key Contributions: <ul> <li>Implemented CNN shape-regularized architectures, enhancing segmentation accuracy for these kind of tissues under this medical intervention, which couldn't be achieved with traditional image segmentation algorithms</li> </ul> </li> </ul>
	<ul> <li>Conducted comparative analysis of different loss functions and traditional segmentation methods to optimize performance metrics.</li> <li>Skills &amp; Technologies: Deep Learning, Python, PyTorch, OpenCV</li> <li>Source code: Available within headCTools.</li> </ul>
OTHER ACTIVITIES	<b>Organizing Staff</b> , <i>IA@Litoral Event</i> 2023 Provided technical support and collaboration for event development, contributing to discussions and seminars among AI researchers and industry professionals.
	Assistant Professor, Deep Learning Course, FICH-UNL, Argentina 2021 As an ad-honorem assistant, I guided students with practical work and their final projects, and delivered a seminar on my PhD research.