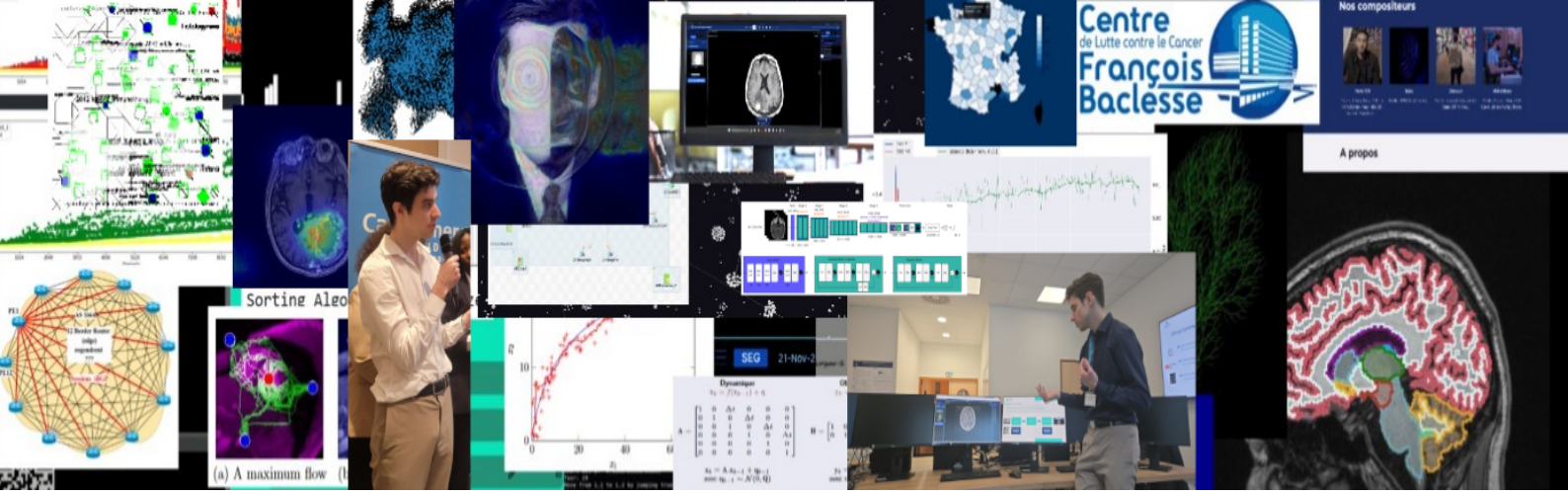

Romain ANDRES

contact.randres@gmail.com | Caen, Normandy, France

25 years old | Full driving licence | GitHub: VendenIX

Professional Experience

- **AI Engineer | Federated Learning for Medical Imaging** - CENTRE FRANÇOIS BACLESSE Caen (08/09/25 - 07/06/26)
  Fixed-term contract contributing to a national federated learning project aimed at advancing personalized medicine through improved survival prediction for glioblastoma patients, building upon prior Master's work in Explainable AI.

  Tasks accomplished :

  - Collaborated with a multi-institutional team of researchers from Inria and several French cancer centers to design and implement technical solutions.
  - Assisted in training a deep learning model on distributed data using the Fed-BioMed framework, ensuring patient data privacy throughout.
  - Managed the project's data pipeline, including standardization and anonymization of multi-center datasets.
  - Addressed complex architectural challenges inherent to federated learning environments.

  Skills developed :

  - Federated Learning (Fed-BioMed framework, distributed training, privacy-preserving AI).
  - Deep Learning applied to medical imaging (survival prediction, glioblastoma).
  - Data engineering (multi-center pipeline, DICOM/NIfTI standardization & anonymization).
  - Project management & cross-institutional collaboration.
- **Research and Development Intern, Explainability** - CENTRE FRANÇOIS BACLESSE Caen (03/03/25 - 01/08/25)
  This internship aims to improve the transparency and interpretability of deep learning models in oncology, in order to provide clinicians with more reliable and understandable decision-support tools in the fight against glioblastomas.

  Tasks carried out :

  - Exploration and application of explainability techniques in deep learning (Grad-CAM, LIME, LRP, etc.) to understand the predictions of the ResNet51q model.
  - Statistical analysis and validation of the model in conjunction with clinical data to ensure the relevance and robustness of the explanations generated.
  - Comparison of the different explainability methods and identification of the model's limitations depending on patient cases.
  - Scientific research and report writing to document the findings and propose areas for improvement.
  - Writing and submission of a scientific article presenting the research outcomes to a peer-reviewed venue.
  - Collaboration with researchers and doctors to refine the interpretation of results and assess their clinical applicability.

Skills strengthened

- Deep Learning & Explainability (ResNet, Grad-CAM, LIME, LRP).
- Medical image analysis (MRI, segmentation, feature extraction).
- Statistics and validation of AI models applied to healthcare.
- Research & development, critical thinking and analysis of bias in medical AI.
- Scientific writing and publication process.

- **Research and Development Intern – Medical AI** - CENTRE FRANÇOIS BACLESSE Caen (27/05/2024 - 05/07/2024)
  Continuation of the yearly project aimed at creating a visualisation interface and an API to use a deep learning algorithm specifically designed for the automatic segmentation of brain lesions on MRI images, under the supervision of Dr Corroyer-Dulmont, Head of AI and Medical Imaging Engineer at the CFB.

  Tasks carried out :

  - Deployment, finalisation and optimisation of the interface based on OHIF Viewer and its API on the centre's Windows environments ; ML Ops work (deployment of a deep learning solution).
  - Optimisation of the deep learning model to reduce computational costs.
  - Retraining of the deep learning model on a new dataset.
  - Co-first author of a scientific article published in *NeuroImage*, Volume 306, 1 February 2025, 121002 : "Development and routine implementation of deep learning algorithm for automatic brain metastases segmentation on MRI for RANO-BM criteria follow-up".

  Skills strengthened

  - Analysis and handling of medical data in DICOM and NIfTI formats (MRI, CT scans).
  - R & D, autonomous problem-solving on complex issues.
  - Critical thinking.
  - Understanding of deep learning models with complex neural architectures (UNET-R).
  - Cross-OS adaptation for deployment.
  - Scientific writing and peer-reviewed publication (co-first author, *NeuroImage*).

- **Front-end Web Developer** - Atlas Music, Assas Lab Incubator Paris (06/2023 - 07/2023)
  Implementation of Cypress E2E tests, front-end development with React, GraphQL, MongoDB, and responsive design.
  A highly rewarding experience within a startup. Rapid progress in front-end development and test design, along with various other valuable skills.

Education

- **Master's degree in AI and Data Analysis with a focus on Healthcare** - University of Caen (09/2023 - 09/2025)
  As part of the SATIN project (Health, Territory, Innovation and Digital Technology).
- **Bachelor's degree in Computer Science** - University of Caen (2023)
- **French Baccalauréat, Economics and Social Sciences stream** - Lycée Fresnel, Caen (2019)
- **First Aid Certificate (PSC1 - Prevention and Civic Rescue, Level 1)** - University of Caen (02/2024)
  First aid training providing the skills required to respond in the event of a medical emergency.

Skills

- **Deep Learning & Computer Vision : PyTorch**, TensorBoard. Strong command of **convolutional neural networks** (ResNet, UNet, UNet-R) and modern computer vision techniques. Computer vision training received from Prof. Youssef Chahir and Prof Alexis Lechervy (University of Caen).
- **Explainability & Interpretability (XAI) :** Hands-on experience with **Grad-CAM, LIME, LRP** and related methods applied to medical deep learning models, and mechanistic interpretability (MI) .
- **Medical Imaging :** Confident handling of **DICOM, NIfTI and HDF5 (H5)** formats ; image preprocessing, signal processing, segmentation and feature extraction on MRI and CT-scan data.
- **Statistics & Model Validation :** Statistical testing, model evaluation, robustness analysis, and critical assessment of **bias in medical AI datasets and models**.
- **Machine Learning (broader) :** Supervised, unsupervised and reinforcement learning, SVMs, dimensionality reduction, data mining and ETL pipelines (KNIME, Weka, Talend).
- **Data Analysis : Python** (NumPy, SciPy, scikit-learn, pandas), **R**.

- **Databases :** Strong proficiency across **relational, NoSQL and graph paradigms** — PostgreSQL, MongoDB, Cassandra, GraphQL.
- **Biomedical Knowledge :** Theoretical background in telemedicine, physiology, neurology, genetics, ECG analysis, and pharmacology (SMILES / SMARTS notation, molecular graph representations).
- **Scientific Communication :** Peer-reviewed publication (co-first author, *NeuroImage*), poster presentations and defences at scientific events, public speaking to large audiences, conference hosting and moderation, science outreach.
- **Project Management & Leadership :** Autonomous coordination of research and development projects from end to end, including planning, execution and delivery.
- **Research Methodology :** Scientific literature review, academic writing (LaTeX), reference management (Zotero), reproducible experimentation, peer-reviewed publication process.
- **Development Tools :** Git, Linux, Bash, React / Flask (for research prototyping and medical imaging interfaces).
- **Languages :** English (B2, CLES B1 certification), French (native).

Publications

Peer-reviewed publications

- Dessoude, L.[1], Lemaire, R.[1], **Andres, R.**[1], Leleu, T., Leclercq, A. G., Desmonts, A., Corroller, T., Orou-Guidou, A. F., Laduree, L., Le Henaff, L., Lacroix, J., Lechervy, A., Stefan, D., & Corroyer-Dulmont, A. (2025). "Development and routine implementation of a deep learning algorithm for automatic brain metastases segmentation on MRI for RANO-BM criteria follow-up". *NeuroImage*, **306**, 121002. DOI: 10.1016/j.neuroimage.2025.121002
  [1] *These authors contributed equally (co-first authors).* This study presents an AI solution for rapid and accurate segmentation of brain metastases on MRI, providing RANO-BM criteria and volumetric measurements to support efficient clinical evaluation.

Manuscripts under review

- **Andres, R.**, Moreau, N., Dessoude, L., Le Henaff, L., Missohou, F., Stefan, D., Desmonts, A., Herault, R., & Corroyer-Dulmont, A. (2025). "Explainability and Clinical Trust of Deep Learning in Glioblastoma Treatment Efficacy Prediction : A Comprehensive Framework".
  First-author manuscript presenting a multi-layered XAI pipeline (Grad-CAM, LRP, LIME, linear probing, causal activation patching) to audit a ResNet-51q model predicting glioblastoma treatment response. The study uncovers that the model relies on an unexpected heuristic based on a proxy of the surgical resection status — anchoring its long- versus short-survival predictions on the detection of the surgical site rather than on tumoral features. This finding was confirmed through targeted ablation studies and high-resolution saliency maps, and the overall framework was validated in a multi-reader, multi-case clinical study. [GitHub]

Projects

- **Interface for a deep learning algorithm for brain lesion segmentation on MRI images** — React, OHIF Viewer, DicomWeb server, Flask API, PyTorch.
- **GeneticPedigreeChartToPed — Digitalisation of genealogical charts for hereditary cancer risk prediction** — Ambitious research project carried out for the data challenge *"Towards connected healthcare : the implications of Artificial Intelligence"* (Campus 5, Caen), in collaboration with the Centre François Baclesse. Designed and implemented an end-to-end computer vision pipeline combining **six AI models** to automatically convert medicalised family trees into structured tabular data usable by clinical tools such as CanRisk for hereditary cancer risk assessment. The pipeline integrates **YOLO** (individual detection), **EasyOCR** (text extraction), text association and classification models, **DeepLSD** (line segment detection) and hierarchical graph analysis to reconstruct family structures, with A. F. Orou-Guidou and I. Jajour, under the supervision of L. Castera, C. Aucouturier and A. Corroyer-Dulmont. [GitHub]

All my other projects are available on GitHub.

Additional Knowledge

- **Research mindset :** Methodical and rigorous approach, driven by critical thinking to analyse problems and by consistent determination to reach effective solutions.
- **Networking & systems :** Unix system administration, deployment of a secure FreeBSD Cloud/NAS server (self-hosted NextCloud instance with two-factor authentication and SSL certificates).

- **Containers & virtualisation :** Management of Docker and Kubernetes container clusters, virtual machines.
- **Technology watch :** Active monitoring of the latest publications and advances in computer science and medicine (Never Settle !).

Last updated on 7 août 2026