Thomas Vuillaume

Senior data scientist

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🌐 vuillaut.github.io/   in vuillaumethomas   ⌂ vuillaut

Data & AI group leader. Expert in scientific data analysis and machine learning. Active in community building, training, and open science.

⚙ Skills

Astrophysics: Active Galactic Nuclei · Gamma-ray Astronomy · Imaging Atmospheric Cherenkov Telescopes

Data Science: Data Analysis · Data Visualization · Statistical Analysis · Machine & Deep Learning

Programming: Python / C / Bash · Numpy / Scipy / Pandas / Scikit-learn / PyTorch · Git / GitHub / GitLab · DevOps / CI-CD · Containerization (Docker / Singularity) · HTC / HPC

Soft skills: Project Management · Team Leadership · Teaching & Training · Scientific Communication · Agile Methods · Open Science & Open Source

💼 Experience

Research Engineer, Head of Data & AI Group.
Dec 2021 – Present

Laboratoire d'Annecy de Physique des Particules (LAPP), CNRS/IN2P3 🔗

Leader of at team of 5 persons. Development, maintenance, and review of data analysis pipelines. Supervision of interns, PhD students and engineers; Leading open-source and open-science initiatives. Teaching at summer schools and universities.

- Leader of the GammaLearn project (since 2016): development of state-of-the-art deep learning methods for CTAO data analysis
- Main contributor and maintainer of CTAO data analysis libraries
- Responsible for the production of ML models for the CTAO-LST collaboration
- EVERSE WP3 leader: tools and services for software quality and FAIRness
- Architect of the ESCAPE Open-source Software and Services Repository (OSSR)
- Leader of the IDEFICS project accompanying socio-economic partners in their adoption of AI methods
- Co-lead the IN2P3 ML working group

Postdoctoral Researcher
Mar 2016 – Nov 2021

Laboratoire d'Annecy de Physique des Particules (LAPP), CNRS/IN2P3 🔗

Postdoctoral researcher in gamma-ray astronomy and development of data analysis pipelines for CTA/LST-1 (image processing, PCA, statistics, machine and deep learning).

- Responsible for the real-time analysis of LST-1 (2019-2022)
- Development and maintenance of data analysis pipelines for CTA using machine and deep learning techniques
- Analysis of the first data acquired by LST-1
- Organization of 4 workshops and 4 summer schools on data & ML

Doctoral Researcher
Oct 2012 – Sep 2015

Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), UJF

Modeling of astrophysical emission processes; C and Python developments; analytical and numerical approaches;

- PhD Thesis: Modeling the emission of active galactic nuclei in the Fermi era
- Supervision of a master's student
- Teaching mathematics at University

🎓 Education

PhD in Astrophysics - Modeling of Active Galactic Nuclei   Oct 2012 – Sep 2015

Université Grenoble Alpes • Grenoble, France

Master's degree in Astrophysics, Plasma, Planets   Sep 2011 – Aug 2012

Université Joseph Fourier • Grenoble, France

Engineer's degree in Nanosciences   Sep 2008 – Aug 2012

Grenoble INP, Phelma 🔗 • Grenoble, France

Classes préparatoires aux grandes écoles in Physics   Sep 2005 – Jun 2008

CPGE Victor Hugo • Besançon, France

🎋 Projects

GammaLearn 🔗   Jan 2016 – Present

Deep learning solutions for the Cherenkov Telescope Array Observatory (CTAO). Develops event reconstruction methods and a complete framework to train and deploy deep learning networks.

- PI of the project since 2016
- Deep learning for event reconstruction (type, energy, incoming direction)
- Complete framework for training and deploying DL networks
- Multiple publications and collaborations with computer science lab (LISTIC) and SME (Orobix)

IDEFICS 🔗   Jan 2020 – Present

Project to accelerate digital transition of enterprises and organizations through AI and Big Data. Provides personalized support and access to computing infrastructure (MUST platform) with technical expertise from CNRS and USMB researchers and engineers.

- Project Leader
- Access to MUST computing and storage infrastructure
- Technical and scientific support from CNRS and USMB
- Co-financing and skill acquisition support for projects

EVERSE 🔗   Jan 2024 – Present

European Virtual Institute for Research Software Excellence. Brings together researchers, research software engineers and service providers to improve the quality, sustainability and FAIRness of research software across Europe.

- WP3 Leader: Tools and services for software quality and FAIRness
- Surveying existing tooling and identifying gaps in research software
- Evaluating and integrating tools for software quality and FAIRness
- Surveying quality indicators and best practices
- Developing quality indicators dashboard for Science Clusters

CODEMETASOFT 🔗   Nov 2024 – Oct 2026

24-month collaborative project to transform how research software metadata is captured, enriched, and shared. Introduces automated frameworks for CodeMeta standard metadata maintenance and enrichment.

- Co-lead (with Daniel Garijo, UPM)
- Autocomplete CodeMeta Wizard for simplified metadata creation
- Automated metadata enrichment and gap detection pipelines
- Testing on ESCAPE OSSR before rollout to other repositories

ESCAPE Open-source Software Repository (OSSR) 🔗   Jan 2016 – Present

Open-source Scientific Software and Service Repository designed and developed as part of the European ESCAPE project. Centralizes scientific software, services, and datasets to foster collaboration and improve discoverability across research infrastructures.

- Architect of the repository, integration with Zenodo and GitLab
- Community building, best practices dissemination

- ▸ Support for astroparticle and high-energy physics communities

Jet Model
Jan 2012 – Dec 2015

Multi-zone modeling of Active Galactic Nuclei (AGN) jets emissions following the two-flow paradigm. Focus on high-energy emission and physical processes in jets.

- ▸ PhD thesis research (2012–2015)
- ▸ Two-flow model development and numerical implementation
- ▸ Study of Compton rocket acceleration in jets
- ▸ Analysis of spectral energy distribution (SED)
- ▸ Published in A&A and conference proceedings

👉 Volunteer

City Coordinator
Jan 2018 – Present

Pint of Science Annecy 🔗

Coordination of the Pint of Science festival in Annecy: organization, communication, and scientific mediation.

Alpinism Instructor
Jan 2023 – Present

Club Alpin Français d'Annecy

Volunteer mountaineering instructor, leading courses and teaching safety and techniques to club members.

❤ Interests

Photography: https://thomasvuillaume.com/ · Published and awarded works · Exhibitions

Sports: Ski touring 🎿 · Paragliding · Mountaineering ⛰ · Climbing · Trail running · Cycling

Travel: Solo world trip 2010–2011 · Hosting international travelers

Science communication: Public outreach · Teaching · Event organization