

Florent FOREST

Data & Machine Learning Scientist | Postdoctoral Researcher
PhD in Computer Science | ISAE-Supaero Engineer (MSc)

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EDUCATION

- 2021 PhD in Computer Science (Machine Learning), UNIVERSITÉ SORBONNE PARIS NORD, Paris area, France**
- 2018 PhD at LIPN lab (CNRS UMR 7030), A3 team (Machine learning). Research topics :**
 - > Unsupervised learning (clustering, deep learning, self-organizing map models, visualization...)
 - > Scalable machine learning algorithms
 - > Big Data processing and distributed computing (map-reduce)
 - > Industry applications in aerospace on aircraft engine flight data (time series)
- 2017 Supaero Engineering Diploma (MSc), ISAE-SUPAERO, Toulouse, France**
- 2013 Graduated in 2017. Specialization in Data & Decision Sciences and Space Systems Engineering**
 - > Machine learning, Statistics
 - > Data mining and visualization
 - > Databases (SQL/NoSQL), Big Data
 - > Reinforcement learning
 - > Optimization & Operations Research
 - > Programming (C, Java, Python, R, Scala)
 - > Signal processing
 - > Applied mathematics & Numerical methods
 - > Physics, Continuum mechanics
 - > Aerodynamics, Flight & Space mechanics
 - > Languages
 - > Project managementProject works : industry group project with Liebherr Aerospace, Hackathons, MOOCs, Kaggle...
- 2016 Erasmus semester, TU BERLIN, Berlin, Germany**
- 2015 Master Luft- und Raumfahrttechnik (aerospace engineering).**
 - > Satellite & Rocket architectures
 - > Space Propulsion
 - > Fluid mechanics, Electronics
 - > Project management (mission design)
- 2013 Preparatory classes, LYCÉE JANSON-DE-SAILLY, Paris, France**
- 2011 Preparation in Mathematics, Physics and Computer science for the top French engineering schools.**
- 2011 Baccalauréat S, LYCÉE MARIE LAURENCIN, Mennecy, France**
- 2008 equiv. A-levels with highest honors.**

WORK EXPERIENCE

- Today Sept. 2022 Scientist, EPFL (ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE), Lausanne, Switzerland**
IMOS (Intelligent Maintenance and Operations Systems) lab. Research topics and activities :
 - > Explainable AI & interpretable deep learning architectures
 - > Domain adaptation
 - > Vision-based automatic inspection
 - > Predictive maintenance, Diagnostics & Prognostics (PHM) applications
 - > Teaching (lectures and exercises)
 - > Supervision of 8 Master and Bachelor students
 - > Organizer and speaker at conferences
 - > Reviewer for journals and conferences
- Today April 2021 Scientist, EPFL (ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE), Lausanne, Switzerland**
Building data analysis and software tools for Innosuisse project "Worm-on-chip" with Nagi Bioscience SA.
- Data Scientist & Software Engineer, NAGI BIOSCIENCE, Lausanne, Switzerland**
 - > Built an end-to-end automated data analysis pipeline (AWS), increasing throughput and efficiency
 - > Deep learning for microscope image analysis (object detection and segmentation)
 - > Extracting relevant features from images and videos, collaborating with biologists
 - > Front-end and back-end development, databases, APIs
 - > Embedded software development for robotics/optics/fluidics control

Machine learning Cloud AWS PyTorch Spark Node.js Vue.js Electron Docker Python Javascript

- March 2021** | **Data Scientist, SAFRAN AIRCRAFT ENGINES, Paris area, France**
January 2018 | Industry research contract. My role is to enable large-scale analytics of data generated by civil aircraft engines during flights, to develop scalable engine health monitoring algorithms, and apply research to industry use cases.
- > Designed a generic Big Data processing pipeline for flight data analytics on the production cluster
 - > End-to-end implementation of health monitoring methodologies based on unsupervised learning
 - > Development and deployment of visualization apps
 - > Support engineers on distributed computing technologies
- Data science Machine learning Aerospace Hadoop Hive Spark Scala Keras PyTorch Python MongoDB
- October 2017** | **Intern, AIRBUS — CENTRAL RESEARCH & TECHNOLOGY, Toulouse, France**
April 2017 | I studied and applied various Artificial Intelligence methods to extract and query information from unstructured technical documents (scanned PDF, text, images) for cognitive assistant applications.
- > Deep learning (computer vision, natural language processing), chatbot
 - > Design and development of a Polymer web application for data annotation and prediction
 - > Reading research articles
- Deep learning Python Keras TensorFlow spaCy Rasa NLU HTML/CSS Javascript Polymer MongoDB REST
- August 2016** | **Intern, CNES (FRENCH SPACE CENTER), Toulouse, France**
March 2016 | Implementation and validation of a Manual Thrust mode in an AOCS (Attitude and Orbit Control System) simulator, in order to analyze end-of-life experiments on the CoRoT satellite (PROTEUS family).
- Space mechanics Signal processing Matlab Simulink
- June 2015** | **Intern, IRAP (RESEARCH INSTITUTE IN ASTROPHYSICS AND PLANETOLOGY), Toulouse, France**
February 2015 | Contributed to developing an open-source scientific library enabling astrophysicists to perform statistical analysis of gamma ray data measured by telescopes.
- Astrophysics C++ Python Git
- July 2014** | **Intern, ONERA (FRENCH AEROSPACE LAB), Toulouse, France**
 Development of real-time software and deployment on Linux embedded systems.
- Embedded systems C Linux

LANGUAGES












French	● ● ● ● ●
German	● ● ● ● ●
English	● ● ● ● ●
Spanish	● ● ○ ○ ○
Chinese	● ○ ○ ○ ○

SKILLS

Programming	Python, Scala, R, Java, C, C++, Caml, Flutter, Web (front/back-end)
Tools & Frameworks	Hadoop, Spark, PyTorch, Keras, TensorFlow, scikit-learn, pandas...
Databases	SQL, Hive, Athena, Postgres, MongoDB, SQLite
Collaborative & DevOps	Git, CI/CD, Docker, Artifactory/Nexus
Cloud	AWS (S3, EC2, SageMaker, Lambda, RDS, Athena, SFN...)
OS	GNU/Linux, Windows
ML Applications	Computer Vision, Natural Language Processing, Time Series (sensor signals), Audio/Speech processing
Industries	Aerospace, Life sciences/Biotechnologies

PUBLICATIONS

 florentfo.rest/publications

- A GENERIC AND SCALABLE PIPELINE FOR LARGE-SCALE ANALYTICS OF CONTINUOUS AIRCRAFT ENGINE DATA** 2018
IEEE International Conference on Big Data 2018  doi.org/10.1109/BigData.2018.8622297
Forest, F., Lacaille, J., Lebbah, M., & Azzag, H.
- DEEP EMBEDDED SOM : JOINT REPRESENTATION LEARNING AND SELF-ORGANIZATION** 2019
ESANN 2019  github.com/FlorentF9/DESOM
Forest, F., Lebbah, M., Azzag, H., & Lacaille, J.
- DEEP ARCHITECTURES FOR JOINT CLUSTERING AND VISUALIZATION WITH SELF-ORGANIZING MAPS** 2019
PAKDD 2019, Workshop on Learning Representations for Data Clustering  doi.org/10.1007/978-3-030-26142-9_10
Forest, F., Lebbah, M., Azzag, H., & Lacaille, J.
- LARGE-SCALE VIBRATION MONITORING OF AIRCRAFT ENGINES FROM OPERATIONAL DATA USING SELF-ORGANIZED MODELS** 2020
Annual Conference of the PHM Society 2020  doi.org/10.36001/phmconf.2020.v12i1.1131
Forest, F., Cochard, Q., Noyer, C., Joncour, M., Lacaille, J., Lebbah, M., & Azzag, H.
- COMPUTER ENVIRONMENT SYSTEM FOR MONITORING AIRCRAFT ENGINES** 2020
FR Patent FR3089501 / US Patent 17/299,249
- AN INVARIANCE-GUIDED STABILITY CRITERION FOR TIME SERIES CLUSTERING VALIDATION.** 2021
ICPR 2021
Forest, F., Mourer, A., Lebbah, M., & Azzag, H.
- DEEP EMBEDDED SELF-ORGANIZING MAPS FOR JOINT REPRESENTATION LEARNING AND TOPOLOGY-PRESERVING CLUSTERING.** 2021
Neural Computing and Applications  doi.org/10.1007/s00521-021-06331-w
Forest, F., Lebbah, M., Azzag, H., & Lacaille, J.
- PREDICTIVE HEALTH ASSESSMENT FOR LITHIUM-ION BATTERIES WITH PROBABILISTIC DEGRADATION PREDICTION AND ACCELERATING AGING DETECTION** 2023
Reliability Engineering & System Safety  doi.org/10.1016/j.ress.2023.109603
Che, Y., Zheng, Y., Forest, F., Sui, X., Hu, X., & Teodorescu, R.
- SELECTING THE NUMBER OF CLUSTERS K WITH A STABILITY TRADE-OFF : AN INTERNAL VALIDATION CRITERION.** 2023
PAKDD 2023  arxiv.org/abs/2006.08530  github.com/FlorentF9/skstab
Mourer, A., Forest, F., Lebbah, M., Azzag, H., & Lacaille, J.
- HEALTH PREDICTION FOR LITHIUM-ION BATTERIES UNDER UNSEEN WORKING CONDITIONS** 2024
IEEE Transactions on Industrial Electronics  doi.org/10.1109/TIE.2024.3379664
Che, Y., Forest, F., Zheng, Y., Xu, L., & Teodorescu, R.
- FROM CLASSIFICATION TO SEGMENTATION WITH EXPLAINABLE AI : A STUDY ON CRACK DETECTION AND GROWTH MONITORING** 2024
Automation in Construction  doi.org/10.1016/j.autcon.2024.105497
Forest, F., Porta, H., Tuia, D., & Fink, O.
- SIMPLIFYING SOURCE-FREE DOMAIN ADAPTATION FOR OBJECT DETECTION : EFFECTIVE SELF-TRAINING STRATEGIES AND PERFORMANCE INSIGHTS** 2024
ECCV 2024  arxiv.org/abs/2407.07586
Hao, Y., Forest, F., & Fink, O.

REFEREES

Dr. Jérôme Lacaille
Emeritus expert, SAFRAN GROUP
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Prof. Mustapha Lebbah
Full professor, UNIVERSITÉ PARIS SACLAY
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Prof. Olga Fink
Associate professor, EPFL
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