Jean-Patrick Francoïa

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JPFrancoia
Nationality: French; Age: 32

For an up-to-date version, check my personal page: https://jpfrancoia.github.io

Professional experience

2022–Today **Senior software engineer (site reliability)**, *Babylon Health*, London, U.K

- On call support (PagerDuty): available 24h/24 to respond to incidents. I react to technical incidents impacting EKS clusters (Kubernetes), RDS databases, microservices, etc. This includes overloaded databases/services, broken software releases, issues reported by partners/patients, etc. My primary focus is mitigation and preservation of SLOs
- Proactive monitoring and observability: I use OpenTelemetry, Honeycomb and Terraform to deploy dashboards/alerts to prevent incidents, or to facilitate incident resolution

2021–2022 **Software engineer**, *Babylon Health*, London, U.K
MLOps for healthcare

- Ensuring high availability/quality of medical data in a regulated environment: I developed a data pipeline using Python, BigQuery and REST APIs to extract, process and anonymize medical data. The processing of this data was done in accordance to legislation, and allowed data scientists to evaluate AI models (for the first time) on production data
- Evaluating the safety of new AI models: I built a simplified set of microservices (with docker-compose) that replicates the production AI inference setup. This setup allowed my team to run model validation on an Azure Devops pipeline instead of a Kubernetes cluster, reducing our costs by x7 and greatly improving maintainability
- Releasing AI models to production: I used Goland and Postgres to develop a CRUD web app for our data scientists and clinicians, allowing them to validate and audit AI models before releasing them to production. This app is critical for the release of new models and for traceability

2018–2021 **Data engineer**, *Okra Technologies*, Netherlands
Building analytics engines for healthcare

- Building data pipelines: I used Python, Numpy, Pandas, Docker and Airflow to build data pipelines from scratch. The pipelines were used for feature engineering and model training
- Building data lake: I built Okras's data lake from scratch using AWS Glue, Glue catalog, S3 and Athena. This data lake was used to process/store data from pharmaceutical companies. I developed libraries to allow data scientists to easily access the data lake
- Building backends: I designed and maintained B2B Flask web applications. These applications were REST APIs and were used to serve machine learning predictions to customers. They were using Postgres databases, and the development was done with CI/CD and unit/integration tests

2017–2018 **Postdoctoral researcher**, *University of Glasgow*, Scotland
3D printing applied to chemistry

- Development of a CAD software to simplify the design of 3D printed reactors (see paper below)
- Development of 3D printing techniques for unconventional materials (see paper below)

2013–2016 **Teaching assistant (Ph. D student)**, *Université de Montpellier*, France
Laboratories in organic and general chemistry for undergraduate students (*ca.* 200 hours)

Skill set / Technologies

- Deep knowledge of Python and its ecosystem: pandas, numpy, scipy, matplotlib, scikit-learn, Flask, pytest, SQLAlchemy, mypy, PyQt (GUI), etc. **Secondary languages:** Golang and Rust
- Kubernetes and Cloud Native Associate certification: obtained February 2023. Excellent knowledge of Docker, Kubernetes, Terraform, Postgres
- AWS Certified Cloud Practitioner: obtained January 2022. Excellent knowledge of AWS Cloud services: EC2, S3, RDS, Glue, Lambda, etc
- Lead interviewer for technical interviews (*ca.* 30 interviews)
- Contributor to open-source projects: scikit-learn, aws-sdk-pandas, Apache Airflow, Cura, etc

Education

2013–2016 **Ph. D. in chemistry**, *Université de Montpellier*, France
Supramolecular chemistry, software engineering, machine learning, biosensors

- Machine learning (PCA, LDA) coupled with chemical sensor arrays (see paper below)
- Machine learning (SVM) and software development to facilitate literature survey (see paper below)
- Development of nonlinear modeling softwares for the extraction of physical constants

2012–2013 **Master in chemistry, with honours**, *Lund University*, Sweden

Relevant Publications

Full publication list available at https://jpfrancoia.github.io/publications

- **Automatic Generation of 3D-Printed Reactionware for Chemical Synthesis Digitization using ChemSCAD**, *Journal: ACS Cent. Sci.*, 2020, link
  I used Python, PyQt, Numpy, Matplotlib and OpenSCAD to build ChemSCAD, a GUI software to generate the design of complex chemical reactors with a 3D structure optimized for 3D printing. The software allows non-technical users to quickly develop chemical reactors. **Citations : 26**
- **Digitization of multistep organic synthesis in reactionware for on-demand pharmaceuticals**, *Journal: Science*, 2018, link
  I used Python, Numpy and OpenSCAD to automate the generation of complex chemical reactors with a 3D structure optimized for 3D printing. It enabled the synthesis of advanced medical compounds in 3D printed reactors. This research was published in one of the top journals in the world. **Citations : 166**
- **ChemBrows: An Open-Source Application Software To Keep Up to Date with the Current Literature**, *Journal: J. Chem. Educ*, 2016, link
  I used Python, PyQt, Numpy, SQLite and scikit-learn to build a GUI software that helps researchers to stay up-to-date with the flood of scientific literature. It uses web scrapping and a SVM machine learning classifier to improve efficiency (400+ users). Open source code available here. **Citations : 2**
- **A KISS (Keep It Simple, Sensor) Array for Glycosaminoglycans**, *Journal: Chem. Commun.*, 2015, link
  I used Python, Pandas, Numpy and scikit-learn to train a LDA machine learning classifier to identify chemical compounds based on the response of a biosensor system. **Citations : 14**

Hobbies

D.I.Y (Do It Yourself)

- Self-hosting: I use MicroK8s to run my own Kubernetes cluster at home. I self-host applications like Home Assistant, Tiny Tiny RSS and Mosquitto (MQTT). See here for an example
- Microelectronics (IoT, MicroPython): see here for an example
- 3D printing: owner of several 3D printers

Martial arts

Kyokushinkai karate, Brazilian jiu-jitsu, Muay-thaï, Krav-maga, Sambo, Tae Kwon do

Salsa

Cuban and L.A. style

Languages

Perfectly fluent in English, native in French, learning Spanish (A2)