

# Jaafar NAJAFI RAD

PHYSICIST AND AUTOMATION ENGINEER

♥ Évreux, France

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## Core Qualifications

<b>Programming Languages</b>	Python(OpenCV, OpenGL, TensorFlow, Keras, Sci-py, Numpy, Pandas, Scikit-learn), C++(OpenCV and OpenGL)
<b>Softwares</b>	LabVIEW, MATLAB, Ubuntu, Virtual Machine, VESTA, VASP, QMC-DFT, OriginLab
<b>Technical Skills</b>	N°, Atom, and X-Ray scattering techniques, Surface Science, Physisorption Measurement, Data analysis and interpretation of scattering results, Material characterization, curve fitting and optimizing, Automation
<b>Languages</b>	Fluent in English, B1 in French, Native in Persian/Dari

## Research Experience and Employment

### CESI Engineering School

Rouen, Normandy

Intern (Full-time)

March 2023 - Sep 2023

- Geometric Change Detection in given 3D model and update the 3D model in Robotic Domain.
  - Developed and contributed to the algorithms to detect changes in a given 3D model with high accuracy.
  - Achieved over 86% localization accuracy and ensured full coverage of detected changes.
  - Expanded knowledge in mesh processing, graphic programming, and parallel processing techniques with OpenGL.
  - Applied expertise in mesh processing, image processing, and remote sensing for change detection tasks.

### Institut des Sciences Moléculaires d'Orsay(ISMO) | University of Paris Saclay

Orsay, Paris

Intern (Full-time)

March 2022 - July 2022

- Measuring Physisorption Well Depth with **Grazing Incidence Fast Atom Diffraction (GIFAD)**.
  - Developed Geometric of Detector System of Grazing Incidence Fast Atom Diffraction (GIFAD) to detect large angles.
  - Fixed barrel aberration, reduced from 10 pixels to less than one pixels, and pedestal correction of CMOS Camera.
  - Measured Physisorption well Depth of noble gases on LiF and calculated the physisorption well depth of Kr which 90 meV
  - Investigated surface topology of many crystals, specifically  $Al_2O_3$  crystal.
  - Online monitored epitaxy and catalysis processes.
  - Online monitored surface topology while annealing.
- Extracurricular Involvement:**
  - Attended Nanophotonics course in Paris Saclay, encompasses three broad domains: **Quantum Physics and Nanosciences**; **Nanofabrication and Nanomaterials**: nanofabrication instrument, optical and particle lithography, deposition techniques, etching techniques, Doping semi-conducting films, and nanoimprint lithography; and **High-Resolution Imaging**.
  - Followed the SwedNess 2021 PhD Summer School, I deepened my understanding of **Small Angle Neutron Scattering (SANS)**, covering theory, instrumentation, experimental design, data analysis, and applications. I explored SANS complementarity with other methods and delved into specialized areas like Magnetic SANS and Grazing Incidence SANS. Hands-on computer lab sessions sharpened my data analysis skills. This experience heightened my passion for SANS applications.

### Dept of Electronics and Physics | Kabul University

Faculty of Physics, Kabul University

Lecturer (Full-time)

Sep 2018 - Sep 2021

- Taught **Electronics Physics to Computer Science students**, as well as Electromagnetism Theory, **Semiconductor Devices**, and Classical Mechanics in the Faculty of Physics. Achieved a **satisfaction rate of over 97% among students**, with many of them pursuing master's degrees abroad, what a great honor!.
  - Proficient in clear communication in both official languages of Afghanistan.
  - Implemented updated teaching methods and assessments focused on outputs and skills-based learning.
  - Revised and updated curricula to align with modern educational standards.
  - Introduced and worked with softwares and technologies for the first time in my courses.
- Conducted weakly recitation and solving problem sessions in **Solid State Physics**, Analog and Digital Electronics, and three sessions in Quantum Mechanics.
- Conducted Electronics Lab, Electricity Lab, and Optics Lab.**
- Monitored and supported students' projects, Basic electronics circuits design using Simulink, Lab-VIEW, and Cadence Virtuoso.
- Organized, planned, and monitored e-learning during the coronavirus pandemic.
- Cooperated, attended, and actively worked in the Department Council and the Cultural Committee. Also, Represented the Faculty of Physics in Independent Administrative Reform and Civil Service Commission and Ministry of Higher Education for hiring technicians.

## Education

### University of Paris Saclay

Paris, France

Master's Degree in SMART Aerospace and Autonomous Systems

Sept 2022 - Sep 2023

- cGPA: 13.35/20  $\equiv$  B+
- Courses:** Control Theory, Artificial Intelligence, Sensor Fusion, Advanced Artificial Perception, Mission Coordination, Embedded Software.

- First Class Honors, cGPA: 3.43/4.0  $\equiv$  B+

- **Courses:** Semiconductors, Solid State Physics (X-ray Diffraction(XRD) and N° Scattering lectures), Atomic Physics, and Chemistry

## Publications

### JOURNAL ARTICLES

Lateral line-profiles in fast-atom diffraction at surfaces

Peng Pan, Carina Kanitz, Maxime Debiossac, Alex Le-Guen, Jaafar Najafi Rad, Philippe Roncin

*Physical Review B* p. 035413. 2023

A setup for grazing incidence fast atom diffraction

Peng Pan, Jaafar Najafi Rad, Philippe Roncin

*Review of Scientific Instruments* p. 093305. 2022

### CONFERENCE PROCEEDINGS

Polar and Lateral Profiles in Fast-Atom Diffraction at Surfaces

Maxime Debiossac, Peng Pan, Carina Kanitz, Jaafar Najafi Rad, Philippe Roncin

*24th International Workshop on Inelastic Ion-Surface Collisions (IISC-24)*, 2023, Charleston, S.C., USA

## Achievements

May 2020 **Turkey Burslari**, Turkey Annual Scholarships (Not used)

Turkey

May 2021 **King Fahd University of Petroleum and Mineral (KFUPM) full-Sponsorship**, (Not used)

Saudi Arabia

May 2021 **Chinese Council Scholarship (CSC)**, (Not used)

China

May 2021 **IDEX Scholarship at the University of Paris Saclay**, (Used)

France

## Personal and University Projects

### Physics Animation Copilot

Evreux, France

Personal Project

Oct 2023 - Dec 2023

- Developed and customized Generative AI to build physics animation for physicist and students but shut downed soon due to big competitors.
- **Technical Skills:** Generative AI, Fine Tuning, and Copilot.

### Application of Drone in Agriculture Survey

Paris, France

University of Paris Saclay

Feb 2022 - Feb 2023

- Developed python and MATLAB code for Sensor integration and Navigation in only few days!
- **Technical Skills:** Python, MATLAB, control theory, and automation.

### Free Energy Drone Systems

Paris, France

University of Paris Saclay

Jan 2023 - Feb 2023

- Conceived a groundbreaking concept for a Free Energy Drone, leveraging innovative techniques such as phase collaboration, anti-inertia moment, and relative wind. However, regrettably, I had to switch the project due to constraints in time and resources.
- **Technical Skills:** Mechanics and Electricity.

## Other Work Experience

### Volunteer Work in My Village

Kajab, Wardak Province

Solar Panel Installation Technician (Part-time)

March 2010 - September 2018

- Voluntarily installed solar panels for my neighbors, performed wiring, battery management system installation, charge controller setup, and mechanical installation of solar panels.

### Winter Course Program | Mohammad Ibrahim Qasemi Offices(MP)

Wardak Province, Afghanistan

Teacher (Full-time)

2 x Nov 2014 and 15 - feb 2015 and 16

- Taught science subjects such as Mathematics, Physics, Chemistry, and Geometry to students preparing for the University Entrance National Exam(KANKOR) in an underprivileged area where education is not easily accessible for girls and economically disadvantaged students.
  - Helped 76% of my students gain admission to four-year bachelor's degree programs in fields such as computer science, engineering, and other disciplines. Three girls got admission to Kabul Medical University.
  - Encouraged and motivated students to learn, implement, and think critically.
- Engaged with the local community to promote education, foster cultural renewal, and introduce new agricultural practices.

## Additional

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- Represented the Faculty of Physics at Afghanistan's Universities Academic Staff Union to advocate for the academic staff's needs. (2019-2020)
- Represented the Faculty of Physics and Kabul University at the Hiring Technician Committee, Independent Administrative Reform and Civil Service Commission, Ministry of Higher Education, and Kabul University. (2020)
- Organized a three-day workshop at Kabul University in collaboration with PWF-ICTP. (2019)
- Initiated a reform in the policy for hiring lecturers in 2018, resulting in numerous reforms and clarity in the Ministry of Higher Education's lecturer hiring policy that distributed around the country.(2018)