

# Fabio Arnez

Orsay, France    fabio.arnez@cea.fr    fabioarnez.github.io    FabioArnez    fabio-arnez  
 Google Scholar    0000-0003-0367-3035

## Experience

---

### Research Engineer in AI

*Commissariat à l'énergie atomique et aux énergies alternatives (CEA), DRT.LIST.DILS.LSEA*

*Palaiseau, France*

*Oct 2019 – present*

Research on DNNs/LLMs/VLMs confidence representation (uncertainty estimation) for out-of-distribution/hallucination detection, runtime monitoring in complex computer vision tasks ([demo object detection](#)), embedded uncertainty estimation, safe and robust end-to-end DNN-based [UAV navigation](#), and AI Safety.

- Trustworthy Deep Learning Team leader, Ph.D. Theses and Internships supervision
- Contributing to the **PRIMaL**- Developed LLM hallucination detection and OoD object detection methods
- Contributing to the **DeepGreen** Project for embedded AI, (France 2030 program)-Embedded DNN uncertainty estimation, developed dropout operator for the [Aidge](#) library
- Contributed to the [Confiance.ai](#) program, (France 2030 program). Developed an OoD detection method [library](#)
- Contributed to the [Comp4Drones](#) project (H2020 Program European Union). Led WP4-Task4.4 on UAV Runtime Monitoring. Developed a distributed uncertainty runtime monitoring system for DNN-based UAV navigation systems

### Data Scientist

*Bamboo*

*Cochabamba, Bolivia*

*Apr 2019 – Oct 2019*

Enterprise data analysis, data visualization (dashboards)

- Engineering team **leader**

### Research Assistant

*University of Applied Arts and Science from Southern Switzerland (SUPSI), ISEA, SMT Lab*

*Lugano, Switzerland*

*Sept 2016 – Aug 2018*

Part-time embedded systems development

- Applied signal processing, embedded machine learning for signal classification
- Developed and implemented embedded systems prototyping for wireless IoT applications (802.15.4, Bluetooth)

### Unmanned Aerial Systems Researcher

*Jalasoft*

*Cochabamba, Bolivia*

*May 2014 – May 2016*

Localization & navigation, ROS integration, embedded systems integration, computer vision tasks

- Built a custom UAV from scratch employing the PX4/Pixhawk autopilot
- Implemented computer vision tasks with an onboard computer in the UAV

### Adjunct Researcher and Lecturer

*Universidad Privada Boliviana (UPB)*

*Cochabamba, Bolivia*

*Sept 2014 – Mar 2019*

Reseearch in embedded wireless IoT applications, Lecturer

- Smart Street Lighting project [paper](#)
- Courses Taught: Embedded Electronic Systems (2016), Microprocessor Architecture and Technology (2015, 2016, 2019), Electronics and Telecom. Project (2018), Telecom. Electronics (2018), Electronic Instrumentation (2014, 2015)

## Education

---

### Université Paris-Saclay

*Ph.D. in Computer Science - Artificial Intelligence*

*Palaiseau, France*

*Nov 2019 – Dec 2023*

*Thesis:* Deep Neural Network Uncertainty Runtime Monitoring for Robust and Safe AI-based Automated Navigation

- DNN uncertainty-based out-of-distribution detection, uncertainty propagation for robust UAV navigation, confidence monitoring in UAV learning-based components for trustworthy navigation.

### University of Applied Arts and Science from Southern Switzerland (SUPSI)

*MSc. in Engineering: Embedded Systems & Microelectronics*

*Lugano, Switzerland*

*Sept 2016 – July 2018*

Thesis Title: *Real-Time Human Footstep Recognition on Smart Anti-Static Floor*

- Signal processing and classification using machine learning targeting resource constrained-hardware

### Universidad Privada Boliviana (UPB)

*BSc. in Electronics and Telecommunications Engineering*

*Cochabamba, Bolivia*

*Feb 2008 – May 2014*

Grade Project Title: *VIRMS: A Vehicle Information and Road Monitoring System*, [paper](#)

- Embedded systems, RTOS, data acquisition & processing, IoT, embedded GUI development

## Skills

---

**Programming:** Python (Numpy, Scipy, Matplotlib, Pandas, Seaborn...), C/C++; PyQt5 for GUI dev; Git

**Machine Learning & Deep Learning:** PyTorch, PyTorch-Lightning, Hydra, MLFlow, Slurm HPC, scikit-learn

**Robotics:** ROS/ROS 2; PyBullet, MuJoCo, CARLA, and AirSim simulators; Gymnasium; PX4/Pixhawk autopilot

**Embedded Systems:** ST/SiliconLabs/NXP ARM Cortex (M0+, M3, M4), FreeRTOS

**Languages:** English (fluent, C1/C2), French (basic-intermediate, B1), Italian (basic), Spanish (native)

## Publications

---

- Hajji, E., Bouguerra, A., **Arnez, F.** (2025, November). *The Map of Misbelief: Tracing Intrinsic and Extrinsic Hallucinations Through Attention Patterns*. In AAAI Fall Symposium Series 2025 - ATRACC.
- Bouguerra, A., Montoya, D., Gomez-Villa, A., **Arnez, F.**, Mraidha, C. (2025, August). *Can Less Precise Be More Reliable? A Systematic Evaluation of Quantization's Impact on CLIP Beyond Accuracy*. (Under review) [link](#)
- Montoya, D., Bouguerra, A., Gomez-Villa, A., & **Arnez, F.** (2025, June). *FindMeIfYouCan: Bringing Open Set Metrics to Near, Far and Farther Out-of-Distribution Object Detection*. arXiv preprint arXiv:2506.14008. (Under review) [link](#)
- Rajendran, P. T., **Arnez, F.**, Espinoza, H., Delaborde, A., Mraidha, C. *Oracle-Guided Soft Shielding for Safe Move Prediction in Chess.*, 2025. (Accepted at 24th ICMLA - to be presented soon)
- **Arnez, F.**, Vasquez, D. A. M., Radermacher, A., & Terrier, F. (2024, July). *Latent Representation Entropy Density for Distribution Shift Detection*. In Conference on Uncertainty in Artificial Intelligence (UAI). [link](#)
- **Arnez, F.** (2023). *Deep Neural Network Uncertainty Runtime Monitoring for Robust and Safe AI-based Automated Navigation* (Doctoral dissertation, Université Paris-Saclay). [link](#)
- Ollier, G., **Arnez, F.**, Adedjouma, M., Lallement, R., Gerasimou, S., & Mraidha, C. (2023). *Towards an Ontological Methodology for Dynamic Dependability Management of Unmanned Aerial Vehicles*. In Proceedings of the DroneSE and RAPIDO: System Engineering for Constrained Embedded Systems (pp. 12-19)
- **Arnez, F.**, Ollier, G., Radermacher, A., Adedjouma, M., Gerasimou, S., Mraidha, C., & Terrier, F. (2022, August). *Skeptical Dynamic Dependability Management for Automated Systems* In 2022 25th Euromicro Conference on Digital System Design (DSD) (pp. 118-125). IEEE Computer Society
- **Arnez, F.**, Radermacher, A., & Espinoza, H. *Quantifying and Using System Uncertainty in UAV navigation*, in Workshop on Releasing Robots into the Wild: Simulations, Benchmarks, and Deployment at ICRA-2022, 2022. [link](#)
- **Arnez, F.**, Espinoza, H., Radermacher, A., & Terrier, F. (2022, September). *Towards Dependable Autonomous Systems Based on Bayesian Deep Learning Components* In 2022 18th European Dependable Computing Conference (EDCC) (pp. 65-72). IEEE. [link](#)
- **Arnez, F.**, Espinoza, H., Radermacher, A., & Terrier, F. *Improving Robustness of Deep Neural Networks for Aerial Navigation by Incorporating Input Uncertainty* Proceedings of the Workshop on Artificial Intelligence Safety Engineering WAISE 2021, International Conference on Computer Safety, Reliability, and Security (pp. 219-225). Springer. [link](#)
- **Arnez, F.**, Espinoza, H., Radermacher, A., & Terrier, F. *A Comparison of Uncertainty Estimation Approaches in Deep Learning Components for Autonomous Vehicle Applications*. Proceedings of the Workshop on Artificial Intelligence Safety 2020, vol 2640, ISSN:1673-0073. [link](#)
- Canipa, F. , **Arnez F.**, Villazon A., Ormachea O., Rivero A., Dozio G.C., Escobar E. *SRESLi: Smart Renewable Energy Street Lightning System* Revista Investigación & Desarrollo, 2019, vol. 19, no 1. ISSN:2518-4431 [link](#)
- **Arnez F.**, Villazon A., *VIRMS – A Vehicle Information and Road Monitoring System* Investigacion y Desarrollo, Nr. 14, Vol. 2: 94 –107, Universidad Privada Boliviana, ISSN:1814-6333. [link](#)
- Casazola, D., **Arnez, F.**, Espinoza, H., *Design Considerations of an Unmanned Aerial Vehicle for Aerial Filming* Techzone 2014, Jalasoft. [link](#)

## Other Scientific Activities

---

- **Ph.D. Thesis Supervision:** *Deep Neural Network Uncertainty Estimation on Embedded Targets* (Aymen Bouguerra, 2024 - Present); *Out-of-Distribution Detection with Vision Foundation Models and Post-hoc Methods* (Joaquin Figueira, starting Nov. 2025)
- **Reviewer in Conferences/Workshops:** CVPR (2025), AAAI (2026, 2025), UAI (2025, 2024), WACV (2025), IV (2025, 2022), AI-Safety workshop at IJCAI (2024), Releasing Robots in the Wild Workshop at ICRA (2022)
- **AI Safety Workshop 2024 Organizing Comitee Member**, Workshop on AI Safety and Security at IJCAI 2024