Université Côte d'Azur
Academy of Excellence « Networks, Information and Digital Society »

PostDoc position Offer

Septembre 2023

Location	Nice and Sophia Antipolis, PACA, France
Geographic mobility	West of Nice (INPHYNI) and Biot - Sophia Antipolis (LEAT) + occasional national or international travels possible
Main scientific field	Embedded Artificial Intelligence
Secondary scientific field	Photonics
Keywords	Artificial Intelligence, Multimodal Unsupervised learning, Brain-inspired methods, Nonlinear Photonics
Founded by	Université Côte d'Azur: RISE Academy 2023
Contacts	
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Application deadline	31/10/2023
beginning of contract	01/09/2023 – 31/12/2023
Official publication	PostdocIA

Employer:

University Cote d'Azur is a university of excellence that teaches 35,000 students on 12 campuses.
Website: https://univ-cotedazur.fr/

Position and missions

Multi modal sensing is key to how the human brain processes incoming information and adapts to the external world. In the AI realm, recent research at the LEAT has shown how sensory modalities can be merged to enhance the quality of the classification [Khacef 2020] or the reconstruction[Muliukov 2023] of signals in a noisy environment using brain-inspired learning methods. Within the EDGE team at LEAT and in collaboration with the "Complex photonic materials and systems" at Institut de Physique de Nice, the applicant will design, implement and assess the performance of advanced learning methods taylored towards the realization of high performance complex photonic sensors[Barland 2021][Barland 2023].

The team:

The ebrAIn team at LEAT has outstanding expertise in brain-inspired artificial intelligence, neuromorphic architectures and tinyML. The project will be developed in collaboration with the "Complex photonic materials and systems" teams, who runs state of the art non-linear photonics experiment and is pioneering the development of hybrid photonic sensors based on nonlinear or disordered systems and computer neural networks.

Project objective

The successful candidate will be responsible for technical implementation and will be a driving force behind scientific proposals through the overall project that stand in the way to design bio-inspired embedded AI models that could be applied to photonic experimentation. Main scientific challenge will come with the reliance on software neural networks, measurement reliability and the limited availability of measurements in non-cooperative scenarios.

Applicant profile

PhD in computer sciences, electronics, physics, photonics or equivalent with a strong interest in brain inspired embedded AI field and the the self-mixing interferometry application.
Skills: Deep learning, TinyML, Auto-Encoder or Self-Organizing Map models
Languages: PyTorch or Keras/Tensorflow, Python, C or C++

Bibliography

[Barland 2021] Barland, S., & Gustave, F. Convolutional neural network for self-mixing interferometric displacement sensing. Optics Express, 2021
[Barland 2023] Robin Matha, Stéphane Barland, and François Gustave, "High-availability displacement sensing with multi-channel self mixing interferometry," Opt. Express 31, 21911-21923 (2023)
[Khacef 2020] L. Khacef, L. Rodriguez, and B. Miramond, *Brain-inspired self-organization with cellular neuromorphic computing for multimodal unsupervised learning*, Electronics, 2020
[Muliukov 2023] Artem Muliukov, Laurent Rodriguez, Benoit Miramond. Cortex Inspired Learning to Recover Damaged Signal Modality by ReD-SOM Model. IJCNN 2023, IEEE, Jun 2023, Queensland, Australia. ⟨hal-04141988⟩