Recrutement prévu dans le cadre du contrat recherche
Projet européen RAIDO

Job title	**Post-doc in Robotics for the automated handling and characterization of micrometer-sized biosourced objects**
Ref	offreEmploi_2024.03_Postdoc_projet H2020 RAIDO
Job type (PhD, Post-doc, Engineer)	**Post-doc**
Contract duration (months)	2 years
Salary	2500-3000 € montly gross salary
Qualifications (Master degree, PhD…)	Ph-D in robotics
Job hours (full time/ part time)	Full time
Employer	UBFC – Université Bourgogne Franche-Comté
Host Laboratory	FEMTO-St Institute
URL Host Laboratory	https://www.femto-st.fr
Address Host Laboratory	FEMTO-ST, AS2M Department, UMR CNRS6174 24 rue Savary, 25000 Besançon, France
Job description	**Context of the works: RAIDO: Reliable AI and Data Optimization** (website under construction, a brief description is given as appendix). The project RAIDO falls within the framework of the development of trustworthy and green AI. It is a Horizon Europe (Cluster 4) research and innovation project especially targeting a human-centered and ethical development of digital and industrial technologies. In this project, we are deploying innovative robotic and automation solutions aimed at helping the human operator to carry out particularly complex tasks with a high societal and ecological impact. In particular, our work focuses on an experimental platform for the characterization of plant fibers (hemp, flax, nettle), which are particularly difficult for human operators to handle, due to their very small dimensions (around 20µm in diameter) and the very low forces to be applied, beyond the limits of human dexterity. This

	platform is based on particularly innovative new technologies [1-6], and its robotization and automation will open to the future manufacturing of structural composites incorporating these natural fibers. This new type of composite meets very high industrial and ecological expectations, whether for reasons of lightness, recyclability, carbon sequestration or mechanical performances. **Main responsibilities of the recruited fellow:** - Design and development of a robot and its gripper for automated handling of plant fibers (diameter 20µm, length 1mm) to avoid statistical biases induced by manual sample preparation prior to characterization. - Interaction with RAIDO consortium partners, e.g. by carrying out experimental campaigns, implementing partner AI algorithms, comparing their results with our physical models. Travel to project partners for short stays (approx. 1 week). - Technological maturation of our platform through the development of new characterization strategies, the evolution of its control architecture (switch to a real-time PLC), and the development of a more integrated force-displacement measurement principle. - Carrying out these tasks in active interaction with several doctoral students/engineers/research professors, supervising trainees, monitoring projects, drafting deliverables, developing partnerships with new users of our prototypes. *[1] Placet, V et al. (2020). Transverse compressive properties of natural fibers determined using micro mechatronic systems and 2D full-field measurements. Materials Today: Proceedings, 31, S303-S308.* *[2] A. N. André et al., "Automating Robotic Micro-Assembly of Fluidic Chips and Single Fiber Compression Tests Based-on XYTheta Visual Measurement With High-Precision Fiducial Markers," in IEEE Trans. on Automation Science and Engineering,* *[3] Govilas, J. et al.(2022). Platen parallelism significance and control in single fiber transverse compression tests. Composites Part A: Applied Science and Manufacturing, 159, 106990.* *[4] Govilas, J. et al.. (2023). Investigating the influence of plant fiber geometry on apparent transverse elastic properties through finite element analysis. Composites Part A: App. Sc. and Manufacturing, 175, 107789.* *[5] Richely, E et al.. (2023). Measurement of microfibril angle in plant fibres: Comparison between X-ray diffraction, second harmonic generation and transmission ellipsometry microscopies. Composites Part C: Open Access, 11, 100355.* *[6] Govilas, J. et al. (2022). Platen parallelism significance and control in single fiber transverse compression tests. Composites Part A: Applied Science and Manufacturing, 159, 106990.*
Supervisor(s)	Cédric CLÉVY, Professor, Franche-Comté University, FEMTO-ST, cclevy@femto-st.fr Vincent Placet, Research Engineer, Franche-Comté University, FEMTO-ST

Candidate profile	- Roboticist, Engineering background - Experience in robot design and control (trajectory control, position, force and visual servoing), mastery of a programming language, CAD design, finite element simulation - Ability to define and conduct experiments - Curiosity, motivation, hard-working, enjoy working in a group - Fluent in written and spoken English.
Keywords	Robotics, AI, experiments, real-time control, vision, modeling
Application deadline	March the 31st, 2024
Starting Job	Ideally 01/06/2024 or later in 2024 depending on availabilities
Application *Depending on the type of position*	***Post-doc position:*** *Please send the following documents (all in one PDF file) by e-mail to cclevy@femto-st.fr :* *1) For EU candidates: Copy of your national ID card or of your passport page where your photo is printed.* *For non-EU candidates: Copy of your passport page where your photo is printed.* *2) Curriculum Vitae (may include hyperlinks to your ResearchID, Research Gate Google Scholar accounts).* *3) Detailed list of publications (may include hyperlinks to DOI of publications).* *4) Letter of motivation relatively to the position (Cover Letter) in which applicants describe themselves and their contributions to previous research projects (maximum 2 pages)* *5) Copy of your PhD degree if already available.* *6) Coordinates of reference persons (maximum 3, at least your master thesis supervisor): Title, Name, organization, e-mail.* *If you have questions regarding the application, please contact the supervisors.*

NEW EUROPEAN PROJECTS

HORIZON-RIA- CL4-2023-HUMAN-01-01

RAIDO - Reliable AI and Data Optimization

C. Clevy, V. Placet

AS2M & APPLIED MECHANICS

RAIDO is a powerful framework for developing trustworthy and green artificial intelligence (AI). Trustworthy AI focuses on ensuring the reliability, security, and unbiased optimisation and deployment of AI systems. RAIDO uses automated data curation methods, such as digital twins, to create high-quality, unbiased training data. It also provides data- and compute-efficient models for energy-efficient AI, using methods such as few- and zero-shot learning. RAIDO ensures transparency and reliability through explainable AI methods, decentralised blockchain, and an innovative AI orchestrator, reducing overall energy consumption in development and deployment. The project will be evaluated through four real-world demonstrators in key application areas such as smart grids, computer vision-based smart agriculture, healthcare, and robotics, demonstrating notable societal and market impacts.

In this project, UBFC/FEMTO-ST will be responsible for the demonstrator in the robotics domain, which is the result of a historical collaboration between AS2M and Applied Mechanics, and will be entitled "Industry 5.0 & Bio-based Composites, AI Models for Plant Fibre Characterisation".

Consortium:

Inst. Joseph Stefan (Coordinator-SI), Ubitech (CY), Netcompany-Intrasoft (LU), Ayesa (ES), Fujitsu (LU), Metamind Innov. (EL), Trinity College London (IE), The awareness movement (CY), Krechnologies (BE), Chelenic Ntainamiks (UK), Vito (BE), Sidroco (CY), UBFC-FEMTO-ST (FR), Eight Bells LTD (CY), Mathema (IT), CRT Hellas (EL), Cyberjab (IE), Dimosia (EL), Axon logic (EL), Adrestia (EL), Logos Ricerca (IT), Jessa (BE), TWI Ellas (EL)

Total funding: 9 M€
FEMTO-ST funding: 450 k€

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