

Chaire de professeur junior - Junior Professor chair

Établissement/organisme porteur - Supporting institution/organization :

Nom du chef d'établissement/d'organisme : Laurent Bordes

Site concerné : Université de Pau et des Pays de l'Adour

Région académique : Aquitaine

Établissements/organismes partenaires - Partner institutions/organizations : UPPA- CNRS

Nom du projet / Name of the project : Physico-Chimie expérimentale et/ou théorique pour l'étude de systèmes moléculaires.

Experimental and/or theoretical approaches in Physical-chemistry for the study of molecular systems.

Mots-clés / Keywords : Energie, Environnement, Physico-chimie moléculaire, modélisation multi échelle, spectroscopie, synthèse.

Energy, Environment, Molecular Physical-chemistry, Multi-scale modeling, Spectroscopy, Synthesis.

Durée visée – Contract duration : 5 years

Thématique scientifique / Scientific thematic : Transitions énergétiques et environnementales. Energy and environmental transitions.

Section (s) CNU/CoNRS/CSS correspondante (s) : CoNRS : 13/12 ; Sections CNU : 31/32

Date de prise de fonction - starting date : 01/09/2022

Establishment strategy :

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In 2017, the I-site E2S UPPA label of excellence, led by the UPPA-INRAE-Inria-CNRS consortium, provided a decisive impetus to UPPA's research activities, which have evolved towards issues associated with energy and environmental transitions. Based on this dynamic, the ambition of UPPA for the future 2030 strategy, is, with the support of its academic and socio-economic partners, to build a multidisciplinary university visible at the national and international level in the sectors of excellence that contribute to the university renown, including analytical sciences and physical chemistry for the environment and materials. To achieve this, UPPA relies on its multidisciplinary character, the niches of excellence developed within its research units in collaboration with research organizations (CNRS, INRAE and Inria) and a very high level of experimental works (Equipex MARSS, XYLOFOREST with XYLOMAT platform, Equipex+ IMAGINE2). Finally, the territory in which it is located, unique because of its cross-border geographical situation, is one of the leading private R&D areas in France, which has led the university to develop original and solid partnerships, of which the Carnot institute ISIFOR and Carnot Filière Extra&Co in the field of sustainable engineering of geo-resources and the joint laboratory IC2MC (UPPA/CNRS/U Rouen/Florida State University) on the molecular mapping of complex matrices are emblematic examples.

Strategy of the laboratory :

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IPREM (<https://iprem.univ-pau.fr/fr/index.html>) has expertise in the fields of analytical chemistry, physical chemistry, theoretical chemistry, chemistry and physics of materials, especially polymers,

biogeochemistry and environmental microbiology, with the common goal to understand reaction mechanisms from the atomic scale to macroscopic properties.

The skills of IPREM are based on analytical strategies, modeling and physico-chemical approaches for the fine study of molecular architectures and their chemical behavior, materials, polymers and surfaces as well as the synthesis, characterization and processing of matter at different scales. The guideline is to combine advanced fundamental research with more applied aspects to allow the understanding of reaction mechanisms from the atomic to the macroscopic scale.

IPREM members are interested in the development of fundamental knowledge in physical-chemistry, analytical chemistry and microbiology, in relation to applications concerning the structure of the living, the management of the environment and the functional properties of different classes of materials. Researchers design and develop innovative concepts to answer major scientific questions concerning numerical simulation (computational codes at the atomic scale), instrumentation (advanced couplings in molecular and isotopic mass spectrometry or new characterization approaches), or the bio-inspired elaboration of functional materials that open up new fields of academic research, but also partnerships, at the highest level in order to anticipate the major societal challenges and needs of energy and environmental transitions.

Summary of scientific project :

The candidate's research work should fit in the research activities of the group of "Analytical Chemistry, Physical-Chemistry and Theoretical Chemistry of IPREM" (pole CAPT) and the thematic "Coupling experiment/modeling for the study of molecular systems". The research activities, which the Chair will reinforce, are focused on the understanding the chemical reaction behavior of molecular systems, such as new organic or organometallic compounds/catalysts. In particular, these activities concern the determination of the relationships between their geometrical structures and their electronic/spectroscopic properties, with a particular attention paid to the understanding of reaction mechanisms. The scientific strategy involves the synergy between experimental and theoretical approaches which lead to a complete and fine analysis of these molecular systems. The fields of application of the systems studied so far are more particularly chemical synthesis (homogeneous catalysis) for the elaboration of "high added value" products and fine chemistry, and more recently organic electronics.

The candidate will have to propose a long-term research project oriented towards the study of properties and the (photo)reactivity of organic/organometallic molecular architectures via experimental (synthesis and/or physical-chemistry) and/or theoretical approaches. The research topics to be tackled should be closely related to the fields of energy (storage and conversion of chemical energy, ...) or environment (photochemical processes in the atmosphere for example, ...).

Complementary information: The research profile is not fixed (organic and organometallic synthesis, and/or molecular physical-chemistry and/or modeling of molecular architectures/materials) and may evolve according to the applications received and projects proposed by the candidates. To carry out his/her project, the candidate will benefit from a fully equipped synthesis laboratory for the synthesis of sensitive compounds (vacuum ramps, glove box ...) and from two spectroscopic techniques: UV-PES coupled to gas phase thermolysis systems, Infrared or UV-Visible coupled to a cryostat (4K) allowing the characterization of transient species or a reactional follow-up of the studied reactions. Through the various technical platforms, the institute can also provide analytical complements that may be necessary for the research undertaken (mass spectrometry, NMR, XPS, Auger, etc.). For modeling, he/she will also have access to the local computing cluster as well as to that of the Mésocentre de Calculs Intensif Aquitaine (MCIA).

It is expected that the person recruited, if he/she does not hold an HDR, will submit one before the end of the contract.

Material resources:

Via the host team: synthesis laboratory, glove box, UV photoelectron-spectrometer (UV-PES) in gas phase, cryostat coupled to Infra-Red or UV-Visible.
Via the institute and its various technical platforms: NMR, mass spectrometers, XPS, Auger ...
Via the university : UPPA computing cluster + MCIA cluster (regional center).
Financial means: ANR funding of 200 000 euros. It will cover at least 120K€ of payroll for the collaborators of the chair candidate (PhD student, post-doc, IT contractual), the balance being used for the operation of the project (missions and travel, subscriptions, reagents ...) and thesis funded by the CNRS

Summary of the teaching project :

The candidate will be primarily requested to give organic chemistry courses to students in physical-chemistry at the undergraduate level (three-bachelor degree), as well as to master students in UPPA's master programs, namely, "Chemistry and Life Sciences" and in "Materials Science and Engineering". During his/her contract the recruited candidate will have a teaching workload of 64 h/year in total. He will also be involved in the University School of Research for the Environment and Energy (GREEN) through the supervision of students in research initiation projects.

Applicant Requirements:

Candidates must fulfil one of the following conditions:

- Hold of a doctorate as provided for in Article L. 612 7 of the Education Code;
- Hold a doctorate in engineering
- Hold a foreign university degree judged equivalent to the above diplomas; in this case, a request for equivalence and a translation are mandatory;
- To justify titles or scientific works judged equivalent to the above diplomas; in this case, the candidates must formulate a request for equivalence.

Applications, selection and auditions :

Applications must be submitted exclusively online on Galaxie website (FIDIS) by April 14, 2022 at the following address:

https://www.galaxie.enseignementsup-recherche.gouv.fr/ensup/cand_recrutement_enseignants_chercheurs.htm

A sample application form can be downloaded at the following address:

<https://organisation.univ-pau.fr/fr/recrutement/recrutement-des-personnels-enseignants/recrutement-chaire-de-professeur-junior-cpj.html>

The evaluation will be carried out by a commission composed of internal and external experts. The composition of the commission will be made public before its work.

Only those candidates pre-selected by the committee will be invited to :

- A role playing : the selected candidates will be asked to come to the laboratory (IPREM) to present themselves. On this occasion, they will have to give a talk - during which they will have to present their background, research and teaching works as well as their future research and teaching projects for the position to be filled - and to discuss with different members of the research institute and teaching staff.
- An audition will take place in Pau or by videoconference depending on the health situation. The audition, which will last from 50 minutes to 1 hour (the precise duration will be indicated on the invitation as well as the details of the audition), will consist of a presentation by the candidate of his (her) previous research and teaching works, his(her) research and teaching

projects for the position of Junior Professor chair, as well as a teaching situation, followed by a discussion with the committee.

Evaluation Criteria

- Excellence of the candidate, motivation, supervisory skills
- Quality and originality of the research and teaching projects
- Integration of the project within the laboratory
- Ability to establish collaborative networks.
- Adequacy of the means to the proposed project and ability to mobilize complementary means