Lecturer in environmental physics and climatology

Context and Job Interest

Observation, analysis, and modelling of physical mass and energy transfer processes in the atmosphere and at interfaces between different compartments aim to understand the functioning of observed terrestrial systems. These skills rely on digital tools and surface observation technologies to represent and model physical phenomena. The interactions between the biophysical environment and climate are at the core of adaptation and mitigation challenges to climate change. The teaching at Institut Agro Rennes Angers aims to meet the specific needs of future generations of engineers, particularly regarding the role of renewable energies, energy efficiency, and adaptation of agro-hydrosystems to global changes. The recruited lecturer, in addition to possessing the skills to meet these specific needs, will also be involved in updating the content in light of these challenges.

Teaching assignments

The lecturer will join the teaching and research unit UMR SAS. She/he will be integrated into the educational unit UP PSN. She/he will be in charge of teaching environmental physics and numerical climate modelling. Teaching assignments for licence and master degree are about 192h/year.

The PSN educational unit is heavily involved in various courses. The teachings provided cover the fields of physics and environmental sciences. These teachings allow for the understanding of major scientific questions such as energy balance, radiative forcings, greenhouse effect, climate variability, and environmental issues. Trained students can thus:

- Have the necessary physical bases for any engineer for a better understanding of physical processes in agronomic and agri-food sciences;
- Acquire the skills necessary to address questions related to water resource management, land planning, energy and climate issues;
- Estimate and evaluate the environmental impacts of anthropogenic and natural actions at different scales;
- Acquire, process, and analyze temporal and spatial environmental data.
- Be able to conceptualize and model the studied systems;
- Apply their knowledge in the fields of environmental science in agriculture and agri-food and develop multidisciplinary approaches;
- Develop their critical thinking and implement a coherent scientific approach.

The PSN educational unit is also involved in the use of digital services for teaching.

Research assignment

The scientific skill of the UMR SAS focuses on the challenges of mitigating climate and environmental changes, as well as the development of alternative systems, transitions or disruptions. Research conducted within the UMR SAS, as part of the Resources team, aims to

assess the impact of climate change on natural resources such as water and soils. Many methodological innovations have emerged in recent years, particularly through the development of connected sensors and measurement instruments such as the optical fiber. Access to very high spatial and temporal resolutions allows for the understanding of complex processes such as exchanges between groundwater and rivers. The vulnerability of streams and rivers to climate change is a promising theme. Research in this field is part of a dynamic driven by a scientific community of experts in ecohydrology, hydraulics, data science, and numerical climate modelling. Specific thematic fields related to the activities of the recruited lecturer will align with the structuring orientations of the UMR SAS. More generally, research will focus on the impact of climate change on water resources, with a focus on the hydrological functioning of the groundwater-river system. The development of innovative modelling approaches will enable the evaluation of the consequences of adaptation scenarios (transition or disruption) aimed at mitigating the effects of climate change on water resources. The systems studied may be rural, urban, peri-urban, or coastal.

The recruited lecturer will have an important role to play in the development and promotion of research on methodological innovations for the study of environmental systems. Their work will rely on skills in environmental physics and climatology to characterize energy and mass transfers in the critical zone.

Animation and Radiance

Manage teaching and create new contents in physics, climatology, remote sensing will be conducted within the PSN educational unit. A partnership agreement between the Institut Agro Rennes-Angers and IMT-A (Institut Mines Télécom - Atlantique) enables the exploration of new engineering curricula involving both schools. Expertise of the recruited lecturer will strengthen the influence of the Institut Agro, which is highly engaged in this dynamic through the dissemination of data to academic and non-academic users.

Required skills

Ph.D. in physics, climatology, or environmental science and data, with skills in physics, remote sensing, and spatial modelling.

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