Tenure track position announcement

Virtual laboratory to match variable biomass properties with target functions (VARIOUS)

INRAE Biopolymers, Interaction and Assemblies laboratory (https://eng-bia.angers-nantes.hub.inrae.fr/) in Nantes (France) in association with the Ecole Centrale de Nantes (https://www.ec-nantes.fr/english-version?l=1) and Nantes University (NU) invites applications for a “chaire de professeur junior” (similar as a tenure track). The application period will probably run from 5th March to 12th April. Upon completion of three-years contract, INRAE is offering tenure as a Senior Researcher (Directeur de Recherche).

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Research project to be developed and associated activities: Industries are prompt to reduce their emissions, inducing the renovation of manufacturing practices. Frequently, the production of materials involves the use of fossil resources with well-known, stable properties. The bioeconomy relies biomass (such as dedicated crops, co-products) which display scattered properties influenced by seasonal changes, the vagaries of climate change or transformation process. It is crucial to sort biomass deposits according to targeted uses without conducting exhaustive analysis of each biomass. In VARIOUS, we use statistical physics, already used by the Centrale Nantes engineering school (https://www.ec-nantes.fr/english-version?l=1), for the design of renewable materials. The CPJ is developing digital strategies (simulation and prediction tools for the rapid development of zero-defect products - AI), making it possible to enable the rapid sorting the different sources of biomass while limiting the need of extensive experimentation. The starting point will be microstructural data specific to BIA, where different properties (tissue structure, etc.) will be used to establish scale links to predict performances and multi-functionalities (e.g. thermal, and their couplings, etc.) and usage properties.

In terms of disciplines, we ideally seek researcher whose expertise lies at the intersection of digital solid mechanics and materials sciences (physics, chemistry). Candidates demonstrating a practice of interdisciplinarity are desirable to carry out the project successfully. The necessary skills required cross the fields of digital tools and the physical chemistry of biomass deposits. The initial training courses expected to effectively manage this project are held either by experts in digital modeling and simulation tools who are familiar with and initiated into plant biomass and fibers; or experts in materials sciences specializing in biomass and natural fibers and users of digital tools.

Financial support: Financial resources will be allocated to CPJ to recruit one or more PhD students or postdocs for a three-year trial period.
Salary: Your gross annual salary* will be starting from €43 500 for the duration of your 3-years contract
Teaching project: The annual hourly volume will be 48 hours, to be taught as part of the ECN and NU, with a 50/50 dedicated to engineering courses (ECN and NU Polytech) and Master 2 courses. The VARIOUS Chair will be devoted to courses on two major complementary topics.

1) Biochemical composition - structure of plant biomasses

2) Mechanics of continuous media, mechanics of multiscale media with controlled microstructure.

Training and skills of applicants: The applicant skills will ideally be at the crossroads of numerical solid mechanics and materials science (physics, chemistry). Applicant demonstrating interdisciplinary track record are desirable. The skills required cut across the fields of numerical tools and the physical chemistry of biopolymers and biomass. The initial training required to effectively lead this project will be held either by experts in numerical modeling and simulation tools who are familiar with and initiated into biomasses and plant fibers; or by material science experts specialized in biomasses and natural fibers and users of numerical tools.