POST DOC POSITION IN STATISTICAL ECOLOGY

- Recruitment grade: young researcher (i.e. with PhD)
- Location: Anglet, France
- Duration: 12 to 36 months, starting late 2018 (October – December 2018)
- Deadline: 15 September 2018
- Gross Salary Range: 2999 euros / month

Context and aims

The continuous increase of data volume and diversity brings the most challenging issues raised in Computational Ecology and Environmental Sciences (C.E.E.S): more parameters to estimate than observations, non-linear effects, heterogeneous data types, and changing relationships between variables over time and space. To handle these challenges, it is urgent to develop suitable statistical methods and confront them to high-stakes socio-environmental issues.

Recent technological advances in E.E.S. fields have given rise to numerous large-scale but often poorly structured datasets. The progress in E.E.S will, for the foreseeable future, continue to depend upon data collected across a wide range of scales on various sites with a great variety of data processing techniques. One main danger for the E.E.S. data is then to remain largely hidden from view in a myriad of disconnected data silos and then to generate a huge assortment of conclusions from local studies and specific methods with little way to judge how general those scientific findings might be. A major challenge is to make available efficient and operational tools for data analytics to the scientific commmunity, in a spirit of data and methods sharing, scientific transparency and reproducibility. Aiming to feed the global integrative research effort and to address the methodological challenges related to the size and complexity of the data, the present project will provide a generic toolbox for E.E.S. at the forefront of innovation. The aim of this project is two-fold: (i) to enhance and further develop the current toolkit for integrative analysis of massive datasets, especially for spatio-temporal data and, (ii), to provide direct applications in high-stakes environmental topics, in the general context of global climate change and continuously increasing human pressure.

The post doc will take part in the development of statistical methods for analyzing long-term ecological data and in statistical analyzes within the BIGCEES team (Big model and Big data in Computational Ecology and Environmental Sciences) based in Anglet (France).

Tasks and proposed methodology

- Development of dimension reduction approaches allowing non-linear effects. This part of the project is dedicated to reduction procedures allowing non-linear effect of the covariates. The project particulary focuses on: (i) a method combining random forest method and clustering of variables and (ii) slice inverse regression (SIR) approaches.
- Development of Sparse Bayesian variable selection regression. This part of the project aims to propose novel bayseian models taking into account (i) repeated measures, (ii), deal with binary outcomes, (iii), cope with multiple correlated mixtures of responses and, (iv), perform integrative analysis.
- Development of spatio-temporal model to predict the flows at river mouth areas. Marine flooding events are generally caused by a strong storm (waves and surge), a spring tide, or a combination of both. In river mouth and estuary areas, it can be exacerbated if it coincides with a high river discharge: when the massive terrestrial waters meet high sea levels, water can not be evacuated to the sea and spreads over the lowlands around it. This is a particular threat in the low-lying areas crossed by rivers (e.g. Bayonne, Anglet, Bidart). We will concentrate on the development of rainfall-runoff models to predict, by relating rainfalls with watershed and affluent drainings, the river discharge and water level in selected areas.

- Evaluate and model the possible impact of climate change on the distribution of fish species in the Bay of Biscay. This project aim is to explore possible changes in the spatial and temporal distribution of targeted fish species (those most important for the realization of turnover) in the Bay of Biscay and to link them to changes in meteo-marine conditions related to climate change. Thus, a new integrated approach will be first dedicated to link various fishery data from sales, logbooks and scientific campaigns with environmental data such as water temperature and salinity.

Funding

This post doc position is funded by the project E2S-UPPA (Energy Environment Solutions) whom core scientific domain focuses on Environment and Energy to meet challenges related to the energy transition, geo-resources, aquatic habitats and the environmental effects of natural and anthropogenic changes (https://e2s-uppa.eu/en/index.html).

Supervision and Contact

Supervisory team: Benoit Liquet (benoit.liquet@univ-pau.fr) at the LMA : Laboratory of Mathematics and its Applications, UMR CNRS 5142 (https://lma-umr5142.univ-pau.fr/fr/index.html) on the campus of Anglet (64600) France. The LMA is one of the lab of the University of Pau and the Pays de l'Adour (UPPA), I-site laureate with its project E2S-UPPA.

For additional information and proposal, please contact: Pr Benoit Liquet, Tel: + 33 6 95 46 10 61 Email: benoit.liquet@univ-pau.fr

Young Researcher skills required

- The applicants should have a Phd in Computer Science or in Statistics, have strong experience with programming, good communication skills and interest in working in a cross-disciplinary team.
- A successful post doc candidate might have experience in the development and application of Bayesian and Frequentist methods for computationally challenging problems.
- A successful candidate will also have experience in scientific computing. Prior experience in ecology is not necessary, but is counted as an advantage. The exact direction to which the post doc will develop novel models for analyzing long-term ecological data and in statistical analyzes can be agreed upon based on the experience and interests of the candidate.

Salary

The salary of the successful candidate will be based on level chart for teaching and research personnel in the salary system of French universities. The salary will be 2999 euros/month (gross salary), including allowance for 64 hours teaching per year.

Applications and deadline

Please submit your application by email to benoit.liquet@univ-pau.fr. Please attach the following documents as a single pdf file: motivational letter (max 1 page), CV (max 2 pages) and publication list. Include also contact information of two persons who can provide a reference letter based on request.

The deadline for submitting the application is 15 September 2018.