Post-doctoral researcher in statistical machine learning for financial multi-asset strategies

Applications are invited for a post-doctoral research associate for a period of 12 months to work on a project jointly supervised by Heriot-Watt University and Aberdeen Asset Management Plc. The project will involve bringing together statistical methodology, machine learning and efficient computing for robust predictive performance assessment and evaluation of multi-asset strategies in finance under increased volumes of data and information. The research is mainly funded by The Data Lab and the post-holder will work closely with a team of academics and quantitative specialists.

Salary: £31,076 - £38,183 (Grade 7 HWU)

Closing date for applications: 21 November 2016

About our team

The School of Mathematical and Computer Sciences at Heriot-Watt University (HWU) comprises leading academics and attracts researchers and students from all over the world. It is part of the Maxwell Institute for Mathematical Sciences, with world-leading research activities in the areas of probability and statistics, actuarial science and financial mathematics. The School has close links with the financial services industry and is partner of the Scottish Financial Risk Academy. It is also a founding member of the Scottish Informatics and Computer Science Alliance (SICSA) and has a strong research profile in the areas of parallel computation, human-robot interaction and intelligent systems. Aberdeen Asset Management (AAM) is one of the world's largest independent asset managers with over £301 billion assets under management, a network of 38 investment centres in 25 countries and over 2,800 staff. It is listed on the London Stock Exchange and manages currency and fixed income and equities in segregated, closed and open-ended pooled structures.

The project will be led by Dr George Streftaris, who has established expertise in Bayesian stochastic modelling and statistical analysis across the interface of statistics, epidemiology, actuarial mathematics and life sciences. In the area of hardware acceleration of machine learning processes, Dr Hans-Wolfgang Loidl's main research area is parallel computation, and in particular high-level programming models for parallel and distributed computation. The project will also have the support of Professor Alex McNeil who is internationally renowned in statistical financial risk management. The quant team at AAM (Emilio Llorente-Cano and Grigorios Papamanousakis) has strong expertise in investment strategy and relevant machine learning tools, and is responsible for producing a systematic investment process for multi-asset allocation and global macro portfolio management.

Detailed description

We are seeking to appoint a one-year post-doctoral research associate with excellent background and qualifications in applied statistics and/or machine learning to work on a project jointly supervised by Heriot-Watt University (HWU) and Aberdeen Asset Management (AAM). The project will bring together Data Science coupled with methodological and industry know-how, aiming to enhance current elements of feature selection, back-testing and statistically robust predictive performance assessment while using high performance computing. All these elements are essential in the framework of multi-asset investment, in support of reliable and quantitatively robust decision-making under an increasingly expanding volume of new information and complex financial market data. The project is funded by The Data Lab, AAM and HWU and the post-holder will work closely with a team of researchers in the School of Mathematical and Computer Sciences at HWU (including two academics and one PhD student), and a team of industry quantitative experts at AAM.

More particularly, the research project will address a number of tasks, including the following:

- Review of various steps required to implement a Machine Learning framework for multi-asset trading strategies, including statistical and machine learning processes such as factor selection, forecasting using relevant learners, Bayesian prediction etc.
- Analysis of the performance and stability of various learners under different input factors, trading horizons and hyper parameters, with focus on establishing statistically reliable back-testing methodologies.
- Review and extension of existing industry-specific machine learning and evaluation methodologies, and development of code base to improve power of current framework.
- Application and testing of methodologies to current mandates incorporating typical customer constraints and investment objectives.
- Improvement of performance and computational efficiency of algorithms using parallel programming and powerful platforms (e.g. cloud infrastructures).

Key duties and responsibilities

The post holder will:

- Work under the direction of the project research team to build AAM's multi-asset investment decision process based on robust statistical methodology and machine learning techniques.
- Conduct individual and collaborative research involving, amongst others, feature selection, back-testing and statistically robust predictive performance assessment.
- Undertake background research and analysis of current statistical back-testing and algorithm capability.
- Contribute to the development of a suitable action plan in light of initial background research and analysis.
- Adapt and extend existing AAM methodology and code base through the development of statistically-robust machine learning modules which utilise mainly internal AAM datasets.
- Cooperate with experts in parallel programming on identifying opportunities for improving performance through parallel execution of application components.
- Contribute significantly to the writing of research reports, documentation of findings and preparation of research papers for publication to peer-reviewed journals and conference presentations.
- Communicate and present results to relevant audiences.

Education, qualifications and experience

Minimum qualification: Doctorate. Applicants should have a PhD degree in Statistics, Machine Learning or related discipline.

In addition the successful candidate should have or be able to demonstrate:

- Evidence of a developing track record of research publications in the area.
- Ability to work within a multi-disciplinary team and contribute to knowledge transfer and exchange.
- Specific expertise is statistical modelling and analysis, practical experience in applying machine learning techniques and strong computer programming skills (e.g. MATLAB, R, C++).
- Ability to work independently and as part of a team in a multi-disciplinary and multi-cultural work environment.
- Experience of working in a Higher Education or similar environment.
- Excellent communication skills.

The following would also desirable and beneficial:

- Knowledge and experience in the field of finance.
- Some background in parallel programming.

Applications

Formal applications must be submitted online at

https://www.hw.ac.uk/about/careers/job-opportunities.htm

Please include the following with your application:

- Your CV.
- A personal statement outlining your interest and motivation for this post and how your background would help you be successful.
- Transcripts for your BSc and MSc degrees or equivalent.
- Names and contact details of two academic referees.

It will also be helpful if you could email these directly to the principal investigator, Dr George Streftaris (g.streftaris@hw.ac.uk).

You can also contact Dr George Streftaris for an informal discussion and more information and details about the project.