The Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA), School of Computer Science, the University of Birmingham is looking for Early Career Researchers (PhD candidates) in nonlinear optimization, data science and machine learning for a Marie-Sklodowska Curie Innovative Training Network (ITN) named "ECOLE: Experience-Based Computation – Learning to Optimize". This unique training programme is initiated by a consortium of academic and industrial partners consisting of the University of Birmingham (UK), Leiden University (Netherlands), the Honda Research Institute Europe (Offenbach, Germany), and NEC Laboratories Europe (Heidelberg, Germany).

Within the programme, research will be performed to seek novel synergies between nature inspired optimization (e.g., evolutionary computation) and machine learning to address new challenges that arise in industry due to the increasing complexity of products, product development and production processes. The unique aspect of ECOLE is to study and capture the notion of experience that is associated with expert engineers, who have worked on complex optimization tasks for a certain time, in a computational framework composed of machine learning and optimization strategies. We aim at developing cutting-edge optimization algorithms that can continuously accumulate experience by learning from development projects both over time and across different problem categories. The more such algorithms are used for different optimization problems, the better they become as their accumulated experience increases.

**Job Summary**

- Work within the EU H2020 ITN project on "ECOLE: Experience-Based Computation – Learning to Optimize" and contribute to the research and report/paper writing for the project
- Work within areas of nonlinear optimization, data science and machine learning as directly by the PI
- Formulate research questions, conduct novel research, analyse and interpret research findings and results
- Develop software systems that link to systems used by the industrial partners
- Contribute to the administration and organisation of training events, including workshops, visits, seminars and project meetings.
- Write project reports and scientific papers
- Work with other ESRs in the same project

**Main Duties**

The PhD candidates will spend 50% of their time in the Honda Research Institute Europe (Offenbach, Germany) or NEC Laboratories Europe (Heidelberg, Germany), and be trained in different academic environments and industrial sectors. They will have the opportunities to work closely with both academic and industrial supervisors. The responsibilities may include some but not all of the responsibilities outlined below.

- Develop research objectives and proposals for own or joint research within the ECOLE project
- Write project reports and scientific papers
- Design experiments, conduct computational studies, and analyse and interpret data
- Apply knowledge in a way which develops new intellectual understanding
- Disseminate research findings for publication, research seminars etc
- Supervise MSc/BSc students on research related work and provide guidance to junior PhD students where appropriate
- Develop new models, techniques and methods
- Undertake management/administration arising from research
- Contribute to School research-related activities and project administration
- Contribute to enterprise, business development and/or public engagement activities of manifest benefit to the College and the University, under supervision of the project leader
- Liaise with other project partners in research
- Develop software systems that can be linked to industrial partners’ existing systems
- Contribute to the organisation of training events, including project meetings, workshops, summer schools, seminars, etc.
- Participate in training activities as required by the project
Person Specification

Suitable candidates for these positions will be selected according to the following criteria:

- Excellent master’s degree or First Class BSc/BEng degree in computer science or a closely related field.
- Strong interest in and focus on meta-heuristic optimization, data science and machine learning.
- Ambition and ability to come up with creative solutions.
- Excellent English language skills.
- Excellent communication and team-working skills

Mobility rule for MSCA-ITN programme: candidates must not have resided or carried out their main activity (work, studies, etc.) in the UK for more than 12 months in the 3 years immediately before the recruitment date.