Teaching profile

The person hired must present skills and interest in teaching basic subjects to any basic teaching a computer engineer such as distributed applications operating, advanced programming and object-oriented programming systems (e.g.: WebServices), information and advanced (objects, UML, etc. analysis), data management (e.g. systems methods: Database, Big data, etc. ...).

Skills and appeal for participation in teaching on emerging areas such as smart environments, the Internet of Things, collective robotics, are particularly welcome.

The successful candidate will have to teach primarily at computer science department of Polytech Lyon but may also teach at computer science department of Faculty of Science and Technology (FST), University Claude Bernard-Lyon 1.

Teaching department description

Polytech Lyon is an internal engineering school at the University Claude Bernard-Lyon 1 belonging to the Polytech network. It forms in 5 years, enterprising and innovative engineers in six specialties of engineering training, including IT specialty. This specialization trains students for careers in engineering information systems. At the crossroads of major areas: computer science and information technology and communication, management, learning, knowledge, skills, life skills is available throughout the training. From a sound scientific basis, professionalization is developed around four areas of expertise: scientific and technological, organizational, methodologies, social and behavioural.

Research profile

Multi-Agents Systems, Developmental Learning and Smart Environments.

Offered Position Profile: The massive development of smart environments raises new scientific and technological challenges in many areas, including in the field of computer science in general and artificial intelligence in particular. Self-* Multi-Agent Systems (self-adaptive, self-organizing, etc.) offer a first class paradigm for tackling such challenges. This paradigm addresses the distributed and highly dynamic nature of these environments, while offering the ability to develop their intelligent and social dimensions, as well as their developmental learning capacities.

Importance of the scientific topic of the position profile

Developmental learning is an emerging field with very hot topics related to the fundamental issues addressed in strong AI (Artificial Intelligence), such like the symbol grounding problem, the issue of constitutive autonomy, etc. From the perspective of Self-* Multi-Agents Systems, developmental learning consists in pushing further the system’s self * (self-organization, self-adaptation, self-assembly, etc.) properties, from simple bio-inspired control mechanisms to self-development of cognitive abilities.

Positioning the job profile in the team’s research project

The person hired for this position will join the Multi-Agents Systems theme, developed in «Cognition & Interaction» research cluster of the LIRIS (UMR CNRS 5205) laboratory. This theme develops three research topics in the field of Multi-Agent Systems: 1) Learning and constructivist approaches to cognition, 2) Self-* Systems and 3) interaction and coordination models. The desired profile for this position relates to the first two topics «Learning and Self- * Systems». Specifically, we aim at strengthening the skills within this theme in the field of developmental learning, constructivist approaches to cognition and ambient intelligence with applications in smart environments (smart home, smart city, intelligent highway, etc.), collective robotics, complex socio-technical systems, etc. In addition to scientific excellence, the candidate must show qualities of dynamism, openness and scientific maturity that enables her/him to engage on this difficult research topic, to actively contribute to research projects and collaborations and engage in research activities and research training conducted by the home team.
LIRIS (Laboratoire d’InfoRmatique en Image et Systèmes d’information) is a research center on Information Science and Technology. LIRIS is affiliated to CNRS (Centre National de Recherche Scientifique) under the label UMR 5205. The laboratory involves 320 researchers from INSA de Lyon, Université Claude Bernard Lyon 1, École Centrale de Lyon, Université Lumière Lyon 2 and CNRS. It is organized in six areas of skills of 20-25 permanents. Each of the 14 research teams belongs to one of these areas:

- **Computer Vision and Pattern Recognition** (IMAGINE and M2DISCO research teams): automatically understanding multimedia data (images, video, digital documents, 3D scenes): acquisition/reconstruction, indexing, modeling, classification or automatic content recognition (objects, actions, concepts ). Skills: signal and image processing (filtering, segmentation, feature extraction), machine learning and pattern recognition (connectionist, statistical and structural approaches), information fusion, constraint programming, discrete and continuous optimization.

- **Geometry and modeling** (GEOMOD and M2DISCO research teams): computational geometry, discrete geometry, geometric and topological modeling, 3D reconstruction and interactive creation, procedural modeling, geometry processing of meshes and discrete shapes (feature extraction, indexing and retrieval, compression, watermarking, segmentation, visualization), topological modeling.

- **Data Science** (BD, DM2L and GOAL research teams): to provide adequate answers to the explosive deluge of digital data, this research group aims to promote fertilization between different complementary areas of computer sciences related to data modeling, algorithmic, graph theory and combinatorics, data mining and statistical learning or languages and systems for databases.

- **Services, Distributed Systems, and Security** (DRIM and SOC research teams): proliferation, discovery and composition of software and data services deployed over the Internet, quality of service and fault tolerance, security, trust, reputation, content adaptation and personalization, reliable information sharing and dissemination.

- **Simulation, virtuality, and computational sciences** (BEAGLE, R3AM and SAARA research teams): this research group aims to acquire, understand, model, simulate and render our environment from the realistic simulation to mathematical modeling continuum. Along the real-virtual continuum, the following skills are acquisition / modeling / interpretation / rendering of scenes, animation, computational biology, artificial evolution, multi-scale models, perception models, reaction / diffusion models in particle systems, augmented reality, computer graphics, artificial life. On the methods plan, the following skills are present: intensive and parallel computing, scientific computing, stochastic methods, self-centered modeling, computer vision, bio-mechanical simulation, multi-physics simulation.

- **Interactions and cognition** (SICAL, SMA and TWEAK research teams): this research group analyzes, designs and develops dynamic digital systems in which agents (human or software systems) interact. The researchers focus both on individual properties of agents, and on properties of the system as a whole. In particular, they are interested in the cognitive abilities of those systems. Skills: knowledge dynamics and traced experience, Computer Environment for Human Learning, interactive systems, multi-agents systems.

The laboratory leads research on fundamental issues in these six areas. It also develops know-how with strong impacts on society and closely with the other scientific disciplines (engineering, Humanities and Social Sciences, Environmental Sciences and Life Sciences):

- **Culture and heritage** (digital libraries, critical edition, digitization of ancient documents, archiving, 3D virtual museums …)

- **Environment et urban world**: intelligent building, 3D modeling of the cities, Geographical Information Systems, mobility, transport optimization

- **Biology and health** (data mining, complex systems modeling and analysis, e-health…)

- **Ambient intelligence** (pervasive systems, sensor networks, intelligent video surveillance, secured communicating objects…)

- **Human learning** (personalization, cognitive assistance, collaborative learning…)

- **Digital entertainment** (video games, animated cinema, multimedia data processing…)

- **Big data management**: processing, visualization