

## Role Summary

The Applied Research + Development team produces cutting-edge technologies including performance-driven design tools, generative and complex geometry workflows, web applications, eXtended Reality (XR) applications, machine learning and data visualisation pipelines, smart building / city and digital twin applications to support Architecture, Engineering, Construction and Operations (AECO) for the built environment. We take these technologies through all stages of the innovation lifecycle, from R+D prototypes through to robust production applications.

Design Systems Analysts are critical in delivering this remit. They bring together experience in research and innovation, strategic thinking about design process and technology, and deep technical expertise. They undertake delivery of technology and workflow solutions supporting teams across the practice in architecture, engineering and specialist disciplines. As they gain seniority, they oversee and manage these processes within the team and laterally across the company as part of the firm's integrated design approach. They also engage with consultants, clients and the broader AECO industry, delivering peer-reviewed research, collaborative design solutions and best-in-class technology.

## Role Definition

**Job Title:** Design Systems Analyst (Applied R+D)

**Reporting to:** Head of Applied Research and Development

## Responsibilities

- Conduct applied research and development in support of the Company's objectives
- Provide technology, modelling and workflow expertise to support design teams in the delivery of projects as internal consultants
- Model, analyse and solve complex, multi-disciplinary design problems
- Research and develop tools, methodologies and products to enable and generalise the above activities
- Develop and maintain applications through coding and developer operations (DevOps) in support of the team's areas of expertise (as above) in one or more of the following application domains:
  - Web development (front-end, back-end, full-stack)
  - Real-time game engines and extended reality (XR)
  - Machine learning and artificial intelligence
  - Desktop software including CAD and BIM plugins
  - High performance computing (distributed and GPGPU)
  - Remote sensing and control including robotics and internet of things
- Manage the above applications as business-facing and/or commercial products from prototype to production
- Delivering in support of all stages of application development lifecycle, including tests, CI/CD pipelines and documentation
- Advise and support project teams at all stages of design and construction, particularly through promotion and application of the above products, tools and methodologies
- Maintain and advance state of the art knowledge of Computer Aided Design, Engineering and Manufacturing (CAD/CAE/CAM)
- Thorough knowledge of and compliance with F+P procedures and standards.

- To contribute or otherwise assist as required also on other fields and projects.
- Equity, diversity & inclusion (EDI) is a core priority. To support and champion the embedding of this focus as a collective workforce responsibility, EDI should be integrated, where relevant, into all workstreams.

## **Qualities and Skills required**

### **Essential**

- Able to demonstrate ability to undertake the above responsibilities
- Legally able to work in the country in which the position is based
- Diploma or degree in architecture, engineering or computer science or a related field or equivalent relevant experience
- Specialist knowledge, experience and capability in one or more of the following areas:
  - complex geometry and fabrication
  - performance-driven design and optimisation
  - collaborative design and interoperability
  - artificial intelligence, machine learning and data science
  - XR and interactive computing
  - applied robotics including SLAM, reality capture and logistics
  - ubiquitous computing (including the internet of things - IoT), smart building/city and digital twin
- Strong programming skills in one or more of the following programming languages: C#, C++, Javascript
- Demonstrated experience of research in an academic or industrial setting, including problem formulation, precedent review, testing, evaluation and communication of results
- Collaborating with software developers, computational designers, engineers and other domain specialists
- Able to manage sensitive and confidential information
- A keen eye for detail
- Good problem-solving skills
- Good interpersonal skills
- Excellent organisational and written and verbal communication skills
- Able to manage sensitive and sometimes confidential information
- Self motivated and able to take responsibility
- Able to demonstrate initiative and a proactive approach to daily tasks
- Good interpersonal skills and able to work independently and as part of an effective team
- Flexible attitude
- Able to build good relationships at all levels, internally and externally
- Resilient to cope with conflicting demands, able to prioritise duties and work effectively under pressure.
- Able to work as part of an effective team assisting and supporting team members

### **Desirable**

- Knowledge of the following CAD/BIM applications: Rhino, Grasshopper, Revit, Dynamo
- Understanding and experience of the processes of design and construction
- CAD/BIM API development
- Experience programming in Python
- Experience with software version control systems (e.g. Git) and/or software development methodologies and practices (e.g. Agile, DevOps)
- Experience with GPU and GPGPU programming, including Vulkan, CUDA, OptiX

- Experience developing applications using computer game platforms, particularly Unity or Unreal Engine
- Experience developing iOS and Android apps
- Experience with web and/or mobile application development
- Experience with database technologies and query languages including relational (SQL), document and/or graph databases.
- Knowledge of data science, machine learning and statistical methods for analysing data
- Experience in data science computing environments including the R language and PANDAS
- Experience deploying cloud-based applications and managing cloud resources, particularly Microsoft Azure
- Experience with environmental simulation applications such as: EnergyPlus, Radiance, OpenFOAM
- Experience with structural engineering applications such as: ETABS, SAP2000
- Knowledge of UNIX and container / cluster computing technologies (Docker, Kubernetes)
- Strong verbal, graphical and textual communication skills
- Maintain and advance state of the art knowledge of Computer-Aided Design, Computer-Aided Engineering, Building Information Modelling, Geographic Information Systems, Computerised Maintenance Management Systems and Computer Aided Facilities Management (CAD/CAE/BIM/GIS/CMMS/CAFM)

This description reflects the core activities of the role but is not intended to be all-inclusive and other duties within the group/department may be required in addition to changes in the emphasis of duties as required from time to time. There is a requirement for the postholder to recognise this and adopt a flexible approach to work. Job descriptions will be reviewed regularly and where necessary revised in accordance with organisational needs. Any major changes will be discussed with the postholder.