Job information



AI Data Scientist/Postdoctoral Computational Biologist for phenotypic analysis

Post ref.	T418	Location (base)	NIAB Headquarters,
			Cambridge
Team	Data Sciences Department	Job group	Specialist
Centre	Research	Salary range	£32,500 to £35,000 per
			annum
Reports to	Head of Data Sciences	Line manages	N/A
Hours per	37 hours working	Contract type	12 months fixed term
week / pattern	Monday – Friday		

About NIAB

As the UK's leading crop science organisation, NIAB has research capabilities in plant genetics, agronomy, farming systems and data sciences, the largest national field trials capability, and strong multi-scale phenotyping and phenotypic analysis research links with industry, Government and academia. With headquarters in Cambridge, and regional offices across the country, employing more than 400 people across the UK, NIAB advances the role of plant genetic resources through research services and training. NIAB's position at the interface of academic research and commercial breeding offers opportunities for strong collaborations across the plant sciences sector.

NIAB has acclaimed multi-scale plant phenotyping and AI-powered trait analysis capabilities include:

- Drone-based aerial phenotyping platforms (AirMeasurer)
- IoT-based sensing for monitoring agricultural and horticultural crops (e.g. CropSight, CropQuant, YieldQuant-Mobile, which is the foundation of the project)
- Seed testing equipment such as the Videometer and SeedGerm

NIAB also has a UK-leading high-performance computing (HPC) and GPU clusters infrastructure, jointly established with James Hutton Institute and other partner institutes. This can be used for machine learning/deep learning, results dissemination, cloud-based informatics and artificial intelligence (AI) modelling. Capabilities include 1,700+ CPU cores for trait analysis, 2 Tesla V100 GPUs/a tailored local GPU cluster, 15 terabytes of memory and 1.5 petabytes of storage,

NIAB's state-of-the-art facilities at its two Cambridge sites host molecular biology and plant growth facilities, including extensive glasshouses and containment units for genetically modified plant trials and over 250 hectares of commercial cropping and field trials. Our HQ site hosts the Crop Science Centre (CSC), a collaboration between NIAB and the University of Cambridge (UoC), with a mission to deliver food in a sustainable way.

Job description

1. Role purpose

This important role underpins NIAB's ongoing research collaboration with One CGIAR (a global research partnership for a food-secure future dedicated to transforming food, land, and water systems in a climate crisis) in identifying wheat and potato varieties to understand genetic gain and key yield components using artificial intelligence (AI) powered techniques and computer vision to develop more sustainable crops. This collaborative research programme is led by Professor Ji Zhou at (NIAB) and Seed Equal (One CGIAR).

The purpose of the role is to mine meaningful information from ultra-large field-based images to inform breeders and farmers regarding the yield potential of target crops through the use of advanced algorithms in automated image analysis, object detection, multimodal AI modelling and big data analytics.

As an AI Data Scientist or Postdoctoral Computational Biologist, you are expected to build on current research activities that utilise AI and computer vision to perform attention-based object detection and classification, time-series

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tracking and dynamic phenotyping. The key to success is working collaboratively with colleagues within and outside NIAB, supporting the Head of Data Sciences to develop and strengthen relationships with existing and potential collaborators, funding organisations and other stakeholders.

2. Financial authority/responsibility

None.

3. Key relationships

- Internal: Colleagues in Data Sciences group pre-breeding/breeding groups, and plant pathology group
- **External:** Research & development staff of collaborating organisations such as One CGIAR and its African partners, Crop Science Centre, the University of Cambridge.

Current and potential funding organisations such as the University of Cambridge and Gray Foundation.

Potentially, other stakeholders in academia and plant breeding and growing commercial sectors, such as NIAB Members.

4. Key tasks/responsibilities

	Approx. % of time
Develop AI-powered variety detection algorithms using smartphone-based computing. This involves vision-based phenotypic analysis using automated image analysis, attention-based object detection, and other deep learning techniques.	40%
Working closely with One CGIAR and University of Cambridge partners, implementing analysis algorithms using optimised Python programming together with database and graphical user interface (GUI) based systems development.	20%
Conduct lab- and field-based phenotyping and data pre-processing using drones and handheld devices.	10%
Assist the Head of Data Sciences with preparing funding applications for research into AI-based breeding, plant and crop phenotyping, Agri-Tech innovation, and agricultural/horticultural crop production. This includes helping develop research & development partnerships with other plant research/data science organisations.	15%
Prepare and assist the Head of Data Sciences to prepare research publications in AI-powered breeding, plant and crop phenotyping, Agri-Tech innovation, and agricultural and horticultural crop research.	15%

5. Working conditions

Primarily office based. Regular Visual Display Unit user. Hybrid working possible – working at least 3 days a week on-site is required. Occasional travel to NIAB. East Malling, Kent if required and possibly to African partners' sites. Occasional field-based phenotyping using remote sensing equipment and drones - involves walking and manual handling.

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Person specification

Criteria	Essential	Desirable
Qualifications		
BSc or MSc in computing sciences, computational biology, artificial intelligence or equivalent qualifications/experience	х	
PhD in computer vision, machine learning or computing sciences		х
Knowledge and skills		
Python programming, deep learning and image analysis	х	
C/C++, Java programming		х
Plant and crop phenotyping		х
Graphic user interface development skills such as Django		х
Good verbal and written communication skills	х	
Good interpersonal skills	х	
Strong numeracy and data handling skills	х	
Strong organisational and planning skills		х
Experience		
Automated image analysis	х	
Vision-based phenotypic analysis using computer vision and deep learning	х	
Computer vision and phenotypic analysis with software implementation		х
Algorithmic design in deep learning together with software implementation		х
Database development, cloud computing		х
Qualities and attributes		
Evidence of commitment to own personal development and willing to learn new skills	x	
Accuracy and attention to detail	х	
Collaborative and open-minded regarding science	х	
Innovative in and committed to applied crop and plant research		х
Motivated and enthusiastic about work	х	
Other		
Driving licence or access to independent means of travelling, enabling occasional travel to NIAB, East Malling, Kent. Transport can be provided.		x

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