# JOB DESCRIPTION & PERSON SPECIFICATION

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|---|---|---|
| **1.Job title:** Postdoctoral Researcher- Multiscale Crop Modelling   **Centre:**   CCR- 24          **Grade:** Specialist     **Location:** HQ | | |
| **Reports to** (Job title)**:** | **Line Manages** (Job titles)**:** | |

## 2.  Main purpose of role:

NIAB is the UK's fastest growing crop science organisation, with rapidly expanding research capabilities in plant genetics, agronomy, farming systems and data science, the largest national field trials capability, and strong research links with industry, Government and academia. With headquarters in Cambridge, and regional offices across the country, employing around 400 people across the UK, NIAB provides scientific research, technical services and practical advice to improve the yield, efficiency and resilience of crop production across the arable, forage and horticulture sectors.

We are seeking an imaginative crop modeler to develop an advanced model of a key glasshouse crop, working at NIAB (a leading UK research institute) in collaboration with a leading data science startup company and a world class horticultural production company.

Multiscale modelling of crops within their environment offers the opportunity to both optimize growing systems to crops and crops to growing systems. Given that food production must rise 50% by 2050, agriculture already accounts for 70% of global freshwater withdrawals and climate change is expected to significantly decrease the yields of field farming - greenhouses are the only scalable solution for production of sustainable nutrient dense horticultural crops and are **essential to the UK's agricultural future**. As part of a flagship project, funded by the Industrial Strategy Challenge Fund "Transforming Food Production"  our industry partners will develop and demonstrate **the world's first Autonomous Growing System(AGS)**. The AGS will provide optimised data-driven growing for any crop variety, in any greenhouse, in any location - **significantly increasing production levels and resource-efficiency** in existing greenhouses, and **accelerating the deployment of new greenhouses in the UK** and around the world.

We are seeking a candidate with skills in Plant Architecture Modelling and Source-Sink Relations as part of the AGS challenge specifically:

- Functional-Structural Plant Model (FSPM) implementation using OpenAlea/XL/GroIMP/Ecomeristem, or similar and development of process based models in crops

- Converstion and registration of point cloud data (using Open CV/PCL or similar)

- Appropriate programming languages and environements (Java, Python, R)

You will be working in a team consisting of geneticists, computational modellers and crop physiologists at NIAB in our Cambridge Crop Research unit. You will also work collaboratively with industrial systems engineers and horticultural growers producing data and participate in the research activities of the project as a whole. You will be expected to contribute their own innovative ideas, resulting in potential independent projects. You will be expected to write scientific research papers and present results at conferences.  You must be comfortable working at the interface of disciplines in a constructive and collaborative manner. Additional guidance from senior data scientists in the Data Sciences department will be provided, which will bring you up to speed on the latest developments in machine learning and AI-based modelling.

NIAB has formed an alliance with the university of Cambridge, the Crop Science Centre with the ambition of carrying out outstanding and impactful science for the equitable transformation of agriculture. You would be working at the heart of this alliance, which receives funding from both national and international sources (e.g. Bill &Melinda Gates

Foundation). You will be part of the Cambridge landscape of Plant and Crop Sciences, working with colleagues in the department of Plant Sciences and the Sainsbury Laboratory.

NIAB is committed to equal opportunity and gender balance and is also recognised by the commitment to work with international partners as evidenced by the number of Newton and GCRF current projects on global staple crops.

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**3. Financial authority/responsibility** (e.g. delegated budget, authorisation level, approx value of contracts etc**):**

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**4. Key relationships** (external and internal)**:**

Industry partners, internally, other PDRAs and group leaders.

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| Tasks/responsibilities (in order of priority) | Approx % of time |
|---|---|
| Developing FPSM model of key horticultural crop | 40 |
| Benchmarking against a range of published models | 30 |
| Integration and testing of model API with NIAB digital platform model framework | 20 |
| Publications, presentation and communication | 10 |
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**6. Working conditions :**

Role will include working in the office, lab and field. Flexible, agile working is required. Travelling where necessary to represent NIAB nationally and internationally is of great importance as is the requirement to work to short deadlines and with variable workloads.

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**7.    PERSON SPECIFICATION**

**Education/Qualifications:**

| Essential: | Desirable: |
|---|---|
| A degree in a Biological, Mathematical and/or Computational science<br><br>PhD in a relevant area | A PhD in crop modelling |

**Experience:**

| Essential: | Desirable: |
|---|---|
| At least 2 years of working experience (post degree) in developing crop models using FPSM<br><br>Experience in interdisciplinary collaboration | Background in machine learning/ deep learning or requisite mathematical skills to learn<br><br>Image analysis skills<br><br>Crop physiology experience |

**Specialist Training:**

| Essential: | Desirable: |
|---|---|
| FSPM programming environments (see main text) and model construction<br><br>Relevant programming language experience | Skills in API development, JSON and Kubernetes<br>Cloud computing experience |

**Personal Qualities (skills, behaviours and competencies)**

| Essential: | Desirable: |
|---|---|
| Attention to detail and ability to solve scientific problems<br>Work independently or with minimal supervision<br>Excellent communication and interpersonal skills | Ability to work effectively in a collaborative environment<br>Enthusiastic to learn and help the scientific community |

**Date of description:**    July 2020    **Compiled by:  Richard Harrison**