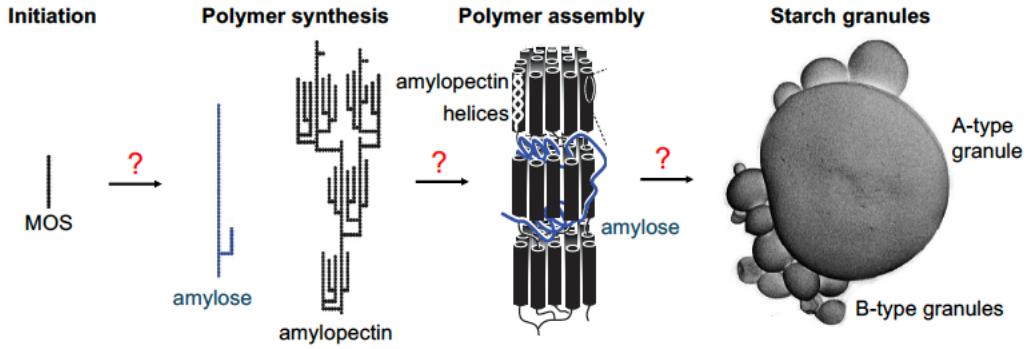
norwich research park
Doctoral Training Partnership

Elucidating Biophysics of Starch Granule Assembly

NRPDTP Studentship under supervision of Yaroslav Khimyak, Fred Warren and David Seung



Wheat is by far the UK's most important crop in terms of production and wheat-based foods are a staple component of our diet. Most of the calories from wheat grains come from starch, which comprises ~80% of the grain weight.

We still do not fully understand how starch is synthesised during grain development. Recently our team have identified a set of conserved proteins that control the number and timing of starch granules formation. By mutating the genes that encode these proteins, they have generated enormous diversity in starch granule morphology. However, how these changes affect the polymer structure and the biophysics of starch granule assembly is not understood.

This studentship will utilise mutant starches to address the knowledge gaps in starch biosynthesis by building structure-function relationships across different length scales. **The student will gain understanding on how the activity of enzyme complexes defines the chain length structures of amylopectin and amylose, and how polymer structure affects granule morphology and organisation**.

We are looking for a motivated PhD student with skills in either structural biology, biosynthesis or advanced structural tools including NMR spectroscopy willing to learn how to work across different disciplines.

By joining an interdisciplinary team of research leaders in UEA, Quardam Institute Bioscience and John Innes Centre the student will have the opportunity to master cutting edge NMR spectroscopy, carbohydrate characterisation tools and biosynthetic approches and apply them to understand the formation of starch granules with differnet properties. As a student you will join the Norwich Research Park, one the largest concentrations of biological researchers in the UK, offering exceptional graduate research and training opportunities. This unique set of scientific and research management skills is relelavant across many areas of modern Biosiences for a successful future careeer in academia or industry.

The position is available for graduates in the fields of chemistry, biological sciences, materials science, physics or pharmacy with attained or expected degree classification of 2.1 or above (of its equivalent). This project has been shortlisted for funding by the Norwich Biosciences Doctoral Training Partnership (NRPDTP, deadline for applications is 25th November 2024). **For further information please contact Prof Yaroslav Khimyak (y.khimyak@uea.ac.uk) as soon as possible.**

https://biodtp.norwichresearchpark.ac.uk/projects/elucidating-biophysics-of-starch-granule-assembly/

Relevant papers:

1. Liu, C., Seung, D. *et al.* (2023). *Sci Adv* **9,** eadg7448.
2. Koev, T., Khimyak, Y. Z., Warren, F. J. (2020) et al. *Carbohydrate Polymers* **249**, 116834.
3. Munoz-Garcia, J. C., Warren, F. J., Khimyak, Y. Z. *et al*. (2019) *Biomacromol*., **20**, 4180.