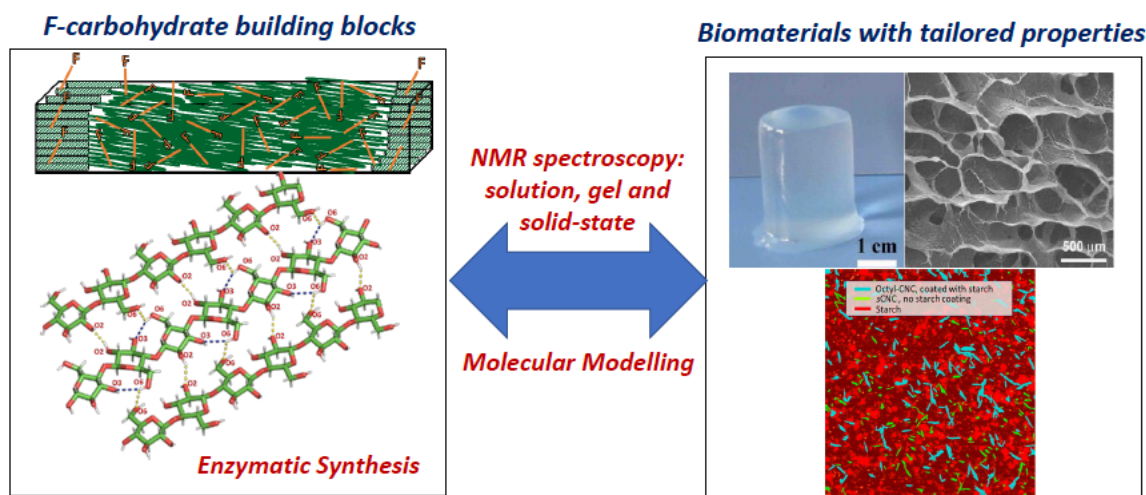


Tailoring building blocks for carbohydrate assemblies: combined NMR and computational approach

Studentship supervised by Yaroslav Khimyak, Laszlo Fabian, Robert Field and Matthew Wallace



Imagine a world free of oil-based plastics where biodegradable materials based on carbohydrates, the most abundant polymers on Earth, reigned supreme. Carbohydrates fulfil many important biological functions ranging from their ability to impart molecular recognition within (cell wall structure) and between species (infection). The natural self-assembly of sugar chains into complex 3D architectures is central to these functions, and also to widespread applications in food, packaging, pharmaceutical tableting *etc.* Cellulose is widely used across industrial sectors, but we still lack insight into how to manipulate its properties. Rational (re)-design is particularly challenging for cellulose-based materials, due to the complexity of the organisation of cellulose chains into distinct ordered and disordered domains, and the intricate arrangements of particle networks at the microscale level.

Incorporating modified cellulose building blocks represents a powerful strategy for tuning self-assembly and for the design of novel renewable materials. This project will enable a PhD student to **achieve a comprehensive understanding of structural and interface properties of novel carbohydrates with fluorine-containing building blocks**, from molecular to microscopic scale through combined use of advanced experimental and computational approaches.

We are looking for a motivated PhD student with skills in either chemistry, biological sciences or molecular modelling and willing to learn how to work across different disciplines. By joining an interdisciplinary team of research leaders in carbohydrate synthesis, characterisation and molecular modelling, the student will have the opportunity to master cutting-edge NMR spectroscopy and computational methods, and apply them to understand the self-assembly of 3D carbohydrate materials. As a student you will join the Norwich Research Park, one of 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 relevant across many areas of modern Biosciences for a successful career 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/tailoring-building-blocks-for-carbohydrate-assemblies-combined-nmr-and-computational-approach/>