

# Enhancing drug delivery with synthetic virus-like particles

STFC Hartree® Centre worked with IBM and the National Physical Laboratory (NPL) through the Hartree National Centre for Digital Innovation (HNCDI) to accelerate virus-inspired drug delivery research.

## Challenge

Delivering drugs effectively to a target in the human body presents significant challenges. Beyond discovering an appropriate drug candidate, it must reach the intended target without being broken down or acting on unintended sites, causing side effects. Researchers at the National Physical Laboratory (NPL) have been exploring virus characteristics to overcome these challenges due to the ability of viruses to travel through the body to precise locations undetected to deliver a package of genetic material. NPL aims to harness these characteristics by using synthetic virus-like particles to help in targeted drug delivery. The miniscule scale and complexity of these particles generate vast amounts of biological data to be analysed, which requires a powerful software solution.

## Approach

Our team developed software and modelling capability that enables NPL researchers to interpret the behaviour of synthetic virus-like particles. By integrating high performance computing with automated advanced data analysis techniques, we can model particle assembly at an atomic level and complete efficient, accurate structural analysis. Gaining access to this bespoke custom software has allowed NPL researchers to identify key insights with speed, precision and unparalleled efficiency.

**“This work provides rare insight, showing theory and experiment in agreement and opening new opportunities for drug delivery.”**

**Max Ryadnov**

National Physical Laboratory

Credit: STFC Hartree Centre

## Benefits

Improving our understanding of advanced drug delivery methods could mean safer and more efficient treatments for patients in the future. By streamlining the analysis of this complex biological data with an advanced software solution, we can accelerate the timeline from discovery to experimentation and implementation for novel drug delivery methods, enabling the production of safer, more efficient treatments sooner.

## At a glance

- Custom software developed to streamline research into an advanced drug delivery method
- Accelerated research for the production of safer, more efficient treatment options
- Faster insights into complex datasets, enabling a more efficient workflow for NPL researchers
- Improved understanding of an advanced, novel drug delivery method inspired by virus characteristics

## Who we are

The Hartree Centre was created by UK Government to help businesses and public sector organisations accelerate the adoption of high performance computing (HPC), big data analytics, artificial intelligence (AI) and quantum technologies. We play a key role in realising UK Government's Industrial Strategy by stimulating applied digital research and innovation, creating value for the organisations we work with and generating economic and societal impact for the UK. We are proud to be part of UK Research and Innovation.

## What we do

- Boost productivity and innovation for industry
- Offer training and skills development
- Provide insights into future technologies
- Give tailored business development support
- Build bespoke small teams around your project

