2018 YCCSA SUMMER SCHOLARSHIP PROJECT SUBMISSION

This form is for prospective project supervisors to submit their projects to be included in the YCCSA Summer Scholarships Programme for 2018.

It is the purpose of the YCCSA Summer School that any projects submitted are novel and interdisciplinary in nature.

Date	*15th January 2018*
Supervisors' Names and Departments / Affiliation and Contact Email	*Prof Reidun Twarock (Maths/Biology/YCCSA) – Reidun.twarock@york.ac.uk* *Dr Eric Dykeman (Maths/YCCSA) – Eric.dykeman@york.ac.uk* *Prof William Latham (Computing Department, Goldsmith) - w.latham@gold.ac.uk* *Dr Lance Putnam (Computing Department, Goldsmith) - L.Putnam@gold.ac.uk* *Prof Stephen Todd (Computing Department, Goldsmith) - stephentodd@gmail.com Visiting Professor.*
Project Title	*Models of viral geometry and RNA structure in a virtual reality*
Project Description	*Twarock and Dykeman have developed mathematical and computational models of virus particles and demonstrated that their genomes play a number of cooperative roles in virus assembly. In this project, we will collaborate with Latham, Todd and Putnam on integrating these models into a virtual reality environment initially into MVR, the Science VR Vortex engine framework for HTC Vive they developed at Goldsmiths under theDC Labs. The student will learn how to develop models of viral geometry and the secondary structures of viral genomes, and prepare files that encode the structures of viral protein containers and different folds of the genomic RNA that are transferred to Goldsmith for integration into a virtual reality environment. This is an ideal opportunity for a bright student to learn about the modelling of viruses and their 3D representation in virtual reality.*
Required Skills	*Background in Mathematics, Physics, Computer Science, Bioinformatics or Computational Biology. Programming skills will be an advantage.*
Supervision and Collaboration Arrangements	*The student will be supervised by Twarock and Dykeman in YCCSA on a day-to-day basis. (S)he will provide a link between the York and Goldsmith groups, preparing files based on Twarock's and Dykeman's models, that will be sent to the Goldsmith group for integration into a virtual reality environment.*
Project Dates	*The summer school runs for 9 weeks, starting on Monday, 09 July 2018 and finishing on Friday, 07 September 2018.*
Other Information	*Anything that doesn't easily fit above.*
References	*[1] P.-P. Dechant, J. Wardman, T. Keef & R. Twarock (2014) Viruses and fullerenes -- symmetry as a common thread?, Acta Cryst A 70:162-7.* *[2] T. Keef, J.P. Wardman, N.A. Ranson, P.G. Stockley & R. Twarock (2013)*

| | *Structural constraints on the three-dimensional geometry of simple viruses: case studies of a new predictive tool, Acta Crystallogr A. 69, 140-50.*
[3]E.C. Dykeman, P.G. Stockley & R. Twarock (2014) Solving a Levinthal's Paradox for Virus Assembly suggests a novel anti-viral therapy, PNAS 111, 5361-5366.
[4]P.E. Prevelige (2016) Follow the Yellow Brick Road: A Paradigm Shift in Virus Assembly, J Mol Biol. 428, 416-8. |

When complete, please email the form to sarah.christmas@york.ac.uk