

Georgios Hardo

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EDUCATION

University of Cambridge, Wolfson College <i>PhD in Biological Sciences (Systems Biology)</i> Dept of Engineering & Dept of Genetics	<i>Oct 2019 - Present</i>
University of Cambridge, Wolfson College <i>MPhil in Biotechnology - Isaac Newton Scholar</i> Department of Chemical Engineering and Biotechnology	<i>Sept 2018 - Sep 2019</i> Special Commendation/1st Class Honours
University of Sheffield <i>B.Eng in Chemical Engineering</i> Department of Chemical and Biological Engineering	<i>Sept 2015 - July 2018</i> 1st Class Honours

SKILLS

Software & Programming	Python, R, MATLAB, ASPEN, AutoCAD, L ^A T _E X, image analysis, machine learning (CNNs)
Lab experience	Standard molecular biology techniques, growth cultures & curves, cloning, plasmid design, timelapse fluorescence microscopy, microfluidic devices (mother machine)

EXPERIENCE

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| School of Life Sciences - Cambridge University
<i>PhD Student in Systems Biology</i> | September 2019 - September 2023 |
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- Rotation 1: *Studying Systems of Interacting Nucleic Acids*. Dept of Genetics, supervisor: Gos Micklem
 - Exploring the thermodynamics and reaction mechanics of systems of interacting nucleic acids.
 - Developed high fidelity DNA assembly techniques for synthetic biology. Modelled reaction mechanisms using kinetic and stochastic simulations of nucleic acid interactions.
 - Rotation Project 2: *Dormancy in Microbial Systems* Dept of Engineering, supervisor: Somenath Bakshi
 - Developed theoretical model of pre-sporulation cannibalism in *B subtilis*. Simulated dynamics using mixed stochastic ODE models, and diffusion of toxins within a mother machine using PDEs.
 - Investigated array of stress promoters for constructing synthetic circuits mimicking cannibalism.
 - Wrote an image analysis pipeline to analyse high throughput fluorescence microscopy mother machine microscopy data.
 - Forged a collaboration with Wang lab at U. Wisconsin Madison - developed a theoretical model of *B. subtilis* persistence.
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| AstraZeneca/MedImmune - Cambridge
<i>MPhil Graduate Researcher</i> | June 2019 - September 2019 |
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- Engineering 5' and 3' mRNA untranslated regions to improve *in vivo* stability and protein expression.
 - Used deep learning to predict mRNA expression and stability based on 3' and 5' UTR sequence data.
 - Extracted model weights and used bioinformatic/statistical techniques to do causal inference to elucidate important mRNA regulatory motif effects on expression.

- Used genetic algorithms to develop generative models to create high expression 5' UTRs which were successfully transfected into human cell lines to test model accuracy *in vivo*.

Dept. of Chemical Engineering and Biotechnology - Cambridge September 2018 - Present
MPhil Graduate Researcher

- Developed graph based tools for mapping the network of organic chemistry.
- Modelled the entirety of the organic chemistry literature as a searchable graph, along with algorithms to allow for efficient network searching.
- Developed all-in-one toolkit to allow for efficient organic chemical reaction synthesis pathway selection based on desired yield, reaction conditions, reaction feasibility, and other parameters.

Dept. of Chemical and Biological Engineering - Sheffield June 2016 - September 2018
Undergraduate Researcher

- EPSRC funded project investigating the growth and interactions of synthetic bacterial consortia in toxic landfill leachate for bioremediation purposes.
- Studied the effects of the composition of synthetic bacterial consortia, species richness (biodiversity) and bacterial interactions on the functioning of these synthetic ecosystems.
- Developed novel experimental and computational workflow analysing effects/interactions of large numbers of bacterial consortia using only growth rate and yield measurements - breaking open the black box by studying many black boxes.

VOLUNTEERING AND EXTRACURRICULAR

Cambridge University Synthetic Biology Society September 2018 - Present
Committee member & researcher *University of Cambridge*

- Part of a 5-person team who are working on the Synthetic Biology Society's Long Term Project.
- Project involves developing a toolkit allowing for rational design of bacterial co-culture interactions (commensalism, parasitism, mutualism etc).
- Project is funded by Prof Jim Haseloff's OpenPlant Biomaker initiative. We hope to use this team and project to reboot Cambridge's iGEM team.
- I lead the computational workshops which aim to teach anyone who is interested some principles for modelling biological systems.

Engineers Without Borders Sheffield September 2015 - July 2018
Project Leader and then Vice President *Engineers Without Borders UK (EWB UK)*

- Leader of a project which aims to install irrigation solutions in Malawi. Goal is to transfer thousands of litres of water to farmland during the dry season, increasing food security.
- Responsibilities include ensuring that the team works efficiently, delegation of tasks, and supervising/assisting in the workshop fabrication of our centrifugal pump solution.

ACADEMIC ACHIEVEMENTS

BBSRC DTP Scholarship	<i>University of Cambridge, 2019</i>
Issac Newton Trust Master's Scholarship	<i>University of Cambridge, 2018</i>
Martin Pitt Prize for best Chemical Engineering Design Project	<i>University of Sheffield, 2018</i>
Sarjant Prize for best overall academic performance and most academic and personal promise displayed during the course	<i>University of Sheffield, 2018</i>
EPSRC Vacation Bursary	<i>University of Sheffield & EPSRC, 2017</i>
Most professional pitch and best engineering solution	<i>Faculty of Engineering, 2017</i>
Best Student Researcher	<i>Department of Chemical And Biological Engineering, 2016</i>
Summer Research Fellowship	<i>Department of Chemical And Biological Engineering, 2016</i>