



Thematic Research Training 2020-2021

Clean Growth group

Chair: Dr Edgar Huitema (University of Dundee)

Session 1: Biology at the extremes – 8 December 2020, 10:00-16:00

Session organisers:

- Dr Stephen Wallace: Stephen.Wallace@ed.ac.uk
- Anna Zolotariof: az57@st-andrews.ac.uk
- Connor Trotter: Connor.Trotter@ed.ac.uk

Session Description:

In this event, the Clean Growth group shall be exploring the application of extremophiles within biotechnology. Throughout the day, we will introduce the concept of extremophiles, as well as how they are identified and characterised. This will also include the logistics of their distribution to researchers via microbial repositories, such as NCIMB. Following this, we will engage in a workshop concerned with how to extract useful information from these extremophiles through genome mining. After lunch, we will explore the different applications of extremophiles within biotechnology, and later we will focus in more detail on a specific example – biomining. To close off the day, we will lead a discussion on extremophiles and synthetic biology as a link to the second thematic meeting, followed by an optional social event.

Schedule:

Times	Sessions details
10:00 - 10:15	Welcome
10:15 - 10:30	General Discussion/Meet & Greet
10:30 - 11:00	“Introduction to Extremophiles and Microbial Repositories” – Dr Jude Huggan, <i>NCIMB</i>
11:00 - 11:15	Dr Jude Huggan NCIMB Questions and Discussion
11:15 – 11:25	Transition Discussion – Connor Trotter, <i>University of Edinburgh</i>
11:25 - 11:40	“Genome Mining for Novel Antimicrobial Compounds” – Dr Alba Iglesias Vilches, <i>Institute of Integrative System Biology</i>
11:40 – 12:15	Workshop: “How to identify genes of interest through genome mining techniques” – Dr Alba Iglesias Vilches
12:15 – 13:15	Lunch break
13:15 – 13:40	“Application of Extremophiles in Biotechnology” – Dr Natasha Nicholson – <i>Heriot-Watt University</i>
13:40 – 13:50	Dr Natasha Nicholson Questions and Discussion
13:50 – 14:20	“Using Microbes to Mine Elements: Experiments on the Space Station” – Prof. Charles Cockell, <i>The University of Edinburgh</i>
14:20 – 14:35	Prof. Charles Cockell Questions and Discussion
14:35 – 14:45	Coffee Break
14:45 – 15:00	Discussion “Extremophiles and Synthetic Biology – A Primer for Session 2” – Connor Trotter & Anna Zolotariof
15:00 – 16:00	Optional Networking Event

Session 2: “Synthetic Biology: DIY-level innovation” - 9 February 2021, 10:0-16:00

Session organisers:

- Dr Stuart MacNeill - sam31@st-andrews.ac.uk

- Louis Headley: Louis.Headley@ed.ac.uk
- David Knight: d.knight.20@abdn.ac.uk
- Connor Trotter: Connor.Trotter@ed.ac.uk

Session Description:

In this event, the Clean Growth group shall be exploring the field of Synthetic Biology. Throughout the day, we will introduce the core concepts and methods behind the field before engaging in a workshop centred around Benchling – a useful online tool for gene design and sequence management.

After lunch, we will explore the different applications of Synthetic Biology within multiple disciplines – starting with more general examples within the SynthSys group at The University of Edinburgh before focussing on how Synthetic Biology can be integrated into our home environment with a talk from Martyn Dade-Robertson at the HBBE.

Session Schedule

Times	Sessions
10:00 - 10:15	Welcome and General Discussion/Meet & Greet – Connor Trotter (The University of Edinburgh)
10:15 – 10:45	Talk 1: Introduction to SynBio – Dr Nadanai Laohakunakorn
10:45 – 11:00	Talk 1: Questions and Discussion
11:00 - 11:15	Coffee Break
11:15 – 12:45	Workshop: An Introduction to Benchling – Connor Trotter
12:45 – 13:45	Lunch
13:45 – 14:00	Discussion 2: Where can we apply SynBio? – Louis Headley (The University of Edinburgh) & Dave Knight (The University of Aberdeen)
14:00 – 14:30	Talk 2: SynBio @ SynthSys, a general overview - Prof. Meriem El Karoui (The University of Edinburgh)
14:30 – 14:45	Talk 2: Questions and Discussion
14:45 – 15:00	Coffee Break
15:00 – 15:30	Talk 3: Living Construction: Biotechnology for the Built Environment Dr Martyn Dade-Robertson (Hub for Biotechnology in the Built Environment, Northumbria University)
15:30 – 15:45	Talk 3: Questions and Discussion
15:45 – 16:00	E-Social (Games Night)

Session 3: “From fundamental research to translational opportunities: Translating discoveries in industry” - 15 April 2021, 9:45–15:00

Session organisers:

- Prof. Nicola Stanley-Wall n.r.stanleywall@dundee.ac.uk
- Evelina Venckute E.Venckute@sms.ed.ac.uk
- David Stevenson 2431161@dundee.ac.uk

Session Description:

This Clean Growth thematic session will focus on the ways scientists, especially those at the early stage of their career, can successfully commercialise and translate their research ideas in industry. Each talk will be followed by a 10-minute-long Q&A session. We’ll start the day with an opening talk from Dr Fiona Mitchell (Research and Innovation Services, University of Dundee) who will outline how to protect your research idea and focus on the merits of translating research with industry partners. Then in Session 1 – Start-up Ideas, we’ll learn about two new start-up companies – OGI-BIO (Dr Alex McVey) and CrustaTec

(María Isabel Amorín). We'll hear about their journey in realising bench top science ideas to practical solutions for efficient microbe culturing and wastewater treatment, respectively. We'll then continue with Session 2 – Accelerating Ideas speakers – Ugnė Baronaitė (Edinburgh Innovations, University of Edinburgh) and Ann Davidson (Scottish Institute for Enterprise). In this session, students will have an opportunity to learn more about the available resources and initiatives for further professional development and realisation of their research innovations. In Session 3 – Spin-out Ideas, Prof. Alessio Ciulli (Amphista Therapeutics, University of Dundee), who specialises in targeted protein degradation therapy, will share with us his success story of developing a spin-out company. Finally, we'll end this online event with an optional discussion about the highlights from the day.

Session Schedule:

9:45- 10:00 Welcome and overview of the day

10:00 - 10:30 Opening Talk: Dr Fiona Mitchell – Research and Innovation Services, University of Dundee

10:30 - 11:00 Session 1 – Start-up Ideas: Dr Alex McVey – OGI-BIO

11:00 – 11:30 Session 1 – Start-up Ideas: María Isabel Amorín (CrustaTec)

11:30 – 11:40 Coffee break

11:40 – 12:10 Session 2 – Accelerating Ideas: Ugnė Baronaitė (Edinburgh Innovations, University of Edinburgh)

12:10 – 12:40 Session 2 – Accelerating Ideas: Ann Davidson (Scottish Institute for Enterprise)

12:40 – 13:55 Lunch break

14:00 – 14:30 Session 3 – Spin-out Ideas: Prof. Alessio Ciulli (Amphista Therapeutics, University of Dundee)

14:30 – 15:00 Closing remarks and optional discussion

Session 4: “New enzymes: Nature vs. synthetic” - 8 June 2021, 9:30-15:45

Session organisers:

- Evelina Venckute (e.venckute@sms.ed.ac.uk)
- Anna Zolotariof (az57@st-andrews.ac.uk)
- Dr Amanda Jarvis (Amanda.Jarvis@ed.ac.uk)

Session Description:

In this Clean Growth thematic meeting, we are going to explore a range of different synthetic strategies for the design of completely new or improved natural enzymes. We will begin our event with a talk from Prof Rebecca Goss (University of St Andrews) who will tell us how biosynthetic pathways can be redesigned to advance the synthesis of small molecules. We will then be hearing from Dr Tracey Gloster (University of St Andrews) who will give us an overview of the process of finding and characterising new enzymes. We will then continue with a talk from Prof Dominic Campopiano (University of Edinburgh) who will introduce us to the industrial applications of biocatalysts and tell us more about what role directed evolution plays in the development of enzymatic cascades for the synthesis of complex molecules. Then we will be joined by Dr Ross Anderson (University of Bristol) who will discuss the current advances in *de*

novo enzyme engineering and tell us how computational tools aid in this process. After the lunch break we will close off the day with Dr Anca Pordea's talk on cofactor recycling using artificial metalloenzymes.

Schedule:

Times	Sessions
9.30-9.45	Welcome
9.45-10.15	"Redesigning Biosynthetic Pathways" - Prof Rebecca Goss, University of St Andrews
10.15-10.30	Q&A
10.30-11.00	"Characterisation of New Enzymes" - Dr Tracey Gloster, University of St Andrews
11.00-11.15	Q&A
11.15-12:00	Break
12.00-12.30	" <i>De Novo</i> Enzyme Design" - Dr Ross Anderson, University of Bristol
12.30-12.45	Q&A
12.45-14.00	Break
14:00-14:30	"Industrial Biocatalysis" - Prof Dom Campopiano, University of Edinburgh
14:30-14:45	Q&A
14.45-15.15	"Design for Artificial Metalloenzymes" - Dr Anca Pordea, University of Nottingham
15.15-15.30	Q&A
15.30-15.45	Optional discussion