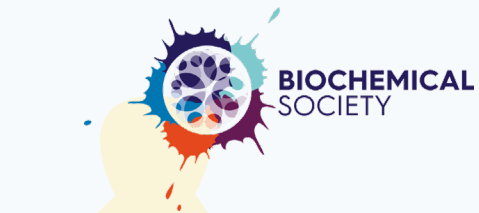


# CROSSOVER WORKSHOP

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Exchanges between Design  
and Biochemical Sciences



**INNOVATION  
SCHOOL  
THE GLASGOW  
SCHOOL OF ART**

## ORGANISERS

### **Elio Caccavale**

Reader in Transdisciplinary Design Innovation  
Innovation School, The Glasgow School of Art

### **Dr Michael Pierre Johnson**

Creative Engagement Leadership Fellow  
Innovation School, The Glasgow School of Art

### **Prof Lynn-Sayers McHattie**

Professor of Design Innovation  
Innovation School, The Glasgow School of Art

### **Dr Pedro Ferreira**

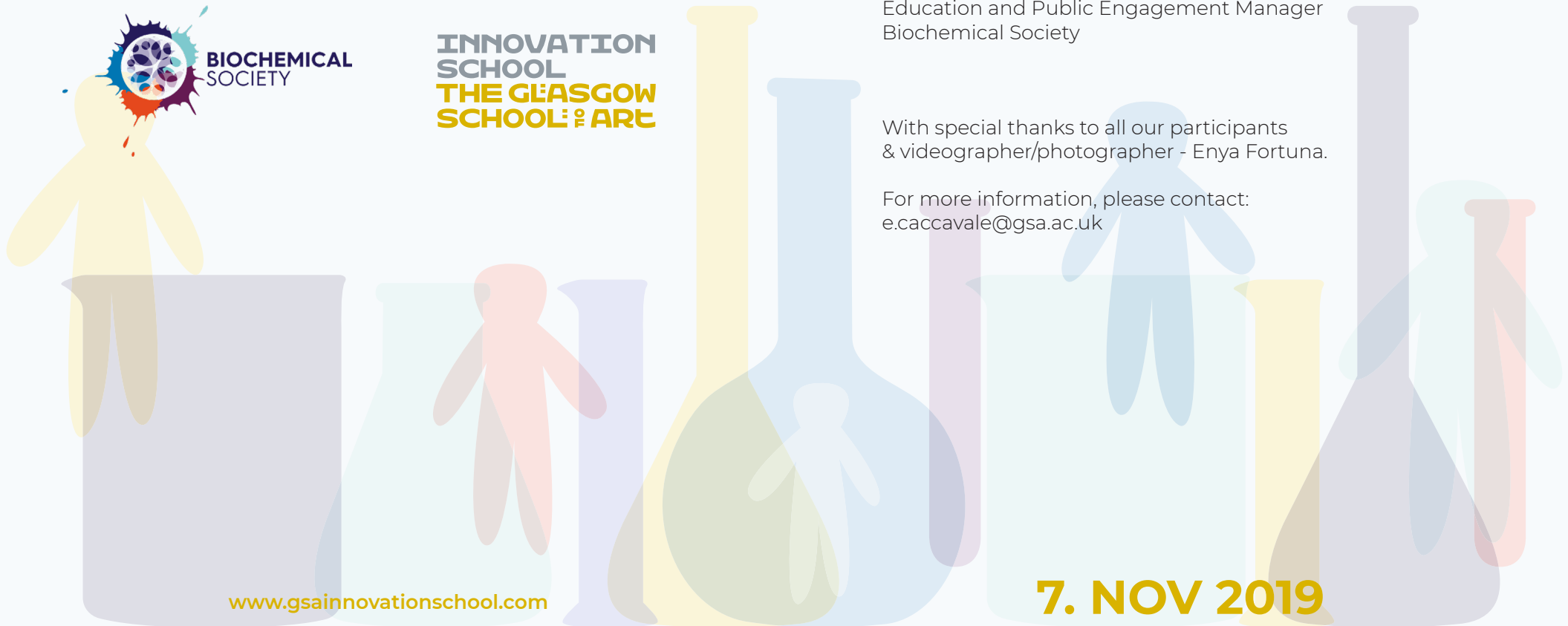
Education and Public Engagement Manager  
Biochemical Society

With special thanks to all our participants  
& videographer/photographer - Enya Fortuna.

For more information, please contact:  
[e.caccavale@gsa.ac.uk](mailto:e.caccavale@gsa.ac.uk)

[www.gsainnovationschool.com](http://www.gsainnovationschool.com)

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## Introduction

The Crossover Workshop was a collaboration between the Innovation School at The Glasgow School of Art (GSA) and the Biochemical Society to explore the potential for exchanges between design and biochemical sciences. It focused on sharing disciplinary expertise and perspectives through a series of design activities and provocative discussions in order to prompt opportunities for future collaborations.

At GSA, we suggest that innovation occurs at the edges of fields of expertise. As such, we feel that initiating design and science

dialogues can reveal the matters of concern and opportunities in unfolding scientific advances.

The Innovation School at GSA aims to apply design practices and inquiries, in collaboration with contextual experts and the people affected across society, to bring tangible form to the abstract and complex contexts, such as scientific research, and its implications.

### What did we do?

On November 7th 2019, eight research members of the Biochemical Society from across Glasgow's Universities were brought together

with eight design researchers and creative practitioners, predominantly from GSA, with one guest from Goldsmiths University.

All the participants presented for three minutes on their area of expertise, a project they wanted to share and its contribution to their discipline and society, while only using a single image and an object or artefact.

This concise introductory format ensured everyone could get to know who was in the room through their work in an engaging way to facilitate making connections.

Each participant was then asked to map participants with whom they wanted to explore cross-disciplinary connections, including a reason why, which facilitated two rounds of paired 'Crossover Conversations'. These involved each pairing taking our 'Idea on a Napkin' template to explore what connections, questions, contributions and audiences they shared, before drafting a shared proposal on the back of the napkin.

The whole group would then come together to share and discuss the opportunities and challenges of potential exchanges between Science and Design going forward.

"I found the workshop very interesting, it had a good balance between a general introduction to everyone's field and a specific discussion with the two artists I got to interact with. I was both left wanting more and with the feeling of having accomplished something."

~ Biochemist Participant



"I was initially a bit wary of how little I knew about biochemical science, but this faded as soon as we began the [conversations], as there were loads of common threads leading to valuable conversations on a range of topics: dementia tech, machine learning and diagnosis or engagement methods."

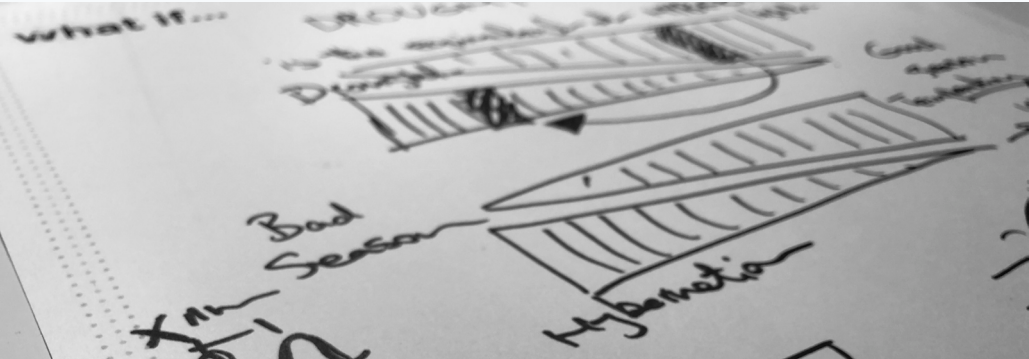
~ Designer Participant



## What did participants present?

The mix of presentations from across the participants was diverse. Examples of design contexts included using VR to simulate dangerous accident scenarios as part of chemical safety, a speculative design approach to enable public debate on emergent technologies, designing playful interactions for people to re-imagine ‘place’, understanding fluid flow using micro-photography and facilitating creative discussions on ‘identity’ to support collaboration within an emerging wine cluster.

Examples of biochemical science contexts included understanding how cell migration can respond to environmental cues, understanding mitochondria as the powerhouse of our cells, developing new treatments for cardiovascular diseases and Alzheimer’s, and studying the effects of drought on crops to inform more resilient genetically modified variants.



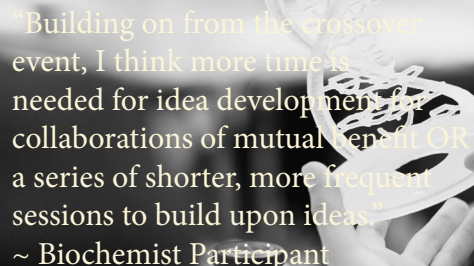
## What were the ‘crossovers’?

Many participants commented on what they learnt from being exposed to differing forms of inquiry to shared or related contexts and interests. In particular, connections were drawn on finding ways to understand and convey complex systems and structures, how to engage and communicate important insights to key audiences, how combining scientific knowledge and creative knowledge can create authentic new forms of inquiry, and how to frame the societal impacts and ethics of emerging trends in science and technology.

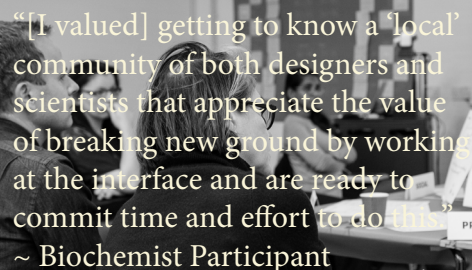
Opposite is an overview of the shared proposals the ‘crossover conversations’ produced as ‘back of a napkin’ ideas. Some are specific and others more broad, but each was grounded firmly in the disciplines and interests of each pair of participants and presented as viable opportunities to pursue further.

Visual learning material for long term conditions based on a structured Scotland-wide programme feeding into content	Community-led projects in health & wellbeing spaces based on personalised medicine & genetic populations	A protein transport game visualising ‘movement of protein’ systems as ‘movement of people through the city’	How different knowledge practices evaluate and define the self
Plant-cell biology in a microfluidic device (LAB-on-a-CHIP) to support efficient, micro-scale cultivation	Challenge the way people make choices & question the linear spectrum between right & wrong that affects ethical principles	Build an immersive & emotive VR experience of dementia symptoms that could be used to raise awareness & educate	Greater cross-disciplinary visibility of issues which could be shared with the design industry as an open forum for development
Simple speculative design tools in STEM education to explore ethical frameworks for existing & future digital technologies	Place-based Innovation of barley production for Scottish whisky & beer through enhanced GM resilience within Scottish climates	Discovery walk tying history & science to Gorbals with tangible outcomes that kids can share on the history of Glasgow Royal Infirmary	‘Painted pebbles’ becoming an extended object of learning through design interactions & using digital interface
Multi-disciplinary approach to enable effective, ethical public engagement & interfacing with smart technologies & big data	Genuine third inter-disciplinary space between the creative studio and scientific laboratory	Scientific knowledge re-expressed through art in a Creative Science Festival (e.g. on theme of maternal inheritance of mitochondria DNA)	Collaborate with a designer to build a model of cell migration powered by the energy from mitochondria





"Building on from the crossover event, I think more time is needed for idea development, collaborations of mutual benefit OR a series of shorter, more frequent sessions to build upon ideas."  
~ Biochemist Participant



"[I valued] getting to know a 'local' community of both designers and scientists that appreciate the value of breaking new ground by working at the interface and are ready to commit time and effort to do this."  
~ Biochemist Participant

## What opportunities emerged?

From the many crossovers found during the workshop, we have identified three key themes with which to explore further opportunities for collaboration between biochemical sciences and design:

### ***Understanding and Caring for Invisible Diseases and Conditions***

Multiple connections were drawn between participatory design approaches and engaging key public audiences, particularly around understanding invisible diseases and conditions (e.g. cardiovascular diseases and dementia) and how this could inform care practices;

### ***Community STEM Education***

A few conversations focused on the access and communication of STEM subjects using design approaches in more inclusive, creative and relatable ways (e.g. with marginalised Glasgow communities or young people making artefacts on scientific knowledge);

### ***A Transdisciplinary Knowledge & Ethics Domain***

Significant opportunities were recognised to bring scientific and designerly knowledge domains together in more sustained and rigorous ways (e.g. understanding and communicating mitochon-

dria, bioethics debates or modelling cell migration).

## What next?

There was a clear sense from everyone involved that this type of initiative should happen again. As such, we aim to develop a transdisciplinary partnership between the Innovation School at GSA, the Biochemical Society, the University of Glasgow, the University of Strathclyde and Glasgow Caledonian University.

The ambition will be to develop research grant proposals that can contribute to the emerging culture of joining up traditionally siloed scientific, policy, critical, communication and creative disciplines through three core aims:

1. Provide biochemical researchers with new transdisciplinary learning opportunities and applications of 'crossover' knowledge;
2. Challenge design innovation approaches through the depth of its engagement with biochemical sciences;
3. Develop a range of collaborative project proposals that provide a rich set of insights into the potential of biochemical research.