



EXCURSIONS AND OTHER NEWS

Small insights in BioS points of view, field trips, and other stuff we do.

Science, Society, and Sustainability: Lab Rotation at Queens University Belfast

Umme Aimen Abbasi

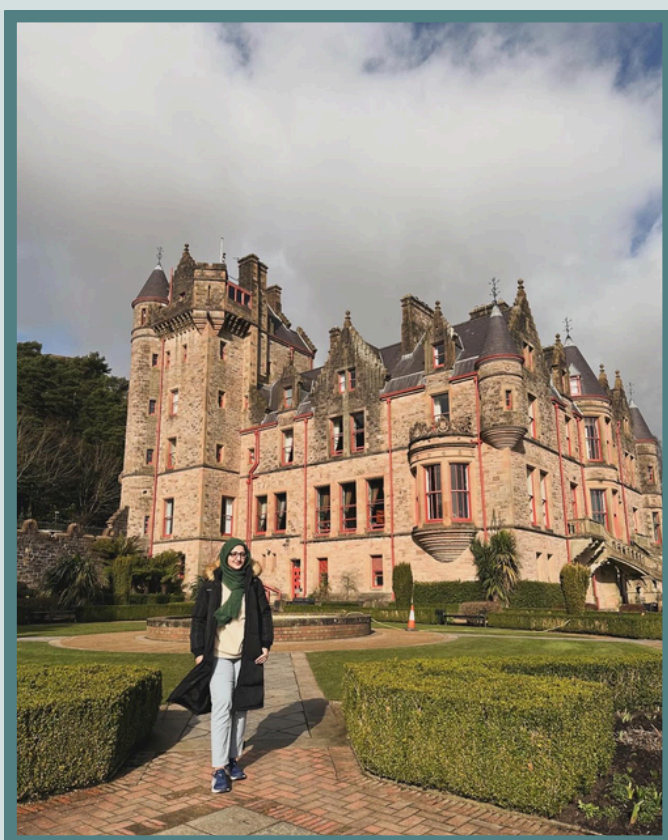
Technological advancements and changes in agricultural systems have affected the intrinsic relationship between diet and environment. Current food systems compromise both health and environmental impact. Hence, there is a growing need for healthy sustainable diets that are safe, economically accessible, and culturally appropriate. This was the focus of my lab rotation at Queen's University Belfast, where I joined Professor Aedin Cassidy's nutritional epidemiology team from February to April, 2024.

From food production to supply chains and food waste, each step plays a role in aggravating the overall negative impact of global food systems on our environment. Food production alone accounts for up to 30% of anthropogenic greenhouse gas emissions (GHGEs) while using 40% of land and 70% of fresh water resources. Moreover, food systems are also responsible for global biodiversity loss. Hence, a global transition towards sustainable food systems is vital to meeting climate change targets on a large scale.

The project aimed to develop a validated index to assess both the nutritional quality and environmental sustainability of diets in the UK Biobank study. This involved measuring three key indicators: greenhouse gas emissions (GHGEs), blue water footprints (which is groundwater and surface water used in food production), and a score that reflects on the abundance of flavonoids in foods. My role centred on preparing the raw data and running correlation analyses. I began by working through large datasets: checking food codes across multiple files, cleaning inconsistencies, and organising them for analysis. Once the groundwork was done, I moved on to coding in R, learning how to run correlation analyses. The study is still ongoing and has many layers, but even in my short time with the team, I gained valuable data analysis skills.

During my time at Belfast, I attended multiple academic seminars addressing topics like: 'How many sweet and fatty meals make an unhealthy diet?' and 'Challenges to achieving nutritional adequacy through a healthy, sustainable diet', hosted by the British Nutrition Foundation.

Beyond the work itself, it was the people who made this experience so special. I really enjoyed working with Professor Aedin Cassidy and her team, including Dr. Amy, Alysha, and Will, who guided me at each step. The connections and new friendships I developed in Belfast are still going strong after a year. Some experiences are more than just work, and this lab rotation was exactly that!



ANIMALS AND MONEY

This part of BioS Reports unravels relationships between animals and the economy.

The Black Soldier Fly: A Tiny Hero Boosting Kenya's Economy

Philine Hampe

Food security remains an issue as the global population is expected to reach 9.7 billion people by 2050 [1]. In Kenya, population growth and rapid urbanization are increasing the demand for meat products [2], driving the need for animal feed production. Conventional feed production - including soybean and fishmeal - significantly strains resources and harms ecosystems. Moreover, Kenya's growing feed shortages are driving up costs [3], compromising the growth of its livestock sector. Agriculture, including livestock, accounts for 21% of Kenya's GDP and could represent a gateway out of poverty [2,3,4]. Thus, finding cost-effective and sustainable feed solutions is crucial for both economic and environmental stability.

One possible solution lies in the mass breeding of insects. Insects represent a resource-saving and cost-effective source of high quality proteins and lipids. In 2023, the insect protein feed market was valued at US\$587.56 million [5], compared to US\$253.2 billion [6] for the overall feed protein market, meaning insect protein represents only 0.2% of global feed protein. Recognizing the future potential, the Kenyan government plans to invest US\$23.2 million in feed production using the Black Soldier Fly (BSF) [3].

Among its insect colleagues, the Black Soldier Fly stands out for its remarkable ability to thrive on a diverse range of organic wastes. Low-value substrates like kitchen wastes, agricultural by-products and even human feces can serve as their food [7]. Since these substrates are abundant and easily accessible in urban environments of low- and middle-income countries like Kenya, BSF farming offers a particularly practical solution to its growing waste pollution challenge [8]. Large amounts of Black Soldier Flies can also be produced easily. They are harvested in various forms - including eggs, wet larvae and dried larvae - and serve as excellent feed for pigs, poultry and fish [9]. Dried BSF larvae, the more valuable form, currently sell for around US\$0.97 to US\$1.16 per kilogram [10]. Farmers collectively produce around 2,800 tons of dried larvae per year. In contrast, small-scale production of wet larvae yields 726 tons, valued at US\$0.77 per kilogram [10]. Together with frass, a by-product of the production, the annual sales of BSF products are estimated at US\$3.36 million [10].

Despite the sustainability and quality benefits of BSF production, it remains financially uncompetitive compared to conventional feed sources. High production costs of around US\$1,400 per ton, mainly due to labour and waste transportation expenses, and the lack of sufficient production scale hinder its economic viability [10]. Most farmers operate at a household level to minimize their own feed and fertilizer costs. They do not own the equipment to produce dried larvae, the form most desired by off-takers like feed millers [10].

However, BSF farmers are optimistic that improvements within the next five years will drive economic growth. If successful, BSF farming could potentially boost Kenya's economy by US\$69 to US\$687 million, significantly reducing poverty by creating employment for between 25,000 to 252,000 people [11]. These numbers do not even include further possible uses of Black Soldier Flies, such as cosmetics or the pharmaceutical industry. The next few years will be crucial in determining whether Black Soldier Flies can become a large-scale solution for sustainable feed production in Kenya.

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Four Generations of BioS Gather for a BBQ to End the Summer!

Layanne Abu-Bader

With the start of the new semester just around the corner, the fifth group of BioS students will soon embark on their own journey through this exciting master's program. To mark the moment and celebrate the close of summer, the BioS community came together on August 15 for a lively barbecue.

The gathering brought together four generations of BioS students, professors, and even alumni, creating a wonderful mix of perspectives and experiences. Current students had the chance to share stories about life in the program, while those further along offered practical advice on research, internships, and surviving the busiest stretches of coursework. Alumni reflected warmly on their time in BioS and gave us a glimpse of life aftergraduation. Some have already found exciting roles in and outside the field of biology, others are preparing for PhDs, while a few are exploring different paths before making their next move. It was inspiring to see how many doors this program can open and how diverse the opportunities truly are.

Of course, no barbecue would be complete without plenty of food. Everyone contributed something to the table, creating a feast that ranged from classic grilled favorites to homemade sides and sweet treats. Laughter and conversation flowed easily as plates were passed around and stories were shared.

As the sun set and the evening grew cooler, the energy only picked up. Friendly games broke out, including beer pong and a few spirited rounds of flunky ball. To everyone's delight, even the professors joined in, proving once again that the BioS spirit is as much about community as it is about academics. This BBQ was a reminder that BioS is a growing family—one that continues to support, inspire, and cheer each other on across every stage of the journey.



SCIENCE UNPACKED - THE BIOS PODCAST

Clara Boehme, Jenny Kurth, Alina Wahlbuhl & Paul Neher

In this episode, our master's students ask: "What's the evidence? Are sex robotics the future of intimacy?" Science has a duty to address the hidden sides of society. Could these robots actually replace humans, and what does current research say about where we are headed?

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