

## PhD Project Advertisement

**Project title:** Insects as a novel source of dietary protein: Does it have legs?

**Project No:** FBS2023-35-Manders-sa

**Lead supervisor:** Ralph Manders, Nutritional Science, University of Surrey

**Email:** r.manders@surrey.ac.uk

**Co-supervisors:**

Rhys Thatcher, Aberystwyth University; Geoffrey Knott, Hop®; Ruan Elliott, University of Surrey

### Project description:

In 2019 687.8 million people were suffering from malnourishment worldwide and despite continuous efforts towards the 'zero hunger' sustainable development goal, that number is projected to increase to ~841.4 million by 2030 (FAO, 2020a).

Additionally, there is a growing strain on food security as traditional farming techniques require unsustainable amounts of finite key resources such as land and water. Livestock protein represents a highly resource-intensive and nutritionally inefficient method of food production (Gerbens-Leenes et al., 2013). Current studies estimate that meat represents 18% of protein production, but the demand for protein from livestock is predicted to increase by 90% by 2050 as the global population approaches 10bn (Henchion et al., 2017). This sharp increase in demand will result in severe land and water shortages. Moreover, the current Covid-19 pandemic and war in the Ukraine is threatening the food supply chain at multiple levels, causing interruptions with planting, harvesting, and transport of crops (FAO, 2020b). This could exacerbate the issue of food security, thus highlighting our need for a more reliable and sustainable protein production system. This need has recently been further highlighted by the Academy of Nutritional Sciences considering COP26 and Global Net Zero initiative (Academy of Nutritional Sciences, 2021).

Insects have been used as a source of dietary protein for many years in East-Asian and African populations and more recently the interest in this potential protein source has been growing in Western countries due to the issues outlined above and increased awareness of animal welfare issues in the food chain. However, up until now there is no clear evidence that insect-derived protein has the same nutritional properties as its animal counterpart. This current PhD project therefore aims to determine the potential of insects as a viable alternative to animal-derived proteins for human consumption. You will compare bioavailability and subsequent anabolic and endocrine effects of an insect protein with a well characterised animal protein in healthy human participants. This project will be the first to examine the acute metabolic and hormonal responses to insect protein in direct comparison with animal protein in humans. You will also examine the use of insect protein in combination with a resistance training programme on skeletal muscle protein synthesis, the project will enable direct comparison between healthy young and healthy older individuals. In addition, you will also be evaluating attitudes toward the consumption of insects and knowledge of the environmental and ethical issues in the production of insects and animal-based protein for food.

The project will give unique insights into the potential benefits of insect-based protein and barriers to consumer acceptance of insect-based products. The project will impact not only the food production industry but will have direct benefit to the environment and inform food production in a move towards reducing the carbon footprint of the food industry, reduce food waste and provide a valuable source of protein for an increasing human population.

### Training opportunities:

In this project you will receive extensive training in performing human interventions and all aspects related to this type of research. You will be trained in project development and writing of ethics applications, subject recruitment and performing the interventions. You will also develop skills in both dry and wet lab analytical techniques such as, but not limited to, performance testing, metabolomics and protein signalling. Both the University of Surrey and Aberystwyth University offer extensive training in all academic and life skills required for and beyond a successful career in academia and industry.

In collaboration with our industrial partner, HOP<sup>®</sup>, you will also undertake a 3-month placement with them which will allow you to be actively involved in and contribute to their ongoing research activities both with the DTP partner's and other projects running simultaneously. You will also have the opportunity to explore business opportunities arising from the DTP Project including getting involved in HOP's marketing, sales, and developing further research streams if so desired by the Candidate.

HOP<sup>®</sup> is a UK start up selling cricket protein sports products in the UK, and was founded by students and alumni of the University of Surrey. Find out more about HOP<sup>®</sup> at [www.hopbar.co.uk](http://www.hopbar.co.uk)

### Student profile:

This project is suitable for students with a BSc degree (minimum qualification required is a 2.1 or equivalent at BSc) in Sport & Exercise Science, Nutrition & Dietetics or a closely related subject. Experience in human interventional studies is highly recommended.

### Stipend (Salary):

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2022/23 this will be £17,668 and this will increase slightly each year at rate set by UKRI.

### Equality Diversity and Inclusion:

The FoodBioSystems DTP is committed to equality, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#).

In accordance with UKRI guidelines, our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

### References:

- Academy of Nutritional Sciences. Transition to more sustainable food systems must be driven by strong evidence-based nutrition. 2021 October 22 2021 [cited 2021 October 26]; Available from: <https://www.academynutritionsciences.org.uk/news/transition-to-more-sustainable-food-systems-must-be-driven-by-strong-evidence-based-nutrition>
- FAO, IFAD, UNICEF, WFP and WHO. 2020. The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, FAO
- Gerbens-Leenes P.W., Mekonnen M., Hoekstra A. 2013 The water footprint of poultry, pork and beef: a comparative study in different countries and production systems. Water resources and Industry, vol. 1-2:25-36
- Henchion M., Hayes M., Mullen A.M., Fenelon M. and Tiwari B. 2017. Future protein supply and demand: strategies and factors influencing a sustainable equilibrium. Foods. Vol. 6(7): 53
- FAO, 2020. COVID-19: Channels of transmission to food and agriculture. Rome, FAO
- Kaza S., Yao L., Bhada-Tata P. and Van Woerden F. 2018. What a waste 2.0: A global snapshot of solid waste management to 2050. Washington DC, The World Bank.

**For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).**