

Stage 3 Talks:
ME Biosystems and Food Engineering



03/2025

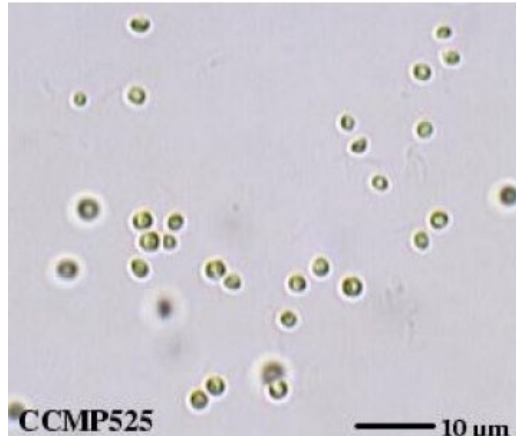
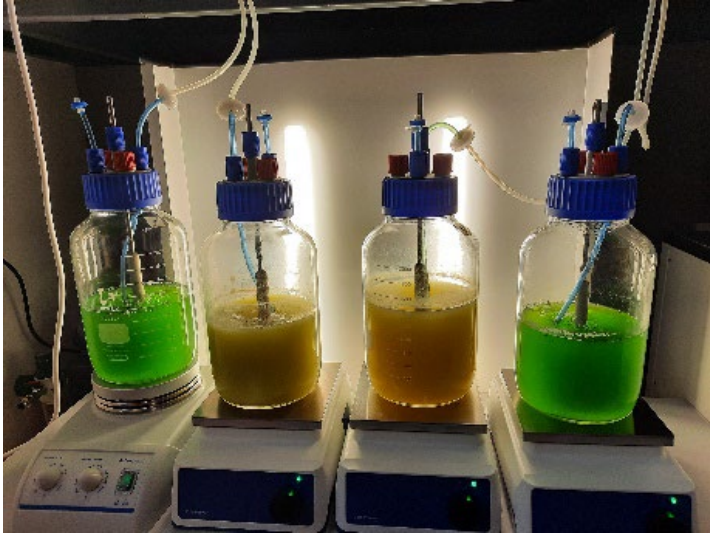
Dr. Ronald Halim

Assistant Professor

School of Biosystems and Food Engineering

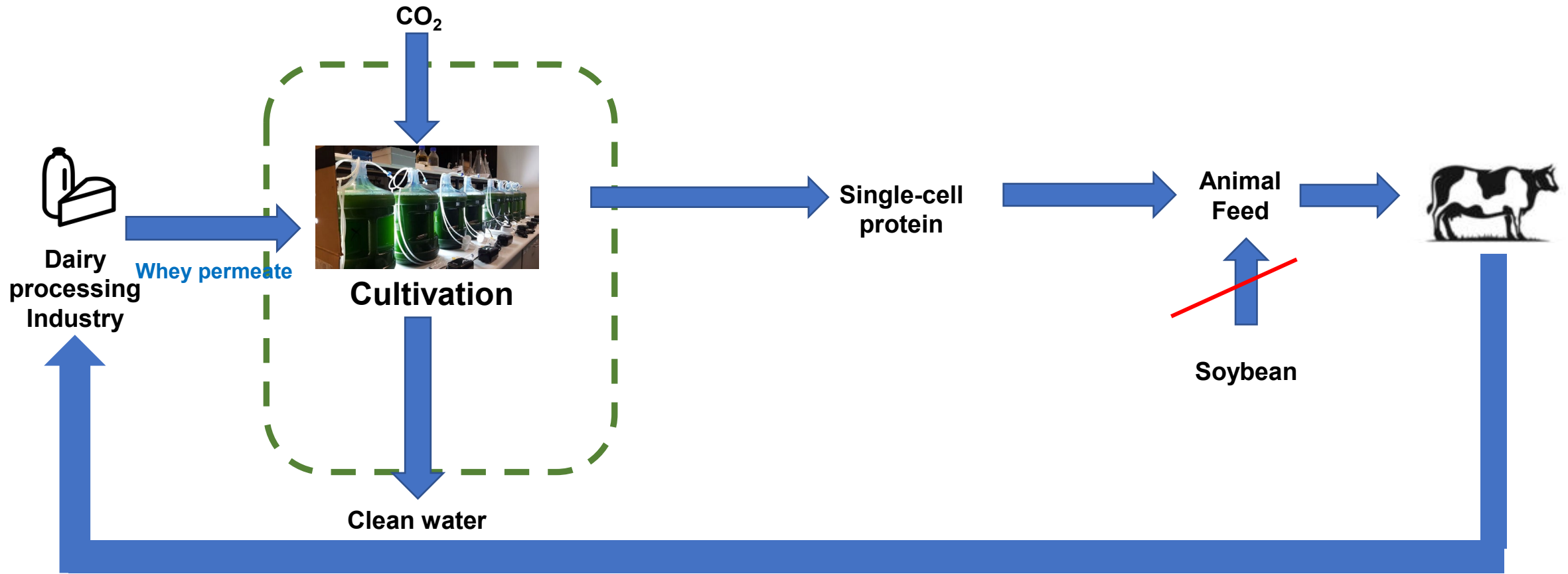


What are microalgae?



Nannochloropsis sp.
(rich in lipid, protein, ω 3 lipid)

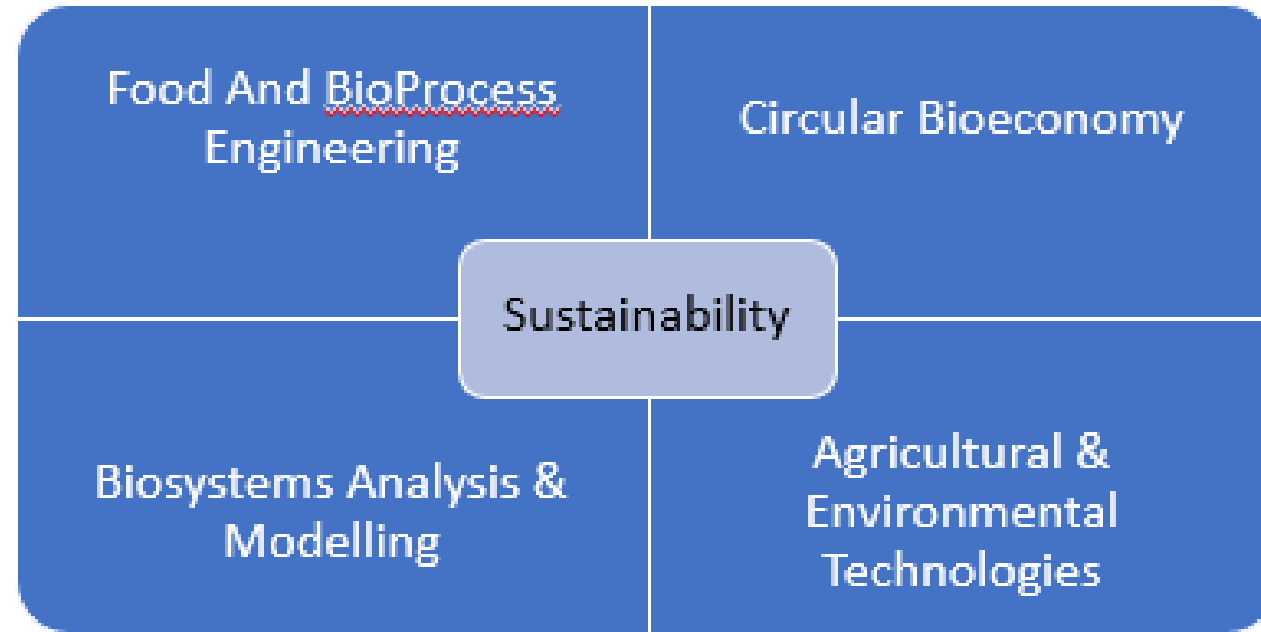
What roles can microalgae play in our society?



Adding value to waste
Carbon capture

Sustainable food/feed system
Circular bioeconomy

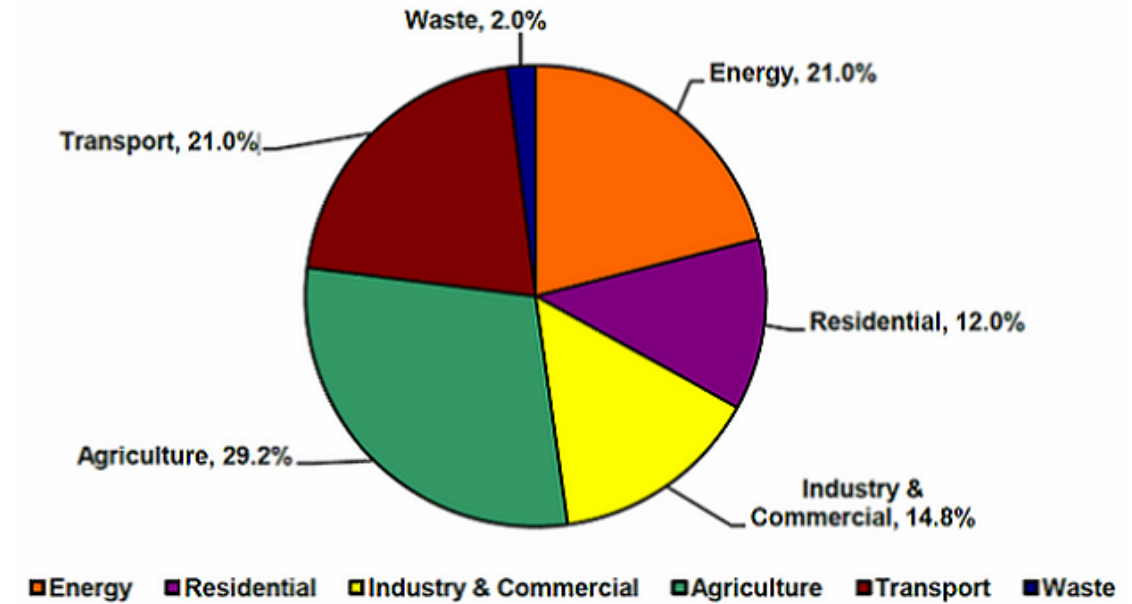
What is Biosystems and Food Engineering?



What is Biosystems and Food Engineering?

Finding Solutions for Life on a Small Planet

- World population in 2050 will be 9.6 billion people
- Growing world population requires more food, water, energy, goods
- Limited resources demand we do more with less, without degrading our natural environment
- Climate change, with a local emphasis



Ireland's Greenhouse Gas emission by sectors

School of Biosystems and Food Engineering

At a glance:

- **20** Faculty
- Total of **300** Full-time equivalent students including 67 research/PhD students
- Circa €5 million research funding awarded annually
- Highly Cited Researchers in our School: Prof Paula Bourke (our Head of School) and Prof Da Wen Sun.



Prof. Paula Bourke
Head of School
paula.bourke@ucd.ie

School of Biosystems and Food Engineering



UCD Conway Institute



UCD Science Centre



UCD Agriculture and Food Science Centre (Primary Location)

Research Projects in Our School



Sustainable and carbon-neutral farming
Through renewable energy, diets and fertiliser
reduction

Proveye Secures €1 million in Seed Funding

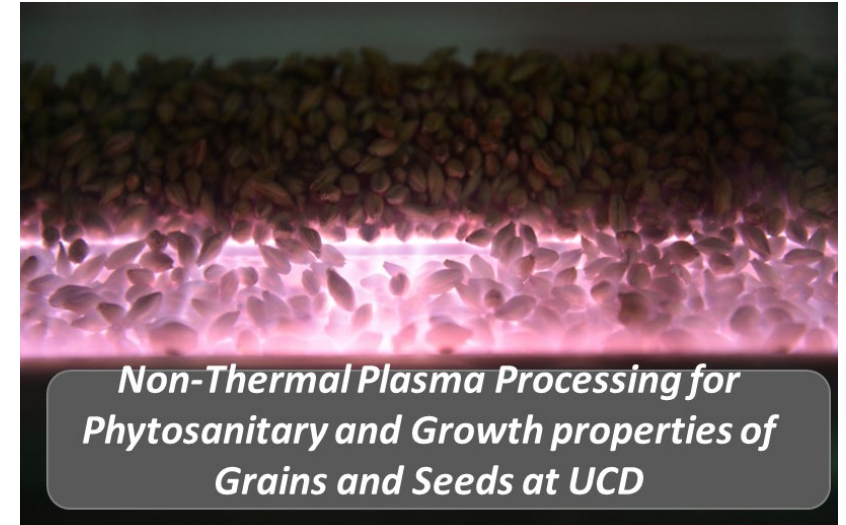


Pictured at NovaUCD are Proveye founders, Jerome O'Connell and Professor Nick Holden,
UCD School of Biosystems and Food Engineering.

Remote sensing coupled with AI
for sustainable agriculture

Research Infrastructure

- Food and Bioprocess Engineering Suite
- Biosystems Analysis and Modelling Suite
- Digital Agriculture and Environmental Technology



*Non-Thermal Plasma Processing for
Phytosanitary and Growth properties of
Grains and Seeds at UCD*



CN-analyser



ICP



Spectral Imaging Research Group
(SIRG)

ME Biosystems and Food Engineering

Two-Year Full Time (120 ECTS)

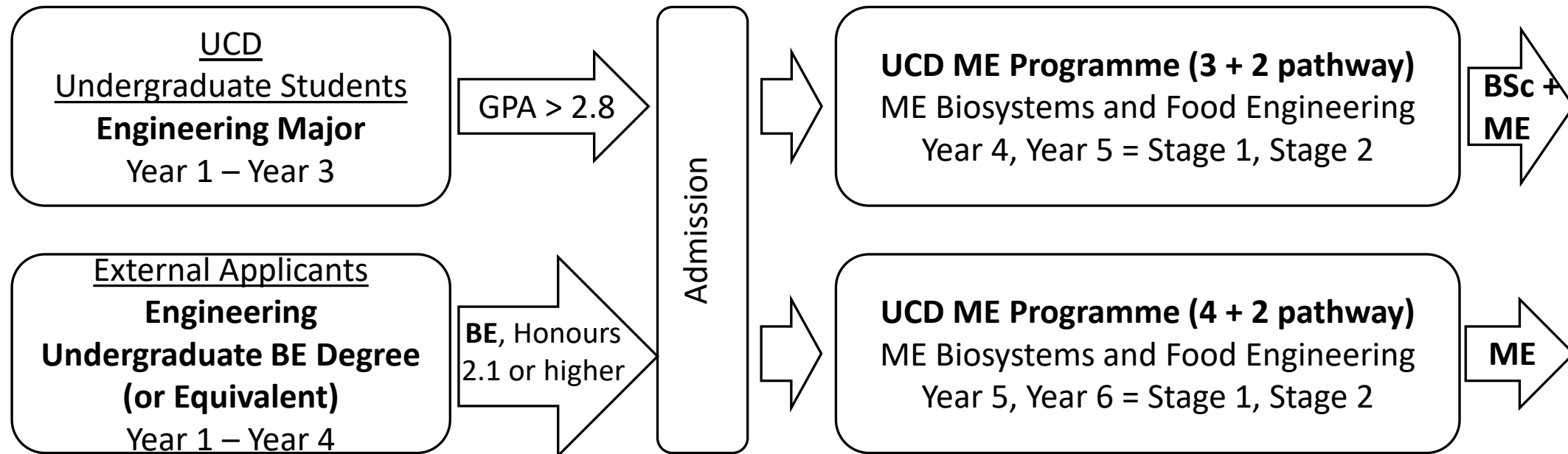
- Provides engineering graduates with the opportunity to deepen their knowledge in the design and application of sustainable biological systems in novel food process engineering, waste and wastewater management, and bioenergy.
- 6 - 8 months professional work experience with one of UCD's industry partners.
- https://hub.ucd.ie/usis/!W_HU_MENU.P_PUBLISH?p_tag=PROG&MAJR=T299



Entry Standards and Pathways



- For UCD engineering undergraduate students, 3 + 2 pathway available.
- To graduate with both BE and ME after 5 years.



Programme Structure



		Stage 1	Stage 2	
AUTUMN TRIMESTER		BSEN30010 Bioprocess Engineering Principles	BSEN40320 Waste to Energy Processes & Technologies	BSEN40710 ME Biosystems Engineering Thesis
		BSEN30280 Water and Wastewater Engineering		
		BSEN40590 Unit Operations for Bioprocess Eng	MEEN40560 Research Skills and Techniques	
		MEEN30100 Engineering Thermodynamics II		
		MEEN30040 Measurement and Instrumentation		
		Option*		
SPRING TRIMESTER	BSEN40230 ME Professional Work Experience		BSEN30320 Food Process Engineering	
			BSEN40440 Food Refrigeration Engineering	
			MEEN40430 Professional Engineering (Management)	
			MEEN30140 Professional Engineering (Finance)	
SUMMER TRIMESTER				

Biosystems Engineering Thesis (BSEN40710)

- 8 months of research in autumn and spring trimesters of Stage 2 (part-time, 25 ECTS).
- Embedment of critical thinking and specialized research skills in biosystems/food engineering.
- Students choose a project from a list of nominated projects by faculty members.
- Based at UCD Belfield, UCD Lyons Farm or Teagasc Food Research Centre
- Open pathways for PhD



Biosystems Engineering Thesis (BSEN40710)



2022/2023

- Effects of Fermentation Time and Point of Grass Silage Bale on Grass Quality
- Economic and Feasibility Analysis of Renewable Energy Installation in Medium-Scale Distilleries
- Bioremediation of Brewery Wastewater by Cultivation of Microalgae *Nannochloropsis Limnetica*

Biosystems Engineering Thesis (BSEN40710)

Yuchen

- ME graduate (2018 – 2020)
- Research Project: Ultrasound and enzyme assisted agar extraction from macroalgae *Gelidium sesquipedale*
- Awarded a China Scholarship Scheme (CSC) Scholarship and an Irish Research Council (IRC) Scholarship to pursue a PhD
- Current PhD Student at UCD (2020 – now)



Investigation of enzyme-assisted methods combined with ultrasonication under a controlled alkali pretreatment for agar extraction from *Gelidium sesquipedale*

Yuchen Li^b, Ming Zhao^{a,b,*}, Laura P. Gomez^a, Ramsankar Senthamarai Kannan^c, Ramesh Babu Padamati^c, Colm P. O'Donnell^b, Brijesh K. Tiwari^a

^a Department of Food Chemistry and Technology, Teagasc Food Research Centre, Ashtown, Dublin 15, Ireland

^b School of Biosystems and Food Engineering, University College Dublin, Belfield, Dublin 4, Ireland

^c School of Chemistry, AMBER Centre, Trinity College Dublin, Dublin 2, Ireland



Professional Work Experience (BSEN40230)

- 30 weeks of professional work experience (full-time, 30 ECTS, Stage 1).
- Provides students with hands-on experience to apply knowledge in science and mathematics to real-world engineering problems and develop communication and teamwork skills.
- Generally paid.
- Students secure national/overseas placement with the support dedicated internship managers.
- Module coordinator and industry sponsor design work plan.

Professional Work Experience (BSEN40230)

Eoin

Current ME student (3 + 2 pathway)

Placement: Sanofi Genzyme (Co, Waterford)

Role: Quality data analysis for an existing production process

Bhuwana

Current ME student

Placement: Royal Oak Distillery (Co. Carlow)

Role: Support facility maintenance and process improvement.

Food and Beverage



Consulting



Nutrition



Pharmaceutical



Bioenergy



Research



Career Opportunities

- Students from Biosystems and Food Eng have secured graduate employment in relevant agri-food and bioenergy industries.
 - Food and beverage (Diageo, Glanbia, Kerry)
 - Environmental protection and waste recycling (Irish Water, Rowan)
 - Bioenergy and green technology (Teagasc)
 - Medical and Pharmaceuticals (Abbotts, Takeda)
- Many have also continued on their academic journeys (PhD at UCD, Mississippi State University).

Ireland

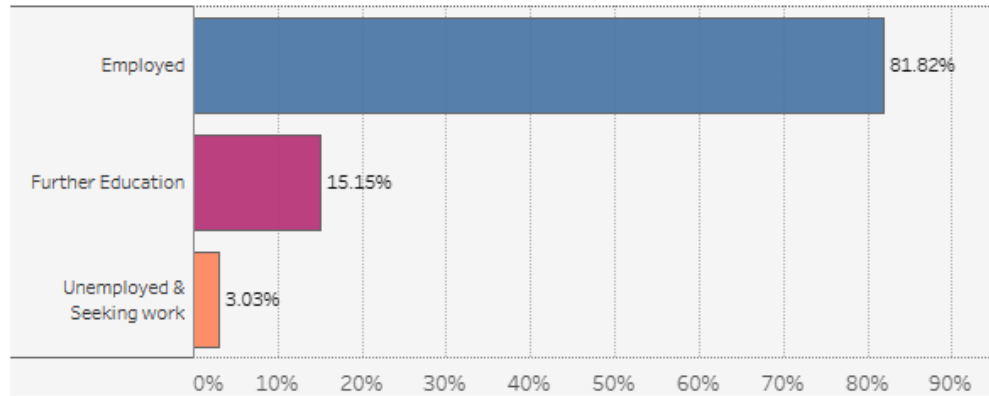


International



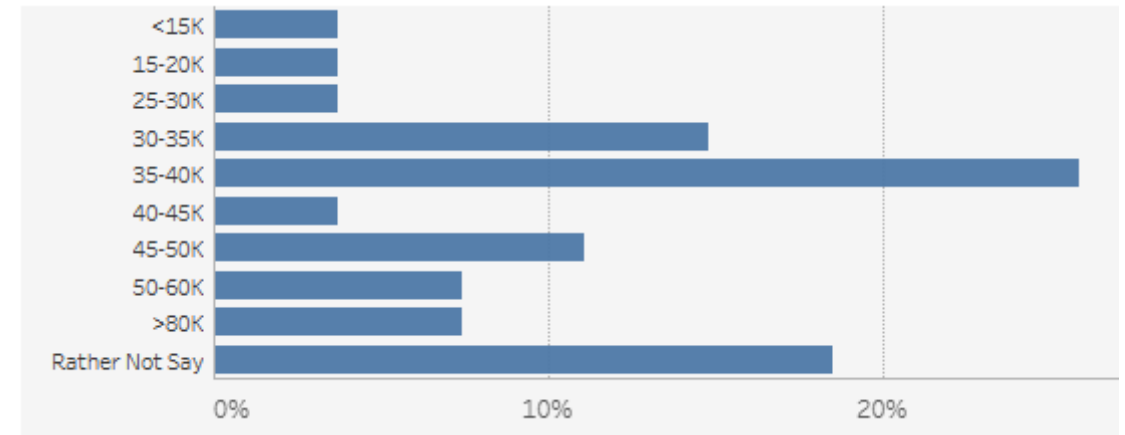
Career Opportunities

Employment status 9 months after graduation (2021/22 academic year*)



*[Graduate Outcomes Survey | Tableau Public](#)

Annual salary or scholarship stipend (2021/22 academic year*)



Rahul

ME graduate (2021 – 2023)

Current Position: Maintenance Systems Coordinator, Royal Oak Distillery

“The ME Biosystems and Food Engineering programme at UCD was highly influential in the trajectory of my career - it helped me approach engineering principles from a practical viewpoint.... I completed a 6-month internship at the Royal Oak Distillery, mainly working towards compliance engineering, quality and safety. I was then offered a graduate position immediately upon the completion of my degree”



Scholarship Opportunities



Students are also welcome to contact the College Office

Réalta Master in Engineering Scholarships [here](#) *(page will be updated when scholarships open for 2024 at c. end March).*

Who to Contact?



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Prof. Enda Cummins
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