

# Dr Ciara Keating - Curriculum Vitae

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## Academic Career

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Jan. 2021 – present: Post-Doctoral Research Associate, School of Biodiversity, One Health & Veterinary Medicine, University of Glasgow (UoG) [inc. 3-month career break]

- ‘Building a decision support tool for potato blackleg disease’ - £2M (BB/T010657/1).
- I also co-direct activities of the Environmental ‘Omics lab (<http://userweb.eng.gla.ac.uk/umer.ijaz/>)

Mar. 2016 – Dec 2020: Post-doctoral Research Associate, School of Engineering, UoG [inc. 6-month career break]

- ‘Synthetic Biology applications to Water Supply and Remediation - £5.2M’ (EP/K038885/1).
- ‘Optimising decentralised low-cost wastewater infrastructure by managing the microbes’ - £1.2M (EP/P029329/1).

March 2015 – Feb. 2016: Post-doctoral Research Associate, Microbial Ecology Lab, National University of Ireland Galway (NUIG)

- Industrial translation of low-temperature anaerobic digestion biotechnology.

June 2014 – Sept. 2014: Research Assistant, NUIG in collaboration with the Marine Institute, Galway

- Influence of diet on the gut microbiome of cod to develop better aquaculture feeding strategies.

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## Education

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2009-2015: PhD in Microbiology ‘Hydrolysis, Methanogenesis and Bioprocess Performance During Low-Temperature Anaerobic Digestion of Dilute Wastewater’, National University of Ireland Galway (NUIG)

2005-2009: BSc. Honours in Microbiology (1:1), National University of Ireland Galway (NUIG)

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## Teaching Experience

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### Undergraduate

2016 – present: 3<sup>rd</sup>-year Environmental Biotechnology  
University of Glasgow School of Engineering UK

### Role Description

- Designed lectures on Anaerobic digestion, Microbial Ecology and Sustainability

2009-2015: 1<sup>st</sup>-year Microbiology Lab Practical’s  
NUI Galway Ireland

### Role Description

- Lab lead (2014-2015)
- Demonstrator (2009-2014)

2009-2015: 3<sup>rd</sup>-year Marine Microbial Ecology Lab Practical’s  
NUI Galway Ireland

- Lab lead (2014-2015)
- Demonstrator (2009-2014)

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### Postgraduate

2018 – present: Industry-led MSc Engineering

### Role Description

- Designed lectures on Microbiology, Anaerobic digestion
- Project design guidance

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## Supervision Experience

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### Undergraduate Students:

#### University of Glasgow (Lead Supervisor)

- 2022: *British Society for Plant Pathology (BSPP) Studentship* - Alexandru-Nicolae Popescu  
2022: *Microbiology Society Harry Vacation Studentship 2022* - Andrea Rico Montana  
2021: *BSPP Studentship* - Alexandru-Nicolae Popescu  
2021 *Society for Applied Microbiology Studentship* - Scott Saunderson

#### NUI Galway, Ireland (Co-supervisor)

- 2010-2012: *Final year undergraduate students in Microbiology* - 2 students for 10 weeks/year

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### MSc Projects (Co-supervisor), University of Glasgow:

- MSc in Food Security*: Lamia Parker-Simms, Simin Chen, and Yuxin Zhang (2022), Ming An and Bingrui Chen (2021)  
*MSc Bioinformatics*: Shubhra Priyadarshini (2021)  
*MSc Engineering*: Dongliang Li, Zhen Yuan, Feng Ni, Kaung Sett, Ruixin Wang, Steffy Anna Cherian, Fan Zou, and Jiajian You (2021)  
*MSC Civil Engineering Management*: Hongyu Mu, Bozhen Chen (2020)  
*MSc Mechanical Engineering*: Keda Li (2020)

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### PhD Students (Co-supervisor and Pastoral Care), University of Glasgow

- Melissa Moore, PhD Candidate (2017-2022; PhD awarded Sept. 2022)  
Visiting PhD student GC Lahore University Pakistan Aneeba Rashid (2020: 3 co-authored publications)  
Visiting PhD students from COMSATS University Pakistan Habiba Tariq (2020), Maria Batool (2022: 1 co-authored publication), Farzana Gul (2022), and Aqsa Ameer (2023)

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## Publications

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1. Singh, S., **Keating, C.** et al. Molecular insights informing inoculum selection for low-temperature anaerobic applications (2023). *Science of The Total Environment* p.162420. *IF: 10.753, Ranking: 26/279 (Environmental Sciences)*
2. Batool, M., **Keating, C.** et al. A Cross-sectional Study of Potential Antimicrobial Resistance and Ecology in Gastrointestinal and Oral Microbial Communities of Young Normoweight Pakistani Individuals. (2023). *Microorganisms*, 11(2), p.279. *IF: 4.926, Ranking: 54/137 (Microbiology)*
3. Trego A. **Keating, C.** et al. Beyond Basic Diversity Estimates – Analytical Tools For Mechanistic Interpretations Of Amplicon Sequencing Data (2022). *Microorganisms*, 10(10), p.1961. *IF: 4.926, Ranking: 54/137 (Microbiology)*
4. Ijaz, U., Gundogdu, O.\* , **Keating, C.\*** et al. Analysis of pit latrine microbiota reveals depth-related variation in composition, and key parameters and taxa associated with latrine fill-up rate (2022). *Frontiers in Microbiology* 13\*Authors contributed equally. *IF: 6.064, Ranking: 34/137 (Microbiology)*
5. **Keating, C.** et al. Drivers of ecological assembly in the hindgut of Atlantic cod fed a macroalgal supplemented diet (2022). *npj biofilms and microbiomes*, 8(1), pp.1-13. *IF: 8.462, Ranking: 17/159 (Biotechnology and Applied Microbiology)*
6. Rashid, A., Mirza, S.A., **Keating, C.** et al. Machine Learning Approach to Predict Quality Parameters for Bacterial Consortium-Treated Hospital Wastewater and Phytotoxicity Assessment on Radish, Cauliflower, Hot Pepper, Rice and Wheat Crops (2022). *Water*, 14(1), p.116. *IF: 3.530, Ranking: 36/100 (Water Resources)*
7. **Keating, C.,\*** Bolton-Warberg, M.\* et al. Temporal changes in the gut microbiota in farmed Atlantic cod (*Gadus morhua*) outweigh the response to diet supplementation with macroalgae (2021). *Animal*

Microbiome 3(1), pp.1-21. \*Authors contributed equally. *IF: Emerging, Ranking: 16/169 (Veterinary Sciences)*

8. Trego, A.B.\* Holohan, B.C.,\* **Keating, C.** et al. First proof of concept for full-scale, direct, low-temperature anaerobic treatment of municipal wastewater (2021). Bioresource Technology 341, p.125786. \*Authors contributed equally. *IF: 11.889, Ranking: 1/14 (Agricultural Engineering)*
9. Rashid, A. Mirza, S.A., **Keating, C.** et al. Hospital wastewater treated with a novel bacterial consortium (*Alcaligenes faecalis* and *Bacillus paramycoides* spp.) for phytotoxicity reduction in Berseem clover and Tomato crops. (2021). Water Science and Technology. *IF: 2.43, Ranking: 47/54 (Engineering, Environmental)*
10. Rashid, A. Mirza, S.A., **Keating, C.** et al. Indigenous *Bacillus paramycoides* and *Alcaligenes faecalis*: potential solution for the bioremediation of wastewaters (2020). Environmental Technology Dec 18:1-4. *IF: 3.475, Ranking: 151/279 (Environmental Sciences)*
11. Connelly, S., Pussayanavin, T., Randle-Boggis, R.J., Wicheansan, A., Jampathong, S., **Keating, C.** et al. Solar Septic Tank: Next Generation Sequencing Reveals Effluent Microbial Community Composition as a Useful Index of System Performance (2019). Water 11(12), 2660. *IF: 3.530, Ranking: 36/100 (Water Resources)*
12. **Keating, C.** et al. Cold adaptation and replicable microbial community development during long-term low-temperature anaerobic digestion treatment of synthetic sewage (2018). FEMS Microbiology Ecology 94, 7, fiy095. *IF: 4.519, Ranking: 59/137 (Microbiology)*
13. Tsagkari, E., **Keating, C.** et al. A Keystone *Methylobacterium* Strain in Biofilm Formation in Drinking Water (2017). Water 9(10), p.778. *IF: 3.530, Ranking: 36/100 (Water Resources)*
14. **Keating, C.** et al. Biological phosphorus removal during high-rate, low-temperature, anaerobic digestion of wastewater (2016). Frontiers in Microbiology 7. *IF: 6.064, Ranking: 34/137 (Microbiology)*
15. Boura, M., **Keating, C.** et al. Loss of SigB in *Listeria monocytogenes* Strains EGD-e and 10403S Confers Hyperresistance to Hydrogen Peroxide in Stationary Phase under Aerobic Conditions (2016). Applied and Environmental Microbiology AEM-00709. *IF: 5.005, Ranking: 46/159 (Biotechnology and Applied Microbiology)*
16. **Keating, C.** et al. The hydrolysis and biogas production of complex cellulosic substrates by three anaerobic biomass sources (2013). Water Science and Technology 67.2 pg 293-298. *IF: 2.43, Ranking: 47/54 (Engineering, Environmental)*

#### Preprints and Submissions

17. **Keating, C.**\*, Trego A.\* et al. A Meta-Analysis Framework for Re-exploration of Amplicon Sequencing Data. (2020). bioRxiv. Jan 1. \*Authors contributed equally.

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### Conference Participation and Invited Talks

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#### Recent Invited talks

Radboud University Microbiology Cluster, January 2023  
Royal Netherlands Institute for Sea Research (NIOZ), January 2023  
Microbial Ecology Lab NUI Galway (delivered online), April 2022  
Mineralogical Society (delivered online), January 2021  
Swedish University of Agricultural Sciences (SLU), July 2019

#### Notable Oral Presentations

Bacterial Plant Diseases stakeholder workshop, “Fighting Bac – Making Microbes Our Allies” (Online, Nov. 2022).

Molecular Microbial Ecology Group (MMEG), “Impact of pathogen burden and management practices on potato blackleg disease prevalence and soil microbial community dynamics” (Glasgow, Dec. 2022)  
MICRO (Biennial international conference on plastic pollution) “Meta-Analysis Based Global Survey of the Microbial Life Associated with Microplastics in the Aquatic Environment” (Online, Nov. 2020)  
Gordon Research Seminar on ‘Archaea’ Nexus | held in Les Diablerets, Switzerland (July 2019).  
“Development of a novel anaerobic incubation and monitoring platform embedded with microfluidics for real-time growth analysis of anaerobic cells”.

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## Awards

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Prof. Anthony Moran Prize 2017 (for a research paper in microbiology) **Keating** et al. *Frontiers in Microbiology* (2016).

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## Funding

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- Wellcome Trust Institutional Strategic Support Fund (ISSF) Feasibility Award (£8,848) – **Lead PI**: “Integrated one health approach for identification of AMR hotspots within poultry farms in Pakistan”.
- Harry Smith Vacation Studentship 2022 (£2,720) – **Lead PI**: Strength in Numbers: “What does the presence of multiple *Pectobacterium* species mean for potential biocontrol measures?”
- British Society for Plant Pathology Studentship 2022 (£4,000) – **Lead PI**: “Genome Assembly and Prediction of Metabolic and Functional Trait Profiles of *Pectobacterium* Species Isolated from Soft Rotting Potato Tubers”
- Wellcome Trust Institutional Strategic Support Fund (ISSF) ECR Catalyst Funding Application 2021 (£22,346) – **Lead PI**: “How do free-living nematodes interact with the microbial populations in soil?”.
- Strathwide funding bid – **Co-investigator**. “Modelling the interkingdom dynamics between microbial communities in response to climate change” 2021 (£5,000)
- Soehngen Institute of Anaerobic Microbiology (SIAM) for a research visit and invited talk to the Royal Netherlands Institute for Sea Research (NIOZ) and Radboud University (RU) 2021 (€3,810).
- Undergraduate remote studentships 2021: British Society for Plant Pathology\* (£4,000) and Society of Applied Microbiology studentship (£2,500) “B-cin Quest: Development of a curated database and workflow for searching for existing and novel bacteriocins produced by bacterial genera associated with plant pathogens”. – **Lead PI**: BSPP \*submitted by Prof. Joel Milner as lead PI on my behalf.
- Co-supervisory role in mobility schemes: International Research Support Initiative Program (2021-2022), under Higher Education Commission, Pakistan Project Nos. 1-8/HEC/HRD/2021/10904; Project No. 1-8/HEC/HRD/2020/10901; ~£14K
- VisNET funding recipient of £4,638 in 2020 – ‘Fundamentals in Anaerobic Culturing and Live-Imaging using the AnaeroGrow platform’. – **Lead PI**
- Scottish Research Partnership in Engineering £2,000 (2020) – ‘Utilising microfluidic cell culture to study strict anaerobic microorganisms in the AnaeroGrow platform’. – **Lead PI**:
- Funding from the Royal Society of Chemistry for Diversity and Inclusion (£2,500) for VisNET Collaboration Event Social Dinner. Written by Mulvana, H.E., Keating, C. et al. (2019). – **Co-investigator**.
- John Robertson Bequest for £1,367 as sole Principal Investigator for a preliminary project supporting my fellowship ideas (2018) on salt tolerance in *Methanospirillum hungatei*. – **Lead PI**:
- I contributed to a successful £1.2M EPSRC grant bid (EP/P029329/1) in 2017.

- Travel grants: Newton Fund travel grant to attend Water and Sanitation Nexus Workshop, Brazil. Thomas Crawford Hayes travel grant to attend AD13, IWA funding to participate in a pre-conference specialised course on 'Innovative Pre-Treatment Technologies' (~£5,800).
- Funded place (12 places – open to EU students) on the UREKA science program in 2008 (€3,600).

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## Professional Membership

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The Microbiology Society | Society for Applied Microbiology | EbNet | British Society for Plant Pathology  
Advance HE

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## Recent Professional Development and Training

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Aurora Higher Education Leadership program 2020. Glasgow Crucible Professional program 2019.  
[VisNET](#) Postdoctoral Researcher Programme 2019-Oct 2020.

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## Skills

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### Wet-lab

Molecular Biology: DNA/RNA Co-Extraction, qPCR, RT-PCR, sanger sequencing, cloning, denaturing gradient gel electrophoresis, terminal restriction fragment length polymorphism, amplicon sequencing.

Microscopy: Anaerobic live-imaging, microfluidic cell culture, fluorescent in situ hybridisation, scanning electron microscopy and energy dispersive X-ray analysis.

Microbial: Microfluidic cell culture, mixed microbial activity/degradation and enrichment assays, aerobic, anaerobic culturing, and protein expression.

Analytical/Operational: reactor operation, analyte measurement, GC-MS.

### Computational

Applications: Amplicon sequencing analysis, metagenomics analysis, pangenome analysis, microbial ecological assembly tools, and statistical analyses.

Software and tools: Command line tools, Qiime2, R studio, GraphPad Prism, ImageJ, Primer-E, Galaxy, python language and other coding pipelines.

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## Additional Experience

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### Academic Service

- Co-chair of 'Plant Microbe Interactions' session at the Microbiology Society Annual Conference in Birmingham April 17<sup>th</sup> 2023
- Review Editor on the Editorial Board of Microbiotechnology (specialty section of Frontiers in Microbiology)
- Peer reviewer for the following journals:  
Environmental Science and Technology | Animal Microbiome | Chemosphere | Water Research | Water Science and Technology | New Biotechnology | International Biodeterioration and Biodegradation | PeerJ |
- Invited to review grants from the Royal Society.

### Administration

- Agresso systems experience and project finance management.
- Organisation of the Water and Environment weekly seminar at UoG from 2017-2019.
- Creation of risk assessments and Control of Substances Hazardous to Health (COSHH) forms.
- Post-doctoral representative for lab re-opening guidance during COVID-19.

## Outreach

- Microbiology Blog on my research: <https://microbiologycommunity.nature.com/posts/how-do-microbial-communities-assemble-in-the-gut-of-atlantic-cod-in-response-to-diet-and-novel-ingredients>
  - Pint of Science 2019 talk entitled 'Microbes: Smol but Mighty'.
  - In 2019 I gave a talk at my secondary school in Tullow, Carlow (Ireland) encouraging students to pursue a career in STEM.
  - Science experience workshops at NUI Galway Ireland.
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