

# Bioscience Careers Day

*Career in Academia*



**Diane Purchase**  
**Professor of Environmental Biotechnology**  
**Middlesex University**

# My background



**Heal**  
The World



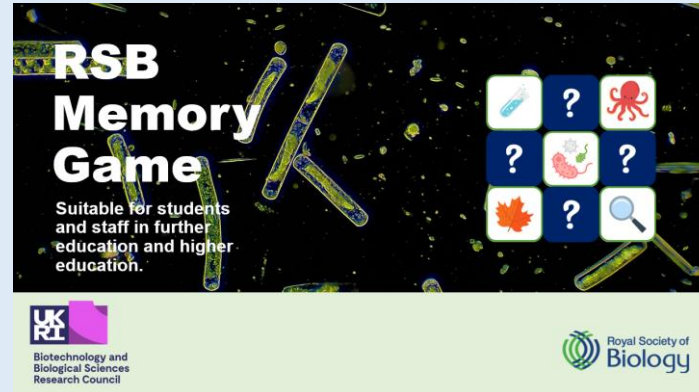
**Fuel**  
The World



**Feed**  
The World

<https://www.bio.org/what-biotechnology>

# My proud association with the Royal Society of Biology



## Professor Diane Purchase



Professor of Environmental Biotechnology  
Middlesex University

[See more details online](#)  
Jobs and research opportunities

## Electrokinetic biocementation using bacteria for ground improvement

This study delves into an innovative method of strengthening clay soil under UK railway embankments using a process called carbonic anhydrase (CA) biocementation, powered by electrokinetics. Unlike traditional ureolytic approaches, CA-producing bacteria can absorb CO<sub>2</sub> and create biocement. By applying biostimulation and bioaugmentation techniques, we encouraged biocementation in clay soil samples. We assessed the impact through tests measuring shear strength, moisture content, and calcium carbonate levels. Scanning electron microscopy (SEM) showed structural changes in the soil after biostimulation. Of the two techniques, we found biostimulation significantly improved soil strength and sequestered CO<sub>2</sub>, promising enhanced railway stability and contributing to climate change mitigation.

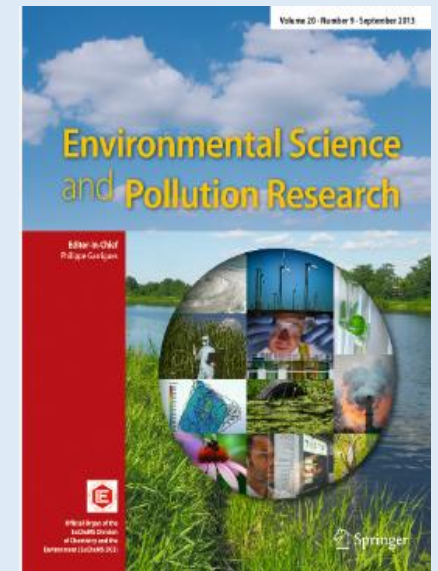
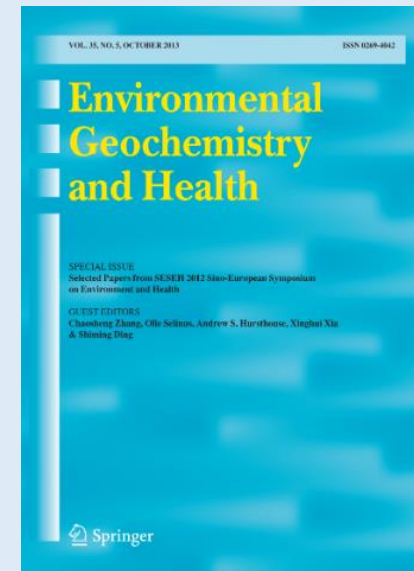
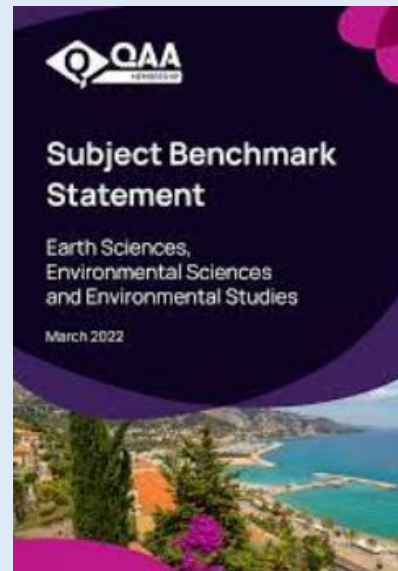
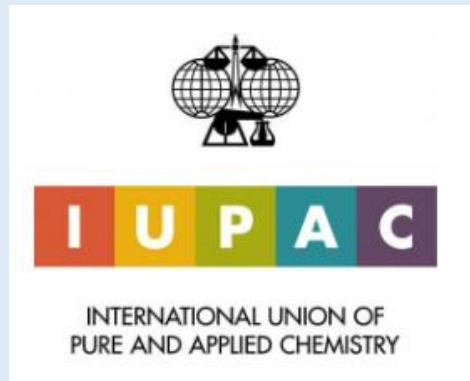


**Fun fact:** Imagine creating tiny, secret gardens called "nanoflowers" using a special enzyme called carbonic anhydrase and copper. These nanoflowers are so tiny that you can only see them with a strong microscope. They look just like tiny dahlia blooms, and they are like hidden treasures that work super well for us.





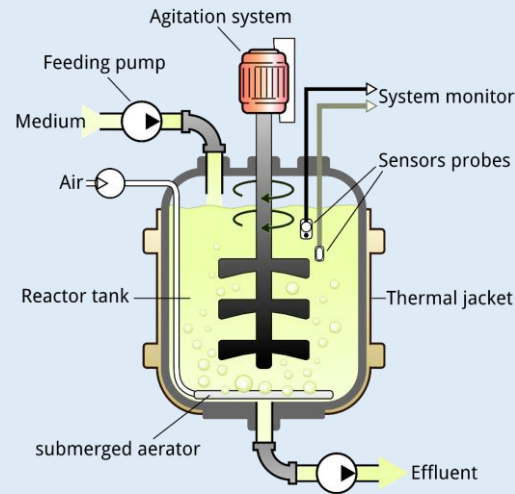
# Other external activities



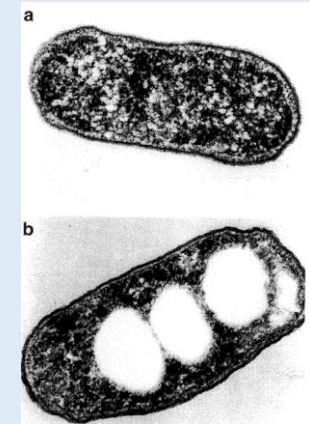
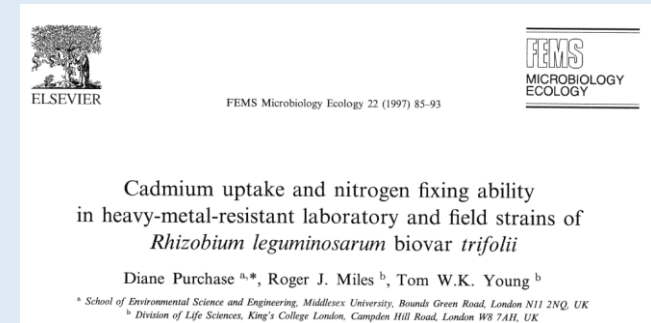
# Studying for my qualifications



BSc Microbiology  
University of London

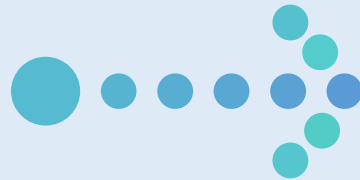


MSc Bioreactor Systems  
University of Manchester  
Institute of Science &  
Technology

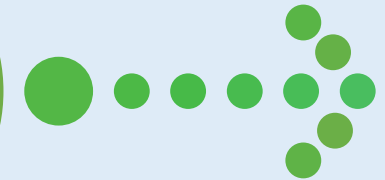
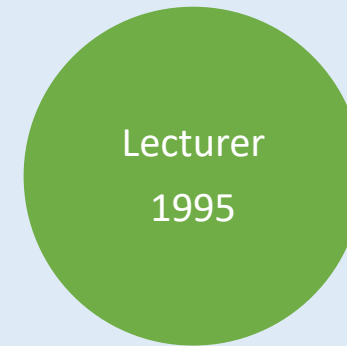
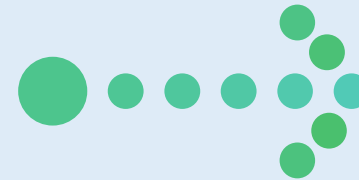


PhD  
King's College London

# My academic journey afterwards



Medeva R&D





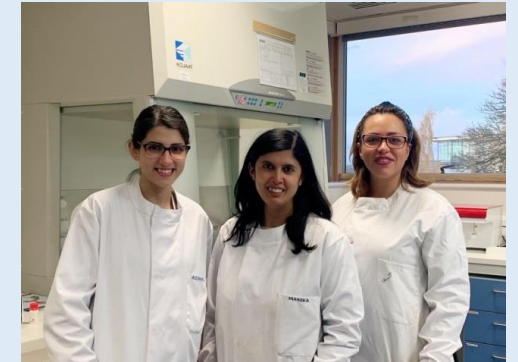
# Why academia?

- Bitten by the bug
- First research experience in my final year project: *Pantoea agglomerans* (formerly *Erwinia herbicola*) metabolite vs *Fusarium* spp.



Public Domain, <https://commons.wikimedia.org/w/index.php?curid=1214930>

- To my own research group and students



# What to expect – the rewards

Passion for research

Intellectual stimulation

Teaching and mentorship

Autonomy and freedom

Impact and contribution

Global collaboration

Diverse work environment

Continuous growth





# What to expect – the challenges

Job insecurity

Intense competition

Publish or perish culture

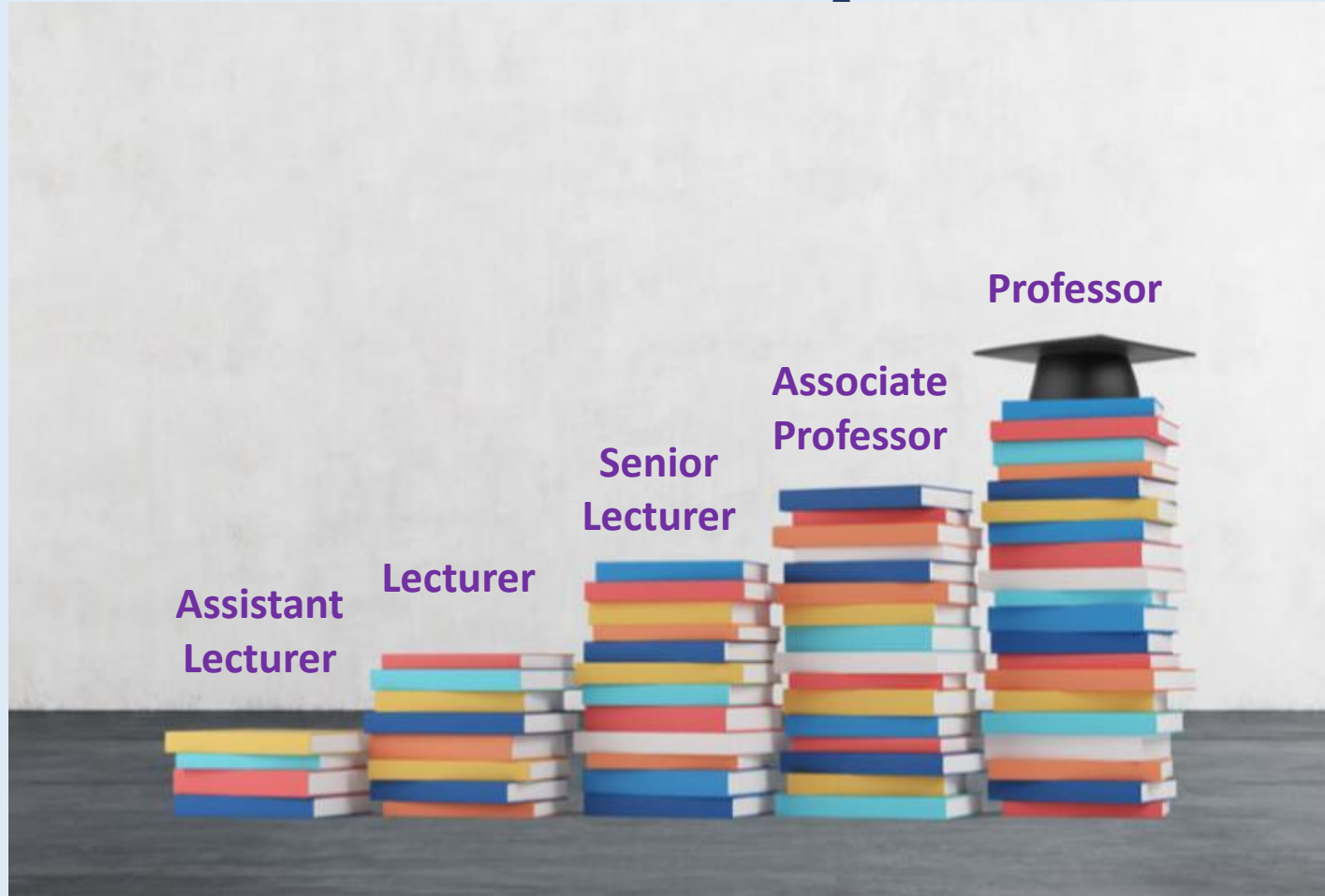
Work-life balance

Limited funding

Balancing teaching and research



# Academic roles and responsibilities



# Alternative academic paths



**RESEARCH  
FELLOWS**



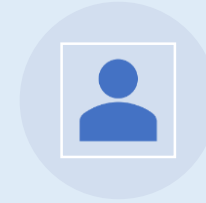
**TEACHING  
FELLOWS**



**TECHNICAL  
TUTORS**



**TECHNICIANS**



**EDUCATIONAL  
TECHNOLOGY  
SPECIALIST**



**SCIENCE  
COMMS AND  
OUTREACH**



**PROJECT  
MANAGER**



# Useful qualifications and experience

- Academic qualifications
  - ❖ BSc, MSc, PhD
  - ❖ Teaching qualification
  - ❖ Professional certifications
- Experience
  - ❖ Postdoctoral research experience
  - ❖ Research and industry experience

Postgraduate  
Certificate in  
Higher Education

 AdvanceHE

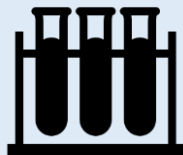
Royal Society of Biology  
Membership



# Useful skills

- Technical skills and proficiency

- ❖ Teaching and mentorship
- ❖ Laboratory techniques
- ❖ Digital competency
- ❖ Statistics
- ❖ Scientific writing
- ❖ Grant writing



- Transferrable skills

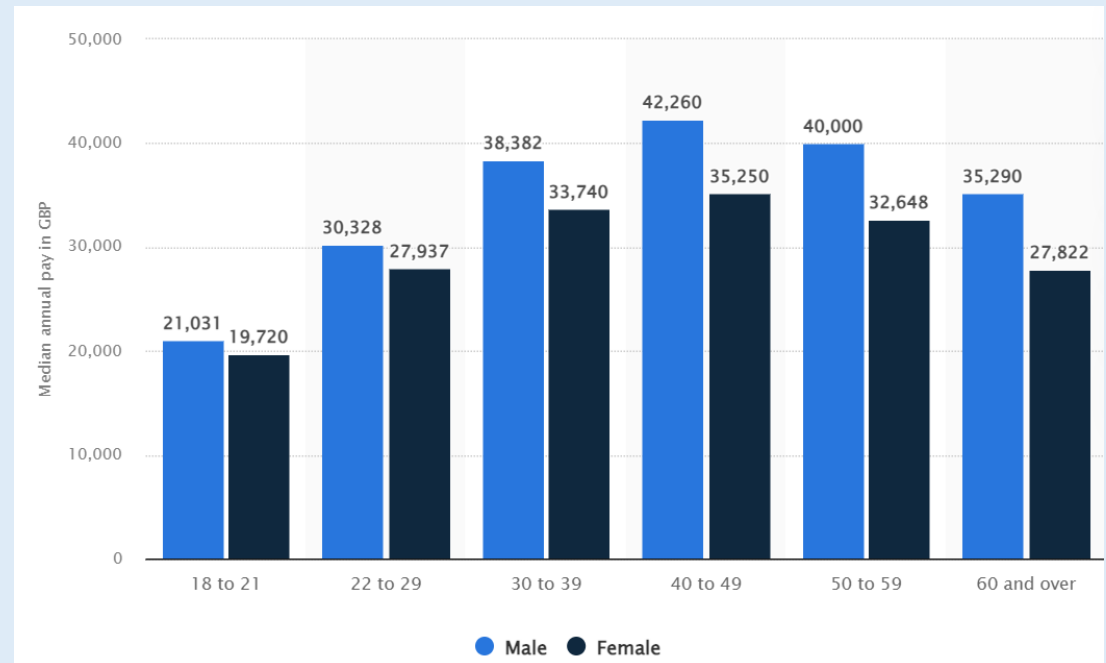
- ❖ Time management
- ❖ Communication
- ❖ Team work
- ❖ Critical thinking
- ❖ Ability to reflect
- ❖ Ethical awareness and cultural intelligence



# Salary Range

PhD studentship £15K-£23K	Research Assistant £25K-£35K	Postdoctoral Researcher £32K-£55K
Research Fellow £35K-£70K	Teaching Fellow £30K-£60K	Technical Tutor £25K-£60K
Lecturer £40K-70K	Senior Lecturer £45K-£80K	Associate Professor £55K-£90K
	Professor £60K-£120K+	

- Median annual earning (£) for full-time employees in the UK in 2023



Source: <https://www.statista.com/statistics/802183/annual-pay-employees-in-the-uk/>





# Job opportunities and where to look

- University and Research institution websites e.g. <https://wellcome.org>
- Academic Job Boards e.g. [www.jobs.ac.uk](http://www.jobs.ac.uk), <https://www.timeshighereducation.com/unijobs/>, <https://jobs.theguardian.com/higher-education>
- Online Job Portals e.g. <https://www.prospects.ac.uk/graduate-jobs>; <https://www.glassdoor.co.uk/Job/index.htm>
- Professional Associations and Societies e.g. <https://www.rsb.org.uk>, <https://royalsociety.org>, <https://www.amrc.org.uk>, <https://www.immunology.org>, <https://careers.appliedmicrobiology.org/>
- Government and Research Funding Agencies e.g. <https://www.ukri.org>
- Science journals e.g. <https://www.nature.com/naturecareers>
- Networking e.g. <https://www.linkedin.com>
- Charitable organisations e.g. <https://www.cancerresearchuk.org>, <https://www.leverhulme.ac.uk>, <https://www.bhf.org.uk>, <https://www.mssociety.org.uk>

# Advice for aspiring academics



Follow your passion



Pursue a strong educational background



Build your network



Draw on your resilience and tenacity



Communicate and collaborate



Take opportunities and chances

# Thank you



<https://www.mdx.ac.uk/about-us/our-people/staff-directory/profile/purchase-diane>



<https://www.researchgate.net/profile/Diane-Purchase>