Multifunctional Nanocomposites in Wastewater Treatment

www.uclanchinawastewatersolutions.net

University of Central Lancashire, Preston, UK; East China University of Science & Technology, Shanghai, China & Feedwater Ltd., UK

Funded by British Council China

Project Description

The project focused on developing nanotechnology-based wastewater treatment, emphasizing the removal of pollutants from our environmental ecosystem. It integrated laboratory research, mobility (exchange visits), co-supervision of PhD students, joint module development with industrial importance, dissemination via workshops, conferences, journal publications, and outreach to the young generation during science festivals.

Major Achievements

- Joint research on novel multifunctional nanomaterials for the removal of pollutants from wastewater which has been published in high-impact peer-review journals.
- Two international chemical policy workshops in the UK and China involving academic and industrial researchers, Government policymakers, and the general public.
- Hosted skills development program by providing training on health & safety in the chemical laboratory, analytical techniques, and nanocomposite synthesis to exchange students and staff.
- Supervised an ongoing joint PhD student
- Facilitated a summer internship program for undergraduates to develop nanomaterials and analytical skills, funded by the Royal Society of Chemistry, UK
- Initiated the development of a joint teaching module by extending our activity to another university in China
- Staff/Student exchanges as a part of mobility program
- Presented our activity at Burlington Consensus 3, London as a part of capacity building, organized by the United Nations under OEWG-3, formed by the Royal Society of Chemistry, UK

Feedback on British Council's support

- The British Council's support was invaluable throughout the project. The staff in the British Council office in China was always available to assist with any queries, providing timely and effective help whenever needed.
- We are grateful for selecting our project for the case study by organising online interviews with the Higher Education Strategy Associates, Canada
- An opportunity to discuss our project achievement with a senior data manager of the British Council office in Hong Kong via an online interview.

Total Number of Faculty Exchanges

Total 5 (UK to China 4; China to UK 1)
UK project Lead Dr Tapas Sen [Sept'23, April'24, Sept'24]
UK Research Assistant, Miss Faryal Mehr (April 2024)

Total Number of Student Exchanges

Total 2 (UK to China 1; China to UK 1)
UK PhD student, Miss Faryal Mehr (April 2024)
China PhD student, Miss Li Yihan (Nov'24)

Total Number of Joint Research Outcomes

Total 10: High-impact Peer-Review journal articles (2 published, 2 under review), 3 keynotes presentations at International policy workshops, 1 plenary talk at International conference in Armenia, 2 keynotes to International audience at Armenia and Japan

Total Number of Audience Reach

Worldwide more than 10000 via the project website: www.uclanchinawastewatersolutions.net
More than 2000 via online and face-to-face delivery of 2 chemical policy workshops, 1 project workshop, and conference presentations in Japan and Armenia

Total Number of TNE Initiatives

Total 8 (2 joint research seminars, 3 international workshops, 2 laboratory trainings, 1 joint module delivery via an online platform)

Project Video Links

1st International workshop in hybrid mode, Shanghai, China, Sept'23
https://www.youtube.com/watch?v=zpuQezcMsqk
1st International policy workshop in China, April 2024
https://www.linkedin.com/feed/update/urn:li:activity:7190806025287950336/?originTrackingId=huFs%2Fp3iS1qghX4ll6nVAg%3D%3D
2nd International policy workshop in Uclan, Preston, UK
https://www.youtube.com/watch?v=h8b0M5sI3Vc
https://www.youtube.com/watch?v=OGWSWr1v_rE
Panel discussion:
https://www.linkedin.com/feed/update/urn:li:activity:7209594257026727936/?originTrackingId=8dQyKnpwQVuN0hkG3Lb4aQ%3D%3D
Outreach event, June 24:
https://www.linkedin.com/feed/update/urn:li:activity:7209594257026727936/?originTrackingId=8dQyKnpwQVuN0hkG3Lb4aQ%3D%3D

Innovative Aspects

- Nanotechnology-based water purification technology
- Cost-efficient, simple, and one-step magnetic separation protocol for the removal of pollutants from water
- Online platform for students/staff engagement with minimum travel for environmental sustainability
- Dissemination of project goals via two international chemical policy workshops involving Government policy makers and the public health department by meeting the United Nations Sustainable Goals

Key Lessons Learnt

- International collaboration is essential for solving global health & environmental issues via joint research and knowledge exchange
- Cross-disciplinary approaches are important for tacking complex issues
- Training workshops and hands-on sessions enhance skills development for next-generation scientists
- Outreach to young students, teachers, and the general public is the key to public-funded projects
- Proper risk assessment is essential for meeting project goals and timeline
- Challenges due to language barriers and differences in financial regulation can be met via proper dialogue

List of Significant Activities

- Development of novel multifunctional nanomaterials for the removal of pollutants from wastewater
- 3 high-impact Peer-Review journal articles (1 published, 2 under review)
- Outreach to the general public, young students, and teachers via Science Festivals
- 2 international chemical policy workshops, one in China and one in the UK involving academic and industrial researchers, British Council members, Government agencies, and the General public.
- Supervised joint PhD student and continuity
- Skills development, knowledge exchange, and capacity building under the United Nations OEWG-3, established by the Royal Society of Chemistry.
- Successful in bidding 2 Royal Society of Chemistry Summer Internships, 1 prestigious Daphne Jackson Fellowship (funded by EPSRC+NERC) in the UK, and 2nd British Council China Going Global Grant for long-term sustainability on environmental research and TNE activity.

Testimonials from Participants

"As a visiting scholar, I had the opportunity to contribute to key experiments and laboratory work in this project. The experience allowed me to enhance both my professional development and academic network."
– Dr. Mohammed M Algaradah, Saudi Arabia

"As a PhD student at UCLan, this project not only enhanced my technical skills but also provided valuable insights into international collaboration."
– Marwa Elhariry, UK

"As an undergraduate student at UCLan, I had the opportunity to join this project as a summer intern, where I learned valuable analytical techniques, which greatly enhanced my research skills."
– Ashley Jane Maude, UK

"My visiting experience at UCLan as part of this project has been incredibly rewarding. It has greatly expanded my knowledge and skills. I am grateful for the support and guidance from the team."
– Yihan Li, China

Project Pictures



1st exchange visit in Shanghai, Sept'23 UK project lead Dr Tapas Sen with China project lead Dr. Lingzi Wang.


1st international workshop in hybrid mode East China University of Science & Technology (ECUST) Shanghai, Sept'23


Mr. David Wang, British Council Shanghai office addressing the international workshop audience, Sept'23


Mr. Chen Zhao, Senior Programme Manager, British Council Beijing Office addressing the international policy workshop audience, April 2024


Mr. Paul Cuilligan, Senior Data Manager, British Council Hong Kong Office taking an online interview to Dr Tapas Sen about the success story, Nov'24


1st International Chemical Policy Workshop Tianjin, China in April 2024


Students' poster presentation 1st International Chemical Policy Workshop Tianjin, China in April 2024


2nd International Chemical Policy Workshop UCLan, UK, July 2024

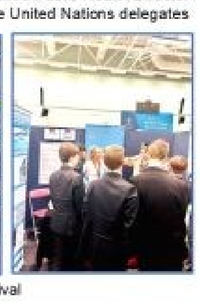

Panel discussion involving Lancashire Public Health Director and the United Nations delegates


1st Outreach event: Lancashire Science Festival University of Central Lancashire, May 2023




Second outreach event: National TeenTech Festival University of Central Lancashire, June 2024






1st student exchange visit from China to UK, (Left) UK project team members, (middle) laboratory training, (iii) analytical training, and (iv) joint FZ4801 master module attendance by Miss Yihan LI at the University of Central Lancashire, Nov'23


UK Project lead, Dr Tapas Sen is presenting the capacity building project at Burlington Consensus 3, London, Sept'24 during the panel discussion, organised by OEWG-3 of the United Nations