

## Dr Joanna Renshaw MA, PhD

Lecturer in Biogeochemistry

**School of Geography, Earth and Environmental Sciences (/schools/gees/index.aspx)**

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### About

Joanna is a microbiologist and radiochemist with extensive experience of research into microbial interactions with radionuclides and metals, working at the interface between microbiology and analytical & radio-chemistry. She is one of the very few people in the UK who is experienced in both microbiology and the chemistry of transuranic and fission product elements, and has the skills required to handle high activity radionuclides. Her current research is focusing on developing novel methods for limiting radionuclide migration in the environment using bacterial biomineralization processes. This research is part of the BANDD (Biogeochemical Applications in Nuclear Decommissioning and Waste Disposal) project involving the Universities of Strathclyde, Glasgow, Birmingham, Manchester and Cambridge, and the British Geological Survey, and funded by EPSRC and NERC. Other recent research has investigated the interactions of silver nanoparticles with bacterial biofilms and microbial transformations of metals.

### Qualifications

PhD in Radiochemistry and Microbiology 2000, University of Manchester  
MA (Hons) Natural Sciences 1995 University of Cambridge

### Biography

Lecturer in Biogeochemistry, School of Geography, Earth & Environmental Sciences, University of Birmingham (2005-)  
Postdoctoral Research Associate, "Mechanisms for the reduction of actinides and Tc(VII) in *Geobacter sulfurreducens*", University of Manchester (2003-2005)  
BNFL Research Fellow, "The coordination chemistry of hydroxamate and carboxylate ligands with simple (Ln<sup>3+</sup>), mono-oxo (VO<sub>2</sub><sup>+</sup>) and dioxo (UO<sub>2</sub><sup>2+</sup>, NpO<sub>2</sub><sup>+</sup>) metal cations", University of Manchester (2000-2003)  
PhD, "Fungal Hydroxamate Siderophores as Complexants for Actinides", University of Manchester, 1996-2000  
BA(Hons), Natural Sciences, University of Cambridge (1992-1995)

### Teaching

- MSc Hydrogeology: Organic Contaminant Hydrogeology; Contaminated Land and Groundwater Remediation
- BSc/MSci Geology/Resource & Applied Geology/Environmental Geology: Topics in Geology (Yr 1); Resources of the Earth (Yr 2)

### Postgraduate supervision

Dr Joanna Renshaw currently co-supervises the following PhD students:

- Tim Batty - Revisiting the K<sub>d</sub> Concept (NERC CASE PhD with ESI Ltd)
- Jimmy Roussel - Metal Speciation in Anaerobic Waste Digesters (University funding)
- Seniyat Afegbua - Phytoremediation of toxic organic pollutants from crude oil contamination in the Niger Delta region of Nigeria (Nigerian Petroleum Development Fund)
- Bryony Anderson - Manufactured nanoparticles – assessing the mobility of a future class of contaminant in groundwaters (NERC Case PhD with Malvern Instruments)
- Naomi Armstrong-Pope - Risks posed by potential radiological-contaminated groundwater discharges to coastal shoreline and river receptors (Sellafield Ltd funding)

Potential students can contact Dr. Renshaw directly, or visit the School [FindAPhD page \(http://www.findaphd.com/search/PhD.aspx?IID=282&PID=135\)](http://www.findaphd.com/search/PhD.aspx?IID=282&PID=135) for available opportunities.

### Research

#### Research Interests

- Microbial transformations of radionuclides and metals
- Biogeochemistry of radionuclides, metals and organic pollutants in groundwater
- Bioremediation of contaminated land and groundwater
- Interactions of microbes and nanoparticles

#### Current / recent research

- Use of biomineralization processes for radionuclide immobilization
- Nanoparticle migration
- Radionuclide migration in the subsurface
- Interactions of nanoparticles with bacterial biofilms
- Virus migration through sandstone aquifers

[Listen to Joanna's podcast 'Biogeochemistry' \(MP3 - 16.7MB\) \(/Audio/news/jo-renshaw-biogeochemistry.mp3\)](#) or read the [podcast transcript \(/accessibility/transcripts/dr-joanna-renshaw.aspx\)](#).

## Other activities

### Administrative Responsibilities

- School Biological Safety Officer
- School Radiation Safety Officer
- Year 3 Tutor (Earth Sciences)
- Careers Officer (Earth Sciences)

## Publications

### Key Publications since 2001

Law, N.; Ansari, S.; Livens, F. R.; Renshaw, J. C.; Lloyd, J. R. (2008). The formation of nanoscale elemental silver particles via enzymatic reduction by *Geobacter sulfurreducens*. *Applied & Environmental Microbiology* 74: 7090-7093

Renshaw, J. C.; Lloyd, J. R.; Livens, F. R. (2007). Microbial interactions with actinides and long-lived fission products. *Comptes Rendus Chimie* 10: 1067-1077.

Renshaw, J. C., Butchins, L. J. C., Livens, F. R., May, I., Charnock, J. M. and Lloyd, J. R. (2005) Bioreduction of uranium: Environmental implications of a pentavalent intermediate. *Environmental Science & Technology*, 39(15), 5657-5660.

Lloyd, J. R., Renshaw, J. C., May, I., Livens, F. R., Burke, I. T., Mortimer, R. J. G. and Morris, K. (2005) Biotransformation of radioactive waste: microbial reduction of actinides and fission products. *Journal of Nuclear and Radiochemical Sciences*, 6(1), 17-20.

Lloyd, J. R. and Renshaw, J. C. (2005) Microbial Transformations of Radionuclides: Fundamental Mechanisms and Biogeochemical Implications. In: Sigel, A., Sigel, H. and Sigel and R. K. O. (eds) *Metal Ions in Biological Systems*. Boca Raton, Taylor & Francis, 44, 205-240.

Lloyd, J.R., and Renshaw, J.C. (2005) Bioremediation of radioactive waste: radionuclide-microbe interactions in laboratory and field-scale studies. *Current Opinion in Biotechnology*, 16(3), 254-260.

Khijniak, T.V., Slobodkin, A. I., Coker, V., Renshaw, J. C., Livens, F. R., Bonch-Osmolovskaya, E. A., Birkeland, N. K., Medvedeva-Lyalikova, N. N. and Lloyd, J. R. (2005) Reduction of uranium(VI) phosphate during growth of the thermophilic bacterium *Thermoterrabacterium ferrireducens*. *Applied and Environmental Microbiology*, 71(10), 6423-6426.

