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# Dr Stephanie Handley-Sidhu PhD

Research Fellow

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

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## Qualifications

- BSc Analytical Chemistry
- PhD Environmental Science

## Biography

**July 2013-Present** Research Fellow, EPSRC Follow on Fund, University of Birmingham

**September 2012 - June 2013** Temporary Lecturer in Biogeochemistry, University of Birmingham

**June 2009 - September 2012** Research Fellow, EPSRC, University of Birmingham

EPSRC funded research consortium: Biogeochemical Application in Nuclear waste Decommissioning and Disposal (BANDD; EP/G063699/1). This project explored the use of microbial processes to immobilise radioactive contaminants and prevent transport pathways by reducing rock permeability.

**December 2008 - June 2009** Honorary Research Fellow, University of Plymouth

**September 2004 - December 2008** PhD in Environmental Chemistry, University of Plymouth. NERC & Ministry of Defence funded research consortium: Geochemical and microbial controls of decomposition and dispersion of depleted uranium (DU) in the environment (NE/C506799/1). Military use of depleted uranium in anti-armour “penetrators” has resulted in large quantities of DU being released into the environment. This PhD project investigated the influence of biogeochemical conditions on DU corrosion and characterised the form and mobility of decomposition products in the environment (viva 9/12/2008).

**Sept 2001- May 2004** BSc Hons. Analytical Chemistry, University of Plymouth

## Teaching

- MSc Nuclear Decommissioning and Waste Management (NDWM): Materials & Analysis Lab, Introduction to Radiochemistry
- MSc Physics and Technology of Nuclear Reactors: The Nuclear Fuel Cycle
- MSc Hydrogeology: Contaminated Land and Groundwater Remediation
- BSc Geology: Environmental Geochemistry, Resources of the Earth, Topics in Geology, Pembrokeshire Geology Field Course
- Administration – Careers Officer

## Postgraduate supervision

Dr. Handley-Sidhu has designed projects and successfully supervised postgraduate and undergraduate students, with several outcomes resulting in publications in international journals (see publications 10, 12 and 13).

(1) Dr Sayo Moriyama and Dr Qianqian Yu from University Kyushu, Japan.

(2) Mr Quentin Grail and Ms Silvia Nougarol from Ecole Nationale du Génie de l'Eau et de l'Environnement de Strasbourg, France.

(3) Mr Andrew Palmer and Ms Miriam Dowle from Physical Sciences of Imaging in the Biomedical Sciences, UoB.

(4) Mr Robert Curley, Mr J Purvis, Mr L Benton-Slim and Mr F Sinclair Smith. MSci Geology students, UoB.

(5) Ms Melissa Collier and Mr James Pearson. MSc Nuclear Waste Disposal and Decommissioning students, UoB

## Research

**Funding**

- April 2013 NERC Catalyst Grant, ‘Biogeochemical Cycling of Rare Earth Elements: Pathways to Mitigation of Environment Impact by Green Recovery', £86,321.

- July 2013 EPSRC Follow on Fund, 'Synthesis and Optimisation of Apatite Composite Materials: A low Cost Ion Exchangers for treating environmental levels of radionuclides', £24,956.
- January 2013 ISIS SANS2D Instrument 'Biotemplated Hydroxyapatite for Radionuclide Remediation', 3 days beam time, Science and Technology Research Council, £35,550.
- April 2012 Diamond XAS Light Source 'Biomineral Remediation Strategies for Radionuclides: Bio-Hydroxyapatite Uptake of Sr, Co, Eu and U', 3 days beam time, Science and Technology research Council, £60,000.
- August 2011 Facility for Environmental Nanoparticle Analysis and Characterisation (FENAC) 'Removal of Radionuclides into Biogenic Hydroxyapatite', Natural Environment Research Council, value £24,000.
- September 2011-2013 Japan's REIMEI Research Program 'Exploration of New Biological Specific Function by Heavy Element Stimulus'. This grant aims to encourage collaboration between researchers working on rare earth elements in Japan and the UK, Japan Atomic Energy Agency - Advanced Science Research Centre, value £56,000.
- May 2010 Facility for Environmental Nanoparticle Analysis and Characterisation. Investigating Nano-crystalline Hydroxyapatite Bio-mineral for the Treatment of Nuclear Wastes, Natural Environment Research Council, value £24,000.

## Other activities

**Membership:** Committee Member for the Royal Society of Chemistry - Radiochemistry Group (2011-Present); Member of the Royal Society of Chemistry (2004-Present), and Member of the European Association of Geochemistry (2008-Present).

**Reviewer:** Applied Geochemistry, Science of the Total Environment, Journal of Environmental Science & Technology and RSC Journals.

**Outreach:** STEM Ambassador - promoting skills to young learners, encouraging students to study Science, Technology, Engineering and Maths subjects (2012-Present).

## Publications


15. Cuthbert MO, McMillan L, **Handley-Sidhu S**, Tobler DJ, Riley M, Phoenix VR, (2013) A field and modelling study of fractured rock permeability reduction using microbially induced calcite precipitation, *Environ. Sci. Tech.* DOI: 10.1021/es402601g

14. Holliday K, **Handley-Sidhu S**, Dardenne K, Renshaw J, Macaskie L, Walther C, Stumpf T (2012). A new incorporation mechanism for trivalent actinides into bio-apatite. *Langmuir*, 28, 3845−3851.

13. Sasaki K, Tsuruyama S, Moriyama S, **Handley-Sidhu** S, Renshaw J.C., Macaskie L.E. Exchange capacity of Sr2+ onto calcined biological hydroxyapatite and the implications for use in permeable reactive barriers. *Mater. Trans.* 53, 1267-1272.

12. **Handley-Sidhu S**, Sham E, Cuthbert MO, Nougarol S, Mantle M, Johns ML, Macaskie LE, Renshaw JC. Kinetics of calcite precipitation using urease active jack bean meal and permeability reduction of porous media evidenced by magnetic resonance imaging. *Int. J. Environ. Sci. Tech.* 10, 881-890.

11. Cuthbert MO, Riley MS, **Handley-Sidhu S**, Renshaw JC, Tobler DJ, Phoenix VR, Mackay R (2012). Controls on the rate of ureolysis and the morphology of calcite precipitated by S. Pasteurii biofilms and limits due to bacterial encapsulation. *Ecol. Eng.* 41, 32-40.

10. **Handley-Sidhu S**, Renshaw JC, Moriyama S, Stolpe B, Yong P, Mennan C, Bagheriasl S, Paterson-Beedle M, Sasaki K, Pattrick R.A.D, Lead J.R, Macaskie L.E (2011). Removal of Sr2+ and Co2+ into Biogenic Hydroxyapatite: Implications for Bio-Mineral Ion Exchange Synthesis. *Environ. Sci. Technol.* 45, 6985-6990.

9. **Handley-Sidhu S**, Renshaw J, Yong P, Kerley R, and Macaskie LE (2011). Nano size hydroxyapatite bio-mineral for the treatment of strontium from aqueous solutions. *Biotechnol. Lett.* 33, 79-87.

8. Tobler DJ, Cuthbert, MO, Greswell RB, Riley MS, Renshaw JC, **Handley-Sidhu S**, Phoenix VR (2011). Comparison of rates of ureolysis between Sporosarcina pasteurii and an indigenous groundwater community under conditions required to precipitate large volumes of calcite. *Geochim. Cosmochim. Ac.* 75, 3290–3301.

7. Alvarez R, Livens FR, Lloyd JR, Holt JP, Langley CE, Boothman C, Wincott P, **Handley-Sidhu S**, Keith-Roach MJ, Vaughan DJ (2011). Geochemical and microbial controls of the decomposition of depleted uranium in the environment: experimental studies using soil microorganisms. *Geomicrobiol. J.* 28, 457-470.

6. **Handley-Sidhu S**, Keith-Roach MJ, Lloyd JR and Vaughan DJ (2010). A review of the environmental corrosion, fate and bioavailability of munitions grade depleted uranium. *Sci. Total Environ.* 408, 5690-5700.

5. **Handley-Sidhu S**, Bryan ND, Worsfold PJ, Vaughan DJ, Livens FR and Keith-Roach MJ. (2009) Corrosion and transport of depleted uranium in sand-rich environments. Chemosphere, 77, 1434-1439.

4. **Handley-Sidhu S**, Worsfold PJ, Livens FR, Vaughan DJ, Lloyd JR., Boothman C, Sajih M, Alvarez R. and Keith-Roach MJ (2009). Biogeochemical controls on the corrosion of depleted uranium alloy in subsurface soils. *Environ. Sci. Technol*. 43, 6177-6182.

3. **Handley-Sidhu S**, Worsfold PJ, Boothman C, Lloyd JR, Alvarez R, Livens FR, Vaughan DJ and Keith-Roach MJ (2009). Corrosion and fate of depleted uranium penetrators under progressively anaerobic conditions in estuarine sediment. *Environ. Sci. Technol.* 43, 350-355.

2. Reinoso Maset E, **Handley S**, Fisher A, Heydon A, Worsfold PJ, Cartwright AJ and Keith-Roach, MJ (2006). The effect of organic co-contaminants on technetium and rhenium speciation and solubility under reducing conditions. *Environ. Sci. Technol*. 40, 5472-5477.

1. Alvarez R, Byran ND, Formina M, Gadd GM, **Handley S**, Keith-Roach M, Livens FR, Lloyd JR, Wincott PL and Vaughan DJ (2006). Geochemical and microbial controls on the decomposition and dispersion of depleted uranium (DU) in the environment: An overview of current research and the development of methods for handling DU microparticulates. Special Publication RSC 305, 80-82.


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