

Dr Helen Reeves

Head of Discipline for Engineering Geology (Europe) & Senior Associate Director

Personal Details

Length of service in the profession: 20 years

Year joined Jacobs: 2020

Jacobs office location: Leeds, UK

Summary Biography

Helen Reeves is an internationally leading and renowned Chartered engineering geologist (CGeol), specialising in site, rock mass and geological hazard characterisation, assessment and communication. She has 20 years' postgraduate experience in engineering geology and geohazard research, with over 30 peer review publications, policy review documents/reports and industry commissioned reports covering a range of topics from site and geohazard characterisation & assessment, mapping, rock mass characterisation, and geomechanics. In Jacobs Helen is the Head of Discipline for Engineering Geology (Europe). She is involved in a range of projects with mainly a nuclear site characterisation and geohazard assessment focus. Before joining Jacobs in 2020, Helen was at the British Geological Survey (BGS) for 18 years. For the last 12 years at BGS she was the Science Director for Engineering Geology & Infrastructure. In this role Helen provided regular technical advice to both the UK (Cabinet Office, GO Science - SAGE) and Scottish (e.g. Scottish Resilience) governments through her BGS and Natural Hazard Partnership (NHP) roles. Additionally, she has advised several international boards (e.g. US Transport Research Board), technical scientific groups (US National Research Council, International Ass. Engineering Geology & the Environment, EU Civil Protection) and industry stakeholders (e.g. CIRIA Geotechnical Asset Owners Forum, Network Rail, Highways England, HS2). In 2020 Helen received the Geological Society of London's Coke Medal; in 2017, the Yorkshire Geological Society's Bisat Award and in 2015 and she was awarded the Geological Society's Engineering Geology Group Award.

In Helen's role as the Science Director for Engineering Geology & Infrastructure at the British Geological Survey (BGS) she led the £3m annual NERC/BGS Engineering Geology research programme investigating the: processes and the spatial distribution of shallow geohazards in the UK (particularly landslides and subsidence); geotechnical & geophysical properties of the UK land mass and urban geoscience challenges in cities. As part of this research programme, she led, managed and oversaw 54 staff across multiple BGS sites. She was also the PI for the NERC/DFID SHEAR LANDSLIP research grant (NE/P000649, £4m – 8 academic partners & 41 researchers) and Co-I of EPSRC Assessing The Underworld (EP/K021699, £5.8m) and Innovate UK/EPSRC Newton-Ungku Omar Disaster Resilient Cities (EP/P01531X, £1.75m) research grants.

Key Skills/Areas of Expertise

- Site and rock mass characterisation, including knowledge in geomechanics
- Geohazard mapping (processes & spatial distribution), hazard assessment & regulator communication
- Urban geoscience
- Liaising, advising, communicating and working with UK and overseas governments
- An EU Civil Protection Mechanism Technical Expert (Engineering Geology & Landslides). Deployed to UNDAC team in Serbia following the May 2013 Balkan Floods.

Education, Qualifications, Registrations and Certifications

- PhD in borehole geophysical imaging, fracture characterisation, in situ stress & hydrogeological characterisation. University of Durham, Dept. of Geological Sciences, 1998 to 2002
- MSc in Engineering Geology, School Engineering, University of Durham, 1997 to 1998
- BSc (Hons) 2.1 Geological Sciences, Dept. of Earth Sciences, University of Leeds, 1994 to 1997
- CGeol from the Geological Society of London

Memberships and Affiliations

- Founding member of the UK Natural Hazards Partnership (NHP) and member of the Senior Management Group & Co-chair of the Hazard Impact Model (HIM) working group (2012-2019). Contributing bi-annually to the UK & Scottish government's national risk assessment process, providing daily technical advice to the Cabinet Office and UK government departments through Daily Hazard Assessment reports, providing expert advice during times of emergency and contributing to the ideas, development, writing and direction of the NHP strategies/operating plans over the last 7 years.
- Contributed to a (US) National Research Council of the National Academies Committee on the "Underground Engineering for Sustainable Underground Development".
- US Transport Research Board (TRB) Committee member on Engineering Geology panel (AFP10) (2011 to 2020). Provide strategic guidance on technical advancements and direction for research programme.
- Scientific Advisor to University of Durham's Earth Science Advisory Board, 2015 to Present.
- International Ass. Engineering Geology & the Environment (IAEG) UK National Group President, 2010 to Present. Committee member and contributor to the IAEG Commission's on Use of Engineering Geological models (C25) and Landslide nomenclature (C37).
- Committee Member for the Engineering Group of the Geological Society of London, 2010 to Present
- Member of the EuroGeoSurveys Geohazards & Earth Observation Working Group, 2010 to 2017
- Associate Fellow at the Centre for Southeast Asian Disaster Prevention Initiative, University of Kebangsaan, Malaysia, 2017 - 2020
- Part of the UK Government's Scientific Advisor Group for Emergencies (SAGE) during 2013-2014 winter storms & UK Government Scientific Responsive Team lead for Kolontar tailings dam disaster Hungary November 2010.
- Supervised PhD and MSc students (Leeds, King's, Reading & Birmingham Universities) and undertaken PhD and MSc External examinations for International (Finland) and UK (Durham & Birmingham Universities) candidates.

Achievements/Awards

- Awarded Geological Society's Engineering Geology Group Award, 2015
- Awarded the Yorkshire Geological Society's Bisat Award, 2017.
- Awarded the Geological Society of London's Coke Medal, 2020.
- Undertaken over 50 presentations of BGS's research findings to scientific meetings, clients and user groups, internationally and in the UK. Undertaken over 20 Invited Keynotes (2006 to Present) to geological societies/universities/ professional and industry related organizations, internationally and in the UK.

Employment History

- From June 2020 to present, Jacobs Limited
- 2002 to 2020, British Geological Survey
- 2001 to 2002, Dunelm Geotechnical & Environmental

Project Experience

RWM, UK, Technical Expert – Site Descriptive Model (SDM) Project, 2020 to Present

Scope/Description: Task lead for Addressing Seismic Hazard within the SDM: Developing Capability project and contributor to the SDM Development Manual and associated outputs. Co-Leading the technical team across the UK to deliver outputs. Liaised closely with the client (RWM), and external consultant (Intera).

Nuclear New Build (Sizewell C), UK, Technical Project Manager, 2020 to October 2021

Scope/Description: Responsible for overseeing and setting the technical direction of Capable Faulting Study & Probabilistic Seismic Hazard Assessment, worth over £1.8M at the new build Sizewell C Nuclear Power Station. Lead the technical teams across the UK. Liaise closely with the client (NNB (SZC) GenCo), the Engineer's Representative, external consultants and the project peer review team. Deliver detailed technical reports, presentations, workshops and meetings for the client to the Office for Nuclear Regulation.

Nuclear New Build (Bradwell B), UK, Technical Project Manager, 2020 to September 2021

Scope/Description: Responsible for overseeing and setting the technical direction of Capable Faulting Study & Probabilistic Seismic Hazard Assessment, worth over £1M at the new build Bradwell B Nuclear Power Station. Lead the technical teams across the UK. Liaise closely with the client (BRB GenCo), the Engineer's Representative, external consultants and the project peer review team. Deliver detailed technical reports, presentations, workshops and meetings for the client to the Office for Nuclear Regulation.

Principal-investigator, Engineering Geology Research programme UK, NERC/BGS, 2008 to 2020

Scope/Description: £3m annual NERC/BGS Engineering Geology Research programme that maps, monitors, tests and models the physical properties of the UK landmass and how it behaves in a changing climate and interacts with the built environment.

BGS Lead & Co Principal-investigator, Disaster Resilient Cities: Kuala Lumpur, Innovate UK/EPSRC Newton-Ungku Omar, January 2017 to November 2019

Scope/Description: 34 month Innovate UK/EPSRC Newton-Ungku Omar funded grant 'Disaster Resilient Cities: Kuala Lumpur'. Total £1.75m. (<http://ancst.org/nuof/>).

BGS Lead & Principal-investigator 'LANDSLIP' (Landslide Multi-Hazard Risk Assessment, Preparedness and Early Warning, South Asia, NERC/DFID SHEAR, July 2016 to June 2020) **Scope/Description:** 48 month NERC/DFID SHEAR funded grant 'LANDSLIP' (Landslide Multi-Hazard Risk Assessment, Preparedness and Early Warning in South Asia (July 2016-June 2020, total £2m) (<http://www.landslip.org/home.html>).

Assessing the Underworld, UK, EPSRC, BGS Lead Co-investigator, June 2013 to May 2018 **Scope/Description:** 48 month on EPSRC funded programme grant Assessing the Underworld, total £5.8m. <http://assessingtheunderworld.org/>.

LiveLands: Predicting, Monitoring and Alerting of Landslides and Subsidence Affecting the Transport Infrastructure, UK, IAP ESA, BGS Lead & Co-investigator, January 2016 to February 2017 **Scope/Description:** 24 month IAP ESA funded project, total €900k, AO6124. <http://liveland-service.com/index.html#>.

Tomorrow's Railway and Climate Change Adaptation (TRaCCA), UK, Rail Safety & Standards Board, BGS Lead & Co-investigator, July 2014 to February 2016 **Scope/Description:** 24 month Rail Safety & Standards Board funded project, total £2.5m, EPK021699.

Zhouqu, China, disaster - data capture, modelling and preliminary geohazard assessment, China, NERC, Co-Investigator, October 2010 to September 2011 **Scope/Description:** 12 month NERC funded Urgency Grant 'Zhouqu, China, disaster - data capture, modelling and preliminary geohazard assessment', total £31k.

Additionally, Helen has lead and successfully delivered over 20 commercial research projects for a variety of infrastructure, asset owners and research organisations. These include: "Landslide hazard assessment" for the Forestry Commission, Scotland (2012), "An analysis of climate change impacts on landslip and scour along the route of the Elan Aqueduct" (2013), "Outside party landslide susceptibility zoning" for Network Rail (2014/2015) and "Review of environmental multi-hazards research and risk assessments" for NERC'S Environmental Risks to Infrastructure Innovation Programme.

Published Papers

Since 2002 a total of over 20 journal articles, 9 book chapters, over 20 conference proceedings, 4 government publications and >30 technical reports. See <https://www.researchgate.net/profile/Helen-Reeves-2/research> for a wider publication list.

- Woodman, J., Ougier-Simonin, A., Stavrou, A., Vazaios, I., Murphy, W., Thomas, M.E., Reeves, H.J. 2021. Laboratory Experiments and Grain Based Discrete Element Numerical Simulations Investigating the Thermo-Mechanical Behaviour of Sandstone. Geotechnical and Geological Engineering. <https://doi.org/10.1007/s10706-021-01794-z>
- Holmes, J., Chambers, J., Meldrum, P., Wilkinson, P., Boyd, J., Williamson, P., Huntley, D., Sattler, K., Elwood, D., Sivakumar, V., Reeves, H. and Donohue, S. (2020), Four-dimensional electrical resistivity tomography for continuous, near-real-time monitoring of a landslide affecting transport infrastructure in British Columbia, Canada. Near Surface

- Geophysics. <https://doi.org/10.1002/nsg.12102>
- Wei, L., Du, H., Mahesar, Q., Al Ammari, K., Magee, D.R., Clarke, B., Dimitrova, V., Gunn, D., Entwisle, D., **Reeves, H.**, Cohn, A.G., A Decision Support System for Urban Infrastructure Inter-Asset Management Employing Domain Ontologies and Qualitative Uncertainty-based Reasoning, Expert Systems With Applications (2020) <https://doi.org/10.1016/j.eswa.2020.113461>
 - Dashwood, B; Gunn, D; Curioni, G; Inauen, C; Swift, R; Chapman, D; Royal, A; Hobbs, P; **Reeves, H**; Taxil, J. 2020 Surface wave surveys for imaging ground property changes due to a leaking water pipe. Journal of Applied Geophysics, 174, 103923. <https://doi.org/10.1016/j.jappgeo.2019.103923>
 - Hobbs, P.R.N.; Jones, L.D.; Kirkham, M.P.; Holyoake, S.J.; Pennington, C.V.L.; Dashwood, C.; Banks, V.J.; Reeves, H.J.. 2020 Establishment of a coastal landslide observatory at Aldbrough, East Riding of Yorkshire, UK. Quarterly Journal of Engineering Geology and Hydrogeology, 53 (1). 88-100. <https://doi.org/10.1144/qjegh2018-209>
 - Freeborough, K.; Dashwood, C.; Diaz Doce, D.; Jessamy, G.; Brooks, S.; **Reeves, H.**; Abbott, S. 2019 A national assessment of landslide hazard from Outside Party Slopes to the rail network of Great Britain. Quarterly Journal of Engineering Geology and Hydrogeology. 8. <https://doi.org/10.1144/qjegh2018-029>
 - Ciurean, R; Gill, J; **Reeves, H.J.**; O'Grady, S; Aldridge, T. 2018. Review of environmental multi-hazards research and risk assessments. British Geological Survey/NERC ERIP Open Report, OR/18/057. 86pp.
 - Curioni, G, Chapman, D, Royal, A, Metje, N, Dashwood, B, Gunn, D.A., Inauen, CM, Chambers, JE, Meldrum, PI, Wilkinson, PB, Swift, RT & **Reeves, H. J.** 2018. TDR potential for soil condition monitoring of geotechnical assets', Canadian Geotechnical Journal. <https://doi.org/10.1139/cgj-2017-0618>
 - Bricker, S. **Reeves, H**, Campbell, S.D.G and Price, S. 2015. The ground beneath cities: where should future development occur? Foresight Future of Cities Thought Piece. GO-Science. <https://www.gov.uk/government/publications/future-of-cities-development-underground>
 - Taylor, J.P., Golding, B., Lisk, I., Gibbs, M., Langford, H., Reynard, N., Turner, S., Wright, T., Rosen, D., Pilling, C., **Reeves, H.**, Kerridge, D., Loughlin, S., MacDonald, D., McKenzie, A., Ward, R. & Colenut, A. 2015. Natural Hazards in Observing the Earth – Expert views on environmental observation of the UK. Royal Society. (<https://royalsociety.org/policy/projects/environmental-observation/>)
 - **Reeves, H.J.**, 2014. UNDAC Landslide advisory visit to Serbia. British Geological Survey. Open Report, IR/14/043. 28pp.
 - Phillips, Emrys; Everest, Jez; **Reeves, Helen.** 2013 Micromorphological evidence for subglacial multiphase sedimentation and deformation during overpressurized fluid flow associated with hydrofracturing. Boreas, 42 (2). 395-427. <https://doi.org/10.1111/j.1502-3885.2012.00261.x>
 - Foster, C.; **Reeves, H.J.**; Pennington, C.; Hobbs, P.R.N.; Culshaw, M.G.; Plim, J.; Smith, J.T.; MacCulloch, F.; Queen, G.; Winter, M.G. 2012 Landslide hazard assessment and characterisation for forestry asset management in Great Britain. In: Eberhart, E., (ed.) Landslides and Engineered Slopes: Protecting Society through Improved Understanding. CRC Press, 6pp.
 - Dobbs, M.R.; Culshaw, M.G.; Northmore, K.J.; **Reeves, H.J.**; Entwisle, D.C. 2012. Methodology for creating national engineering geological maps of the UK. Quarterly Journal of Engineering Geology and Hydrogeology, 45 (3). 335-347. <https://doi.org/10.1144/1470-9236/12-003>
 - Busby, J.P.; Entwisle, D.; Hobbs, P.; Jackson, P.; Johnson, N.; Lawley, R.; Linley, K.; Mayr, T.; Palmer, R.; Raines, M.; **Reeves, H.**; Tucker, S.; Zawadzka, J.. 2012 A GIS for the planning of electrical earthing. Quarterly Journal of Engineering Geology and Hydrogeology, 45 (3). 379-390. <https://doi.org/10.1144/1470-9236/11-023>
 - MacDonald, A.M.; Maurice, L.; Dobbs, M.R.; **Reeves, H.J.**; Auton, C.A. 2012 Relating in situ hydraulic conductivity, particle size and relative density of superficial deposits in a heterogeneous catchment. Journal of Hydrology, 434-43. 130-141. <https://doi.org/10.1016/j.jhydrol.2012.01.018>
 - Sathar, S.; **Reeves, H.**; Cuss, R.J.; Harrington, J.F.; Evans, Nicholas. 2012 The role of stress history on the flow of fluids through fractures. Mineralogical Magazine, 76 (8). 3165-3177. <https://doi.org/10.1180/minmag.2012.076.8.30>
 - Lilly, A.; Auton, Clive; Baggaley, N.J.; Bowes, J.P.; Foster, Claire; Haq, M.; **Reeves, H.**. 2011 Soil erosion and landslides. In: Dobbie, K.E.; Bruneau, P.M.C.; Towers, W., (eds.). The state of Scotland's soil. Natural Scotland, 86-99, 13pp.
 - **Reeves, H.J.**, Wealthal, L.G. & Younger, P.L. 2010. Advisory visit to the Bauxite Processing Tailings Dam near Ajka, Veszprém County, western Hungary. British Geological Survey Open Report, OR/11/006. 25pp.
 - **Reeves, H.J.**; West, T.R.. 2009 Geodata for the urban environment. In: Culshaw, Martin; Reeves, Helen; Jefferson, I.; Spink, T.W., (eds.) Engineering geology for tomorrow's cities. London, UK, Geological Society of London, 209-213.
 - Busby, Jon; Lewis, Melinda; **Reeves, Helen**; Lawley, Russell. 2009 Initial geological considerations before installing ground source heat pump systems. Quarterly Journal of Engineering Geology and Hydrogeology, 42 (3). 295-306. <https://doi.org/10.1144/1470-9236/08-092>
 - Barron, A.J.M.; Sumbler, M.G.; Morigi, A.N.; **Reeves, H.J.**; Benham, A.J.; Entwisle, D.C.; Gale, I.N.. 2010 Geology of the Bedford district : a brief explanation of the geological map Sheet 203 Bedford. Nottingham, UK, British Geological Survey, 38pp. (BGS sheet explanation, 203)
 - **Reeves, H.J.**; Cuss, R.J.; Noy, D.J.. 2006 Gas transport processes in crystalline rocks and engineered barriers within the EDZ : BGS contribution to NF-PRO WP4.4.1. Nottingham, UK, British Geological Survey, 26pp. (CR/06/244N)
 - Cuss, R.J.; **Reeves, H.J.**; Noy, D.J.; Harrington, J.F.. 2006 Gas transport processes in argillaceous rocks within the EDZ : BGS contribution to NF-PRO WP4.4.1. British Geological Survey, 30pp. (CR/06/243N) (Unpublished)