WE184 Bioturbation in contaminated sediments: effects on exposure, toxicity and biogeochemistry. T.M. Remaili, Griffith University / Environmental Futures Research Institute; W. Bennett, Griffith University / Griffith School of Environment; S.L. Simpson, CSIRO Land and Water / Centre for Environmental Contaminants Research; E.D. Amato, University of Antwerp / Department of Biology; D.T. Welsh, Griffith University / Environmental Futures Research Institute; E. Lombi, University of South Australia / Future Industries Institute; D. Howard, Australian Synchrotron; D.F. Jolley, University of Wollongong / School of Chemistry. Sediments are a major sink for a range of contaminants. Organism-sediment interactions such as bioturbation can alter sediment physicochemistry, and facilitate the diffusion of reactive chemical species (e.g. O_2) into deeper sediments, potentially changing the oxidation state of various redox-sensitive materials and the fate and toxicity of contaminants. We applied multidisciplinary to: (i) characterise influences of bioturbation on contaminant fate, exposure and toxicity to aid current sediment quality assessment frameworks; and, (ii) assess the potential use of bioturbation in the management and natural recovery of heavily degraded sediment ecosystems. Incresed bioturbation in predominantly metal-contaminated sediments increased bivalve (*Tellina deltoidalis)* and amphipod (*Victoriopisa australiensis)* survival from 53 to 100% and 42 to 93%, respectively; and reproduction in a second amphiod (*Melita plumulosa*) from 3 to 65%. This was attributed to the decreased concentrations of dissolved copper in the overlying water associated with bioturbation. Conversely, increased bioturbation in sediments contaminated by metals and hydrocarbons decreased reproduction (44 to 23%), which was attributed to an increased release of polycyclic aromatic hydrocarbons (PAHs). High-resolution chemical imaging dissolved oxygen and metals in a legacy contaminated sediment mesocosm with a bioturbator present showed the indtroduction of oxic overlying waters waters into sediments, and significant organism-induced fluxes of nickel and zinc into burrow and overlying waters. The presence of nickel and zinc in burrow and overlying waters demonstrated that organism exposure is likely to be greater from the burrow waters than from the pore waters. This is consistent with increased accumulation of zinc observed with co-habitation of bivalves and amphipods. Low copper and lead concentrations in burrow waters during bioturbation events was consistent with the results of previous tests, where copper concentrations were lower in the presence of high bioturbation intensities, possibly due to binding with iron-(oxy)hydroxide phases or to resuspensed particulate phases. These results highlight the importance of considering organism-interactions during sediment quality assessments, and the contributions they have to biogeochemistry and contaminant exposure to surrounding ecosystems.