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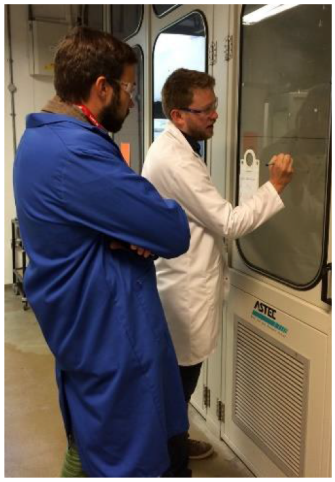
# Microbial recovery of metals from contaminated *Miscanthus* used in the industrial remediation of degraded landscapes

**"With this funding, we were able to kick start a new collaboration, bringing technologies together that wouldn't have been possible from any other funding source."**

**Chris Chuck,** University of Bath; **Michal Mos**, Terravesta Ltd

**OUTCOMES:** The project demonstrated that the most suitable technique for metal recovery from *Miscanthus* grown on contaminated land was hydrothermal liquefaction. The hydrothermal liquefaction of the *Miscanthus* produced a reasonable bio-oil yield, and in addition the majority of metals from the *MIscanthus* partitioned in the aqueous phase or the solid residue and could be recovered and/or recycled easily. Further work to increase the bio-oil content needs to be conducted, as well as further optimisation to partition the metals into the solid residue while decreasing the carbon content.



Chris and Michal discuss their collaborative work

**INITIAL AIMS: Metal leaching from mining and other industrial activity has the potential to degrade landscapes across the globe. However, several techniques have recently been trialled and brought to market to restore the natural capital of such areas. One of the most promising is growing *Miscanthus x giganteus*, an energy crop that can remove metal contamination while being used as a biofuel feedstock. However, the processing of the contaminated *M. x giganteus* remains an issue. In this study we explored the use of the oleaginous yeast *M. pulcherrima* — which produces metal chelators such as pulcherriminic acid — as a method of valorising the *Miscanthus* biomass into a range of products including a palm oil substitute, and removing the metal waste into a smaller containable volume. This method was compared to hydrothermal processing of the *Miscanthus* waste.**

- **Hydrothermal liquefaction was the most suitable technique for metal recovery**
- **Further work is underway to assess the applicability of the technique**