GATERSLEBEN LECTURE

IPK LEIBNIZ-INSTITUT

Speaker: **Prof. Dr. Malcolm Bennett**
University of Nottingham, Sutton Bonington Campus, Leicestershire, UK

Title: ***Lessons from underground: discovering how roots sense soil stresses***

Time: **Tuesday, February 10, 2026, 2 pm**
https://ipk-gatersleben-de.zoom-x.de/j/64783767811?pwd=hndGuIynz0tMsTZ3oKnPjTsgHfQDL8.1
ID: 647 8376 7811
Kenncode: 184928

Place: **IPK Lecture Hall and via Zoom,**
Correnssstr. 3, 06466 Seeland OT Gatersleben

Abstract:
Plants exhibit a remarkable ability to modify their growth and development in response to environmental signals and stresses. This ability is particularly striking during root development where they forage in highly heterogeneous environments (Mehra et al, 2025, Ann. Rev. Plant Biol.). I will describe how plant hormones enable roots to sense and/or respond to soil environmental signals. Examples include discovering how plants sense soil moisture availability by linking intercellular water fluxes with movement of hormones auxin and ABA, triggering changes in root branching designed to maximise capture of soil resources (Orosa et al,2018, Science; Mehra et al, 2022, Science; Roy et al. 2025, Science). Plant roots also employ volatile signals like ethylene to sense changes in soil physical properties like compaction stress using a novel gas diffusion-based mechanism (Pandey et al, 2021, Science). I will conclude by describing how mechanistic insights about hormone-regulated root plasticity, combined with advances in technologies including single cell expression profiling (Zhang et al, 2025, Nature), are helping design stress resilient crops.

Short CV
Discovering how roots use external signals to regulate their growth and development has been an enduring interest throughout Malcolm's research career. Over the last three decades his team has characterized many regulatory signals, genes and mechanisms that control root growth and development. Highlights include elucidating how plant roots respond to water availability (Orosa et al, 2018, Science; Mehra et al, 2022, Science; Roy et al, 2025, Science).
Recognising the importance of studying root responses in their natural soil environment, Malcolm and colleagues have developed a unique X-ray microCT based root phenotyping platform termed the Hounsfield Facility to achieve this goal. Recent discoveries include characterization the novel root-water adaptive responses termed Hydropatterning (Bao et al, 2014, PNAS) and Xerobranching (Orman-Ligeza et al, 2018, Current Biology) and a gas diffusion-based signalling mechanism for sensing soil compaction (Pandey et al, 2021, Science).
Malcolm has published >250 research papers and review articles about root growth and development and is ranked in the top 1% most highly cited animal and plant biologists. His research activities have attracted fellowships and awards including BBSRC Professorial (2010), ERC Advanced (2011) and Royal Society Wolfson Research (2013) Fellowships; election to the European Molecular Biology Organisation (EMBO; 2014) and Royal Society (2020); and ISRR Dundee Medal (2022).

Prof. Dr. Nils Stein (organizer) *Prof. Dr. Nicolaus von Wirén (host)*