

Wednesday 5 August

08:00

Registration and breakfast (provided)

Break | **Location:** Cornell University, Emerson 135

09:00

09:00

Welcome

Contribution |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

09:15

09:15

Introduction to XLEAP

Contribution |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Speaker: Louis A. Seikaly |

09:45

09:45

Fundamental processes in plant nutrient homeostasis

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Mary Lou Guerinot

09:45–10:15

Plant interactions with soil composition in the extremophile *Arabidopsis halleri*

Speaker

Ute Kraemer

10:15–10:30

Connecting mineral nutrient homeostasis to fertility and crop yield through synchrotron-based XRF microscopy

Speaker

JU-CHEN CHIA

10:30

10:30

Coffee break

Break |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

10:45

10:45

Fundamental processes in plant nutrient homeostasis

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Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Mary Lou Guerinot

10:45–11:00

A tomato under the beam: Tackling the challenges of fresh-tissue SXRF analysis

Speaker

Paco ROMERO

11:00-11:15

Toward multimodal synchrotron imaging of pollen wall development in Arabidopsis

Speaker

Teagen Quilichini

11:15-11:45

Transgenerational effects of water limitation on seed morphology, ionome, and performance under nutrient limiting conditions

Speaker

David Mendoza-Cozatl

11:45

11:45

Lunch (provided)

Break | **Location:** Cornell University, Emerson 135

12:45

12:45

Plant-soil interfaces and biogeochemical cycling

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Tiina Roose

12:45-13:15

Unraveling Dynamic Iron Regulation at the Plant-Microbe Interface

Speaker

Wolfgang Busch

13:15-13:45

Mycorrhizal-Bacterial Interactions and Resource Fluxes at the Plant-Soil Interface

Speaker

Rachel Hestrin

13:45-14:00

Root-secreted Coumarins Increase Phosphorus Bioavailability to Plants through Reductive Dissolution of Iron

Speaker

Christopher Schuler

14:00-14:15

Tracing Mineral Copper Acquisition in Grasses through Imaging and Reduction Kinetics

Speaker

Luna Natoli

14:15

14:15

Coffee break

Break |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

14:30

14:30

Metals and nutrient cycling in aquatic systems

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Anne Sylvester

14:30–15:00

Cell Wall Architecture and Dynamics in the Streptophyte Alga, *Penium margaritaceum*

Speaker

Josephine LoRicco

15:00–15:30

Selenium exposure differentially influences methylmercury retention in mayflies

Speaker

Jacqueline Gerson

15:30–15:45

Imaging Elements in Fish “Hard Parts” To Make Discoveries About Their Secret Lives

Speaker

Karin Limburg

15:45

15:45

Break- coffee and tour logistics

Break |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

16:00

16:00

Walk to CHESS for tours

Break |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

16:15

16:15

Tours of CHESS

Session | **Location:** Wilson Synchrotron Laboratory, Campus Road, Ithaca, NY 14853

Description

NOTE: Please wear closed toe shoes for the CHESS tour. The tour will involve walking from Bradfield to Wilson Lab (~10 minutes), stairs, and duck-under.

18:00

18:30

20:30

Banquet dinner

Session | **Location:** Statler Hotel

Thursday 6 August

08:30

Breakfast (provided)

Break | **Location:** Cornell University, Emerson 135

09:00

09:00

Announcements

Contribution |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

09:15

09:15

Plants under stimuli (environmental stress, nanoparticles, pathogens)

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Jose A. Hernandez-Viezcas

09:15–09:45

Toward Live Elemental Imaging of Anoxia Responses in Plants

Speaker

Kendal Hirschi

09:45–10:15

Exploring plant-environment interactions through multimodal imaging at SSRL

Speaker

Shuxiao Zhang

10:15–10:30

Meeting at the Gate: The Role of Root Barriers in Microbe-Induced Resistance

Speaker

Valeria Castaldi

10:30–10:45

Foliar application of Nanoscale Iron and Manganese Micronutrients in full life cycle of Soybean (Glycine Max)

Speaker

Sharif Uddin Ahmed

10:45

10:45

Group photo

Break |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

11:00

11:00

Coffee break

Break |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

11:15

11:15

Plants and critical minerals

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Vibha Kalra

11:15–11:45

The Microbe-Mineral Atlas and Biomining Critical Elements

Speaker

Buz Barstow

11:45–12:15

Advances in Simultaneous Reduction and Nitriding of Iron Oxides using Ammonia by Harnessing Operando Cross-Scale X-Ray Scattering Measurements

Speaker

Greeshma Gadikota

12:15

12:15

Lunch (provided) + optional campus walk

Break | **Location:** Emerson Hall, Room 135

14:15

14:15

Plants and food safety and nutritional quality

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Olena Vatamaniuk

14:15–14:45

Keeping Babies Safe from Farm to Table: Food and Plant Science's Role in Baby Food Manufacturing

Speaker

Amber Morey-Lanza

14:45–15:15

Characterizing Impact of Heat Stress on Rice Nutritional Quality and Safety

Speaker

Harkamal Walia

15:15–15:30

A novel μ XRF based approach to mapping Fe Absorption across the small intestine (*Gallus gallus*)

Speaker

Eliot Dugan

15:30–15:45

Synchrotron XRF-based analyses of minerals distribution in tef (*Eragrostis tef*) seeds and transgenic Arabidopsis and rice expressing tef Iron-responsive genes

Speaker

Ayalew Osen

15:45–16:00

The atomic- and molecular underpinnings by which exposure to the anthropogenic exposome impacts food quality.

Speaker

Mahesh Narayan

Poster session**Session** | **Location:** Cornell University, Emerson 135

16:00–17:30

Chemical biomarker analysis of *Desmophyllum dianthus* corals in New York Bight Submarine Canyons

16:00–17:30

Multimodal imaging at LiX for plant and environmental sciences

16:00–17:30

Meeting at the Gate: The Role of Root Barriers in Microbe-Induced Resistance

16:00–17:30

Investigating the Role of Copper in *Arabidopsis thaliana* Reproduction Using X-ray Fluorescence (XRF) Microscopy

16:00–17:30

X-ray induced damage in monocot plants at ambient temperature

16:00–17:30

XLEAP: A new beamline under construction at CHESS

16:00–17:30

Imaging Elements in Fish “Hard Parts” To Make Discoveries About Their Secret Lives

16:00–17:30

Predicting Spatial Maps of Iron Redox Heterogeneity Using Multi-Energy μ XRF

16:00–17:30

Urea-to-Ammonia Conversion at *Proteus mirabilis* Modified Pt-Ni/BDD Electrodes

16:00–17:30

Uranium Bioremediation in Water Using *Geobacter Sulfurreducens* Electroactive Biofilm on Boron-Doped Diamond Electrode Modified with Nano Zero Valent Iron

16:00–17:30

Refurbished ID21 beamline (ESRF): novel tools for μ -XRF and μ -XANES data acquisition and processing

16:00–17:30

Exploring the Role of ACA8 and ACA10 in Ion Homeostasis

Friday 7 August

08:30

Breakfast (provided)

Break | **Location:** Cornell University, Emerson 135

09:00

09:00

Announcements

Contribution |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

09:15

09:15

Looking forward

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Louisa Smieska

09:15–09:45

X-ray fluorescence microscopy, the next chapter: correlating elemental distributions with structural features

Speaker

Martina Ralle

09:45–10:00

Optimising cryofixation of plant tissues for 2D X-ray microscopy: insights from the ID-21 beamline (ESRF)

Speaker

Gabriel Sgarbiero Montanha

10:00–10:15

XLEAP-Enabled Opportunities for Micron-Scale Confocal X-ray Fluorescence Imaging

Speaker

Arthur Woll

10:15

10:15

Coffee break

Break |

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10:30

10:30

Looking forward

Session |

Location: Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

Description

Chair: Louisa Smieska

10:30–10:45

Technique-Independent Analysis Software for Biological Elemental Imaging

Speaker

Tracy Punshon

10:45-11:15

Synthetic Biology and Programmable Plant Systems - Opening a Dialogue with Plants**Speaker**

Margaret Frank

11:15

11:15

Discussion of operations**Session** |**Location:** Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

12:00

12:00

Closing remarks and time to complete survey**Contribution** |**Location:** Cornell University, Bradfield 101, 306 Tower Road, Ithaca, NY 14853, USA Cornell University College of Agriculture and Life Sciences

12:30

12:30

Boxed lunch (provided)**Break** | **Location:** Emerson Hall, Room 135

13:45