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PROGRAM

AgroEnviro Workshop Online

Applications of Synchrotron Radiation for Foundational Science in
Agricultural and Environmental Research

Brazilian Synchrotron Light Laboratory (LNLS) - Brazilian Center for Research in Energy and
Materials (CNPEM), Campinas Brazil

20-21 May 2020

- * All times are local Campinas time. Moderators will use up to 1 min. to introduce each speaker.
- * Speakers may provide materials to be previewed by registered attendees prior to the workshop.

DAY 1 - WEDNESDAY, 20 MAY

08:00 - 08:45 PARTICIPANT LOG-IN

WELCOME AND INTRODUCTION

Moderators: Dean Hesterberg, Carlos Pérez (LNLS/CNPEM)

08:45 - 09:00 Review Instructions and Protocols for Online Conference (Moderators)

09:00 - 09:10 **Harry Westfahl, Jr.** (Director of LNLS-CNPEM) - Welcome

09:10 - 09:30 **Helio Tolentino** LNLS-CNPEM Heterogeneous and Hierarchical Matter Division

INVITED INTERNATIONAL SPEAKER

Presenter: **Johannes Lehmann** (School of Integrative Plant Science, Cornell University)

Moderators: Dean Hesterberg, Carlos Pérez

Topic: Synchrotron Applications to Study Organic Carbon and Nutrients in Soil

09:30 - 09:50 Part 1 - Presentation (15 min.) and Questions (5 min.)

09:50 - 10:05 Part 2 - Presentation (15 min.)

10:05 - 10:10 General Discussion



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INVITED BRAZILIAN SPEAKER

Presenter: **Ciro Rosolem** (UNESP-Botacatu)

Moderators: Dean Hesterberg, Carlos Pérez

Topic: Critical Research Needs in Brazilian Agriculture

10:10 -10:22 Presentation

10:22 – 10:30 Questions and General Discussion

SPOTLIGHT ON PARTICIPANTS

Moderators: Dean Hesterberg, Carlos Pérez

10:30 - 10:45 Contributed Presentations (4 minutes each)

Leonardus Vergütz (Morocco) - Development of integrated solutions to increase P use efficiency

Luiz Francisco Souza Filho (Brazil) - Behavior of nutrients in sandy soils

Carlos Alberto Silva (Brazil) - Biochar-based fertilizers

10:45 - 10:55 Questions and General Discussion

10:55 - 11:10 BREAK

11:10 - 11:15 RETURN INTO MEETING

INVITED BRAZILIAN SPEAKER

Presenter: **Luiz Roberto Guimarães Guilherme** (Universidade Federal de Lavras)

Moderators: Carlos Pérez (LNLS/CNPEN), Ricardo Bordonal (LNBR/CNPEN)

Topic: Soil Fertility Problems of the Brazilian Cerrado

11:15 -11:27 Presentation

11:27 – 11:35 Questions and General Discussion

INVITED BRAZILIAN SPEAKER

Presenter: **Tales Tiecher** (Universidade Federal do Rio Grande do Sul)

Moderators: Carlos Pérez, Ricardo Bordonal

Topic: Managing Nutrients and Animal Wastes in Southern Brazil

11:35 -11:47 Presentation

11:47 – 11:55 Questions and General Discussion



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SIRIUS BEAMLINER PREVIEW - PAINEIRA

Presenter: Cristiane Barbieri Rodella (LNLS/CNPEM)

Moderators: Carlos Pérez, Ricardo Bordonal

Topic: X-ray Diffraction Capabilities of the Paineira Beamline

11:55 -12:05 Presentation

12:05 – 12:15 Questions and General Discussion

SPOTLIGHT ON PARTICIPANTS

Moderators: Carlos Pérez, Ricardo Bordonal

12:15 - 12:35 Contributed Speaker Presentations (4 minutes each)

Julia Santos Venzon (Brazil) - Sources, transformations and fate of copper and zinc from organic livestock waste in agricultural soil

Marius Tuyishime (Sweden) - Effect of post-glacial weathering on phosphorus speciation in acid forest soils

Gbotemi Abraham Adediran (Sweden) - Phosphorus in 2D: revelation of micro-scale heterogeneity by synchrotron X-ray microscopy and spectroscopy

Jon-Petter Gustafsson (Sweden) - Uncertainty Analysis of P K-edge XANES Spectra

12:35 - 12:50 Questions and General Discussion

12:50 - 14:20 LUNCH BREAK

14:20 - 14:35 RETURN INTO MEETING

INVITED INTERNATIONAL SPEAKER

Presenter: Alexandra Kravchenko (Department of Plant, Soil and Microbial Sciences, Michigan State University)

Moderators: Ricardo Bordonal (LNBR/CNPEM), Douglas Galante (LNLS/CNPEM)

Topic: X-ray Computed Tomography and Nitrogen Emissions

14:35 -14:55 Part 1 - Presentation (15 min.) and Questions (5 min.)

14:55 - 15:10 Part 2 - Presentation (15 min.)

15:10 – 15:15 General Discussion



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INVITED BRAZILIAN SPEAKER

Presenter: Karina Maria Vieira Cavalieri Polizeli (Universidade Federal do Paraná)

Moderators: Ricardo Bordonal, Douglas Galante

Topic: Soil Physical Compaction Issues of Brazil

15:15 -15:27 Presentation

15:27 – 15:35 Questions and General Discussion

INVITED BRAZILIAN SPEAKER

Presenter: José Coelho de Araujo Filho (Embrapa Soils, Recife, PE)

Moderators: Ricardo Bordonal, Douglas Galante

Topic: The Problem of Cohesive Soils along the Brazilian Coast

15:35 -15:47 Presentation

15:47 – 15:55 Questions and General Discussion

15:55 - 16:15 BREAK

16:15 - 16:20 RETURN INTO MEETING

SIRIUS BEAMLINER PREVIEW - MOGNO

Presenter: Talita Ferreira (LNLS/CNPEN)

Moderators: Douglas Galante, Dean Hesterberg

Topic: X-Ray Computed Tomography: Mogno Beamline Capabilities for Soil Science

16:20 -16:30 Presentation

16:30 – 16:40 Questions and General Discussion

SPOTLIGHT ON PARTICIPANTS

Moderators: Douglas Galante, Dean Hesterberg (LNLS/CNPEN)

16:40 - 17:00 Contributed Speaker Presentations (4 minutes each)

Luiz Fernando Pires (Brazil) - Soil porous system analysis by x-ray computed tomography

Diego Barcellos (Brazil) - The battle between iron-reducers and methanogens: effects of O₂ perturbation on FeIII reduction and CH₄ emissions in redox oscillating soils

André Maurício Brinati (Brazil) - Elemental and mineral analysis of soils by X-ray fluorescence and diffraction

Derek Peak (Canada) - Seeing the rhizosphere with soft X-ray fluorescence Imaging

17:00 - 17:15 Questions and General Discussion

17:15 - 17:35 GENERAL DISCUSSION ABOUT AGRICULTURAL PROBLEMS

Moderators: Dean Hesterberg, Douglas Galante

17:35 - 17:45 Audience Feedback to Enhance Remote Format



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DAY 2 - THURSDAY, 21 MAY

08:45 - 09:30 PARTICIPANT LOG-IN

SPOTLIGHT ON PARTICIPANTS

Moderators: Dean Hesterberg, Douglas Galante (LNLS/CNPEM)

09:30 - 09:50 Contributed Speaker Presentations (4 minutes each)

Anderson Almeida Pacheco (Brazil) - Monitoring of water and sediment quality in the Doce River basin after the Samarco Dam collapse

Leônidas Melo (USA/Brazil)- Spectroscopic investigation of Pb(II) retention on phosphorus/magnesium-engineered biochars, Fully-Remote Workshop

Andre Rodrigues dos Reis (Brazil) - A glimpse on nutrient toxicity in crops using μ -XFR

Sergio Da Costa (Brazil) - X-ray scattering at small angle of soil humic acid (HA)

09:50 - 10:05 Questions and General Discussion

INVITED INTERNATIONAL SPEAKER

Presenter: Alain Manceau (ISTerre, University Grenoble Alpes and CNRS, France)

Moderators: Dean Hesterberg, Douglas Galante

Topic: Emerging Applications of X-ray Emission Spectroscopy in Environmental Science

10:05 - 10:25 Part 1 - Presentation (15 min.) and Questions (5 min.)

10:25 - 10:40 Part 2 - Presentation (15 min.)

10:40 - 10:45 General Discussion

SIRIUS BEAMLINE PREVIEW - QUATI

Presenter: Santiago Figueroa (LNLS/CNPEM)

Moderators: Dean Hesterberg, Douglas Galante

Topic: Applications of Quick EXAFS at the Quati Beamline

10:45 - 10:55 Presentation

10:55 - 11:05 Questions and General Discussion

11:05 - 11:25 BREAK

11:25 - 11:30 RETURN INTO MEETING



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SIRIUS BEAMLINER PREVIEW - CARNAÚBA

Presenter: Carlos Pérez (LNLS/CNPEM)

Moderators: Douglas Galante, Dean Hesterberg

Topic: Chemical Imaging and Spectroscopy at the Carnaúba Beamline

11:30 - 11:40 Presentation

11:40 - 11:50 Questions and General Discussion

INVITED BRAZILIAN SPEAKER

Presenter: Clistenes Williams Araujo do Nascimento (Universidade Federal Rural de Pernambuco)

Moderators: Douglas Galante, Dean Hesterberg

Topic: Phytoremediation of Heavy Metals

11:50 -12:02 Presentation

12:02 – 12:10 Questions and General Discussion

SIRIUS BEAMLINER PREVIEW - CATERETÊ

Presenter: Carla Polo (LNLS/CNPEM)

Moderators: Douglas Galante, Dean Hesterberg

Topic: High-Resolution Coherent Diffraction Imaging of Plant Structures at the Cateretê Beamline

12:10 - 12:20 Presentation

12:20 - 12:30 Questions and General Discussion

12:30 - 14:00 LUNCH BREAK

14:00 - 14:15 RETURN INTO MEETING

SIRIUS BEAMLINER PREVIEW - IMBUÍA

Presenter: Raul de Oliveira Freitas (LNLS/CNPEM)

Moderators: Carlos Pérez (LNLS/CNPEM), Ricardo Bordonal (LNBR/CNPEM)

Topic: The Imbuia Beamline as a Nanoscale Chemical Probe in Plant Biology

14:15 - 14:25 Presentation

14:25 - 14:35 Questions and General Discussion



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INVITED BRAZILIAN SPEAKER

Presenter: Cauê Ribeiro de Oliveira (Embrapa Instrumentation, São Carlos, SP)

Moderators: Carlos Pérez, Ricardo Bordonal

Topic: Moving from Environmental Remediation to Energy: What We Learned about Semiconductor Photocatalysis

14:35 -14:47 Presentation

14:47 – 14:55 Questions and General Discussion

SPOTLIGHT ON PARTICIPANTS

Moderators: Carlos Pérez, Ricardo Bordonal

14:55 - 15:05 Contributed Speaker Presentations (4 minutes each)

Juliana Velasco Oliveira (Brazil) - Deciphering signaling molecules for a sustainable agriculture

Matheus Barreto (Brazil) - Hausmannite as potential As(V) filter. Macroscopic and spectroscopic study of As(V) adsorption and desorption by citric acid

15:05 - 15:25 Questions and General Discussion

SIRIUS SUPPORT LABORATORY PREVIEW

Presenter: Douglas Galante (LNLS/CNPEM)

Moderators: Carlos Pérez, Ricardo Bordonal

Topic: Analytical Capabilities to Support Research at Sirius

15:25 - 15:35 Presentation

15:35 - 15:45 Questions and General Discussion

15:45 - 16:05 BREAK

16:05 - 16:10 RETURN INTO MEETING

SIRIUS PROPOSAL SUBMISSION

Presenters: Helio Tolentino, Dean Hesterberg (LNLS/CNPEM), Hudson Carvalho (CENA)

Moderators: Carlos Pérez, Douglas Galante

16:10 - 16:20 The Beamtime Proposal System - Helio Tolentino

16:20 - 16:25 Questions

16:25 - 16:35 Writing a Successful Beamtime Proposal - Part I Dean Hesterberg

16:35 - 16:40 Questions

16:40 - 16:50 Writing a Successful Beamtime Proposal - Part II Hudson Carvalho

16:50 - 17:10 Questions and General Discussion

17:10 - 17:30 GENERAL DISCUSSION AND CLOSING
(**Moderators:** Dean Hesterberg, Douglas Galante)