NANOPLANT Newsletter

No. 1 February 2022

IN THIS ISSUE:

NANOPLANT

NANOPLANT, The creation of Department of Plant Nanotechnology to maximise the impact of ERA Chair culture on the IPG PAS was approved by the EU in 2019 under Horizon 2020, grant agreement No. 856961. Its overarching idea is to strengthen interdisciplinary research potential, scientific excellence, international visibility, intensity of collaboration, and academic-industrial partnership at the IPG PAS by supporting a new cutting-edge research area via creating the Department of Plant Nanotechnology.

The Institute of Plant Genetics, Polish Academy of Sciences (IPG PAS)

Poland has a long history of agriculture and forestry. More than half of the country is devoted to agriculture. Nanotechnology could provide much-needed support, boosting crop production with technologies for controlled release of agrochemicals such as fertilizers and pesticides or targeted delivery of molecules.

Nanoplant Work Packages:

- WP1 Ethics requirements
- WP2 Coordination and management
- WP3 ERA Chair holder selection
- WP4 Strenghtening scientific potential
- WP5 Stepping up research excellence
- WP6 Knowledge transfer and spill-over
- WP7 Promotion and dissemination

WP3

ERA CHAIR HOLDER SELECTION

Dr Dibyendu Mondal

The ERA Chair holder is expected to be one of the key persons who will boost the research performance of IPG PAS in the area of nanotechnology and will lead its active participation in European Research Area.

Dibyendu Mondal has been selected as ERA Chair holder of NANOPLANT and joined IPG PAS on September 2021. He will establish and lead an interdisciplinary and international research team at the IPG PAS.

Dibyendu received his PhD in Chemical Sciences from CSIR-CSMCRI, India in 2015. He was a postdoctoral fellow at CICECO, University of Aveiro, Portugal from 2015-2017 and has been an Assistant Professor at CNMS, Jain University, India since 2017. His research interest include value addition of bio-resources under the biorefinery concept and packaging of biomolecules using green solvents. He is also fascinated with the development of green nanocomposites for task-specific applications such as biocatalysis, water purification and in plant science.

Dibyendu has 66 publications in high impact journals and 5 granted patents. He was selected as a member of of the Royal Society of Chemistry (MRSC), London. Dibyendu has worked on various challenging problems and new concepts which have helped him to gain experience in a wide range of research areas, experimental techniques and critical analysis.

WP4

STRENGHTENING SCIENTIFIC POTENTIAL

Dr Mónia A. R. Martins

Senior Postdoc

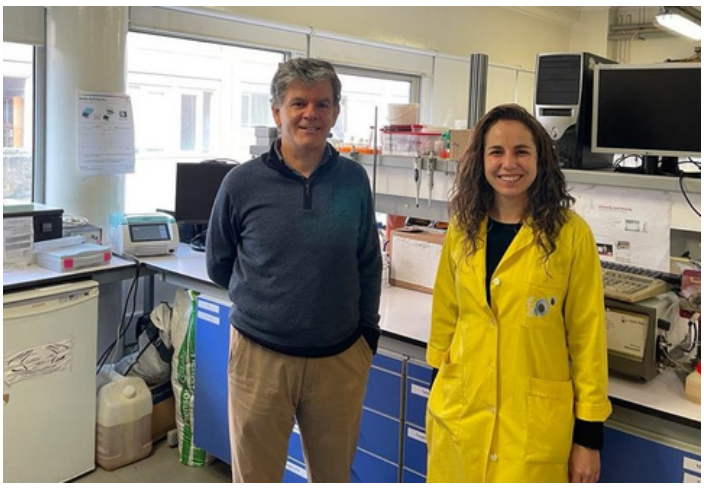
Mónia A. R. Martins has been selected as a team member in the NANOPLANT project.

She joined the team on December 2021. In the NANOPLANT project, Mónia will focus on the development of green and low-cost nanoformulations using neoteric solvents for sustainable agriculture.

Mónia A. R. Martins received her PhD in Chemical Engineering from the University of Aveiro, Portugal, in 2017. From 2017 to 2021 she was a postdoctoral researcher at the Associate Laboratory LSRE-LCM (University of Porto) and CICECO-Aveiro Institute of Materials (University of Aveiro). In 2021 she worked as Analytical Development Scientist in a pharmaceutical company. Mónia is author of 42 publications in reputed international journals with ˜1000 citations and 16 h index. Her PhD thesis was awarded by European Federation of Chemical Engineering (EFCE) as the best European dissertation in Thermodynamics and Transport Properties 2019. Her main interest is the characterization and application of neoteric green solvents such as ionic liquids and eutectic systems.

Studies on the controlled release of metal ions from nanomaterials for agricultural applications using green solvents

Mónia Martins is currently visiting CICECO – Aveiro Institute of Materials at University of Aveiro. In this visit, Mónia is performing fundamental studies on the controlled release of metal ions using neoteric green solvent.



Prof. João Araújo Pereira Coutinho
and dr Mónia Martins

The work is of most relevance for NANOPLANT project since it deals with the sustainable application of nanomaterials in plants using green solvents with great potential for ecological agriculture. The work will foster the development and understanding of different mechanisms in the field of plant nanotechnology while promoting interdisciplinary research and international collaborations.

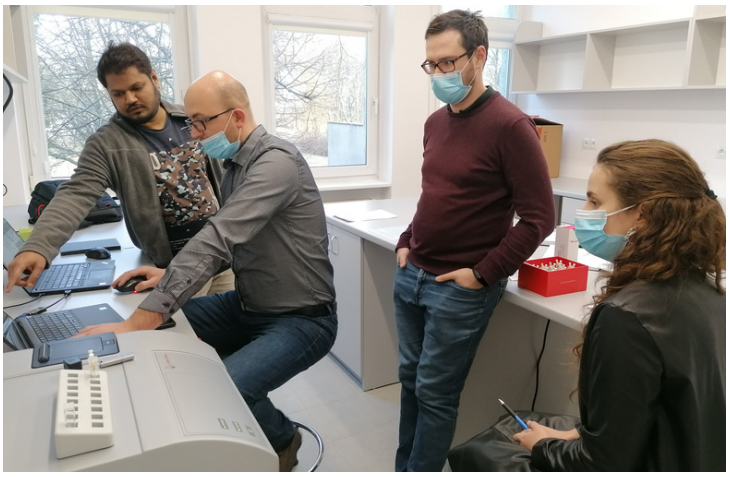
WP5

STEPPING UP RESEARCH EXCELLENCE

Particle size analyzer workshop

In 21 January 2022, we had the opportunity to see how the particle size analyzer works in a workshop by measuring the standard particle size and zeta potential of solutions.

Particle Size Analyser



Demonstration in progress

Plant Nano Lab

Department of Plant Nanotechnology will focus on research to unlock the potential of phytonanotechnology in the fields of agriculture, pharmaceuticals, and chemistry while investigating the effects of nanomaterials on plants. To achieve this goal, we are improving our laboratory to make it a perfect environment for conducting research.

Research Projects

In December 2021 we submitted a SONATA project proposal on "Designing ionic liquid assisted protein nanoconstruct" and a OPUS project with an acronym NANOHORMESIS.

NARODOWE CENTRUM NAUKI

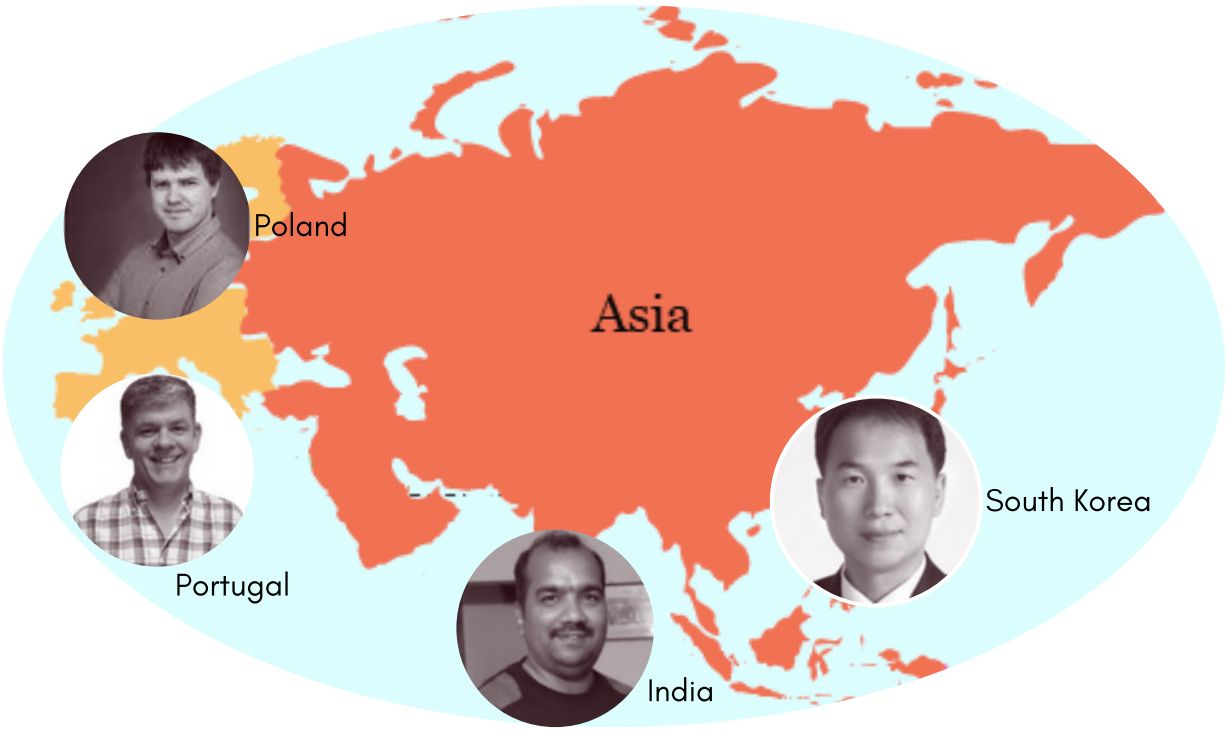
Collaborations

- Prof. João Araújo Pereira Coutinho
  CICECO-Aveiro Institute of Materials
  University of Aveiro, Portugal

- Prof. Jan Brezovsky
  Institute of Molecular Biology and Biotechnology
  Adam Mickiewicz University, Poland

- Prof. Kyeong-Hwan Lee
  Dept. of Convergence Biosystems Engineering Adjunct Professor Dept. of Intelligent Mobility
  Director, Agricultural Automation Research Center, South Korea

- Prof. S. K. Nataraj
  Sustainable materials and Process Lab Centre for Nano and Materials Sciences
  Jain University, Bangalore, India



WP7

PROMOTION AND DISSEMINATION

M.A. Marta Gloger
PR Specialist

Marta Gloger has been performing the role of Public Relations Specialist for the NANOPLANT project since November 2021. Her main role is to promote the project on social media, build relationships with potential stakeholders and organise public relations to maximise the impact of NANOPLANT.

Marta received her Master's degree in European Studies from Adam Mickiewicz University in 2001. From 2005-2020 she worked as a personal assistant to the CEO of ASKET company. She also dealt with environmental issues, including the EU pilot programme for the review of environmental technologies.

Marta runs NANOPLANT's website - the main communication tool for the project. All the dissemination materials will be published here. It will be also used as a gateway to diffuse project information as widely as possible including the newsletter, news section and social media links.

Dissemination activities:

Publication in "ACS Sustainable Chemistry & Engineering"

https://pubs.acs.org/doi/pdf/10.1021/acssuschemeng.1c06960


ACS Sustainable Chemistry & Engineering

pubs.acs.org/journal/ascecg

Research Article

Uncovering the Phytochemical Basis and the Mechanism of Plant Extract-Mediated Eco-Friendly Synthesis of Silver Nanoparticles Using Ultra-Performance Liquid Chromatography Coupled with a Photodiode Array and High-Resolution Mass Spectrometry

Matam Pradeep, Dariusz Kruszka, Piotr Kachlicki, Dibyendu Mondal, and Gregory Franklin*

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Institute of Plant Genetics
Polish Academy of Sciences
Seminars

IGR PAN

29 October 2021

Dr Dibyendu Mondal
Plant Nanotechnology Team, NANOPLANT
Institute of Plant Genetics,
Polish Academy of Sciences, Poznań, Poland

On 29th of October 2021 at 11.00 Dibyendu gave a lecture via ZOOM platform titled "Neoteric Solvents Assisted Sustainable Strategies for Enhanced Protein Packaging with Improved Stability and Activity".

UAM
Adam Mickiewicz University
Poznań

On November 2, 2021, Dibyendu visited the University of Adam Mickiewicz in Poznan, Poland for a scientific discussion and collaboration with prof. Jan Brezovsky.

UPCOMING EVENTS

Invited talks

- Artificial intelligence and smart agriculture
- Ionic liquids and Eutectic solvents as sustainable media for formulations development
- Nanomaterials and nanotoxicity
- Uptake, transport and assimilation of nanomaterials in plants
- Sustained and controlled delivery of nano-fertilizers to plant
- Plant-nanomaterials interactions study by OMICS, molecular and biochemical approaches
- Nano-pesticides and nanosensors
- Effect of nanomaterial on soil microbes
- Nanomaterials-protein interactions
- Life cycle assessment of liquid fertilizers for sustainable agriculture

Workshops

- Stimuli rsponsive engineered nanomaterials for smart agriculture
- Agro-nanotechnology for plant monitoring and plant protection
- Nanotoxicity and soil health

Contact us

Nanoplant
Institute of Plant Genetics
Polish Academy of Sciences
34 Strzeszynska street
60-479 Poznan, POLAND
+48 61 65 50 200
nanoplant@igr.poznan.pl

www.nano-plant.eu