

13th International Workshop on Advanced Ground Penetrating Radar - IWAGPR2025 01 - 04 Jul 2025 *All times in EEST*

Tuesday, 1 July

PRE-CONFERENCE SHORT-COURSES DAY

09:00 **Course A: gprMax**
Conference Hall II

» Antonis Giannopoulos, Craig Warren, Iraklis Giannakis

11:00 **Morning Coffee Break**
Foyer (-1)

11:15 **Course A: gprMax**
Conference Hall II

» Antonis Giannopoulos, Craig Warren, Iraklis Giannakis

13:00 **Lunch Break**
Foyer (-1)

14:00 **Course B: GPR Full-Waveform Inversion**
Conference Hall II

» Jan van der Kruk, Anja Klotzsche

16:00 **Afternoon Coffee Break**
Foyer (-1)

16:15 **Course B: GPR Full-Waveform Inversion**
Conference Hall II

» Jan van der Kruk, Anja Klotzsche

18:00 **Registration**
Foyer (-1)

19:00 **Ice-breaker Reception**
Outdoor Foyer

Wednesday, 2 July

08:30 **Registration**
Foyer (-1)

09:00 **Welcome**
Conference Hall II

» Nectaria Diamanti – Chair IWAGPR2025

09:10 **Opening Address**
Conference Hall II

» Representatives from the Aristotle University of Thessaloniki

09:20 **Keynote**
Conference Hall II
Chaired by: Nectaria Diamanti

Unknown Unknowns!
» Peter Annan

10:00 **Oral Session 1: Forward Modeling Techniques and Inversion Methodologies**
Conference Hall II
Chaired by: Antonis Giannopoulos and Sébastien Lambot

Continued from **Wednesday, 2 July**

- 10:00 **Recent developments and possible applications of the 2.5D GPR full-waveform inversion for high resolution subsurface imaging**
» Dominik Hoven, Jan van der Kruk, Craig Warren, Harry Vereecken, Anja Klotzsche
- 10:20 **Earth Surface Effects in Ground-Penetrating Radar Responses**
» Evert Slob, Nectaria Diamanti, Peter Annan
- 10:40 **Estimating the size of scatterers in GPR data sets by means of a novel post-tracking diffraction analysis**
» Matteo Dossi, Barbara Cosciotti, Sebastian Lauro, Elisabetta Mattei, Elena Pettinelli
- 11:00 **Morning Coffee Break**
Foyer (-1)
- 11:30 **Parallel - Oral Session 2a: Forward Modeling Techniques and Inversion Methodologies, Engineering and Geotechnical Applications**
Conference Hall II
Chaired by: Craig Warren and Xavier Dérobert
- 11:30 **Utilizing GPR to Develop Digital Twins across Maturity Levels for Underground Infrastructure Maintenance**
» Huamei Zhu, Feng Xiao, Yimin Zhou, Mengqi Huang, Wallace Lai, Qianbing Zhang
- 11:50 **Optimal Height for Ground Coupled GPR**
» David Redman, Nectaria Diamanti, Peter Annan, Steven Jackson
- 12:10 **The method of the diffraction curves for retrieving the dielectric permittivity in a layered medium**
» Raffaele Persico, Ding Yang, Gianfranco Morelli, Iliaria Catapano, Giuseppe Esposito, Gregory De Martino, Luigi Capozzoli

- 12:30 **Optimizing FDTD EM boundary conditions.**
» Giacomo Roncoroni, Elisa Ligas, Børge Arntsen, Emanuele Forte, Michele Pipan
- 11:30 **Parallel - Oral Session 2b: Advanced Data and Image Processing Algorithms**
Conference Hall III
Chaired by: Svein-Erik Hamran and Vega Perez
- 11:30 **Microwave tomography enhanced UAV-GPR imaging: on field assessment at Altopiano di Verteglia (Avellino, Italy)**
» Giuseppe Esposito, Gianluca Gennarelli, Giovanni Ludeno, Francesco Soldovieri, Iliaria Catapano
- 11:50 **Advanced interpretation tools for WISDOM, the ExoMars GPR. Validation on experimental data acquired in Svalbard, a Martian analogue**
» Emile Brighi, Valérie Ciarletti, Alice Le Gall, Nicolas Oudart, Yann Hervé, Dirk Plettemeier, Wolf-Stefan Benedix, Aleksey Shestov, Esther Mas Sanz
- 12:10 **Positioning of Ground Penetrating Radar Assisted by Transmission Tower Response Signal**
» Fuyou Zhang, Xiaoxian Tang, Junkai Ge, Xinna Tian, Zhiqiang Liu, Cuiwei Lun, Qian Kang, Bowen Lu
- 12:30 **Lidar-assisted Georeferencing of Multi-channel GPR data**
» Victor Lu, Chun-Te Wu, Chuan-Chou Lu, Yau-Hsuan Tsai
- 12:50 **Lunch Break**
Foyer (-1)
- 14:00 **Oral Session 3: Geological and Environmental Applications**
Conference Hall II
Chaired by: Jens Tronicke and Jan van der Kruk
- 14:00 **Evaluating guided-wave GPR velocity profiling and its potential in soil studies**
» Sophie Stephan, Jens Tronicke, Philipp Koyan

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Continued from **Wednesday, 2 July**

14:20 **A GPR Survey of Arctic Pingos**
» John Bradford, Benjamin Hills, Roger Michaelides, Matthew Siegfried, Venezia Follingstad, Kynan Hughson

14:40 **Imaging tracer experiments using time-lapse crosshole GPR full-waveform inversion**
» Anja Klotzsche, Peleg Haruzi, Harry Vereecken, Jan Vanderborght, Jan van der Kruk, Gabriel Rau, Hannah Gebhardt, Andreas Englert, Peter Bayer

15:00 **3D Imaging of Ground Ice in the Canadian Arctic**
» Craig Warren, James Martin, Georgia Coote, Michael Lim, Rebecca Lee, Dustin Whalen

15:20 **Strategies for GPR peatland characterisation**
» Jan Igel, Bárbara Blanco Arrué, Tobias Splith, Stephan Costabel, Mike Müller-Petke

15:40 **Afternoon Coffee Break**
Foyer (-1)

16:10 **Exhibitor Presentations**
Conference Hall II
Chaired by: Nectaria Diamanti

16:40 **Oral Session 4: Advanced Data and Image Processing Algorithms, Novel developments in GPR Systems and Antennas**
Conference Hall II
Chaired by: Lorenzo Capineri and Ilaria Catapano

16:40 **Bandwidth Enhancement of Cylindrical Borehole Radar Antenna Using Coaxial Line Feeder**
» Ayodeji Matthew Monebi, Sang Hyun Kim, Seunghwan Lee, Sang-Wook Kim

17:00 **3-D Estimation of Horizontal Conducting Cylinder by Loop Array Antenna in a Vertical Borehole**
» Satoshi Ebihara, Masaya Ito, Kodai Takamatsu

17:20 **Performance evaluation of AI segmentation networks for GPR data interpretation**
» Davide Pasculli, Marco Capitani, Michal Pryczek, Lukasz Cyran, Jakub Niedzwiedzki, Alessandro Simi

17:40 **Perspective approaches to landmine detection, identification and positioning**
» Gennadiy Pochanin, Iryna Pochanina, Tetiana Ogurtsova, Fronefield Crawford, Lorenzo Capineri, Tim Bechtel

18:30 **City views by boat!**
Seafront by the White Tower

Thursday, 3 July

08:30 **Registration**
Foyer (-1)

09:00 **Keynote**
Conference Hall II
Chaired by: Nectaria Diamanti

The RIMFAX GPR on the NASA Mars 2020 Perseverance Rover
» Svein-Erik Hamran

09:40 **Oral Session 5 - Student Paper Competition**
Conference Hall II
Chaired by: Peter Annan and Motoyuki Sato

Continued from **Thursday, 3 July**

09:40 **Accelerating GPR Numerical Simulations via Machine Learning: A Sparse Multi-Offset and Supershot Framework**
» Yuxin Liu, Antonis Giannopoulos, Deshan Feng, Xun Wang

10:00 **End-to-end GPR System Simulation: Parameter Study and Optimization for Reconfigurable Design**
» Léa Mercier, Yann Hervé, Valérie Ciarletti, Benoit Agnus

10:20 **MS-TFNet: An unsupervised deep learning method for multi-frequency GPR data fusion in tunnel lining inspection**
» Huaiyuan Zhou, Tess Luo, Yiqing Ni

10:40 **Morning Coffee Break**
Foyer (-1)

11:10 **Oral Session 6 - Student Paper Competition**
Conference Hall II
Chaired by: Peter Annan and Motoyuki Sato

11:10 **Integrating Back Projection and Full-Wave Inversion for Advanced Multilayer Reconstructions**
» Zihan Xu, Xinfei Jin, Hongxu Li, Fulin Su, Guodong Xu, Sébastien Lambot

11:30 **Possibilities for reducing FWI calculation costs for GPR multi-offset data**
» Bingchao Li, Anja Klotzsche, Jan van der Kruk, Dominik Hoven, Xun Wang, Deshan Feng

11:50 **Development of a digital twin for airborne ground penetrating radar**
» Ying Wang, Feng Zhou, Iraklis Giannakis, Antonis Giannopoulos

12:10

Poster Session 1 - Short Presentations: Archaeology and Cultural Heritage, Engineering and Geotechnical Applications, Geological and Environmental Applications

Conference Hall II

Chaired by: Simona Fontul and Jan Igel

Geophysical prospecting at the pre-Roman archaeological site of Monte Sannace (Apulia, Italy)

» Gerardo Romano, Gregory De Martino, Domenico Patella, Michele De Girolamo, Davide Di Gennaro, Marco Di Lieto, Savino Gallo, Francesco Longobardi, Luigi Capozzoli

GPR prospecting in the Saint Francis of Paola church in Rome

» Raffaele Persico, Paolo Zimmaro

Sustainability of Bronze Age Monuments at Oman: GPR imaging at an archaeogeophysical laboratory

» Nikos Economou, Khaled Douglas, Muhammad Younis Khan, Mohamed Hesein, Nasser Al-Jahwari, Sara Pizzimenti, George Kritikakis, Bader Al-Shaqsi, Said Al-Abri

Time-lapse electrical resistivity tomography and ground penetrating radar for moisture monitoring in monuments' walls: the Thessaloniki's Rotunda case

» Prodromos Louvaris, Panagiotis Tsourlos, Nectaria Diamanti, George Vargemezis, Gregory Tsokas, Konstantinos Polydoropoulos, Georgia Zacharopoulou

Trace-to-IFC: Integrating Layer Thickness from GPR data into BIM

» Mercedes Solla, Sofía Calvar, Ahmed Elseicy, Gemma Guillamón-Andreu, Paula Pudell, Mario Soilán

Application of ground penetrating radar and electrical resistivity tomography for recognizing cavities in critical urban areas: the case study of Muntplein (Amsterdam, The Netherlands)

» Marios Karaoulis, Nectaria Diamanti, Chris Bremmer, Evert Slob, Dominique Ngan-Tillard, Pantelis Karamitopoulos

Continued from **Thursday, 3 July**

Monitoring of reinforced concrete degradation phenomena by GPR and other NDTs: a laboratory test

» Luigi Capozzoli, Gregory De Martino, Davide Di Gennaro, Giuseppe Salvia, Emilia Vasanelli, Stefania Imperatore, Cristina Monteleone, Hadi Monsef Ahmadi, Francesca Nerilli

Research on Rapid Acquisition of Ice Crack Morphology Using a Decision Tree Fusion Model with FP-GPR

» Xuan Feng, Liulei Wang, Haoqiu Zhou, Jiarun Yang, Zejun Dong, Yuheng Wang, Yafei An, Wenjing Liang

GPR Signal Artifacts Caused by Reinforcing Bars

» Davide Campo

Experience of Using GPR in Assessing Thin Asphalt Layer Thicknesses

» Christina Plati, Andreas Loizos, Alexandros Mouzakis

Study on time-lapse detection and polarization response characteristics of cracks with FP-GPR based on H-Alpha decomposition

» Xuan Feng, Yafei An, Haoqiu Zhou, Jiarun Yang, Zejun Dong, Wenjing Liang, Yuheng Wang, Liulei Wang

3D GPR Stratal Slicing of Sedimentary Structures

» Mark Grasmueck, Gregor Eberli

Robotics and GPR in agriculture

» Vega Perez, Nuria Rodríguez Calderón, Marc Sanchez Atienza, David Caballero, Adriano Liso, Carles Domenech

Detecting Agricultural Operations Combining SAR and Optical Data

» Andrea Soccolini, Sara Antognelli, Francesco Santaga

A combined geophysical approach to imaging permafrost across varying ground types in the Inuvialuit Settlement Region

» Georgia Coote, Craig Warren, Michael Lim, James Martin, Rebecca Lee, Dustin Whalen

Detailed GPR survey and UAV imaging for detecting gas vents – mofettes in NE Slovenia

» Marjana Zajc, Nina Rman

Geophysical Investigation Using GPR and FEM to Detect Anthropogenic Structures in the Coastal Area of Artemis, Attica, Greece

» Stavros Karizonis, George Apostolopoulos

Mapping and modelling of sand wedge polygons in saline alluvial sediments in the Atacama Desert using ground-penetrating radar

» Pablo Schwarze, Jan Igel, Bárbara Blanco Arrué, Christof Sager, Alessandro Airo, Jenny Feige

Advanced Techniques for Evaluating Trunk Health: Integrating 3D Photogrammetry with Dual-polarized GPR Survey

» Lilong Zou, Ying Li, Kevin Munisami, Amir M. Alani

12:50

Bid Presentations for IWAGPR2027

Conference Hall II

Chaired by: Nectaria Diamanti

13:10

Lunch Break

Foyer (-1)

14:10

Poster Session 1 - Poster Walkthrough

Foyer (-1)

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Continued from **Thursday, 3 July**

15:00 **Afternoon Coffee Break & Exhibitor Field Demonstrations**
Foyer (-1) and AUTH Gym

16:40 **Parallel - Oral Session 7a: Artificial Intelligence and GPR**
Conference Hall II
Chaired by: Iraklis Giannakis and Giacomo Roncoroni

16:40 **Airport Pavement Inspection through Multi-Static GPR Surveys Using Deep Neural Networks**
» Lilong Zou, Ying Li, Kevin Munisami, Amir M. Alani, Motoyuki Sato

17:00 **Depth CoordConv for Enhancing Unsupervised Domain Adaptation in Fully Convolutional Network-Based GPR Inversion**
» Takanori Imai, Tsukasa Mizutani

17:20 **Detection of Hyperbolic Reflections in GPR Data Using Faster R-CNN and Point Extraction**
» Zeljko Bugarinovic, Aleksandar Ristić, Aleksandra Radulović, Miro Govedarica, Milka Šarkanović Bugarinović

17:40 **Preliminary Study on Automating Rebar Detection in Reinforced Concrete Structures Using YOLOv11 and GPR Data**
» Ahmed Elseicy, Mercedes Solla, Alexandre Novo

16:40 **Parallel - Oral Session 7b: Engineering and Geotechnical Applications**
Conference Hall III
Chaired by: Nikos Economou and Albane Saintenoy

16:40 **Measuring Dielectric Constant of Soil Cores Based on GPR Transmission Measurements**
» Kazunori Takahashi, Masaki Ono

17:00 **Detection water leaks in soils by stepped-frequency radar and continuous wavelet transform spectra**
» Benhui Fan, Camille Herlent, Jean-Marie Fleureau, Alain Sylvestre, Cyrille Fauchard

17:20 **Advanced Classification of GPR Data**
» Richard Yelf, Daniel Yelf, Waleed Al-Nuaimy

17:40 **GPR measurements in the eastern part of the Asse salt structure with examples from direction sensitive borehole radar on the 700-m-level**
» Volker Gundelach

20:00 **Conference Dinner**
Allegro - Thessaloniki Concert Hall

Friday, 4 July

08:30 **Registration**
Foyer (-1)

09:00 **Keynote**
Conference Hall II
Chaired by: Nectaria Diamanti

How to Model your Radar: An Open Source GPR Journey to Open Science
» Antonis Giannopoulos

09:40 **Oral Session 8: Geological and Environmental Applications**
Conference Hall II
Chaired by: Anja Klotzsche and Mark Grasmueck

Continued from **Friday, 4 July**

- 09:40 **The potential of 3D GPR for imaging and characterizing permafrost regions**
» [Philipp Koyan](#), Jens Tronicke, Julien Guillemoteau, Pier Paul Overduin
- 10:00 **GPR-Based Subsurface Characterization in Support of Soil Response Studies**
» [Vega Perez](#), Oriol Caselles, Ramón González-Drigo
- 10:20 **Exploring Unprecedented GPR Penetration Depths in Low-Loss Sedimentary Environments: The Bødalen Delta Case, Western Norway**
» [Georgios Tassis](#), Nectaria Diamanti, Jan Steinar Rønning, Louise Hansen
- 10:40 **Soil water retention curve parameters estimation based on ground penetrating radar full waveform inversion with an improved grey wolf optimizer**
» [Minghe Zhang](#), Maksim Bano, Xuan Feng, Haoqiu Zhou, Zejun Dong, Yafei An
- 11:00 **Morning Coffee Break**
Foyer (-1)
- 11:30 **Parallel - Oral Session 9a: Advanced Data and Image Processing Algorithms, Forensic, Security and Search-&-Rescue Applications**
Conference Hall II
Chaired by: Evert Slob and John Bradford
- 11:30 **Polarimetric Viewpoint Correction for Ground Penetrating Radar Data**
» Fernando Rial, [Christian Bräu](#), Thoetphan Kingsuwannaphong, Stefan Rümmler
- 11:50 **Time Domain Projection for Real-Time Side-Looking GP-SAR**
» [Johannes Schlichenmaier](#), Bernd Arendt, Winfried Mayer

- 12:10 **Impact of Shallow Vegetation on the Detection of Buried Targets by GPR**
» Michael Schneider, [Thomas Walter](#), Hubert Mantz
- 12:30 **Multi-sensor cooperative robots for shallow buried explosive threat detection: radar sensors and optical sensors integrated by system software**
» [Lorenzo Capineri](#), Luca Bossi, Vadym Ruban, Emanuele Vivoli, Tim Beethel, Gennadiy Pochanin, Fronefield Crawford
- 11:30 **Parallel - Oral Session 9b: Archaeology and Cultural Heritage, General Submissions**
Conference Hall III
Chaired by: Raffaele Persico and Emanuele Forte
- 11:30 **Characterisation and diagnosis of timber floor of the Ajuda National Palace in Lisbon**
» [Simona Fontul](#), Rogério Mota, Marília Pereira, Helena Cruz, Luís Matias, Sónia Duarte, Ana Isabel Marques
- 11:50 **Novel MCGPR technology applied to archaeological mapping at “El Caracol”, Chichen Itza (Mexico)**
» [Alexandre Novo](#), Ivan Ariel Rufino Contreras, Denisse Argote, Maximiliano Saucedo, Pedro López-García, Octavio Juárez
- 12:10 **Teaching GPR data processing methods using the Jupyter environment (from A-scan to C-scan)**
» [Albane Saintenoy](#), Emmanuel Léger, Nicolas M. Thiéry
- 12:30 **Integration of satellite data analysis with ground penetrating radar to map archaeological features in Al Aamerah, United Arab Emirates.**
» [Sonia Alexandra Santos Assuncao](#), Diana Francis, Cherif Charfeddine, Moamen Ali, Mohammed Ali, Muhammad Asim Iqbal
- 12:50 **Lunch Break**
Foyer (-1)

Continued from **Friday, 4 July**

13:50

Poster Session 2 - Short Presentations: Advanced Data and Image Processing Algorithms, Artificial Intelligence, Forensic, Security and Search-&Rescue Applications, Forward Modeling Techniques and Inversion Methodologies,

Conference Hall II

Chaired by: Satoshi Ebihara and Lilong Zou

Numerical parametric study: effect of GPR source on MPM-inversion performances

» Mourougén Marimoutou, Khalil EL Khamlichi Drissi, Amine Ihamouten, Mengda Wu, David GUILBERT, Xavier Dérobert

3D UWB Positioning System on Data Processing by ANN

» Vadym Plakhtii, Oleksandr Dumin, Lorenzo Capineri, Gennadiy Pochanin, Dmytro Havrylenko

Detection of Tail Parts in Double-Layer Rebar Hyperbola Using Sobel Filters and Radon Transform

» Shunsuke Iwaj, Tsukasa Mizutani

Impact of Completeness of Hyperbolic Data on GPR Detection using Hyperbolic Fitting

» Wenchao He, Wallace Wai-Lok Lai

CNN-Based Crack Detection in Asphalt Pavements Using GPR: Intensity Map and Histogram Analysis

» Grigório Ribeiro Soares Neto, Francisco Manuel Carvalho Pinto Fernandes, Simona Fontul, Jorge Carvalho Pais

Enhancing Ground Penetrating Radar Data Interpretation for Facies Delineation Using Integrated Patch-Based PCA dictionary learning

» Hemen Gogoi, Ankit Dipta Dutta, Oindrila Bose, Akhilesh Kumar Yadav, Probal Sengupta, Abhijit Mukherjee

Reconstruction of Airborne Radargrams Using a Generative Adversarial Network Trained on Synthetic Data

» Minyu Li, Gabe Redding, Patrice Delmas, Morio Fukuoka, Sam McColl, Steven Le Moan, Daniel Parker

Multi-sensor cooperative robots for shallow buried explosive threat detection: system architecture, mission strategy, and test field results

» Lorenzo Capineri, Pierluigi Falorni, Vadym Ruban, Tim Bechtel, Fronefield Crawford, Maksym Maiboroda

2D FDTD Numerical Modelling of GPR a Masonry Wall: an Application for Cultural Heritage Conservation in Central Italy

» Giorgio Alaia, Maurizio Ercoli, Nicola Cavalagli

Three-dimensional Finite-Difference Time-Domain Modeling of Ground Penetrating Radar Survey for Buried Paleo-Channel Detection

» Changwan Sun, Takao Kobayashi, Youngbeom Cheon, Jin-Hyuck Choi

Evaluating subsurface roughness and antenna elevation effects by GPR forward modeling

» Ilaria Santin, Giacomo Roncoroni, Emanuele Forte

Extended dynamic range GPR for bedrock detection: an effective approach in geotechnical applications

» Fabio Giannino, Alessandro Simi, Davide Pasculli, Davide Morandi

The Application of the Short Chirp GPR system to the Shield Machine

» Toshimitsu Nozu, Kiyoshi Yoshida, Yashuhiro Ishikawa, Kenyu Sakao, Toshimune Imai, Yoshitaka Imado

Comparison of Theoretically Calculated Waves from a Dielectric Slab and Reflected Waves from an Actual Fracture in Rock in Polarization-Sensitive Directional Borehole Radar

» Satoshi Ebihara, Aito Matsuda, Masatsugu Fujimoto, Takuya Magawa

Continued from **Friday, 4 July**

» Nectaria Diamanti – Chair IWAGPR2025

17:40

Farewell Drinks
Foyer (-1)

14:20

An innovative long-range multi-offset GPR acquisition method: synthetic and real data testing

» Emanuele Forte, Giacomo Roncoroni, Michele Pipan

Poster Session 2 - Poster Walkthrough

Foyer (-1)

15:30

Afternoon Coffee Break

Foyer (-1)

16:00

Oral Session 10: Forward Modeling Techniques and Inversion Methodologies, Engineering and Geotechnical Applications

Conference Hall II

Chaired by: Wallace Wai-Lok Lai and David Redman

16:00

GPR performance for material characterization of existing end-of-life buildings

» Ourania Patsia, Alexandre Novo, Samuel Lehner, Miguel Clavijo

16:20

A Framework for Evaluating the Degradation of UHPFRC Waterproof Layers in Bridge Decks Using GPR: A Numerical and Experimental Approach

» Mengda Wu, Amine Ihamouten, Etienne Bellenfant, Alexis Cothenet, Théo Dezert, Jérôme Tissier, Grégory Andreoli, Xavier Dérobert

16:40

Comparative study of realistic and homogenized ballast layer

» Sepideh Haraichi, Evert Slob

17:00

Projecting and positioning unknown trajectories of MCGPR swaths

» Yimin Zhou, Wallace Wai-Lok Lai

17:20

Closing Address

Conference Hall II