

Ground Penetrating Radar
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EDITORIAL & PREFACE

EDITORIAL

Welcome to Issue 1, Volume 2 of *Ground Penetrating Radar*, the first peer-refereed, open-access, international academic journal designed to advance scientific knowledge and foster innovative engineering solutions in the field of Ground Penetrating Radar (GPR).

This issue includes four papers (see the Preface for an introduction to the papers), a Retraction Note, and a 'News & Announcements' section.

We are delighted to inform our Readers and Authors that we have recently joined Crossref, this will guarantee higher discoverability and visibility of *Ground Penetrating Radar* papers to the research community. Crossref was founded in 2000 by a group of publishers who needed an efficient method to connect their journal articles, and so they started using DOIs to link references between articles. When an article is registered with Crossref, the bibliographic metadata of that article are submitted, such as the title, authors, publication dates, online location, the DOI, and the references, to name a few. This makes it easier, e.g., for a Reader to locate all items registered in Crossref citing a certain article. Not only new *Ground Penetrating Radar* papers, but also papers published on *Ground Penetrating Radar* in 2018 are going to be registered in CrossRef! Moreover, we have updated the journal website and each published paper now has a dedicated webpage.

We are also pleased to inform you that two Special Issues are being launched:

- The last issue of Volume 2 (to be published in December 2019) will be a collection of scientific papers resuming contributions presented during Session GI4.1 "Ground Penetrating Radar: Technology, Methodology, Applications and Case Studies" of the 2019 European Geosciences Union General Assembly (7-12 April 2019, Vienna, Austria). This Special Issue will be edited by Alessandro Fedeli (University of Genoa, Italy), Aleksandar Ristic (University of Novi Sad, Serbia), Milan Vrtunski (University of Novi Sad, Serbia), and myself. Papers can be submitted by Authors of GI4.1 abstracts and session Attendees.
- Submissions are open for a Special Issues entitled "New perspectives for the study and preservation of cultural heritage with the aid of noninvasive prospecting." This Special Issue will be edited by Raffaele Persico (CNR – National Research Council, Italy), Mercedes Solla (University of Vigo, Spain), and Xavier Dérobert (IFSTTAR – Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux, Nantes, France).

More information on these Special Issues and the calls for papers are found in the News & Announcements section.

Another piece of news is that we have set up a Twitter profile dedicated to *Ground Penetrating Radar*, where scientific insights into papers published on our journal are being twitted: GPR_OpenAccess.

All *Ground Penetrating Radar* papers are processed and published in true open access, free to both Authors and Readers, thanks to the generous support of TU1208 GPR Association and to the voluntary efforts of the journal Editorial Board. The present issue is also supported by IDS Georadar s.r.l. (idsgeoradar.com).

Do you have suggestions to improve the journal? Would you like to join the Editorial Board or propose a Special Issue? You are most welcome to send us a message at journal@gpradar.eu.

The Editor-in-Chief
Lara Pajewski

PREFACE

The first issue of the second volume of *Ground Penetrating Radar* includes four papers authored by scientists from 11 institutes in 9 countries (Belgium, Canada, Czech Republic, Estonia, Greece, Italy, Portugal, Serbia, Turkey).

The issue is opened with a paper entitled “**Influence of bark surface roughness on tree trunk radar inspection,**” authored by Jana Jezova and Sébastien Lambot [1]. The paper deals with microwave radar testing of tree trunks for the evaluation of their internal structure, with a main focus on investigating how the surface roughness of a trunk influences radar data. Several numerical simulations and laboratory measurements were carried out, to compare radargrams obtained by testing a cylinder with a smooth surface and a cylinder having an irregular surface. Then, real trees with different surfaces and internal structures were tested, to validate the simulation and laboratory findings. The results presented in this paper indicate that the presence of a rough and irregular bark can significantly inhibit the ability to study the internal structure of a tree with a radar. On the other hand, if the bark is smooth, the internal composition of a tree can be successfully estimated even for highly heterogeneous specimens.

The second paper is entitled “**Discrimination of dispersive materials from radar signals using Q^*** ” and is authored by Chun An Tsai, Rebecca Ghent, Alexander Boivin, and Dylan Hickson [2]. Via a combination of laboratory measurements and simulation results, the Authors demonstrate the potential of distinguishing two dispersive materials by estimating the quality factor using radar signals at two different frequencies. Complex dielectric permittivity measurements were carried out on a pulp sample mainly composed of pyrite and quartz, from a massive sulphide mine, as well as on a calcium-rich montmorillonite sample, for comparison. For the montmorillonite sample, a dispersive behaviour caused by water was observed, consistent with previous studies. For the pulp sample, a dispersive behaviour independent of water was observed, which could be distinguished from the behaviour of moist clays by estimating the quality factor at two different frequencies. Simulations with the inverted parameters were implemented with gprMax, to further verify the idea.

The third paper is entitled “**Real-time visualization of the data gathered by a reconfigurable stepped-frequency GPR system;**” it is authored by Filippo Brigatti [3]. Recent improvements made to the acquisition software of a reconfigurable stepped-frequency ground penetrating radar (GPR) prototype are presented in this work, which was carried out during the Master thesis in Electronic Engineering of the Author. In particular, real-time data visualization was not yet implemented in the

previous version of the acquisition software, although this is a common feature available in all commercial systems. By developing suitable procedures for a more efficient data handling, the Author upgraded the software and enabled real-time visualization of the radargrams measured by the prototype. The most significant parts of the code are available for download as ‘Supplementary materials.’

The last paper of this issue stems from COST (European Cooperation in Science and Technology) Action TU1208 “Civil engineering applications of Ground Penetrating Radar.” The paper is entitled **“TU1208 GPR Roadshow: Educational and promotional activities carried out by members of COST Action TU1208 to increase public awareness on the potential and capabilities of the GPR technique”** and is authored by myself, Hannes Tonisson, Kaarel Orviku, Miro Govedarica, Aleksandar Ristic, Vladislav Borecky, Salih Serkan Artagan, Simona Fontul, and Klisthenis Dimitriadis [4]. The purpose of this paper is to present descriptions, principles, and impact of a successful series of science communication initiatives about the GPR technique, overall denominated “TU1208 GPR Roadshow.” Part of the Roadshow consisted of a series of six non-scientific workshops and practical demonstrations held in Portugal, Italy, Greece, Croatia, Serbia, and the Czech Republic, from March 2016 to May 2017. Audiences went well beyond the GPR scientific community and primarily included representatives from public agencies and private companies, as well as interested citizens. The workshops were attended by almost 500 participants in total: we were able to raise considerable interest in various countries and our events were catalysts for a series of new activities. Another significant part of the Roadshow consisted of a series of promotional and educational initiatives carried out in Estonia. Before these initiatives, very few people in Estonia knew what GPR was and how it could be used in different application fields. Several lectures were delivered in schools, practical workshops were held during the Researchers’ Nights as well as during other large communication events, and short lectures were given on TV.

Many thanks to the Authors of these four papers for choosing *Ground Penetrating Radar*. Thank you very much to all researchers and experts involved into the revision process of the papers, for their voluntary efforts. I am grateful to TU1208 GPR Association (gpradar.eu/tu1208) and IDS Georadar s.r.l. (idsgeoradar.com), for supporting the publication of this issue, and as always to COST (cost.eu) for having funded and supported the Action TU1208 (gpradar.eu).

The Editor-in-Chief
Lara Pajewski

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