

Cuong Ha-Minh · Dong Van Dao ·
Farid Benboudjema ·
Sybil Derrible · Dat Vu Khoa Huynh ·
Anh Minh Tang *Editors*

CIGOS 2019, Innovation for Sustainable Infrastructure

Proceedings of the 5th International
Conference on Geotechnics, Civil
Engineering Works and Structures

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Editors

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Editors

Cuong Ha-Minh
University of Paris-Saclay
Cachan, France

Farid Benboudjema
LMT Cachan
University of Paris-Saclay
Cachan, France

Dat Vu Khoa Huynh
Norwegian Geotechnical Institute
Oslo, Norway

Dong Van Dao
University of Transport Technology
Thanh Xuan, Hanoi, Vietnam

Sybil Derrible
University of Illinois at Chicago
Chicago, IL, USA

Anh Minh Tang
Ecole des Ponts ParisTech
Marne-la-Vallée, France

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Preface

Following the great success of each of the four previous consecutive events since 2010, CIGOS (*Congrès International de Géotechnique—Ouvrages—Structures*) has firmly established its international reputation and is perceived as an important conference for promoting both academic and high-quality professional exchanges in the fields of **Geotechnics, Civil Engineering Works and Structures**. This, the fifth International Conference—**CIGOS 2019**, held in Hanoi, Vietnam, was co-organized by the Association of Vietnamese Scientists and Experts ([AVSE Global](#)) in collaboration with the University of Transport Technology ([UTT](#)) and in partnership with the Ecole normale supérieure de Paris-Saclay ([ENS Paris-Saclay](#)).

CIGOS 2019 placed particular focus on the theme of **Innovation for Sustainable Infrastructure**, aiming to not only raise awareness of the vital importance of sustainability in infrastructure development but also highlight the essential roles of innovation and technology in helping to plan and build sustainable infrastructure. Having built on the success of CIGOS 2017, this year's conference saw almost double the number of published papers, which covered a broad spectrum within the following topics:

- Advanced Modeling and Characterization of Structures
- Sustainable Construction Materials and Technologies
- Geotechnics for Environment and Energy
- Urban Planning, Transport and Environment
- Data Mining & Machine Learning
- Building Information Modeling

The present CIGOS proceedings contain 201 peer-reviewed papers from 27 different countries, six of which are keynotes presented by internationally outstanding experts in their respective fields. The choice of papers was made on the basis of nearly 380 abstracts accepted. The first keynote presents the author's wide perspective on four decades of computing in civil engineering, which are highly multidisciplinary—crossing computer science, multiple engineering fields, mathematics and medicine. The second, third, fourth, and fifth keynotes address the recent novel technologies and innovations in transportation and construction, which have

been remarkable in helping to plan and build infrastructure that is increasingly more sustainable. The sixth and final keynote emphasizes that society and standards require increasingly more “risk-informed” based decisions, demonstrating that the implementation of reliability and risk-based approaches can not only provide useful complementary information both for design and for re-evaluation during the lifetime of the infrastructure but also efficiently assist the preparation of sustainable engineering recommendations and risk-informed decision making.

We wish to acknowledge the wonderful support of the scientific committee and the external reviewers, who provided valuable assistance in the review process and undoubtedly made a tremendous contribution in raising the quality of the proceedings. We are thankful to the keynote speakers, authors and participants for their enthusiastic efforts and time in preparing valuable papers as well as bringing encouragement and inspiration to the conference. Our special thanks also to the organizing committee, without whom it would have been difficult to run this conference.

Last but not least, we would also like to thank all sponsors for their support and generosity in making our CIGOS 2019 such a success.

On behalf of the CIGOS 2019’s committees, we believe that the present proceedings, which include a mixture of contributions from academia and practitioners, will provide valuable up to date knowledge for all those interested in Geotechnics, Civil Engineering Works and Structures.

Cachan, France	Cuong Ha-Minh
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VinTech City, a member of Vingroup, was founded with the aim of supporting the Vietnamese ecosystem of tech research and startups, following the success model of Silicon Valley. To realize such mission, VinTech City has identified three fundamental areas of activities: Tech talents, tech products, and an ecosystem of supporting activities. Among these factors, the workforce and tech products with competitive edges have been considered the stepping stones of the development strategy of VinTech City.

Specifically, VinTech City has designed programs focusing on tech startups, innovators, researchers, university lecturers and students, in order to support them in creating innovative research and translating them into commercialized products and companies based on applied research. In May 2019, VinTech City has officially announced six such programs, namely: (i) VinTech Fund—a grant for applied research; (ii) Research Laboratory sponsorship; (iii) University-Enterprise Co-operative Semester; (iv) SAP Training; (v) Events, workshops, or seminars sponsorship; and (vi) Tech Startup Student Clubs. Such wide range of support activities and programs demonstrates the comprehensive cooperation between Vingroup and the science and technology universities in Vietnam.

One of the most prominent programs of VinTech City is VinTech Fund—a grant for creating innovative tech products from research, or in another word “bringing lab ideas to market”, which has recently announced the first batch of applied research projects receiving fundings of 86 billions VND in total (equivalent to \$3.7m). Learn more about them on www.vintechcity.com.

In brief, Vietnamese researchers, who works at prestigious research institutes and universities, can contribute to the development of science and technology in

Vietnam through research collaboration, tech product development, and educational activities with domestic universities within the sponsorship framework of VinTech Fund.

We believe that VinTech City can contribute to create a catalyst for “Make in Vietnam” technology products in market and complete the mission of supporting Vietnam startup and technology ecosystem.

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NUCE has undergone over 50 years of formation and development and over 60 years of training. NUCE becomes nowadays a leading centre for training, research, technology transfer and creating high quality human resources for the country in the field of civil engineering. In addition, NUCE was one of the first four universities in Vietnam evaluated and accredited by HCERES (Haut Conseil de l'Evaluation de la Recherche et de l'Enseignement Supérieur)—an international assessment organisation for 5 years, without conditions until May 2022.

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