

Athens Journal of Technology & Engineering

Quarterly Academic Periodical, Volume 11, Issue 4, December 2024

URL: <https://www.athensjournals.gr/ajte>

Email: journals@atiner.gr

e-ISSN: 2241-8237 DOI: 10.30958/ajte



Front Pages

HANS DULIMARTA & WILLIAM DICKINSON

[Composite Command Pattern for Managing Spherical Geometry Constructions](#)

ALAN ATALAH & WALID AL-AZANKI

[Impact of Supply Chain Disruptions and Inflation on the Construction Industry in the Arab States of the Gulf Cooperation Council](#)

XIN ZHOU, HAO WANG, AOXUAN TAN, ENJING ZHANG & JINXIN CHONG

[Machine Learning-Based Evaluation of Susceptibility to Geological Hazards in Yunyang District, Shiyang City, China](#)

XAVIER FERNANDO HURTADO AMÉZQUITA & MARITZABEL MOLINA HERRERA

[Experimental Analysis of CSC-type Shear Connectors Behavior under Direct Shear: Pry-Out Test \(I\)](#)

Athens Journal of Technology & Engineering

Published by the Athens Institute for Education and Research (ATINER)

Editors

- Dr. Timothy M. Young, Director, [Center for Data Science \(CDS\)](#) & Professor and Graduate Director, The University of Tennessee, USA.
- Dr. Panagiotis Petratos, Vice-President of Information Communications Technology, ATINER & Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.
- Dr. Nikos Mourtos, Head, [Mechanical Engineering Unit](#), ATINER & Professor, San Jose State University USA.
- Dr. Theodore Trafalis, Director, [Engineering & Architecture Division](#), ATINER, Professor of Industrial & Systems Engineering and Director, Optimization & Intelligent Systems Laboratory, The University of Oklahoma, USA.
- Dr. Virginia Sisiopiku, Head, [Transportation Engineering Unit](#), ATINER & Associate Professor, The University of Alabama at Birmingham, USA.

Editorial & Reviewers' Board

<https://www.athensjournals.gr/ajte/eb>

Administration of the Journal

1. Vice President of Publications: Dr Zoe Boutsili
2. General Managing Editor of all ATINER's Publications: Ms. Afrodete Papanikou
3. ICT Managing Editor of all ATINER's Publications: Mr. Kostas Spyropoulos
4. Managing Editor of this Journal: Ms. Effie Stamoulara

*

ATINER is an Athens-based World Association of Academics and Researchers based in Athens. ATINER is an independent and non-profit Association with a Mission to become a forum where Academics and Researchers from all over the world can meet in Athens, exchange ideas on their research and discuss future developments in their disciplines, as well as engage with professionals from other fields. Athens was chosen because of its long history of academic gatherings, which go back thousands of years to Plato's Academy and Aristotle's Lyceum. Both these historic places are within walking distance from ATINER's downtown offices. Since antiquity, Athens was an open city. In the words of Pericles, Athens "...is open to the world, we never expel a foreigner from learning or seeing". ("Pericles' Funeral Oration", in Thucydides, The History of the Peloponnesian War). It is ATINER's mission to revive the glory of Ancient Athens by inviting the World Academic Community to the city, to learn from each other in an environment of freedom and respect for other people's opinions and beliefs. After all, the free expression of one's opinion formed the basis for the development of democracy, and Athens was its cradle. As it turned out, the Golden Age of Athens was in fact, the Golden Age of the Western Civilization. Education and (Re)searching for the 'truth' are the pillars of any free (democratic) society. This is the reason why Education and Research are the two core words in ATINER's name.

The *Athens Journal of Technology & Engineering (AJTE)* is an Open Access quarterly double-blind peer reviewed journal and considers papers from all areas engineering (civil, electrical, mechanical, industrial, computer, transportation etc), technology, innovation, new methods of production and management, and industrial organization. Many of the papers published in this journal have been presented at the various conferences sponsored by the [Engineering & Architecture Division](#) of the Athens Institute for Education and Research (ATINER). All papers are subject to ATINER's [Publication Ethical Policy and Statement](#).

The Athens Journal of Technology & Engineering
ISSN NUMBER: 2241-8237- DOI: 10.30958/ajte
Volume 11, Issue 4, December 2024
Download the entire issue ([PDF](#))

<u>Front Pages</u>	i-viii
<u>Composite Command Pattern for Managing Spherical Geometry Constructions</u> <i>Hans Dulimarta & William Dickinson</i>	251
<u>Impact of Supply Chain Disruptions and Inflation on the Construction Industry in the Arab States of the Gulf Cooperation Council</u> <i>Alan Atalah & Walid Al-Azanki</i>	267
<u>Machine Learning-Based Evaluation of Susceptibility to Geological Hazards in Yunyang District, Shiyan City, China</u> <i>Xin Zhou, Hao Wang, Aoxuan Tan, Enjing Zhang & Jinxin Chong</i>	291
<u>Experimental Analysis of CSC-type Shear Connectors Behavior under Direct Shear: Pry-Out Test (I)</u> <i>Xavier Fernando Hurtado Amézquita & Maritzabel Molina Herrera</i>	305

Athens Journal of Technology & Engineering

Editorial and Reviewers' Board

Editors

- **Dr. Timothy M. Young**, Director, [Center for Data Science \(CDS\)](#) & Professor and Graduate Director, The University of Tennessee, USA.
- **Dr. Panagiotis Petratos**, Vice-President of Information Communications Technology, ATINER & Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.
- **Dr. Nikos Mourtos**, Head, [Mechanical Engineering Unit](#), ATINER & Professor, San Jose State University USA.
- **Dr. Theodore Trafalis**, Director, [Engineering & Architecture Division](#), ATINER, Professor of Industrial & Systems Engineering and Director, Optimization & Intelligent Systems Laboratory, The University of Oklahoma, USA.
- **Dr. Virginia Sisiopiku**, Head, [Transportation Engineering Unit](#), ATINER & Associate Professor, The University of Alabama at Birmingham, USA.

Editorial Board

- Dr. Marek Osinski, Academic Member, ATINER & Gardner-Zemke Professor, University of New Mexico, USA.
- Dr. Jose A. Ventura, Academic Member, ATINER & Professor, The Pennsylvania State University, USA.
- Dr. Nicolas Abatzoglou, Professor and Head, Department of Chemical & Biotechnological Engineering, University of Sherbrooke, Canada.
- Dr. Jamal Khatib, Professor, Faculty of Science and Engineering, University of Wolverhampton, UK.
- Dr. Luis Norberto Lopez de Lacalle, Professor, University of the Basque Country, Spain.
- Dr. Zagabathuni Venkata Panchakshari Murthy, Professor & Head, Department of Chemical Engineering, Sardar Vallabhbha National Institute of Technology, India.
- Dr. Yiannis Papadopoulos, Professor, Leader of Dependable Systems Research Group, University of Hull, UK.
- Dr. Bulent Yesilata, Professor & Dean, Engineering Faculty, Harran University, Turkey.
- Dr. Javed Iqbal Qazi, Professor, University of the Punjab, Pakistan.
- Dr. Ahmed Senouci, Associate Professor, College of Technology, University of Houston, USA.
- Dr. Najla Fourati, Associate Professor, National Conservatory of Arts and Crafts (Cnam)-Paris, France.
- Dr. Ameersing Luximon, Associate Professor, Institute of Textiles and Clothing, Polytechnic University, Hong Kong.
- Dr. Georges Nassar, Associate Professor, University of Lille Nord de France, France.
- Dr. Roberto Gomez, Associate Professor, Institute of Engineering, National Autonomous University of Mexico, Mexico.
- Dr. Aly Mousaad Aly, Academic Member, ATINER & Assistant Professor, Department of Civil and Environmental Engineering, Louisiana State University, USA.
- Dr. Hugo Rodrigues, Senior Lecturer, Civil Engineering Department, School of Technology and Management, Polytechnic Institute of Leiria, Portugal.
- Dr. Saravanamuthttu Subramaniam Sivakumar, Head & Senior Lecturer, Department of Civil Engineering, Faculty of Engineering, University of Jaffna, Sri Lanka.
- Dr. Hamid Reza Tabatabaiefar, Lecturer, Faculty of Science and Technology, Federation University, Australia.

- **Vice President of Publications:** Dr Zoe Boutsoli
- **General Managing Editor of all ATINER's Publications:** Ms. Afrodete Papanikou
- **ICT Managing Editor of all ATINER's Publications:** Mr. Kostas Spyropoulos
- **Managing Editor of this Journal:** Ms. Eirini Lentzou ([bio](#))

President's Message

All ATINER's publications including its e-journals are open access without any costs (submission, processing, publishing, open access paid by authors, open access paid by readers etc.) and is independent of presentations at any of the many small events (conferences, symposiums, forums, colloquiums, courses, roundtable discussions) organized by ATINER throughout the year and entail significant costs of participating. The intellectual property rights of the submitting papers remain with the author. Before you submit, please make sure your paper meets the [basic academic standards](#), which includes proper English. Some articles will be selected from the numerous papers that have been presented at the various annual international academic conferences organized by the different divisions and units of the Athens Institute for Education and Research. The plethora of papers presented every year will enable the editorial board of each journal to select the best, and in so doing produce a top-quality academic journal. In addition to papers presented, ATINER will encourage the independent submission of papers to be evaluated for publication.

The current issue is the fourth of the eleventh volume of the *Athens Journal of Technology & Engineering (AJTE)*, published by the [Engineering & Architecture Division](#) of ATINER.

Gregory T. Papanikos, President, ATINER.



Athens Institute for Education and Research

A World Association of Academics and Researchers

15th Annual International Conference on Civil Engineering 23-26 June 2025, Athens, Greece

The [Civil Engineering Unit](#) of ATINER is organizing its 15th Annual International Conference on Civil Engineering, 23-26 June 2025, Athens, Greece sponsored by the [Athens Journal of Technology & Engineering](#). The aim of the conference is to bring together academics and researchers of all areas of Civil Engineering other related areas. You may participate as stream leader, presenter of one paper, chair of a session or observer. Please submit a proposal using the form available (<https://www.atiner.gr/2025/FORM-CIV.doc>).

Academic Members Responsible for the Conference

- **Dr. Dimitrios Goulias**, Head, [Civil Engineering Unit](#), ATINER and Associate Professor & Director of Undergraduate Studies Civil & Environmental Engineering Department, University of Maryland, USA.

Important Dates

- Abstract Submission: **3 March 2025**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **26 May 2025**

Social and Educational Program

The Social Program Emphasizes the Educational Aspect of the Academic Meetings of Atiner.

- Greek Night Entertainment (This is the official dinner of the conference)
- Athens Sightseeing: Old and New-An Educational Urban Walk
- Social Dinner
- Mycenae Visit
- Exploration of the Aegean Islands
- Delphi Visit
- Ancient Corinth and Cape Sounion

Conference Fees

Conference fees vary from 400€ to 2000€
Details can be found at: <https://www.atiner.gr/fees>



Athens Institute for Education and Research

A World Association of Academics and Researchers

13th Annual International Conference on Industrial, Systems and Design Engineering, 23-26 June 2025, Athens, Greece

The [Industrial Engineering Unit](#) of ATINER will hold its 13th Annual International Conference on Industrial, Systems and Design Engineering, 23-26 June 2025, Athens, Greece sponsored by the [Athens Journal of Technology & Engineering](#). The aim of the conference is to bring together academics, researchers and professionals in areas of Industrial, Systems, Design Engineering and related subjects. You may participate as stream leader, presenter of one paper, chair of a session or observer. Please submit a proposal using the form available (<https://www.atiner.gr/2025/FORM-IND.doc>).

Important Dates

- Abstract Submission: **3 March 2025**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **26 May 2024**

Academic Member Responsible for the Conference

- **Dr. Theodore Trafalis**, Director, [Engineering & Architecture Division](#), ATINER, Professor of Industrial & Systems Engineering and Director, Optimization & Intelligent Systems Laboratory, The University of Oklahoma, USA.

Social and Educational Program

The Social Program Emphasizes the Educational Aspect of the Academic Meetings of Atiner.

- Greek Night Entertainment (This is the official dinner of the conference)
- Athens Sightseeing: Old and New-An Educational Urban Walk
- Social Dinner
- Mycenae Visit
- Exploration of the Aegean Islands
- Delphi Visit
- Ancient Corinth and Cape Sounion

More information can be found here: <https://www.atiner.gr/social-program>

Conference Fees

Conference fees vary from 400€ to 2000€
Details can be found at: <https://www.atiner.gr/fees>

