International Commission of Agricultural and Biosystems Engineering

March 2025

Newsletter 140

"...to serve - on a world-wide basis and through its members - the needs of humanity by fostering mutual understanding, improvement and rationalisation of sustainable biological production systems while protecting nature and environment and managing landscape through the advancement of engineering and allied sciences..."

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Call for Participation: International undergraduate engineering student competition

The International Commission of Agricultural and Biosystems Engineering, CIGR, is inviting students enrolled full time in an undergraduate Agricultural and Biosystems Engineering (ABE) program to participate in an international competition. The aim of this competition is to encourage student participation in professional societies and to recognize outstanding undergraduate students.

Participating students are required to submit a three-minute video and a one-page description of a project conducted while registered full-time in an ABE program. Also required are a statement from the advisory faculty member and proof of enrollment.

Students must submit their materials under one of the following categories, corresponding to CIGR Technical Sections:

- Land and Water
- Structures and Environment
- Plant Production
- Energy in Agriculture
- System Management
- Bioprocesses
- Information Technology

Winners of each section will be considered finalists and will be required to submit an extended abstract of their project from which a gold, silver and bronze winner will be selected. Travel, registration and per diem expenses will be provided to the gold winner to attend the CIGR World Congress the 24-26 of June, 2026, in Torino, Italy.

Evaluation Criteria

A standard evaluation criterion is to be used across the competition to include:

- Quality and rigor that is present in the submission (Clear description of the problem, analysis and elected approach of the solution implemented, sound use of engineering science and technology).
- Originality and creativity in the implementation of engineering principles and science (The solution demonstrates mastery of the principles used in the solution and their use in a creative and innovative manner).
- Relevance and impact (The problem addresses an important issue and may affect many stakeholders).
- Interest and relevance to Agriculture and Biosystems Engineering (The subject matter is squarely within the domain of one of the CIGR Technical sections).

Important dates

Submission website open	April 15, 2025
Submission Deadline	September 15, 2025
Announcement of winners	February 15, 2026

Prizes:

Each section winner will receive a certificate. In addition, a cash prize according to the following schedule:

Gold	$US1500 and travel to 2026 CIGR World Congress
Silver	$US1000
Bronze	$US750
Finalists 1-4	$US500

In Memoriam: Maohua Wang

Academician Maohua Wang peacefully passed away in Beijing on February 28, 2025, at the age of 93. As an active member of CIGR, Academician Wang contributed for decades to the improvement of the quality of life of all. He collaborated with many professionals in the field and participated in many strategic initiatives of the CIGR organization.

Academician Maohua Wang dedicated his life to teaching, research and innovation in agricultural and biosystems engineering. With profound knowledge, keen thinking and broad academic vision, he understood and expanded the frontiers of knowledge of the discipline. He made outstanding contributions to the establishment and development of agricultural engineering discipline in China. He was a pioneer and leader in agricultural engineering, electrification and automation in China. Since the 1980s, he served as the convenor of the Academic Degree Committee of The State Council's "Agricultural Economy, Agricultural Mechanization and Agricultural Engineering Discipline" Evaluation Group, the Chairman and Honorary Chairman of the Chinese Society of Agricultural Engineering, and the Honorary Chairman of the Chinese Society of Agricultural Machinery. He presided over the" Development *Strategy of Agricultural Mechanization in China"* that became the guiding strategy for the development of agricultural mechanization in China. He led the founding of the "Precision Agriculture Research Center", "Modern Precision Agriculture System Integration Research" and "Smart Agriculture System Integration Research" key Laboratory of the Ministry of Education, leading and promoting the frontier development of smart agriculture in China.

Academician Maohua Wang made important contributions to international scientific and academic communities. He was a long-standing member of CIGR and served in the FAO Agricultural Mechanization Expert Group. His participation in important initiatives included membership in the Technical Committee of the United Nations Asia-Pacific Center for Agricultural Engineering and Machinery, a founding academician of the International Academy of Agricultural and Biological Systems Engineering, and was a professor of the Asian Institute of Technology, a visiting professor of Kansas State University.

Academician Maohua Wang was recipient of the CIGR Lifetime Achievement Award. This award has been given only to two individuals in the 95-year history of CIGR.

During his tenure Academician Wang received many national and international awards. Amongst these, because of his numerous contributions to the profession he received the CIGR Lifetime Achievement Award in 2024. In addition, he won the second Prize of National Science and Technology Progress, the first prize of Beijing Science and Technology Progress, and the Shennong China Agricultural Science and Technology Award.

Academician Maohua Wang's legacy will continue through the many contributions he made to agricultural engineering worldwide as well as the indelible mark he left on his many students and peers. A farewell ceremony was held in his honor on Tuesday, March 4, Beijing, China.

Optimizing Forage Harvesting: Advanced 3D Route Planning in Agriculture

Innovative research at Aarhus University and AGCO A/S has introduced groundbreaking methods to streamline forage harvesting while safeguarding soil health and reducing fuel consumption.

Claus Aage Grøn Sorensen
CIGR President
Aarhus University, Denmark

Erfan Khosravani Moghadam
Researcher
Aarhus University, Denmark

Background & Challenge

Forage harvesting is a vital component of modern agriculture, but heavy machinery traffic often leads to high non-working distances, increased fuel usage, and significant soil compaction, factors that collectively result in yield losses and environmental stress. In Denmark alone, inefficiencies in harvest operations have been linked to notable annual revenue losses and soil degradation.

Innovative Approaches

Ongoing and continued research compared two advanced optimization algorithms for 3D route planning in capacitated agricultural machines:

- **NSGA-II (Non-dominated Sorting Genetic Algorithm II):** An evolutionary method that balances multiple objectives such as minimizing non-working distance, fuel consumption, and soil compaction.
- **SGA (Stochastic Greedy Algorithm):** A novel approach that incrementally builds optimal routes, dynamically adapting to field conditions and constraints.

Methodology at a Glance

- **Data Integration:** Input parameters include soil strength, topography, yield maps, and detailed machinery characteristics.
- **Field Testing:** The algorithms were evaluated on two field to simulate real-world challenges: a simple 12-track field and a complex 75-track field.
- **Optimization Goals:** Both algorithms aimed to reduce non-working distance, lower fuel usage, and minimize soil stress (compaction).

Implications for Smart Farming

The results highlight the potential of advanced route planning and logistics algorithms to transform agricultural practices. By significantly lowering non-working distances and fuel consumption while preserving soil structure, these methods not only enhance operational efficiency but also contribute to overall sustainable farming practices. This is especially relevant and beneficial in the case of extensive biomass transport.

Looking Ahead

This comparative study underlines the importance of algorithm-driven innovations in agriculture. With further refinement, such technologies could revolutionize field operations, ensuring optimal resource use and long-term soil conservation.

APFITA2024 successfully held

Prof. Seishi Ninomiya
Past President, CIGR
University of Tokyo, Japan

From November 5 to 8, APFITA2024 (14th International Conference of Asia-Pacific Federation for Information Technology in Agriculture)

was held at the Tsukuba International Congress Center in Tsukuba City, one of Japan's research and academic cities, under the joint sponsorship of APFITA (The Asian-Pacific Federation for Information Technology in Agriculture) and JSAI (Japanese Society of Agricultural Informatics). This international conference is the 14th since the establishment of AFITA (The Asian Federation for Information Technology in Agriculture), the predecessor of APFITA, in 1998. This is the third time that the conference has been held in Japan, following the first (1998) and sixth (2008) conferences. 212 participants from 12 countries, mainly from Asia, attended the conference and discussed a wide range of topics, including information, communication and automation technology, big data analysis and agricultural bioinformatics, remote sensing, and geospatial technologies, Internet of Things technologies, smart plant phenotyping, wireless and sensor networks, artificial intelligence and blockchain applications, e-business in agriculture, image processing technology, disaster, environment and disease

control, unmanned aerial vehicle applications, smart nano and biotechnologies, market analysis and food traceability market, agricultural product supply chain, modeling, simulation and optimization, digital transformation (DX) in agriculture, mathematics and data science education for agriculture, etc. In addition to the three keynote speeches and two special sessions with 9 presentations, 127 papers were presented in general sessions on various topics.

Keynote speeches were delivered by Dr. Rafael Andres Ferreyra on "Enabling the SDGs with ISO Agrifood Data Interoperability Standards", Dr. Rassarin Chinnachodteeranun on "From Research to Field: Translating Agronomic Research into AgTech Solutions for Sustainable Soil to Harvest," and Dr. Takahiro Kawamura on "NARO Research DX for Promoting Data-Driven Agriculture." In addition, two special sessions were held in conjunction with these keynote presentations: "Data Standardization and Interoperable Data Platform" and "International AgTech Startups". The development of smart agriculture technology, smart breeding technology and accelerating the diffusion of such technology to farmers were widely discussed at the fruitful international conference.

The technical tour on the last day also provided an opportunity to learn about Japanese culture through visits to a local sake brewery and the ancient Tsukuba Shrine.

ASABE Standards

Revised Standard for Seed Cotton Module Identification System

ST JOSEPH, MICHIGAN— The American Society of Agricultural and Biological Engineers (ASABE) has revised its standard for the module identification system for seed cotton.

The new version, ASABE S647.1 JAN2025ED, Seed Cotton Module Identification System, includes an update on RFID designations for manufacturers of round module wraps who have entered the marketplace since the original version of the standard was first published.

ASABE members with standards access and those with site-license privileges can access the full-text via electronic download on the ASABE online Technical Library at elibrary.asabe.org/. Others can obtain a download for a fee directly from the library or by contacting ASABE headquarters at OrderStandard@asabe.org.

ASABE Moves ISO Adoption to ASABE Recognized Document List

ST JOSEPH, MICHIGAN— The American Society of Agricultural and Biological Engineers (ASABE) has withdrawn the 2008 identical adoption ASABE/ISO 15077:2008 OCT2008 (R2024), Tractors and Self-Propelled Machinery for Agriculture — Operator Controls — Actuating Forces, Displacement, Location and Method of Operation, from publication.

Within ISO TC23/SC3, Tractor safety and comfort, the US led a revision to ISO 15077 to update operator controls methodology. The latest revision, ISO 15077:2020, reflects the changes requested by the US. The current ISO 15077 document has been added to the ASABE Recognized Document list in parallel with the withdrawal of the older adopted version. A Recognized Document is a document that a committee of designated ASABE experts has reviewed and deemed relevant to industry interests. Additional details can be found at asabe.org.

Revised standard for material performance of cotton module covers

ST JOSEPH, MICHIGAN— The American Society of Agricultural and Biological Engineers (ASABE) has revised its standard for the materials used to cover cotton modules after harvest.

The new version, ASABE S615.3 NOV2024ED, Cotton Module Cover Material Performance, includes an update of the laboratory-based material performance threshold values listed in the standard for round cotton module covers.

ASABE members with standards access and those with site-license privileges can access the full-text via electronic download on the ASABE online Technical Library at elibrary.asabe.org/. Others can obtain a download for a fee directly from the library or by contacting ASABE headquarters at orderstandard@asabe.org.

ASABE is recognized worldwide as a standards-developing organization for food, agricultural, and biological systems, with more than 280 standards currently in publication. Conformance to ASABE standards is voluntary, except where required by state, provincial, or other governmental requirements, and the documents are developed by consensus in accordance with procedures approved by the American National Standards Institute. For information on this or any other ASABE standard, contact Scott Cedarquist at 269-932-7031, cedarq@asabe.org. A current listing of all ASABE standards projects can be found on the ASABE web site at www.asabe.org/projects.

ASABE is an international scientific and educational organization dedicated to the advancement of engineering applicable to agricultural, food, and biological systems. Further information on the Society can be obtained by contacting ASABE at (269) 429-0300, emailing hq@asabe.org or visiting www.asabe.org/.

Invitation to attend CIOSTA 2025

Dear Colleagues,

It is with great pleasure that we invite you to join us at the 41st CIOSTA 2025 International Conference, which will be held at the Daniel Hotel in Herzliya, Israel, from October 20 to 23, 2025.

The 41st CIOSTA International Conference theme **"Agricultural production and management in the era of AI, robotics, and advanced technologies"** underscores the importance of collaboration across a wide range of professional disciplines. The conference will highlight significant advances in research and applications in agricultural engineering, production and management. The event will feature oral and poster presentations, an exhibition and an arena for networking, discussions and exchanges of information and ideas about state-of-the-art technology. CIOSTA 2025 is an excellent opportunity to make new connections and renew old friendships. We encourage students, researchers, practitioners, and industry leaders to submit their work for presentations and to actively engage in discussions that will shape the future of the industry.

Avital Bechar and Yael Salzer
Chairs of the CIOSTA 2025 Conference

https://events.ortra.com/ciosta2025

EurAgEng award nominations deadline is on 25th April 2025.

The nominations have now opened for the 2025 EurAgEng Awards - the Award of Merit – Innovation into Practice award and the Recognition Award.

The EurAgEng Award of Merit- Innovation into Practice

The award will, in general, be given a leading light in the industry. The winner will have made an outstanding contribution to commercial practice and to engineering innovation that has been widely recognized through new products or by governmental and other organizations, for the benefit of agriculture, environment, industry and/or the rural sector in Europe.

Nominations can be made here.

The EurAgEng Recognition Award

The award acknowledges personalities who represent the European idea of EurAgEng in a special way and promote it to the professional public.

EurAgEng owes a huge debt of gratitude to the many people who have given time, energy, and enthusiasm to the Society in many different ways.

Candidates for this award, which is handed over at the Land Technik AgEng2025 conference can be provided at any time by completing this form.

Invitation to attend Ragusa SHWA 2026

The Ragusa SHWA (Safety, Health, and Welfare in Agriculture and Agro-food Systems) organizing committee is preparing the eighth edition of Ragusa SHWA, scheduled for an online event in September 2025. This year's event will feature *Lectio magistralis* by eminent scholars on topics selected collaboratively by all of us. In keeping with our conference's tradition, we will explore innovative themes that intersect with, and extend beyond, traditional agricultural engineering topics. Some examples of possible themes include assistive robotics, landscape and well-being, motivations for safety, gaming and role-playing for training, and economic aspects of safety and welfare. We also welcome reports on recent activities and achievements from institutions, organizations, and research groups working in this field.

The Ragusa SHWA organizing committee is also thrilled to announce the ninth edition of Ragusa SHWA, to be held in Rome and Viterbo on 14-16 September 2026. This beautiful location, close to the Italian capital, will mark an exciting new chapter for the conference, which will take on the name "Roma-Viterbo SHWA 2026".

Prof. Massimo Cecchini, Università della Tuscia, Viterbo, Italy

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Upcoming Conferences

Biosystems Engineering 2025, May 2025, Tartu, Estonia

The Biosystems Engineering conference is organized by Estonian University of Life Sciences. It aims to become the leading annual conference in Baltic region in fields related to traditional and modern engineering techniques and technical solutions applied to biological systems. The goal of BSE 2025 is to gather scholars from all over the world to present advances in the fields of biosystems engineering and to foster an environment conducive to exchanging ideas and information. This conference will also provide an ideal environment to develop new collaborations and meet experts on the fundamentals, applications, and products of the mentioned fields.

Biosystems Engineering

15th European Conference on Precision Agriculture, June29th-July 3rd, Barcelona, Spain

CSBW/ASABE International Annual Meeting, July 7-16, Toronto, Canada

#ASABE25 takes us to Toronto, Canada for the decennial CSBE/ASABE joint AIM!

Registration and the Call for Abstracts are open! Find all the details at www.asabemeetings.org

XIII Congresso Ibérico de AgroEngenharia, 21-23 July, 2025

Início - AgroIng 2025 - XIII Congresso Ibérico de AgroEngenharia

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International Agricultural Engineering Conference, September 11-14 September 2025, Katmandu, Nepal.

https://aaaesociety.org/

CIOSTA 2025 – The XXXXI CIGR Section V International Conference, October 20-23, 2025, Herzliya, Israel

The 41st CIOSTA International Conference theme "Agricultural production and management in the era of AI, robotics, and advanced technologies" underscores the importance of collaboration across a wide range of professional disciplines. The conference will highlight significant advances in research and applications in agricultural engineering, production and management.

Abstract submission is open: https://events.ortra.com/ciosta2025/AbstractVSubmission
Website: https://events.ortra.com/ciosta2025
LinkedIn: https://www.linkedin.com/company/ciosta-international-conference/posts/?feedView=all

CIGR2026: CIGR World Congress, June 2026

During the CIGR International Conference in Jeju Island, Republic of Korea, Patrizia Busato, Chair of the 2026 CIGR World Congress Invited the participants to attend the CIGR World Congress to be held in June 2026, In Torino, Italy.

Ragusa SHWA (Safety, Health, and Welfare in Agriculture and Agro-food Systems), Rome and Viterbo on 14-16 September 2026

https://www.ragusashwa.it/index.php

CIGR 2028: International Conference, 3-6 October 2028, New Delhi, India

The Indian Society of Agricultural Engineering (ISAE) was selected by the 2024 CIGR Executive Board as the organizer for 2028 CIGR International Conference. The venue of the conference will be in New Delhi, India.