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NANO, BIO, GREEN, AND SPACE TECHNOLOGIES FOR A
SUSTAINABLE FUTURE**
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FOREWORD

SGEM Conference Proceedings - Nano, Bio, Green, And Space Technologies For A Sustainable Future, Vol 25 / Issue 6.2

Biotechnology for Sustainable Solutions and Bioengineering · Green Design, Sustainable Cities and Smart Infrastructure

It is a pleasure to present this special selection of papers in **Nano, Bio, Green, And Space Technologies For A Sustainable Future, Vol 25 / Issue 6.2** of the *SGEM GeoConference Proceedings 2025* - an interdisciplinary volume that reflects one of the most decisive directions in contemporary green sciences: the convergence of **biotechnology, sustainable design, and smart infrastructure**. In today's sustainability landscape, environmental progress increasingly depends on two complementary capacities: (1) the ability to innovate at the level of biological systems and materials, and (2) the ability to translate that innovation into healthier, more resilient, and more intelligently managed human environments.

Issue 6.2 of the 25th edition of the conference proceedings embodies this dual focus. It brings together research that ranges from bioengineering and functional biomaterials to urban climate adaptation, circular design strategies, and AI-supported planning tools. The result is a scientifically diverse yet conceptually unified collection: solutions for sustainability are not single-domain outcomes—they emerge through interactions between biology, technology, design, and governance.

Biotechnology for sustainable solutions and bioengineering

The first major section highlights **biotechnology and bioengineering** as practical engines of sustainability—especially in the domains of food systems, health-related environments, biomaterials, and natural-product research. Contributions address themes such as alternative formulations and functional substitutions in food products, antioxidant potential in natural materials, physico-chemical and quality indicators in honey and traditional foods, oxidative stability of oils, and the role of bio-based approaches in engineered surfaces and carbon materials. This section also reflects the growing importance of environmental health at the micro-scale, including research on microbiological air quality in healthcare facilities and related risk awareness.

Collectively, these works demonstrate how sustainability increasingly depends on understanding—and responsibly guiding—biological processes, whether through improved nutrition, safer indoor environments, natural bioactive compounds, or bioengineered material performance. In this sense, bioengineering is not merely a laboratory discipline; it is a pathway toward measurable improvements in health, efficiency, and ecological compatibility.

Green design, sustainable cities, and smart infrastructure

The second major thematic axis advances the volume into the built environment: **green design, sustainable cities, and smart infrastructure**. Here, the contributions address urgent urban challenges such as heat-risk exposure, green infrastructure needs,

vegetation's role in urban heat island mitigation, noise pollution and housing quality, and the evaluation of sustainable recovery of cultural and urban assets. The research emphasizes that sustainability in cities is not only a matter of technology - but also of planning intelligence, adaptability, and long-term resilience.

A substantial set of papers further explores **advanced diagnostics, digital tools, and AI-supported methods**: GIS-driven environmental assessment, micro-photovoltaic analysis for urban buildings, non-destructive measurement and UAV-based diagnostics, and path-planning strategies evolving from classical algorithms to AI-based approaches. Importantly, the volume also includes contributions that address the ethical and social dimensions of AI in sustainability, including disaster risk reduction and citizen awareness—highlighting that innovation must be guided not only by capability, but by responsibility and public trust.

From biological innovation to resilient urban futures

The combined scope of this collection of papers (Issue 6.2) underscores a central scientific truth: sustainability is an integrative project. Healthier food and bioactive compounds, improved indoor environmental quality, smart materials and engineered surfaces, and resilient city infrastructures are all part of a single systems challenge. This volume contributes to that challenge by presenting research that is not only descriptive, but increasingly solution-oriented - bridging laboratory insights with real-world applications and decision-making frameworks.

Editorial standards and academic integrity

All manuscripts included in this published edition underwent **rigorous peer review** conducted by independent specialists. The editorial process prioritized scientific integrity, methodological clarity, originality, and relevance. The resulting volume aims to support long-term academic traceability and practical usefulness through structured publication standards and durable scientific record-keeping.

On behalf of the Editorial Board and the scientific community supporting SGEM Vienna Green, we express our sincere appreciation to all authors for their scholarly contributions and trust. We also thank the reviewers for their careful evaluations and for safeguarding academic quality. The work presented in this conference proceedings strengthens interdisciplinary dialogue and supports the shared mission of advancing sustainability through knowledge, innovation, and responsible practice.

We wish readers an inspiring and productive engagement with the research presented in conference proceedings - **Nano, Bio, Green, And Space Technologies For A Sustainable Future, Vol 25 / Issue 6.2**, and we hope the findings and approaches collected here will contribute meaningfully to scientific progress and practical impact across biotechnology, green design, and sustainable urban development.

Sincerely,

Prof. Dr. hab. oec. Baiba Rivza

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CONFERENCE PROCEEDINGS CONTENTS

BIOTECHNOLOGY FOR SUSTAINABLE SOLUTIONS. BIOENGINEERING

- 1. APPLICATION OF SOYBEAN OIL OLEOGEL STRUCTURED WITH BEES WAX AS A FAT SUBSTITUTE IN GLUTEN-FREE MUFFINS BASED ON MILLET FLOUR**, Assoc. Prof. Dr. Sorina Ropciuc, Assoc. Prof. Dr. Viorica Bulgaru, Lecturer PhD Eng. Florina Dranca, PhD. Eng. Daniela Oana Pauliuc, PhD. Eng. Olga Smerea3
- 2. AWARENESS OF HEALTHCARE FACILITY OCCUPANTS AND THE MICROBIOLOGICAL AIR QUALITY**, M.Sc. Eng. Katarzyna Kauch, PhD. DSc. Ewa Braęoszewska, Prof. SUT, PhD. DSc. Eng. Anna Mainka, Prof. SUT..... 13
- 3. COMPARISONS REGARDING THE QUALITY INDICATORS OF SOME SAMPLES OF POLYFLORAL BEE HONEY TAKEN FROM BEEKEEPERS IN CARAS - SEVERIN COUNTY, ROMANIA**, Assoc. Prof. Dr. Ramona Cristina Hegheduș Mîndru, Biol. Milan Alexandru Ciușdic, Lecturer Dr. Ileana Cocan, Lecturer Dr. Bogdan Rădoi, Assoc. Prof. Dr. Gabriel Hegheduș Mîndru23
- 4. EVALUATION OF THE TECHNOLOGICAL PROCESS AND PHYSICOCHEMICAL CHARACTERISTICS OF TRADITIONAL PORK, SAUSAGES COMPARED TO SIMILAR PRODUCTS**, Assoc. Prof. Dr. Gabriel Hegheduș Mîndru, Eng. Cristian Gottvald, Lecturer Dr. Bogdan Rădoi, Lecturer Dr. Ileana Cocan, Assoc. Prof. Dr. Ramona Cristina Hegheduș Mîndru31
- 5. ASSESSMENT OF THE ANTIOXIDANT PROPERTIES OF DRIED APPLE PEEL (*Malus domestica* L.)**, Assoc. Prof. Dr. Ariana-Bianca Velciov, Assoc. Prof. Dr. Maria Rada, Lect. Dr. Rădulescu Laura, Assoc. Prof. Dr. Corina-Iuliana Megyesi, Assoc. Prof. Dr. Ioan David41
- 6. SELECTED RELICT COLCHIC PLANTS AS SOURCES OF NATURAL RAW MATERIALS FOR HEALTHY NUTRITION**, Assoc. Prof. Dr. Eteri Jakeli, Prof. Dr. Aliosha Bakuridze, Dr. Mariam Metreveli, Assoc. Prof. Dr. Malkhaz Jokhadze, PhD Stud. Lasha Bobokhidze49
- 7. THE EFFECT OF SPICES ADDITION ON OXIDATIVE STABILITY OF WALNUT OIL**, Lecturer Dr. Diana Moigradean, Prof. Dr. Mariana-Atena Poiana, Prof. Dr. Maria-Despina Bordean, Assoc. Prof. Dr. Daniela Stoin, Ress. Assist. Silvia Alda Stoia59
- 8. THE IMPACT OF PHYTOGENIC ADDITIVES ON REPRODUCTION IN CULTURED FISH: A REVIEW**, Prof. Dr. Adrian Grozea, PhD Ress. Assist. Petruța Gherescu, Dr. Sandra Mihailov, Prof. Dr. Ioana Grozea, Prof. Dr. Silvia Pătruică.....67

9. THE ROLE OF THE OXIDATION TECHNIQUE IN SURFACE ENGINEERING OF BIOCARBON MATERIALS, Assoc. Prof. Dr. Elena David, Prof. Dr. Janez Kopac, PhD Roxana Marinescu, Drd. Adrian Armeanu77

GREEN DESIGN, SUSTAINABLE CITIES AND SMART INFRASTRUCTURE

10. IDENTIFYING NEIGHBORHOODS IN NEED OF GREEN INFRASTRUCTURE: A STUDY IN BUCHAREST BASED ON HEAT RISK INDEX, DEVELOPED USING GIS TECHNIQUES AND ONLINE RESOURCES Prof. PhD. Eng. Ana Cornelia Badea, Prof.PhD.Eng. Gheorghe Badea, Assist. PhD. Stud. Anca Ene, Lect.PhD.Eng. Anca Patricia Grădinaru.....87

11. APPLICATION OF GIS TECHNOLOGY TO IDENTIFY ENVIRONMENTAL PROTECTION FACILITIES IN THE CONTEXT OF SMART CITY, Assoc. Prof. Anna Bluszcz, Assoc. Prof. Katarzyna Tobór-Osadnik, Ph.D., Eng. Aleksandra Mierzejowska, Assoc. Prof. George Hloupsis95

12. THE ROLE OF VEGETATION IN URBAN HEAT ISLAND EFFECT: AN APPLICATIVE RESEARCH AND DESIGN ON A MEDITERRANEAN PROMENADE, PhD. Ani Tola, Msc. Teuta Peshkopia, Prof. Paul Louis Meunier105

13. NOISE POLLUTION IN HOUSING UNITS AND APARTMENT COMMODITY. CASE STUDY: RESIDENTIAL COMPLEX “50 YEARS OF INDEPENDENCE” IN TIRANA, ALBANIA, PhD. Parashqevi Tashi, PhD. Ani Tola, Ark. Ani Tashi113

14. EVALUATION PROCEDURES FOR SUSTAINABLE RECOVERY OF CULTURAL PROPERTIES: A CASE STUDY IN ROME, Prof. Rocco Murro121

15. DESIGNING FOR ADAPTABILITY AND ADAPTIVE RUESE: CIRCULAR STRATEGIES FOR THE REGENERATION OF DISMISSED OFFICE BUILDINGS, PhD collaborative researcher Giulia Vignati, Full Prof. Elisabetta Ginelli131

16. ANALYSIS OF DAYLIGHTING INFRASTRUCTURE IN SUSTAINABLE BUILDING DESIGN, Ing. Michal Kraus, Ph.D., prof. Ing. Ingrid Juhasova Senitkova, CSc., Ing. et Ing. Petra Machova, Ph.D.....141

17. A TECHNICAL-ECONOMIC ANALYSIS OF MICRO PHOTOVOLTAIC SOLUTIONS FOR URBAN BUILDINGS, Dr. Ionut Ciobanu, PhD. Denisa Violeta Pislaru, Prof. Dr. George Cristian Lazaroiu149

18. BIOLOGICAL CONTAMINATION RISK ON ETICS FACADES UNDER CENTRAL EUROPEAN CLIMATE CONDITIONS, Ing. Michal Kraus, Ph.D, Prof. Ing. Ingrid Juhasova Senitkova, CSc., Ing. et Ing. Petra Machova, PhD.....159

19. UNMANNED AERIAL VEHICLES AS A TOOL FOR SUPPORTING THE DIAGNOSTIC PROCESS OF HIGH-RISE STRUCTURES , Daniel Czech, Mateusz Francik, Jędrzej Minda, Mateusz Pruszczak, Wiktor Onik	167
20. VOLUMETRIC NON-DESTRUCTIVE MEASUREMENT OF 3D PRINTED STRUCTURES , Dipl. Eng. Ondřej Lokos, Dipl. Eng. Richard Dvořák, Ph.D., Dipl. Eng. et Dipl. Eng. Kristýna Hrabová, PhD.....	173
21. UNMANNED AERIAL VEHICLES PATH-PLANNING STRATEGIES: FROM CLASSICAL METHODS TO ARTIFICIAL INTELLIGENCE-BASED APPROACHES , PhD Stud., Eng. Cătălin Cucu, Lecturer, PhD, Eng. Daniel Măriuța, Assoc. Prof., PhD, Eng. Ciprian Larco, Prof., PhD, Eng. Lucian Grigorie	181
22. A MULTI-PURPOSE, EXPERIMENTAL PLATFORM FOR TESTING THE PROPERTIES OF FULLY ACTUATED MULTIROTORS (OMNICOPTERS) , MSc. Jędrzej Minda, Mateusz Pruszczak	191
23. THE ROLE OF GREEN-AI IN SUSTAINABLE PLANNING: AN, EXPLORATION ON THE CASE OF TARANTO, ITALY , Domenico Camarda.....	199
24. ETHICAL ASPECTS OF THE APPLICATION OF GENERATIVE ARTIFICIAL INTELLIGENCE FOR DISASTER RISK REDUCTION , Prof. Dr. Dimiter Velev, Prof. Dr. Plamena Zlateva	207
25. ARTIFICIAL INTELLIGENCE AND ENVIRONMENTAL SUSTAINABILITY: A FIRST LOOK INTO CITIZENS' UNAWARENESS , Assoc. Prof. Dr. Francesco La Barbera, Dr. Carmela Altamura, Dr. Roberta Rivero.....	215
26. SUSTAINABLE LIFE AND DIGITAL ASSET: A SELF-SOVEREIGN FRAMEWORK FOR TRACEABLE AND INCENTIVIZED ENVIRONMENTAL ACTIONS THROUGH DECENTRALIZED TOKENS AND REEXPERIENCABLE CIVIC ENGAGEMENT , Assoc. Prof. Junichi Suzuki, Dr. Yuki Minoda, Mr. Motoki Kodama, Mr. Theodore Achtem, Dr. Prof. Yasuhiro Kawahara.....	223
27. CREATIVE WORKSHOP ON PLANNING A SUSTAINABLE URBAN ENVIRONMENT ON A HUMAN SCALE , Prof. Dr. Andra Ulme, Elina Elere, Dace Kalvane.....	237

