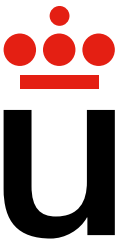
EULiST Student Conference

30th of June – 4th of July 2024, Vienna

EULiST



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Organizing committee:

Simon Los **(TUW)** - Lisa Marx **(TUW)** - Gregor Fischer **(TUW)** - Thomas Auguste **(IMT)**

Georgy Salko **(STU)**- Konstantina-Maria Giannakopoulou **(NTUA)**

Luis Alfonso Fanjul Simancas **(URJC)**

Universidad Rey Juan Carlos

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BRNO UNIVERSITY OF TECHNOLOGY

UNIVERSITÀ DEGLI STUDI DELL'AQUILA

Ladislav Janíček
Rector of Brno University of Technology (BUT)

Dear **EULiST** Students,

You are reading the proceedings of the first **EULiST Student Conference,** an event that marked the largest gathering of students in our **European University Alliance, EULiST.** I was delighted to accept the invitation to participate in the conference's opening and was keen to explore its conclusions. When we first started forming this alliance, we asked ourselves what **EULiST** is or should be? Today, as its profile takes shape, we continue to ponder this question. We ask, what truly defines a European University, and how does that apply to us? Is it indeed a university in the fullest sense? What mission and role should our Alliance serve among the many other ones in the European Higher Education Area? What should set us apart?

We also ask ourselves what the **Alliance** should bring to us as universities, and, equally, what we, as member universities and individuals—including those in its governance or those dedicated to specific goals within our implemented project—should contribute to fulfil its mission? But perhaps the most important question is: what should be the role and place of students in our **Alliance?** What should the Alliance offer them, and how can they contribute to realizing its goals?

I raised these and many other questions in my opening speech, asking our student delegates to share their insights and suggestions to help shape the Alliance in ways that benefit them. Universities are **fundamentally about students–perhaps,** above all, about students – and they exist primarily for them. I was proud and pleased to witness the commitment our student delegates showed in tackling these and other questions. It was clear that they are genuinely prepared to address these topics thoughtfully. Now, we have the opportunity to consider the conference's conclusions.

For the first time, we have begun rotating the Alliance's presidency, and I humbly accepted the role of **Chair of the Alliance's Governing Board,** handed over by the President of Leibniz University Hannover, the institution that led our Alliance to gain the status of a European University. I feel a profound responsibility for its development, and I am convinced that our students must play a key role in this growth. Our Alliance should be a source of inspiration, a reference for managing our universities, a place to exchange experiences and best practices in both university governance and areas of expertise. It should serve as a pool of knowledge, which we can transform into joint study oreducational opportunities and collaborative research projects that combine the best expertise within our Alliance, thereby supporting the competitiveness of each partner university and our **Alliance** as a whole.

The **Alliance** should intensify support for student and faculty exchanges through mobility programs and help internationalize our universities. It should also respond to societal needs, national economic demands, and contribute ideas to adapt traditional concepts and paradigms in education and research. As an alliance of primarily technical universities, we can lead initiatives to strengthen the presence of **STEM studies,** which are becoming a priority in educational policies to develop human resources for the economic competitiveness of our countries. In education, we need to focus on nurturing thought, working more with talent of our students and developing our students' abilities to think critically, innovate, and address technical problems in all their complexity and interdisciplinarity.

I am committed to addressing these challenges and welcome student involvement in forming individual initiatives and tasks. This student conference, with representation from across our **Alliance's 200,000 students,** offers an excellent platform for such dialogue. I hope the conference becomes the foundation of a new tradition. I would like to see this student initiative thrive, and I will do all I can to support its ongoing growth as one of the natural communication platforms within our Alliance.

Ladislav Janíček
Chairman of the Governing Board

Jens Schneider
Rector of Technische Universität Wien (TUWien)

Dear Readers,

Several months after the first **EULiST Student Conference at TU Wien,** it is a fitting time to reflect on this milestone for our young alliance of European universities.

In my inauguration speech at TU Wien a year ago, I referred to **EULiST** as a "European family" and introduced the seven T's that embody the spirit of TU Wien.

These seven T's are:

1 **Technology** 2 **Talent** 3 **Tolerance** 4 **Trust**

5 **Transparency** 6 **Team** 7 **Truth**

I believe these principles apply as much to **EULiST** as they do to TU Wien. In this foreword, I want to connect some of these guiding principles to the **EULiST Student Conference.**

Last July, over 180 students from ten European universities came together for this conference, representing a wide range of disciplines-from social sciences to engineering. While engineers are critical in addressing today's and tomorrow's challenges, their work should ultimately serve society. In an ever-expanding field of knowledge, it is more crucial than ever that researchers continue to collaborate across **diverse disciplines, cultures, and languages.** The sooner students experience this kind of interdisciplinary exchange, the better equipped they will be to thrive in our modern world.

Innovation in the future will require not only expertise and excellence in one's own discipline but also a commitment to open-minded, interdisciplinary teamwork within an environment of cultural diversity. Such a climate is built on tolerance and trust. In this European family, we should create spaces for meaningful encounters that foster these values. The **EULiST Student Conference** is one such space, and I am delighted that our French colleagues have agreed to host the next edition. I am confident that the upcoming conference will once again allow participants to present their ideas and research through pitches and exhibitions, fostering transparency and trust through face-to-face engagement. In an age of misinformation and disinformation, in-person exchanges and open discussions are more needed than ever. Only by sharing our passions and different perspectives can we cultivate mutual understanding and build trust.

Finally, I would like to extend my gratitude to all the students and staff who worked so hard to organize this event. The **EULiST Student Conference** is a unique opportunity created by students, for students, and the alliance greatly benefits from the energy and initiative they bring. Thank you for showing us the strength of our European family.

Jens Schneider
Rector of TU Wien

Dear participants

On behalf of the **EULiST Student Board** we would like to extend our heartfelt thanks for your participation in the first **EULiST Student Conference.** This event would not have been a success without your presence and support. Whether you were an attendee, a speaker, a sponsor or a volunteer, your contributions made all the difference. We are very grateful for the energy, enthusiasm and insights you brought to this event.

The idea behind the **Student Conference** was to offer a space for students of the different **EULiST** universities to learn, exchange knowledge, and network in diverse cultural environments, while helping participants develop their soft skills in a friendly and international space. The project was thought by students, put into effect by students, and for the benefit of the student community of our ten member universities.

We are thrilled with the positive feedback and engaging discussions that occurred throughout the days of the event. The networking opportunities and shared experiences were truly inspiring, and we hope participants left with valuable connections and new ideas. The **Student Conference** was a great opportunity for sharing with students the work we develop inside the alliance, and the first major milestone towards building an **EULiST Student Community** within the alliance's universities.

We look to the future with enthusiasm knowing how much students can accomplish when working together towards the same goal. May this **Student Conference** be the first of many more to come.

Best regards,
EULiST Student Board

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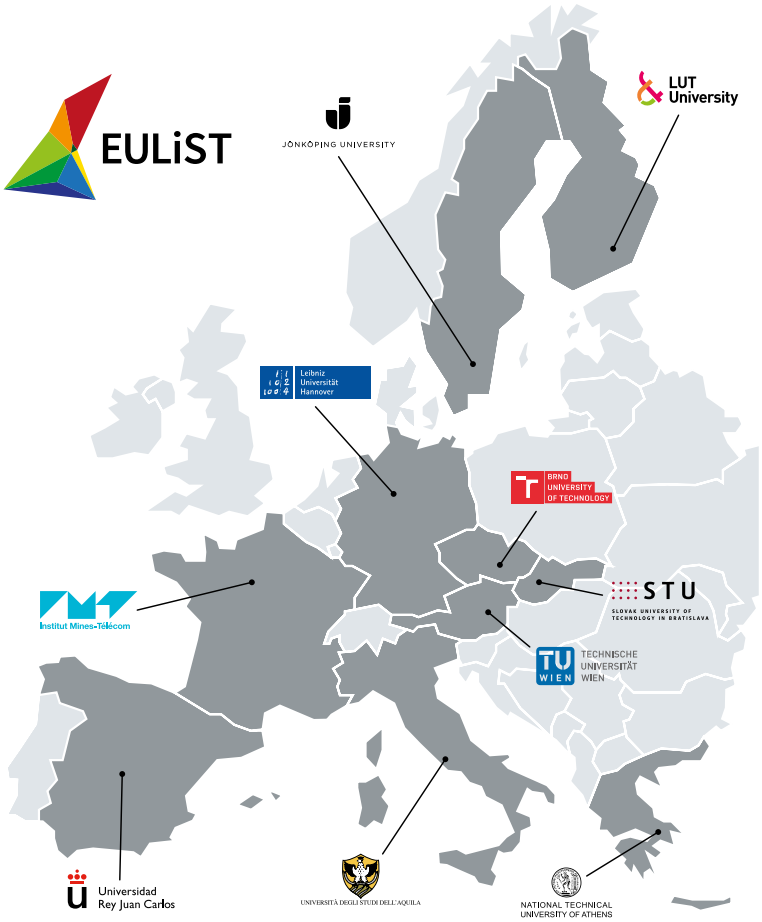
Preface

EULiST Alliance

The **EULiST Alliance** (European Universities Linking Society and Technology) integrates over 200,000 students and 20,000 staff at 10 universities in 10 countries and even more European regions with complementing strengths in technical topics, humanities, and social sciences. Our mission is to educate new generations of graduates and early-career researchers, as well as to equip lifelong learners with the competencies necessary to address the societal and global challenges of today and tomorrow.



Map of members of the EULiST Alliance

Our collective motivation is grounded in shared values such as equality, inclusion, diversity, democracy, and peaceful international cooperation. Aligned with the European Education Area and the European Research Area, and in synergy with the **European Higher Education Area,** we believe in the active role of universities, borderless mobility, and innovation in the digital age. We are committed to sustainable development, lifelong learning, and providing future-proof skills for sustainable, long-term employment that align with the green and digital transitions. We strive for interdisciplinary, high-impact research while ensuring academic freedom, open data, and open science for the benefit of society.

Our institutional diversity, combined with the diversity of our local and national environments, ecosystems, and student bodies, provides us with the necessary perspectives to develop solutions relevant to both metropolitan and regional areas. These solutions aim to counter increasing inequalities and polarization, contributing to social cohesion, and addressing challenges facing our planet and various human communities.

EULiST 1st General Assembly (Madrid, 2022).

To fulfill the **EULiST Mission and Ambition,** and in line with the needs we have identified, we will actively pursue specific objectives. These objectives, while achieving their full impact over a longer period, will be realized during the current project. All specific objectives aim to develop a long-term European inter-university joint strategy for educating a new generation of graduates and young researchers, where social sciences, humanities, and STEM disciplines are interconnected and mutually beneficial, with climate action as a primary focus, including research and outreach activities.

Our proposal is founded on a comprehensive and inclusive approach. From the outset, **EULiST** has engaged all groups and institutions within our member universities, with a particular emphasis on students, as well as civil society representatives and other stakeholders at all levels—from local, regional, and national to European and global—in a dynamic, bottom-up approach. Our vision is a reflection of this methodology.

We embody the diversity of the **European university landscape,** with institutions from Sweden and Finland in the North, Greece, Italy, and Spain in the South, the Czech and Slovak Republics in the East, and Austria, France, and Germany in the West and Center. This diversity is essential, as it enables us to address future challenges from multiple perspectives, taking into account the different regions and the complex consequences of our actions on individuals, society, and the planet.

EULiST 1st General Assembly (Madrid, 2022).

Furthermore, this diversity provides the foundation for future collaborations, forming hubs with other European University alliances, various countries, and the Global South. It allows us to serve as a model of good practice for other universities, fostering synergies across a broad disciplinary range within and beyond Europe. **All EULiST Members** are strongly committed to these core values and objectives and will adhere to them in the future. Working together as one university with shared institutional structures and a common academic ecosystem across disciplines will enable us to accomplish more than we could individually: educating students and scholars to think, create, and act in ways that benefit a diverse and inclusive society. Our combined capacities will help propel cooperation between the **EULiST** regions and foster sustainable European cohesion.

EULiST 3rd General Assembly (Brno, 2024).

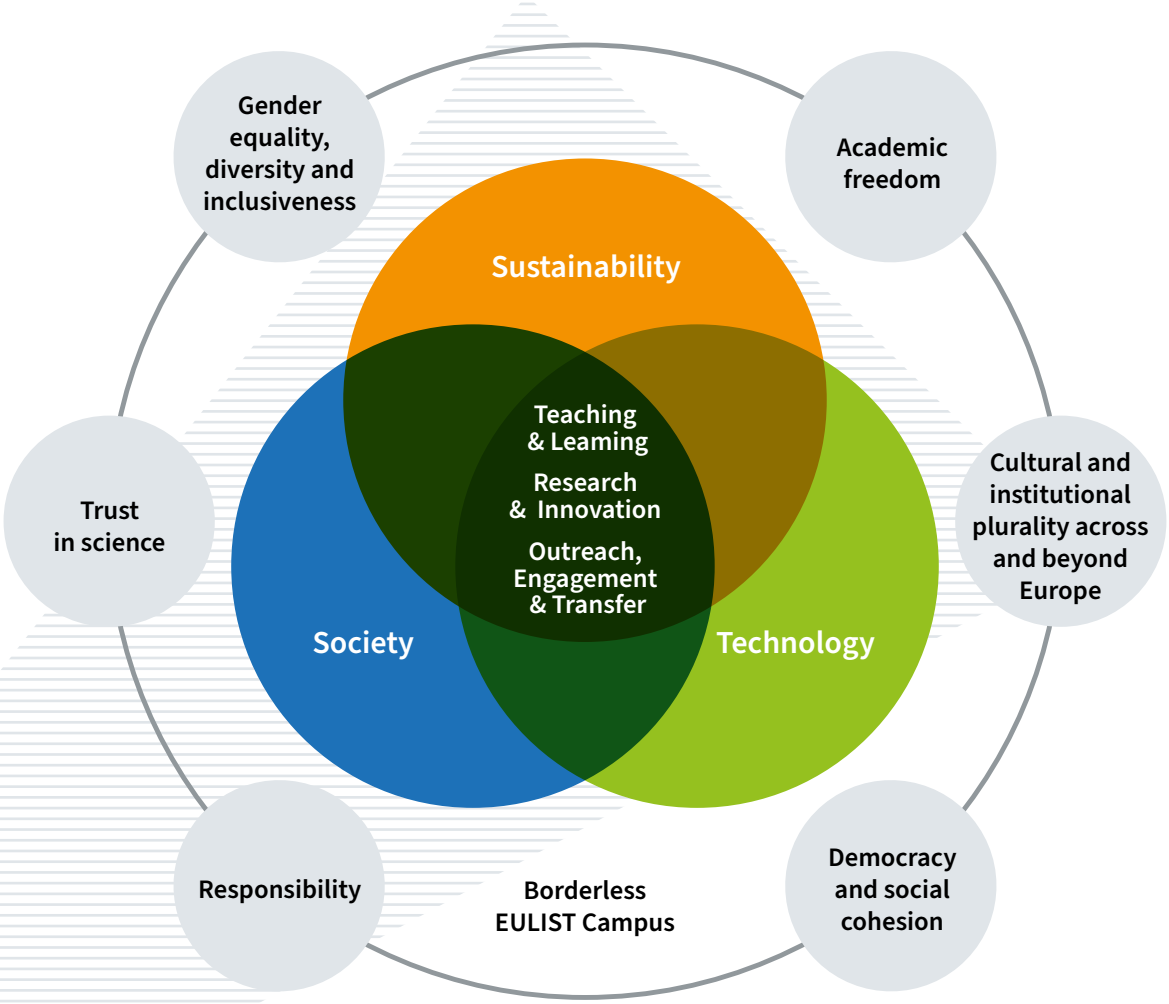
EULiST is dedicated to forming a **European University** based on shared European values and a common identity, addressing global challenges to rebuild trust in technology, enhance climate action, and reinforce social cohesion. We aim to tackle humanity's challenges through education, research, innovation, and outreach. This involves transforming our campuses to be carbon-neutral, fostering interdisciplinarity, and collaborating with various stakeholders.

Our focus on sustainability interlinks **STEM with Social Sciences and Humanities** to address climate change and social cohesion. We aim to prepare our universities for a sustainable future and secure social cohesion as part of climate action. **EULiST** will generate knowledge and innovation, empowering students, scholars, and researchers. We strive to build an inclusive academic ecosystem, fostering trust between society and technology.

EULiST connects campuses, territories, and communities, leveraging their diverse knowledge and experience. By integrating social and technical sciences and promoting challenge-based learning, **EULiST** fosters innovation for a sustainable and globally engaged Europe. We train future generations to tackle major challenges like climate change, digital transition, and social cohesion.

Our shared European values and diverse approaches add value to **European University Alliances,** facilitating joint solutions to societal challenges. **EULiST** combines strengths in technology and impactful research to propose practical,

quickly implementable solutions, acting as a model for other universities. By embedding social sciences and humanities in our technological innovations, we ensure they are socially driven and acceptable. Using the STEAM approach, we blend STEM with other fields to address environmental and social challenges through creative problem-solving, critical thinking, and dialogue with societal actors.



EULiST's unique and creative academic ecosystem at the intersection of society, technology and responsibility, grounded in European core values.

EULiST Student Conference

The **EULiST Student Conference** is designed to offer students a truly distinctive collective experience. As the first and foremost student-led event of the **EULiST** academic alliance fostering open dialogue between society and the evolving landscape of technological innovation. This Student Conference was the first major milestone of **EULiST,** as student involvement is a key factor for the success of the project implementation and the overall development of our alliance. The goal of the event is to develop knowledge in advanced technological topics, improve soft skills, and ponder on the future of **European alliances.**

Undergraduate, master's, and doctoral students had the opportunity of presenting their projects and attending various workshops where they had the chance to learn about a range of multidisciplinary topics, from health sciences, technology, and physics to business and socio-economics, sustainability, and social impact. Participants learned about different fields thanks to the lectures, workshops and plenary sessions organized in the event, with field experts and relevant speakers being part of them.

Purpose and significance

Unlike traditional conferences in academia, this event stands out for its student-led approach. This conference, specially designed by students, ensures a program brimming with dynamic discussions and innovative insights. Therefore, the event struck the right balance between educational learning, professional networking, and social events for bringing students closer and developing their soft skills.

Statistical information

Figure 1 shows us how balanced the Student Conference participants were in terms of gender. This is especially remarkable as traditionally, technology related fields are male-dominated. During selection of participants gender balance was one of the criteria used.

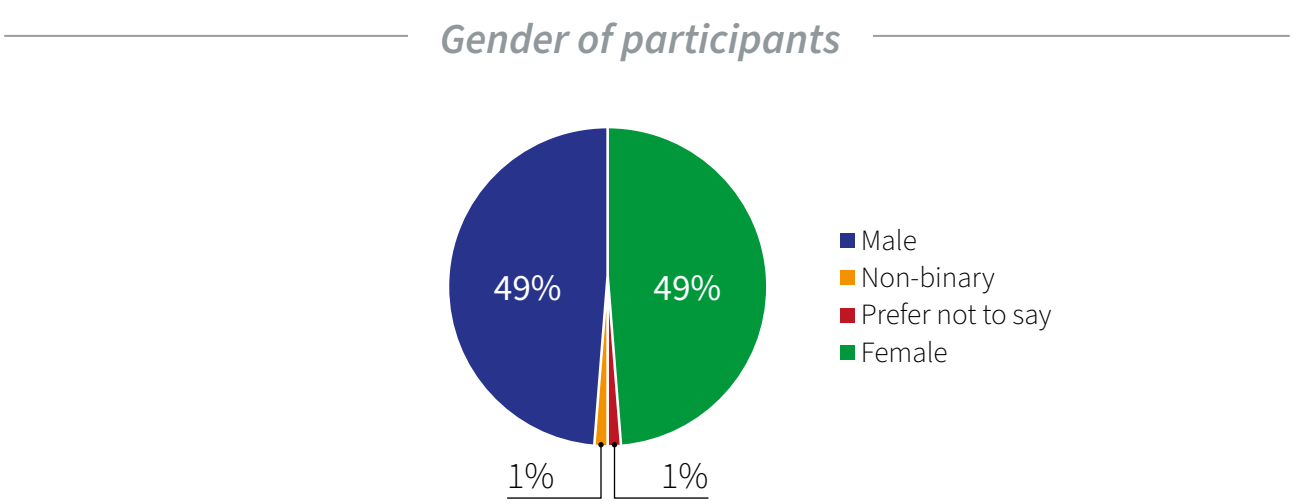


Figure 1

Figure 2 offers a glimpse at number of participants by sending university. The range of numbers might be surprising considering the original pledge of bringing 20 students from each university to the event. The reason for the higher numbers at TU Wien was the expectation that **TU Wien's students** are more likely to be no-shows due to lower commitment needed to attend the conference. On the other hand the reasons for other universities to send fewer than 20 students were twofold. Firstly, one university had to cut their number of students sent due to budgetary reasons. Secondly, promotion of and interest in the **Student Conference** lacked at some institutions which led to fewer than 20 applicants.

Number of participants per university

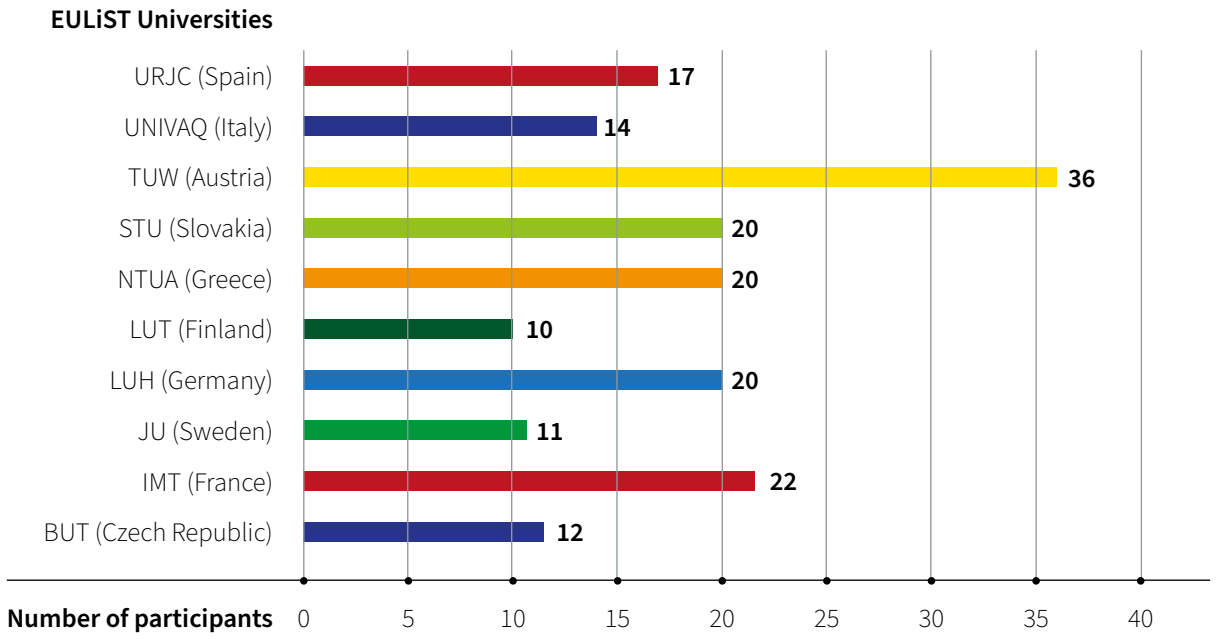


Figure 2

Active participation of students could be seen as it is pointed out in Figure 3 that 35% of attending students wanted to pitch or present their own projects (64 participants). This indicates further that students are motivated to show their work and more formats like this are needed.

Percentage of participants that wanted to pitch their projects

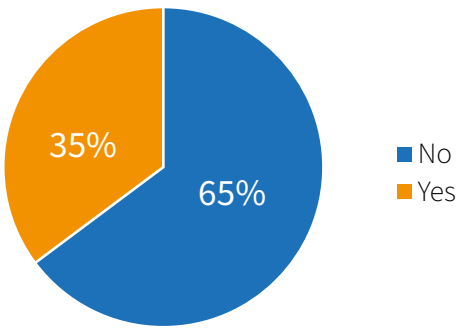


Figure 3

Acknowledgments

Special thanks to the **EULiST** Alliance for supporting the organization of this student-led initiative that sets a precedent for the future of this project and other university alliances in Europe. Furthermore, we would like to express our gratitude to all the member universities and its local coordinators for offering their support to the organizing committee. Thanks to our sponsors: HTU Wien, Metallurgical Industry and Redbull for believing in this project and giving the support necessary to make this event happen. Thanks to the Organizing Committee for setting all their work, to the **EULiST** Student Board volunteers for making sure the event was running as planned, and special thanks to TU Wien and its staff members for hosting this outstanding event. May it be the first of many more to come.

Committee Information

The organization committee in charge of the Student Conference was formed by student board members and TU Wien staff. It was composed by Simon Los (TUW), Lisa Marx (TUW), Gregor Fischer (TUW) , Thomas Auguste (IMT) , Georgy Salko (STU) and Konstantina-Maria Giannakopoulou (NTUA).

Eight more students volunteered during the Student Conference : Niilo Hendolin (LUT), Robin Karlsson (LUT), Hannah Hálová (BUT), Anahita Nouri Langroudi (UNIVAQ), Jasmin Krüger (LUH), Luis Alfonso Fanjul Simancas (URJC), Aitana Velasco Muñoz (URJC) and Katarina Rovenská (BUT).

In total, the working group for the Student Conference was composed of 14 organizers that oversaw planning and putting the event into action. Tasks included the coordination with the host university and between the Local Coordinators and Student Board members of **EULiST** in matters such as setting the program, accommodation, contact with speakers and the overall logistics of the event.

Organizers of EULiST Student Conference (Vienna, 2024).

Venue: Technical University of Vienna

TU Wien is Austria's largest research and educational institution in the field of technology and natural sciences. More than 4,000 scientists are researching in five main research areas at eight faculties. More than 26,000 students in 62 degree programmes benefit from this. As a driver of innovation, **TU Wien** strengthens the business location, facilitates cooperation and contributes to the prosperity of society.

Under the motto **"Technology for People",** research, teaching and learning have been taking place at the TU Wien for more than 200 years. **TU Wien** is not only an excellent research university and training center for over 26,000 students, but has also developed into an open university where discussions take place, opinions are represented and arguments are heard. Despite different individual life concepts and world views, **TU Wien** members stand for cosmopolitanism and tolerance.

@ Matthias Heisler

TU Wien Main Building.

Program Overview

The program started in the evening of the 30th of June with an introduction to the **Student Conference** and the activities that would take place during the week, dinner at TU Wien's cafeteria and followed by an ice-breaker social event for participants to get to know each other.

The conference formally started on the 1st of July with the opening ceremony and the **EULiST** Panel discussion titled **"What is EULiST?"** to present the alliance to the participants. As main plenary sessions we had on the 3rd of July Mr. Frank Piplat, **Head of the Liaison Office of the European Parliament** in Austria to give an overview of the work the Liaison Office does, the situation after the European Parliament elections, and the relevance of European educational projects. Finally, on the 4th of July, to close the conference, Peter Lorenz, a distinguished architect and founder of Lorenzateliers, held a talk. The lecture featured Mr. Lorenz's visions for the future of architecture and urban planning.

The rest of the conference was filled with diverse workshops, pitches from participants and a fair for presenting their own projects, and social activities like the International **Evening and City-Rall**y for participants to get to know each other and have an overall entertaining experience. The sessions will be further explained in the next sections.

- Timetable -

	29th june	30th june	1st july	2nd july	3rd july	4th july
9:30	Key-Pick Up	Key-Pick Up + Registration	Opening Ceremony	Registration	Registration	Coffee + Key Drop
10			Coffee	Workshop	EULiST Fair	Special Guest
11			EULiST Panel Discussion			Clossing Remarks
12			Lunch	Lunch	Lunch	
13						
14			Workshop	Workshop	Workshop	
15						
16			Break	Free Time	Break	
17			Pitch (1/2)		Plenary Session	
18		Intro Talk	Break	Social Activity	Break	
19		Dinner	Dinner		Dinner	
20		Ice Breaker	International Evening		Goodbye Party	
21						
22						

Timetable of EULiST Student Conference 2024.

Opening Ceremony Panel: "What is EULiST?"

The panel's goal was to present what the **EULiST Alliance** is, how and when it started, what are its goals and which are the member universities that are part of this initiative. It was a round table with Thomas Auguste from the Student Board acting as moderator, Natália Gurská (Local Coordinator from Slovak University of Technology), Chirs Schubert (Local Project Manager from TU Wien), Katarína Rovenská (Student Board representative from Brno University of Technology), and Konstantina-Maria Giannakopoulou (Student Board representative from National Technical University of Athens).

The discussion revolved around what speakers think is an **European University,** its history, but also the history of the **EULiST alliance.** The functioning of the **EULiST** organizational structure, who are the member universities, and what are the visions and goals of the alliance were explained, too.

Opening Ceremony Panel of Speakers at the EULiST Student Conference 2024.

Opening Ceremony of the EULiST Conference 2024.

Plenary Sessions

European Speaker: Mr. Frank Piplat

The 3rd of July, a lecture was given by Mr. Frank Piplat, Head of the **Liaison Office of the European Parliament** in Austria. With 16 years of experience inside the European Parliament, he was appointed head of the Liaison Office in Austria in the year 2009, and since then makes sure that the Austrian population is well-informed about the actions of the **European Parliament.**

Mr. Piplat gave an overview of the work the **Liaison Office** does, the situation after the European Parliament elections, and the relevance of European educational projects and youth involvement. Finally, during a lengthy question and answer session answered the numerous questions listeners which revolved around a multitude of topics in the European sphere.

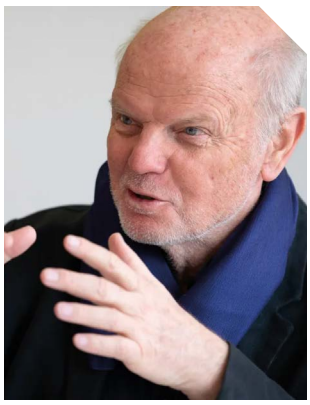
@ Anahita Nouri Langroudi


@ Anahita Nouri Langroudi

@ Anahita Nouri Langroudi

Moments at the Plenary Session by Mr. Frank Piplat.

Guest Speaker: Mr. Peter Lorenz



Peter Lorenz, a distinguished architect and founder of Lorenzateliers, concluded the **EULiST Student Conference** as a keynote speaker. Lorenz, whose career is marked by his passion for integrating philosophy, ethics, and architecture, has completed nearly a third of his more than 500 projects in Austria, Germany, Italy, and Slovenia. Among his most renowned works are the "Bora Projects" in Raubling, Niederndorf, and Herford, the Medical University in Linz, the school at Markt Wien, the "Factory for Boys" in Trieste, the "Sportcity Ilirija" in Ljubljana, and several subsidized housing projects in Vienna, including the "Nussbaumallee."

As someone who is constantly traveling, teaching, and giving lectures, and who passionately discusses the phenomena of nature, city, architecture, and beauty, Peter Lorenz brings a unique perspective. His role as a juror in numerous design advisory boards and architecture competitions underscores his commitment to advancing architectural discourse. The lecture, which took place featured his visions for the future of architecture and urban planning. In the very fitting setting of **TU Wien's Kuppelsaal** his insights provoked a number of questions from the audience.

@ Anahita Nouri Langroudi

@ Gloria Krenn

@ Anahita Nouri Langroudi

Moments at the Plenary Session by Mr. Peter Lorenz.

Workshops

This part of the program was filled with workshops containing a theoretical and practical part regarding a diverse range of topics, counting with field experts as speakers. With a total **23 workshops,** students were able to expand their knowledge in a practical way in different study fields. **Check Annex 1.**

@ Anahita Nouri Langroudi


@ Gloria Krenn

@ Gloria Krenn


@ Gloria Krenn


@ Gloria Krenn

@ Gloria Krenn


@ Gloria Krenn

Moments at the different workshops and pitch sessions that took place during the EULiST Student Conference 2024.

Pitch Sessions

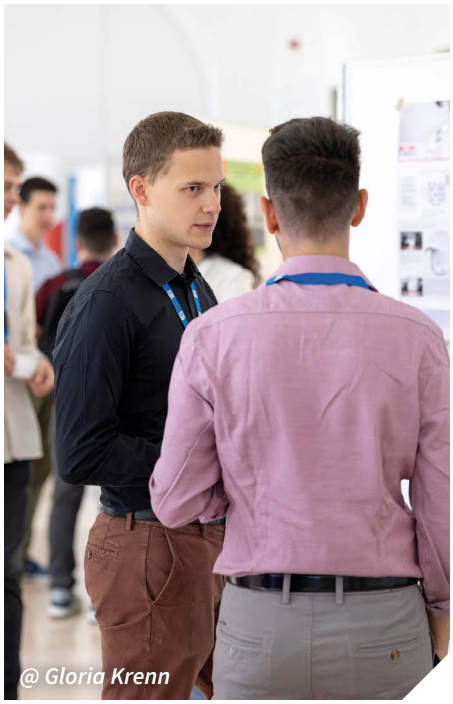
Pitch sessions were split into **six parallel sessions.** Each room had its own theme and welcomed pitches of 7 students throughout 2 hours. The first 15 minutes were dedicated to an introduction conducted in the Paris room. Participants were free to change rooms at any time, allowing to choose the presentations they wanted to see. In this document you will find the details for each pitch: the speaker's profile, the pitch's topic, and a short abstract.

Here are the themes for each room:

- **Medical and chemical innovation** – Bratislava Room
- **Technology, from Robots to AI** – Paris room
- **Let's delve into Physics** – Lappeenranta room
- **Green technologies** – Hannover room
- **The power of Business and Socioeconomics** – Brno room
- **An impact on society** – Jönköping room

EULiST Fair

Participants were invited to present their ideas and research (similar to the pitches), this time using posters while providing a relaxed environment for visitors wandering around. In this space participants were able to approach and ask for projects they were more interested in, as well **as exhibitors to show their projects** and research with posters following the doctoral style.



Exhibition of research posters and projects at the EULiST Fair.

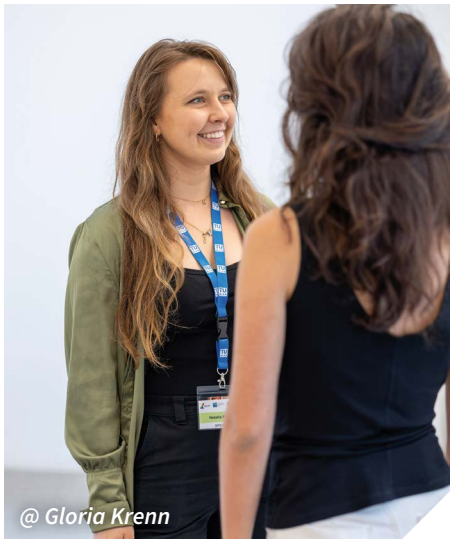
Social Activities

During the event, several social activities were organized for students to keep bonding in a relaxed environment after **seminars and workshops** during the day. With a variety of activities carried out throughout the days of the event, participants kept knowing each other while having a great time.

Ice Breaker: "Get 2 Know" – 30th of June

The 30th of June as attendees were starting to arrive to Vienna during the day, in the evening there was a small introductory talk about what the event was going to be like and a quick overview on what the **EULiST Alliance** is. After dinner, an Icebreaker activity took place in order for participants to start knowing each other before the official beginning of the conference the following day. It featured a **World Café and a Human Bingo.** The **World Café** consisted in participants moving across the tables of the room, in each of them the attendees had to answer the questions or the information that was set at every table and comment on that. After some minutes, participants had to move to a different table and start again talking with the people at the new table.

After that took place the **Human Bingo.** A paper was given to every participant, in that paper they would find distinct characteristics (speaks more than 4 languages, plays a musical instrument, volunteered locally, etc.), for each of them they had to find 2 participants that fulfilled those characteristics until they filled the entire sheet: Bingo! And the first ones to fill it had a prize.



EULiST Student Conference 2024 participants socializing.

International Evening - 1st of July

The 1st of July at 20:30 **the International Evening began;** participants were asked to bring and share typical food and drinks from their countries of origin. Also a **Kahoot** with typical things and customs from the countries of participants with a price for the winning team. It was a great opportunity to learn more about the traditions from the participants and their home countries and eat delicious food while doing it.

Participant Students during the International Evening event.

City Rally – 2nd of July

The 2nd of July activities ended sooner so participants could do the **City-Rally.** Participants were organized into groups and given a map with a route visiting **the most important parts of Vienna,** at each spot they were required to complete a task and take pictures of their challenges. The teams that fulfilled all the tasks and took the pictures would win a prize.

Participant Students at the City Rally.

Goodbye Party – 3rd of July

Coinciding with the end of semester, the Fachschaft Raumplanung, and Fachschaft Bau- und Umweltingineurwesen **(Spatial Planning Department, Civil and Environmental Engineering Department)** Student Unions organized a Goodbye Party starting at 20:30, the participants of **EULiST** Student Conference were invited to take part in it. It was the best way to say goodbye to all the **EULiST** students, enjoying different scenarios with music across the open areas of the Technical University of Vienna. An unforgettable experience.

Conference feedback

EULiST Wall

During the entire event at the main hall, there was a the **"EULiST Wall".** There participants could put up sticky-notes with ideas for what the **EULiST** Alliance could be and what other things the alliance could be doing in future **Student Conferences.** Regarding the Student Conference participants overall were satisfied with the event. In the wall they expressed that they would love more workshops centered around humanities and social sciences, more coffee-breaks since the event lasted the entire day, they would like for future occasions for a guide to show the city, and they would want more game nights and socials. And of course, more **Student Conferences** in the future! They also expressed that the program was quite demanding due to its duration each day, so other alternative program distributions can be studied for future conferences.

Regarding the Alliance, participants would like overall wider and deeper cooperation in several areas in the benefit of students. Examples they gave were research cooperation and even joint research stays, an **EULiST Career mentoring program,** joint cultural and sport events, a joint Alumni association for the students of all member universities and participants of **EULiST** events such as the **Student Conference,** and also provide more agreements between the member universities for a bigger offer of exchange programs.

Results of the Brainstorming Session on the EULiST Wall.

Feedback from students

After the conclusion of the **Student Conference,** participants were asked to fill a form to get their feedback of the overall event, in order to take it into account for future events. It was filled by 85 of the participants. Overall, the feedback of the event was very positive, and it is explained in the following graphics.

In figures 4 and 5 that there was very positive reception of the overall event by participants, as well of the overall program. It can be translated in a successful mix of academic activities with networking and social spaces.

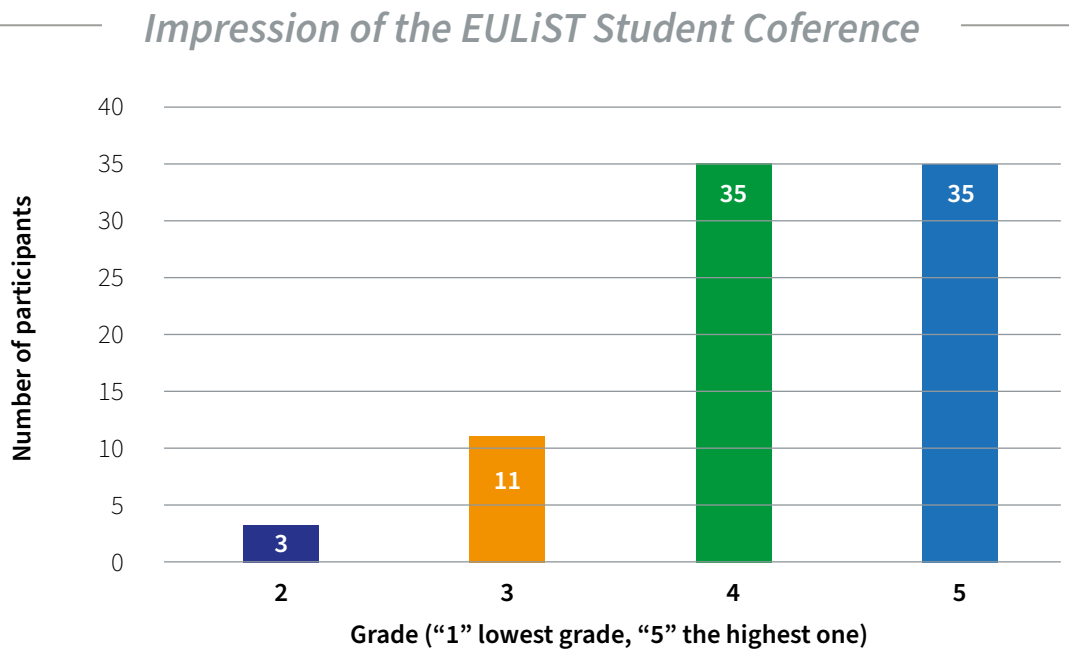


Figure 4

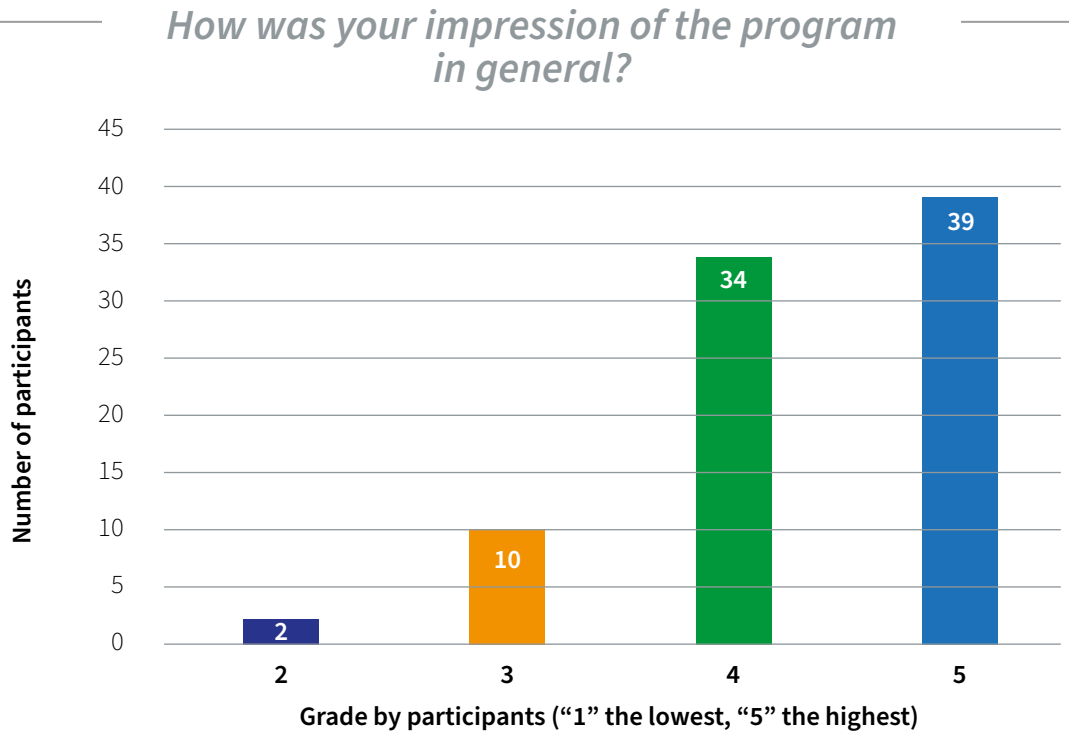


Figure 5

In figures 6 and 7 is shown the impression of participants of communication prior to the event: both with their respective universities and the organizing team of the **Student Conference.** There was good communication of participants with the universities, however it is important to take into account that from 184 attendees, 85 filled the feedback form and it is uneven the amount of participants per university that filled this form (Jönköping University, Lappeenranta-Lahti University of Technology and Slovak University of Technology were the universities with lower amount of students sending back their feedback), therefore some numbers may not be representative from the university. However, when not taking into account university, communication was highly graded in general. **Communication with organizers was excellent.**

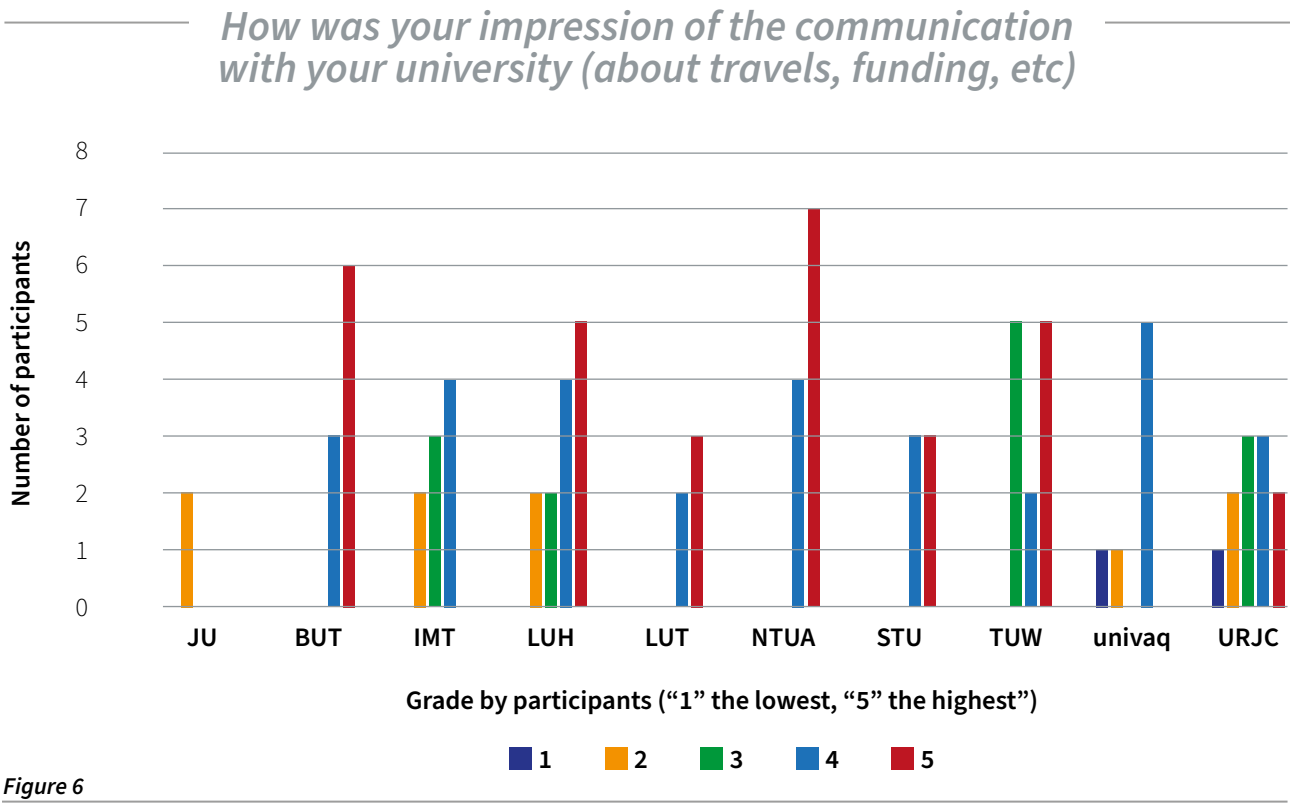


Figure 6

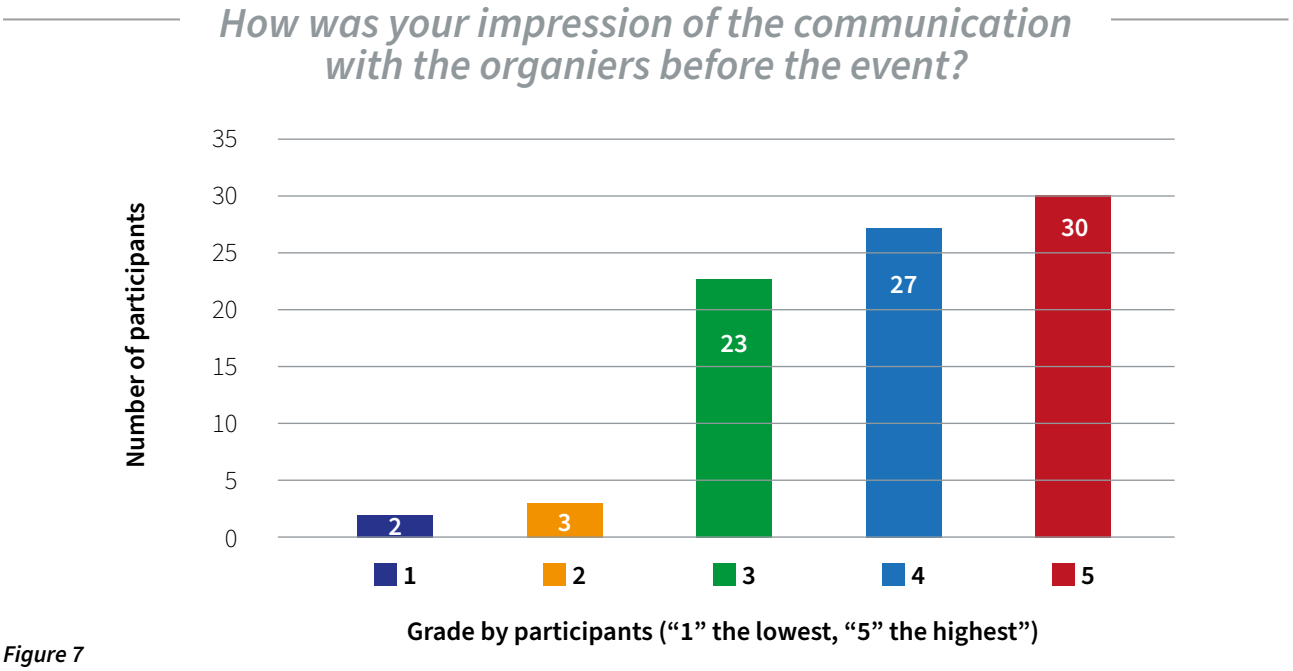


Figure 7

Also, communication with the organizing team during the days of the event was excellent, as well of the participants' impression of all the organizers of the **Student Conference.** It is highlighted in figures 8 and 9. Good and constant communication was an important asset for the development of this conference.

How was your impression of the communication with the organiers before the event?

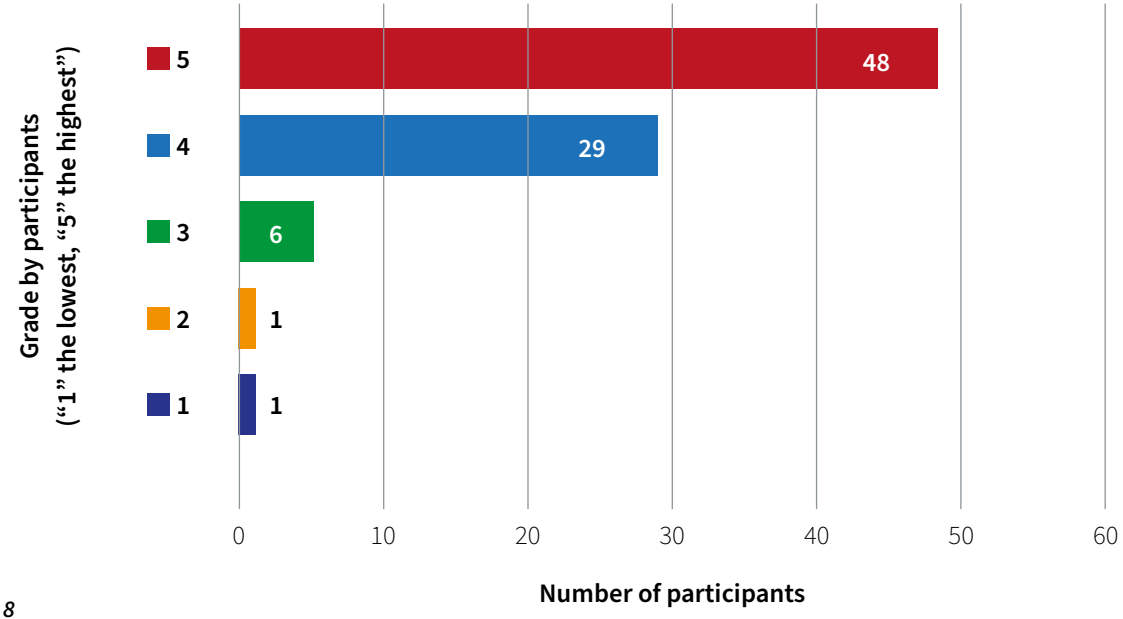


Figure 8

How was your impression of the organizers?

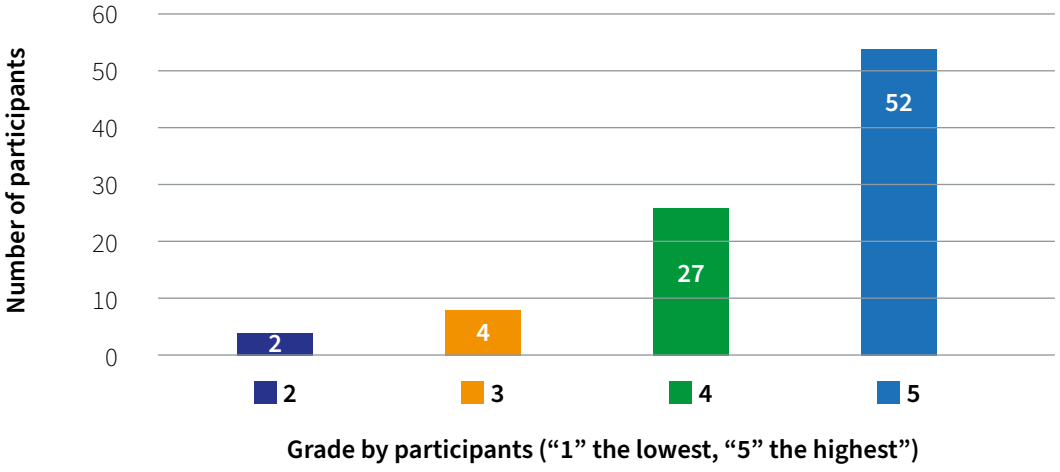


Figure 9

It was also asked their satisfaction towards the different events and socials organized for the conference with positive results as well, fulfilling the **expectations of the participants.** The conference was characterized by its diversity of different types of activities and panels, molding to what the participants could like more. Overall participants had positive impressions of all the sections of the **Conference.**

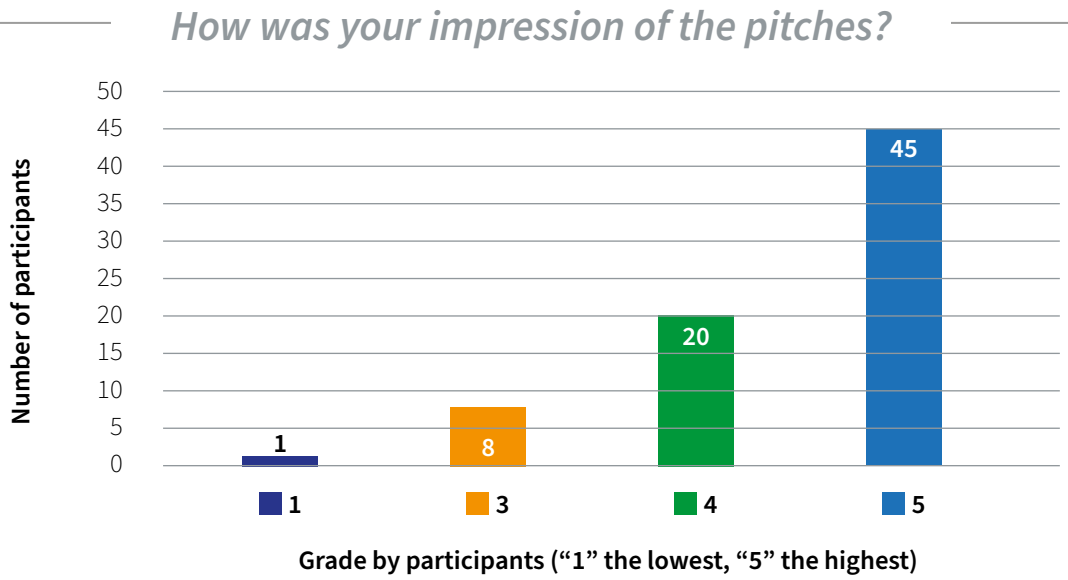


Figure 10

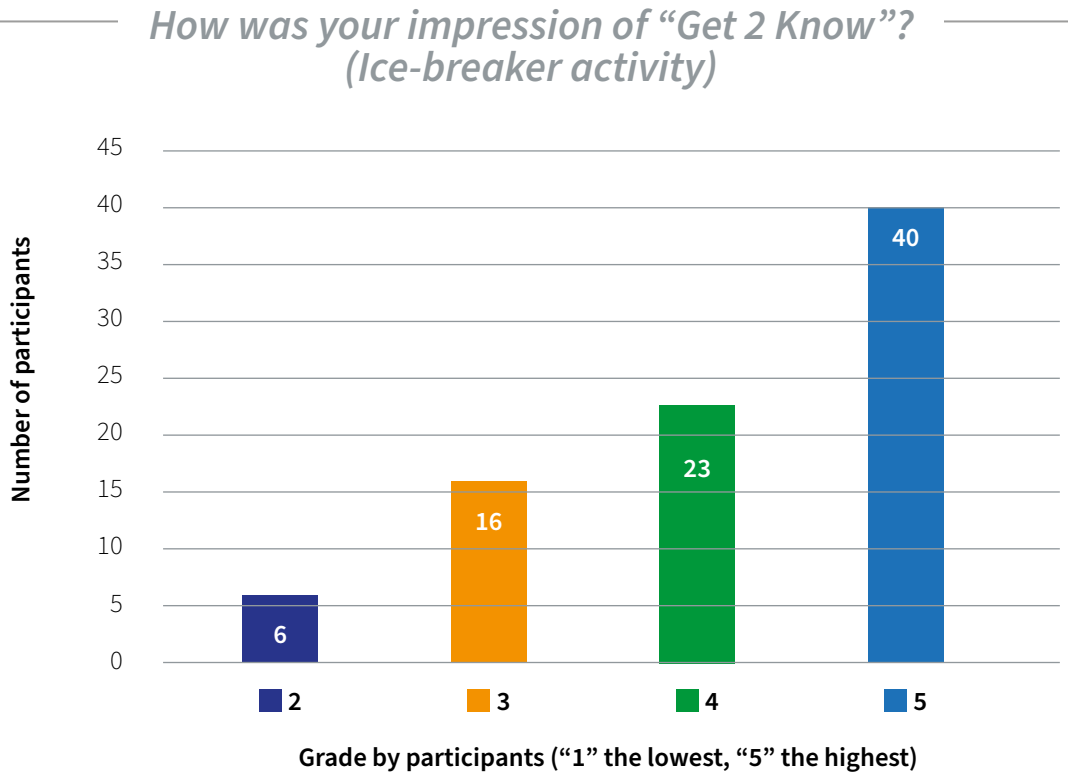


Figure 11

How was your impression of the "What is EULIST?" Panel?

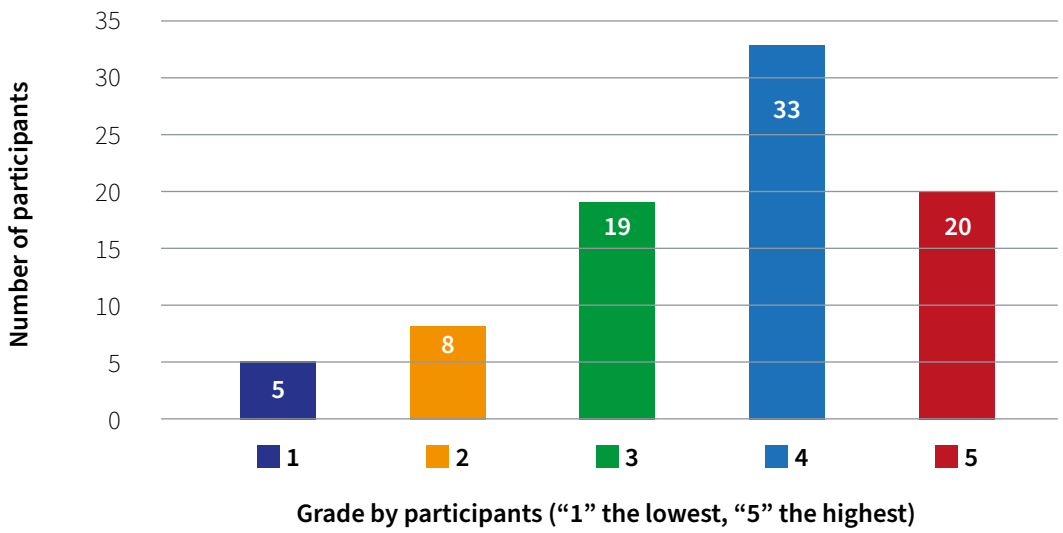


Figure 12

How was your impression of your workshop?

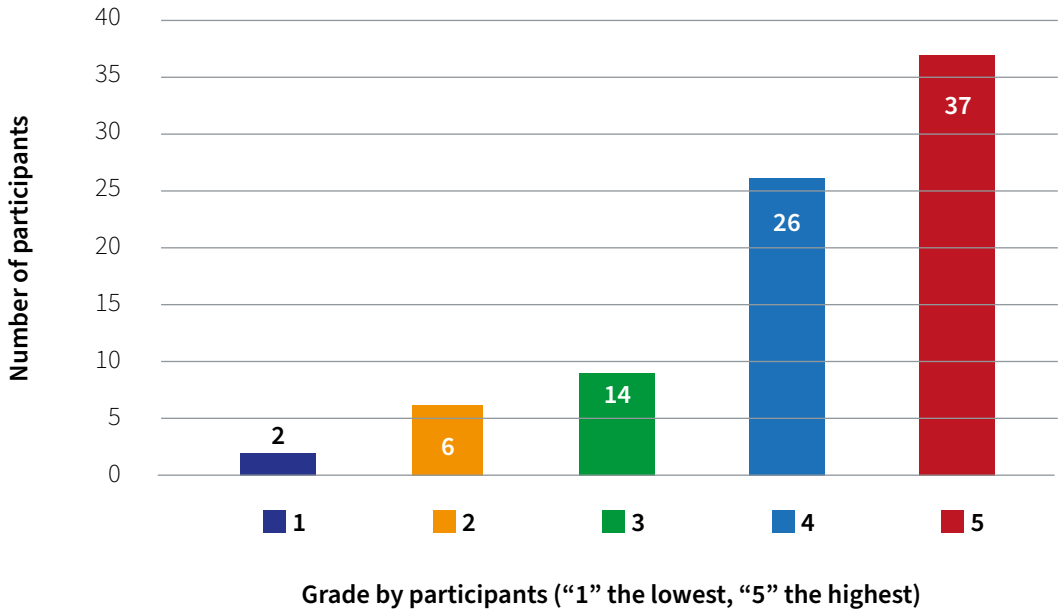


Figure 13

How was your impression of the EULiST Fair?

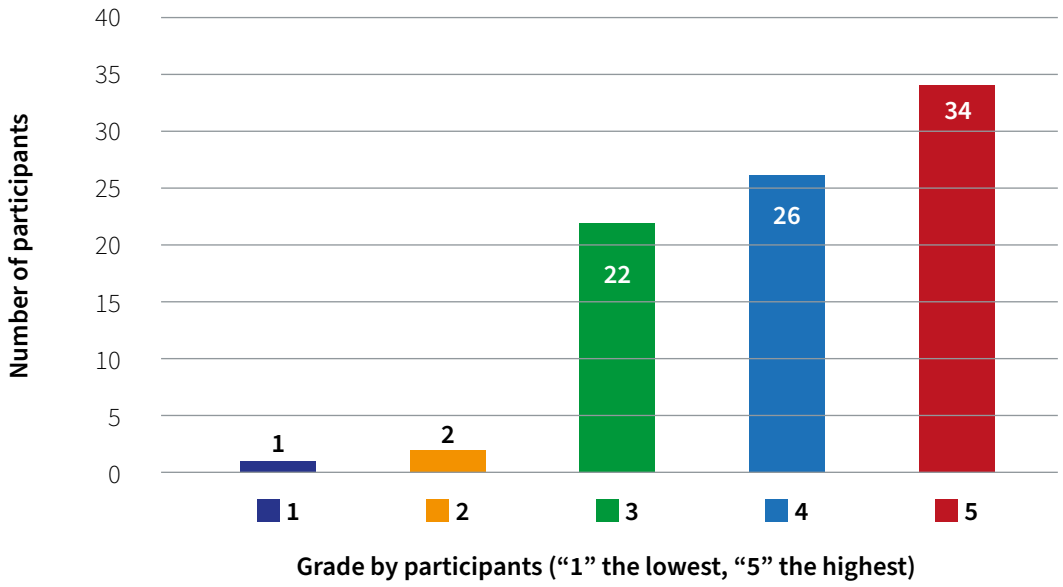


Figure 14

How was your impression of the City Rally?

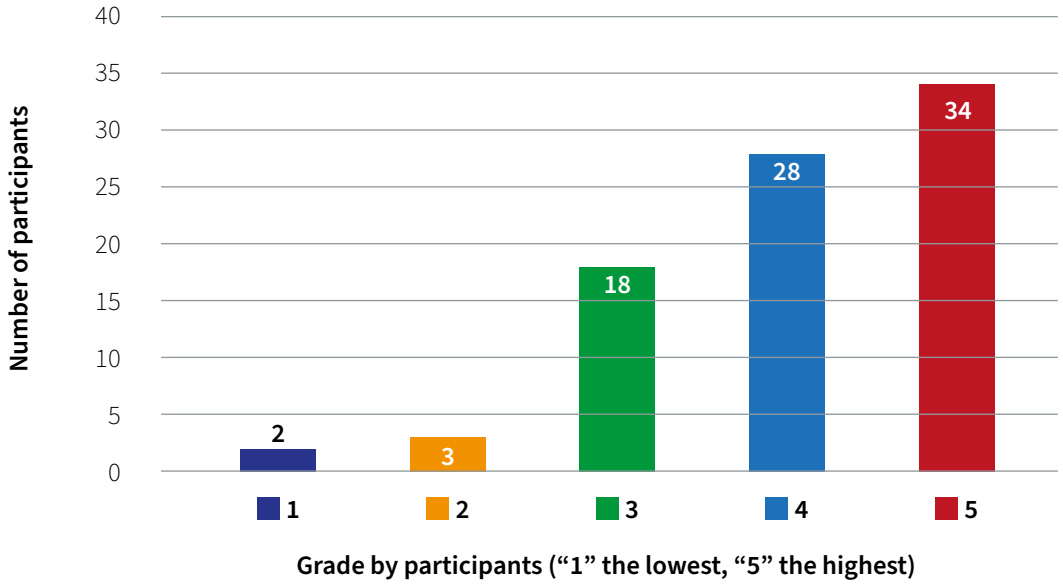


Figure 15

In general, the participants' expectations were met with a very high grading in the form, something remarkable since this event was something completely for **EULiST, the EULiST Student Board,** and the participants of the event. What truly shows the success of the **Student Conference** among participants is that the vast majority would attend a **EULiST Student Conference** again, and that half of the surveyed would like to take part and actively participate in the **EULiST Alliance.**

Did we fulfill your expectations?

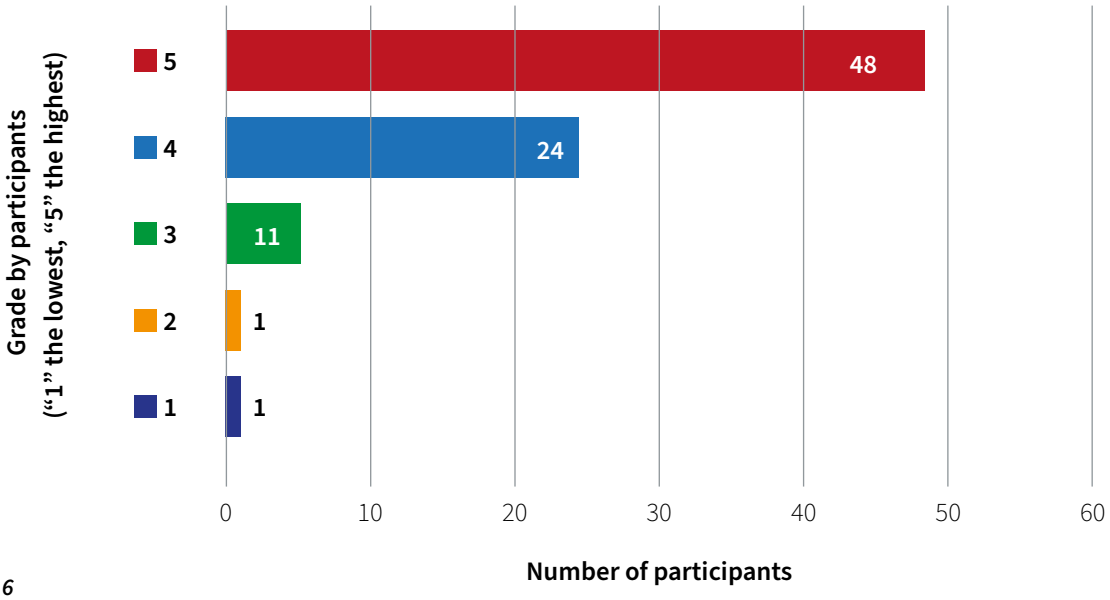


Figure 16

Would you attend the Student Conference again?

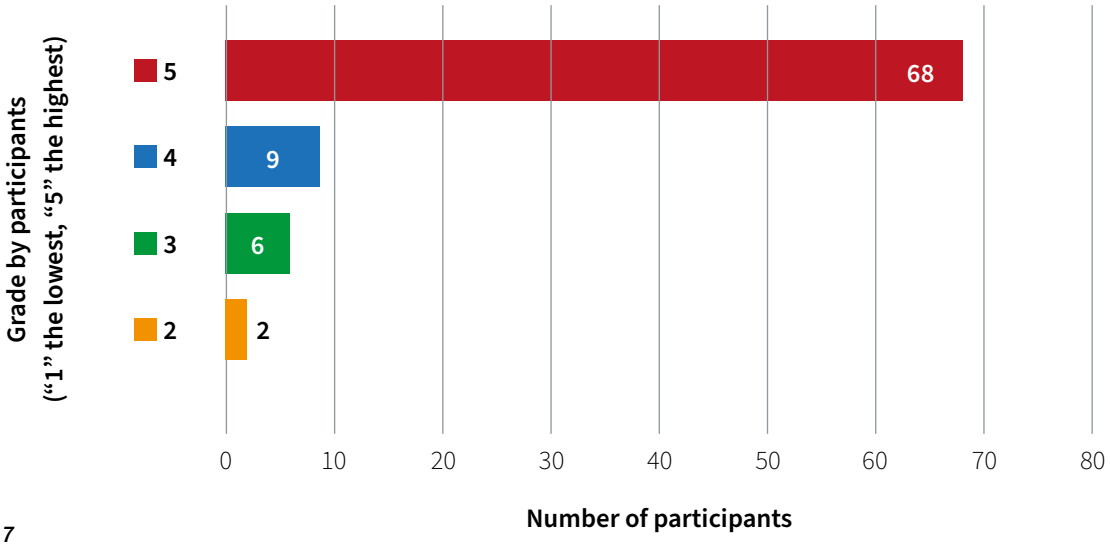


Figure 17

Do your want to take an active role en EULiST?

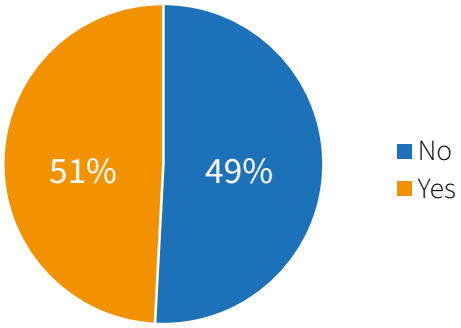


Figure 18

Speakers' feedback

We asked some of the speakers of the workshops to give us some feedback of their session and the overall conference. Most speakers were not familiar with **EULiST** before the conference, but now they are all more familiar with the project and very excited with the future direction of the alliance, its impact on young students and possibilities for cooperation between universities. They appreciated having this space to exchange different perspectives on several topics, and from **very different academic backgrounds.** Some of them would like to repeat their experience as speakers but also for the alliance to do more conferences and create more spaces for this exchange of ideas.

Speakers were also satisfied with how their respective lectures went, indicating that generally participants were actively participating in it. However, some speakers would have liked to have more students present at their workshop. They shared some opinions with students regarding the intensity of the program (since the program lasted almost the entire day at some points). The speakers had very positive remarks regarding the **Organizing Committee and volunteers** at the event, expressing that they felt very well taken care of, but some highlighted some aspects to take into account for future events such as having all information about the event with more anticipation like final schedule of the program and workshops.

Final Conclusions

Overall the Student Conference was a success among participants, with many of them showing interest in the next student conference and other events and activities that could be developed within EULiST. The conclusions will be divided into key successes, areas of improvement, and recommendations to take into account in the future.

Regarding **key successes,** the event had a quick and smooth setup which was facilitated by a motivated small team that worked effectively. Also as data showed there was a high level of participation and recognition: there were large registration numbers showing that overall communication from universities regarding the event was effective, registration and assistance to the event.

The supportive team of volunteers played a significant role in ensuring smooth operations, from registration to setting up venues, to help participants that had any kind of issue during the event. Participants had a very positive impression from the organizing team and volunteers. Also the flexibility of the working team contributed greatly to the overall development of the event and creating a positive atmosphere.

The beautiful venues and well-organized social programs added value to the overall event experience. Additionally, the European Speaker and pitch Session were particularly well-received.

As expected, there are many **areas of improvement** related to the organization of the **Student Conference.** Internal communication sometimes presented issues within the Organizing Committee, leading to unclear responsibilities and unmet expectations. Some tasks were assigned to only one person, which caused delays when they became busy. Having more people involved per task could have improved efficiency.

Too many emails were sent out to participants, it was sometimes confusing for students and many of the emails ended up in spam folders, leading to missed communications. Some problems were encountered with the cleanliness of the housing and the ability to contact the housing providers. Communication surrounding local student party customs was lacking, which may have caused confusion for participants.

Regarding **suggestions,** the organizing committee should have multiple day-long set up meetings: one at the beginning of January (ideally in presence), one in the middle of April (either online, or least- distance meeting point). Another tool for communication different from whatsapp and can be thought of (like the use of a joint platform exclusively for the event). Also to set someone in charge of overall communication. Maybe **Local Coordinators** can help confirm selection and selection processes at every university. It would be ideal to have at least two people per task to avoid delays and also having more than one person of reference regarding that task. It is also important to go through the expectations of all implied actors to know the objectives we want to achieve and expectations that need to be met not only by the **Student Board or the Organizing Committee.**

Another suggestion is having an independent awareness team either present or have measures in place to contact one. It would be important to set up a detailed joint communication schedule and calendar with collaborative documents and deadlines for sending, all in order to make work more effective and also for the **Local Coordination and Management Board** to be aware as well. Also it would be a good proposal to do a tour around the campus for participants to get around the venue before the beginning of the different activities.

Most participants agreed that it was a very dense program with very limited free time, so adjustments in the overall program are suggested so participants can also have free time to visit the city the venue is taking place in, and not feel tired or bored during the activities of the program.

A big part of the success of this conference was due to the presence of **TU Wien staff** as point of reference, coordinating logistic details that are difficult to set from the outside. Participation of staff from the university in which it is going to take place is an important aspect, as well as the involvement of students from that university in the overall organizing process **(Student Board or volunteers outside of EULiST Student Board).**

The organization of this conference was a milestone for the alliance, with many students asking how they could get involved in their home universities. It is highly recommended to find formulas that could ensure participation of EULiST students outside the **Student Board as volunteers for future Student Conferences** (as well as other activities at each university). This is a critical aspect to take into account, cooperation with Work Package 1.2 (Student Engagement) would be ideal regarding dissemination. All universities should take back what was achieved during this conference and start setting up activities for dissemination: the future of the alliance lays on student participation.

Participants gave much feedback of how they see the alliance and what they expect from it. It is highly suggested to take on these ideas for further development and put into action. Even if it was many days talking and explaining the functioning of the alliance, students still had doubts of the effect it could have on their academic formation, and most importantly the opportunities that can be offered to them.

Annex 1. Workshops information

Scientific Knowledge Graphs: Theory and Applications

Abstract: Scientific Knowledge Graphs (SKGs) are a means to store metadata, such as bibliography, and content of scientific literature. They have been powering various applications, such as Question Answering Systems and Research Discovery & Exploration. Such applications serve the use case of literature search. In this workshop, we want to introduce and describe Scientific Knowledge Graphs and give real-world examples including access and download possibilities. Furthermore, we want to look at a few of the aforementioned SKG-based applications that can enhance literature search, making it more structured and giving better overviews of connected literature.

Filip Kovacevic is a PreDoc researcher in the third year at TU Wien, specializing in Scientific Knowledge Graphs and RDF data versioning. His research aims to improve scientific methods and facilitate the work of researchers. He has gained experience in automating processes such as systematic literature reviews and novelty detection in scientific literature. Currently, he is exploring various LLM-based methods to represent the contents of scientific papers in a more structured way.

Designing the EULiST Student Digital Infrastructure

Abstract: Within this workshop EULiST students will jointly discuss with a task member of the digital campus team the future digital campus of EULiST. After a short individual survey, we will create discussion tables where we exchange ideas and thoughts on various topics concerning the EULiST digital campus, such as tops and flops of campus software, student communication in the digital campus, streamlining key steps within the offerings of the EULiST digital campus, discussing Moodle's potential as the central EULiST e-learning tool etc. We are looking forward to your ideas and collaboration!

Dr. Gergely Rakoczi is an e-learning specialist at the TU Wien. As a trained media computer scientist his main interests include digital teaching and learning, e-learning design, Moodle, teaching with new media, virtual reality and all kinds of web-based and digital educational technologies - both for higher education and for the private sector. His research focuses on multimedia learning, technology-enhanced teaching, eye tracking analysis and the design of user interfaces that promote learning. He is currently head of the "Digital Teaching and Learning" service unit at TU Wien.

Link to the presentation

Deepfakes and security threats caused by them

Abstract: This workshop will introduce the different types of deepfakes, delve into methods of creating and detecting them, and explore their impact on IT security. Through interactive demonstrations, attendees will gain practical insight into the world of deepfakes and learn strategies for identifying them and techniques for mitigating risks. Join us for an engaging session that combines theory with interactive demonstrations to give you a better understanding of this critical technology and its security challenges.

Kamil Malinka currently works as an assistant professor at the Faculty of Information Technology at Brno University of Technology and is the head of the Security@FIT research group, which primarily focuses on computer security. His current research interests include security implications of AI and usable security.

Link to the presentation

Presentation Skills: “Dare to impress” level unlocked

Abstract: Are you ready to take your public speaking to the next level? This interactive workshop is designed to elevate your presentation skills and boost your confidence when facing any audience. Together we’ll practice techniques to strategically manage audience interactions, handle interruptions, and maintain engagement throughout your presentation.But that’s not all! In a unique twist of the classic “Truth or Dare”, the workshop will be in the form of a “Do You Dare?” Card Game, that is sure to keep you on your toes. Each card is designed to help you practice and refine your skills in a supportive and fun environment. And worry not! Our trainers will be by your side, guiding you every fun step of the way and providing valuable feedback. So, are you up for the challenge?

Mi.M.E.C.

Mi.M.E.C s a volunteering team founded by students of the National Technical University of Athens (School of Mining & Metallurgical Engineering), devoted to bridging the gap between hard and soft skills. Our mission is to provide students with the opportunity to develop critical skills for the challenges of tomorrow. Since 2021, we have organized 15 virtual and in-person events, gathered more than 680 applications, and grew more than twice our size. Our events are focused on soft skills such as communication and presentation skills, negotiations, critical thinking, and teamwork.

Link to the presentation

Green Skills in Practice: Empowering a Sustainable Future

Abstract: This interactive workshop is designed to equip participants with essential skills in Root Cause Analysis (RCA), as a critical tool for identifying and addressing underlying causes of environmental challenges and sustainability issues. By focusing on RCA, participants will learn how to systematically approach problems, ensuring sustainable and effective solutions. The workshop includes both theory and practice.

ENVINOW.GR is a youth initiative launched in 2018 by students of the National Technical University of Athens (NTUA). Its current editorial team includes more than 30 participants from seven NTUA Schools and other Universities. Its content includes news, articles, scientific reports, interviews and legislation. The team also addresses questions posed by the readers, covering the whole range of environmental issues. Another axis of activity of the group is the implementation of projects and actions of environmental interest. Such examples are the organization of workshops or informative and networking events, but also the team's research activity in collaboration with other stakeholders.

Multisensory experience of a public space (earplugs, eye masks)

Abstract: In this workshop, participants will learn how specific features of urban environments connected to the concept of the 7 senses derived by Juhani Pallasmaa (sight, hearing, smell, touch, taste, balance, proprioception) are essential to perceive it clearly and coherently. Those features include size, proportion, light, colour, sound, texture, resonance, etc. During the class, students will take part in the survey which will be used for both scientific and educational purposes.

Valentina Fesenko is a PhD/DLA student and teaching assistant at the Department of Urban Planning and Design at the Faculty of Architecture, Budapest University of Technology and Economics. Her research focuses on assessing the quality of public spaces in terms of human experience. With 10 years of professional experience in architecture, Valentina has worked with various architecture and construction companies. Her responsibilities have included designing residential, industrial, and public buildings at various stages, from developing initial sketches to creating execution plans. She actively participates in architectural contests and has won several prizes.

Link to the presentation

Urban MYCOskin: awarded New European Bauhaus prize

Abstract: Urban MYCOskin is an international project developed by Rita Morais, Natalia Piórecka, and Jennifer Levy at the Bartlett School of Architecture's Bio-ID Lab. This project utilizes mycelium to convert waste into sustainable architectural systems, improving human comfort and plant growth through an environmentally informed design approach.
Awarded the New European Bauhaus Prize 2024 for its pioneering use of mycelium-based materials in circular industrial ecosystems, Urban MYCOskin has also been featured in international exhibitions. This workshop provides an in-depth exploration of bio-integrated architecture, showcasing the advanced materials and technologies that blend biology and design to create resilient systems for climate change adaptation.

Rita Morais, a Portuguese interdisciplinary researcher, biodesigner, and artist, is passionate about merging biology with digital technologies to propose sustainable solutions. Her work is centered on exploring the potential of bio and living materials through scientific exploration, computational design, and environmental simulations. Rita pursued a Master of Architecture in Bio-Integrated Design from UCL's Bartlett School of Architecture, following her Bachelor's in Business from Nova SBE, in Lisbon.

Natalia Piórecka is Polish, interdisciplinary designer and researcher with a strong focus on biodesign and sustainable development. Her work centers around bridging architecture with scientific advancements, aiming to redefine conventional approaches to design and ecology. She holds a Bachelor's degree in Architecture from Newcastle University and a Master's degree in Bio-Integrated Design from the Bartlett School of Architecture at UCL, winning the "Bartlett's Best MArch Award". Her work focusing on working with living organisms like mycelium or bacteria and robotic fabrication have earned her recognition, including a feature in Forbes' "25 under 25" or awards like Green Product Award of IF Design Award.

"Fresque de l'Eau" - Water fresco

Abstract: The "Fresque de l'Eau" is an educational workshop designed to raise awareness about water-related challenges. It aims to help participants understand the complexities of water management, including issues like pollution, scarcity, and the impact of human activities on water resources. Through interactive activities and collaborative discussions, the workshop educates attendees on sustainable water use and encourages proactive measures to protect and conserve water for future generations.

Ingrid Bazin is a teacher-researcher at IMT Mines Alès, specializing in environmental and societal responsibility. My research focuses on the development of innovative biosensors for monitoring water quality, particularly in detecting herbicides. For over four years, I have been leading the DDRS policy at IMT Mines Alès and became the Director of Transitions in January 2024 at IMT.

Technostress and TechnoIntrusion: Building Responsible Digital Natives

Abstract: In this workshop you will understand the phenomenon of technostress and technoinstrusion. As responsible digital natives you will share and creatively develop in small groups tips and tricks to better cope with technostressors and share the same with fellow participants in the group.

Anuragini Shirish is a Professor at the Institute Mines-Télécom Business School, France, and has completed her HDR from Université de Strasbourg, France. Her research explores the humanistic and instrumental impacts of socio-technical phenomena in digital work, innovation, and society. Her work has been published in prestigious journals such as the Journal of Management Information Systems, European Journal of Information Systems, and Information Systems Journal.

She has presented at major conferences like the International Conference on Information Systems, Academy of Management, and Americas Conference on Information Systems. Ranked 6th worldwide for publishing in top IS journals by the Association for Information Systems (2021-2023), she serves as an Associate Editor at the European Journal of Information Systems. Anuragini Shirish has received several awards, including the “Outstanding Educator Award” by the AIS Women’s Network and is recognized as an AIS Distinguished Member Cum Laude.

Link to the presentation

Students' perspective to Teaching and Learning in the EULiST Alliance

Student engagement is a crucial factor in all topics covered by WP3. In this workshop, the students' expectations of the teaching and learning programmes in EULiST will be discussed, as well as the necessary framework conditions to enable mobility in the spirit of the Alliance.

Lead of the Work Package 3 (WP3) in EULiST Alliance for TU Wien: Teaching & Learning. Speakers: **Shabnam Tauböck (TUW), Konstantina-Maria Giannakopoulou (NTUA).**

The 5 Task Groups in the WP3 cover any topics concerning teaching & learning in the EULiST Alliance: The EULiST Alliance will promote flexible teaching formats, including micro-credentials, micro-degree programmes, joint modules, and joint degrees that will enable all students to integrate EULiST into their studies. EULiST will emphasise challenge-based learning, international collaboration, and transdisciplinarity and will promote knowledge building in all STEM and SSH disciplines.

The EULiST Citizen Science Office and open door events will engage non-traditional learners and the public, broaden student recruitment, and embed the university in the community. Digitalised processes will facilitate mobility, admissions, and credit transfer, and will enable students to personalise their study plans.

Link to the presentation

Kallipos Open Academic Textbooks and an open-source Typesetting Suite

Abstract: The Kallipos initiative focuses on developing electronic textbooks for students and professors at Greek universities, making them freely available with open licenses through the Kallipos digital repository. Over 900 academic e-books have been published through this initiative, which has also paved the way for exploring alternative typesetting and authoring methods.

The Kallipos Docbook Document Suite is designed to produce easily revisable, versatile documents in multiple output formats, such as custom-style PDFs and HTML pages, from a single XML base format using the Docbook schema. This suite aims to meet the needs of both novice and advanced users. Advanced users can customize the suite, while novice users are provided with tools and documentation to create high-quality documents and gain a better understanding of the document production process.

Fotis Branikas is in the final year of an integrated MEng degree at the School of Electrical and Computer Engineering, National Technical University of Athens (NTUA). Recently, he completed his diploma thesis titled “Performance Analysis and Modeling of Parallel Applications in Distributed Memory Architectures.” For the past couple of years, he has been involved with NTUA’s Kallipos, the Initiative of Open Academic Textbooks, where he developed an authoring tool software suite using open source software. This project will be the focus of his presentation at the conference. His professional passions include software engineering, high performance computing, and computational modeling. Additionally, he completed an internship at Tesla’s Motor R&D department as a software engineer.

Link to the presentation

Obstacles of Exchange and finding the perfect exchange place

Abstract: The workshop will compromise two parts. The first will be around finding out students at your university don't go abroad? Traditionally STEM-students are quite reluctant to go abroad, it would be nice to know why and find solutions. The second part will revolve around finding out what makes our cities worth visiting both for exchange and holidays. This way you get a comparatively easy opportunity to train your presentation and persuasion skills, all while having only a short time to prepare.

Hey, I'm **Gregor Fischer,** the most important thing you have to know about me regarding this workshop is that I'm involved in student exchange for my whole student life. It started with being a buddy to exchange student while studying abroad myself. Afterwards I was a member of ESN Buddynetwork at TU Wien. In the past three years I have been working in this field both as an employee as well as a representative for the student union. My drive is to bring students together and therefore I want to know what hinders students from exchanges and how can we attract more students to do exchanges.

Linking Society and Technology through Research for Impact

Abstract: In this workshop, we will introduce you to the Special Interest Group "Frontiers of Impact" within global ISPIM innovation community and use the Scoping Emerging Research Context Canvas to identify in multidisciplinary groups emerging areas of research for impact. Examples of such areas, which we call the new frontiers, are digital and green transition, healthcare innovation, quantum technology, AI, and other societally relevant topics. The aim of this workshop is to support EULiST consortium members (students, research and innovation staff) in developing multi-disciplinary collaboration and impact skills.

Kateryna Kryzhanivska is a PhD Candidate at LUT University, Business School. She researches open and collaborative innovation practices on digital platforms in the context of grand societal challenges, such as digital and green transition, resilience towards global pandemics, and the current geopolitical crisis. Kateryna is actively involved in research for impact and co-leads a Special Interest Group "Frontiers of Impact" within the global ISPIM innovation community.

Link to the presentation

The Community Life Competence Process (CLCP) and SALT Process in Science and Technology

Abstract: The Community Life Competence Process (CLCP) and SALT (Stimulate, Appreciate, Learn, Transfer) are participatory approaches designed to empower communities and foster self-reliance. CLCP guides communities through identifying strengths, setting goals, developing action plans, and monitoring progress. SALT, an integral part of CLCP, involves stimulating reflection, appreciating community strengths, learning from experiences, and transferring successful practices.

This workshop will explore how CLCP and SALT can be applied in science and technology to design and implement solutions that are technically innovative, culturally sensitive, and socially sustainable. By integrating these processes, technology initiatives can align with community needs, promote ownership, and ensure long-term success. Participants will learn how to leverage local knowledge and foster collaboration for continuous improvement.

Nabaraj Adhikari is a social scientist specializing in social welfare, health policy, and sexual and reproductive health and rights (SRHR). He is currently serving as a Junior Researcher and pursuing doctoral studies on Social Sustainability and Welfare policy at LUT University Finland, where he is involved in a research project to explore work and retirement perceptions across Europe. He is a facilitator of a strength-based approach known as “Community Life Competence.” they use the SALT (stimulate, appreciate, learn, and transfer) approach to bring communities together and encourage them to take ownership.

Link to the presentation

Discover your career potential – from planning to applying

Abstract: Are you looking for a job or would you like to find out more about career planning and applications? In this workshop, you will benefit from tips from HR experts from the TU Career Center.

In the application workshop you will learn:
- How you can approach your job search.
- How to design application documents (CV, letter of motivation).
- How you can prepare for job interviews.
- How you can present yourself and your skills in an application context.

Workshop was delivered
by **Tina Landreau and Tanja Elgendy.**

Link to the presentation

Club of unseen monuments. A question of social and ecological visibility in architecture and urban planning

Abstract: The increasing demands of climate activists and experts highlight the urgent problems we face. Global warming is now at our doorstep, and a societal rethink is necessary. We must adopt a broader perspective that recognizes humans as part of a larger system, valuing overlooked factors and organisms. In Germany, cities struggle with complex issues, including the lack of affordable housing—a sector that ironically contributes significantly to CO2 emissions. This shortage leads to gentrification and changes in population structure. It's crucial to understand that creating affordable housing and developing climate-friendly cities are not contradictory goals but must be addressed together.

This workshop aims to uncover the unseen monuments that make our cities liveable. We will explore what factors contribute to a vibrant environment, the challenges we face, and the skills architects need. Join the discussion to draft ideas on identifying and protecting these new monuments, defining shared goals and values for the future.

Anna Pape works in the fields of architecture, urban design, graphics and art. Her work focuses on the theme of the just city in terms of social and ecological aspects. She is currently working with raumlaborberlin on the topics of real estate policy oriented towards the common good. As well as she is a researcher at Leibniz University Hannover on the EU project CiD.circular design for the interdisciplinary development on how to link design with circularity and urban transformation within new learning/teaching formats and materials to connect the education and research environment.

Link to the presentation

Structuring and sensor manufacturing with microtechnology

Abstract: The workshop provides an interactive introduction to the main principles of microtechnology; a key component of the ever growing semiconductor and chip industry. Students will be presented with the fundamental techniques of lithography and deposition technologies, the basics of magnetic sensors using the anisotropic magnetoresistive effect (AMR) and how to electrically connect for data read-out, while also actively manufacturing and evaluating their own sample sensor chip.

Maren Prediger has a strong background in biochemistry, toxicology, and micro technology. With a distinguished academic career, earning top honors in both B.Sc. and M.Sc. programs at West Virginia University, they have developed extensive expertise in analytical chemistry. As a doctoral student at Leibniz University Hannover, her research has further delved into the intricacies of micro production technology. Throughout her career she has held pivotal roles in both academic and research settings. As a Graduate Research and Teaching Assistant, she honed their skills in conducting high-level research while mentoring students. At the Institute of Micro Production Technology, she has made significant contributions as a Research Associate, and currently as a Scientific Coordinator for the CRC SIIRI Integrated Research and Training Group. In leadership roles, she headed research groups focusing on Magnetic and Biomedical Applications, and more recently, Biomedical Technologies. Her work continues to push the boundaries of scientific innovation, with a commitment to advancing the field through interdisciplinary research and collaboration.

Link to the presentation

Synergetic Factory planning: Interlocking process and object planning based on practical example

Abstract: Factory planning processes are characterized by numerous challenges. These challenges include the consideration of a wide range of influencing factors, based on internal or external change drivers that affect companies. In order to make the long-term investment in a factory cost-effective, future-proof factories must therefore be planned flexibly and adaptably. One approach to solving these challenges is the Synergetic Factory Planning process model, which combines production and object planning with project management. Synergetic factory planning is a sensible way of parallelizing the planning of the various specialist disciplines for a factory at an early stage and using mutual synergies. The interlinking of the disciplines and thus the high quality of the planning results achieved with the help of the process model will be demonstrated in a practical example.

Tanya Jahangirkhani, M. Sc. (*1995) studied industrial engineering with a focus on mechanical engineering at the Technical University of Darmstadt, the Politecnico di Torino and the Technical University of Central Hesse. Since 2022, she has been working at the Institute of Factory Systems and Logistics (IFA) at Leibniz Universität Hannover as a research assistant in the Factory Planning department. In research and industry projects, Ms. Jahangirkhani deals with the integration of agile quality management systems in the factory planning process as well as holistic factory and quality planning.

Link to the presentation

Use of robotic exoskeletons and augmented reality to counteract sarcopenia in elderly patients

Dr. Valerio Caputo's research focuses on the use of robotic exoskeletons and augmented reality to address sarcopenia in elderly patients with complex chronic diseases. With projections indicating that 1.5 billion individuals will be elderly by 2050, this research is critical for improving health outcomes and reducing public health burdens.

The study will enroll 300 elderly patients, assessing sarcopenia through instrumental analyses, strength tests, and biomarkers at admission and discharge. AI-based approaches will personalize treatments, with patients using robotic exoskeletons for tailored rehabilitation exercises. Preliminary pilot studies have identified potential molecular biomarkers associated with sarcopenia, which will be validated and integrated with clinical data. The goal is to test an "embedded system" combining robotic exoskeletons and mixed reality to improve patient prognosis, reduce hospitalization time, and lower healthcare costs.

Link to the presentation

The application of Large Language Models for supporting learning and clinical decision making in emergency setting

Technology-enhanced learning (TEL) refers to the use of digital tools and resources to improve and facilitate the educational process. This can include various technologies, such as online learning platforms, multimedia content, interactive simulations, educational software, and communication tools that support teaching and learning.

In such a broad context, the teaching program will focus on the illustration of AI pipelines and their application in the context of clinical medicine as well as on the description of current projects. In particular, aims to develop an app to support learning and decision-making of resident students in emergency departments, exploiting a “Flash cards”-based approach. Currently, the app has been designed and developed for both Android and iOS, and we are testing the use of generative AI to create the same content that we manually developed.

The main objectives are:

1.- To test the ability of generative AI to reduce the development of the app content without lowering its quality and accuracy.

2.- To measure the user experience in the real setting.

3.- To evaluate the opinions of the resident students in terms of both supporting learning and their professional activities.

The project is in its early stages, and the current results show a good promising ability of the generative AI—after a thorough prompt engineering and evaluation activity—to support the content development. Overall, the present project will highlight the relevance of AI-based tools in supporting the improvement of skills as well as the clinical decision-making.

Clara Balsano is a Full Professor of Internal Medicine, Chair of the School of Emergency and Urgency Medicine, Department of Clinical Medicine, Life, Health & Environmental Sciences-MESVA, University of L’Aquila.

Link to the presentation

Current trends in the development of structural alloys

Abstract: The workshop will focus on materials, in particular, alloys for structural applications. It will range from known to emerging new alloy concepts that are currently of interest to research groups around the world. It will briefly touch on well-known alloys such as Duralumin, TRIP-steels but also new alloy concepts such as Cantor alloy. The aim of the workshop is to convince participants that in order to unlock a full potential of known as well as emerging alloys, we have to look at them from several points of view. Therefore, together we will examine nano, micro, mezzo and macro scale structure of alloys. Is it possible to further improve conventional alloys? This question is already answered by reductionist and constructionist approach, which will be illustrated by the known alloys discovered by each group of scientists. Of course, none of these discoveries would be possible without experimental observations and theoretical predictions. A few examples of experimental techniques will be briefly mentioned, covering, for example, more than 400 years of microscope development starting with the Leeuwenhoek late 17th century single-lens microscope. Recent progress and high pace of discoveries will be highlighted with computational materials science approach.

At the Slovak University of Technology, **Martin Kusý** is a fellow of the Institute of Materials. He is a member of the scientific board of the Faculty of Materials Science and Technology and the Institute of Materials and Machine Mechanics of the Slovak Academy of Sciences. He was a deputy director of the Institute of Materials in the period from 2009 to 2013. Martin Kusý is a president of the Society for New Materials and Technologies. He received his master's and PhD. degree at the Slovak University of Technology. During his career he held visiting research positions at the Universita degli studi di Torino and Leibniz Institute for Solid State and Materials Research Dresden (IFW). His research interests are self-sacrificial Zn based alloys for protection of steels against corrosion, solidification and microstructure evolution during solidification, x-ray diffraction analysis, particularly, microstructure determination using diffraction.

Nanotechnology at the frontiers: imaging of the future

Abstract: Smaller, better, faster, stronger. Not quite Daft Punk, but rather the societal expectations for future technology. The trend of miniaturizing our everyday devices is hitting its limits as electronics can't be made much smaller than it already is today. Therefore, we are now focusing on the miniaturization of optical components. This session will explore how nanotechnology can manipulate light, paving the way for future advancements in imaging technology.

Hello, I'm **Katarína Rovenská**, a fourth-year doctoral student in nanotechnology at the Central European Institute of Technology in Brno, Czech Republic. I have been involved in nanophotonics research for eight years, focusing on light-matter interactions and specializing in the fabrication and characterization of nanostructures for optical applications. I am passionate about promoting science to all kinds of audiences and am always keen to inspire curiosity and a love for scientific advancement.

Introduction to (Research) Data Management

Abstract: Understanding research and data lifecycles is foundational in many work settings, not limited to academia. In this workshop we give an overview of research and data lifecycles, review data management practices and give an understanding on how to differentiate between different data and software license types. We explain the use of persistent identifiers, such as DOIs (Digital Object Identifiers), the FAIR principles for data (Findable, Accessible, Interoperable, and Reusable) and how to apply them by means of metadata and standards for efficient (research) data management. We will also describe the components of a Research Data Management (RDM) infrastructure, discussing differences between repository systems. All these topics will help with understanding the challenges of digital data preservation, of planning and implementing reproducible experiments, as well as the application of Open Science principles.

Tomasz Miksa is a Senior Scientist at TU Wien, Centre for Research Data Management and Faculty of Informatics. He works in digital transformation for research data management, making data management more automated and machine-actionable. This includes improving the interoperability of research data repositories and ensuring data is FAIR (Findable, Accessible, Interoperable, and Reusable) and reproducible. He is an experienced researcher in the domain of data management and has a PhD from TU Wien on the "Verification and Validation of Scientific Workflow Re-executions".

Florina Piroi is Senior Scientist at TU Wien, Centre for Research Data Management and Faculty of Informatics. She is involved in interdisciplinary and Industry related projects in the domain of data science, focusing specifically on
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data analytics / machine learning and underlying processes. She has received her PhD degree from the Johannes Kepler University, Linz, Austria, where her work concentrated on management and retrieval of mathematical knowledge and automatic theorem provers. She is also an Information Retrieval researcher with experience in domain specific search and search engine evaluation.

Annex 2. Pitch Sessions

Separated by field

Medical and chemical innovation – Bratislava Room

Solvolysis of Thermoset Polymer Matrix Composites

Maria Pantazidou - Undergraduate student at NTUA (Greece)
The present study focuses on the chemical recycling through solvolysis of Carbon fiber (CF) and Glass fiber (GF) reinforced composites (CFRPs/ GFRPs), such as End-Of-Life wind turbine blades (WTB), at both lab and pilot scales. The matrix of CFRPs that is used is epoxy resin and the matrix of the GFRPs is polyester according to literature and FT-IR analysis. The developed solvolysis processes aim to recover the fibers. Different solvolysis processes are examined, with an example being the glycolysis of WTB samples with Polyethylene glycol (PEG and specifically PEG200) as solvolysis agent, in the presence of NaOH, at 200oC and ambient pressure. Each process has been optimized at lab scale regarding temperature, catalyst, and solvolysis agent quantity, time, etc., and then upscaled to pilot. The surface morphology of the recovered fibers is observed through SEM analysis. In the case of the PEG200/NaOH system, the optimal conditions are 200 g PEG200, 12.5 g NaOH, 10 g WTB, for 6 h at 200oC, with a decomposition efficiency of 83%.

Is real science behind TV shows?

Tamara Pócsová - PhD student at STU (Slovakia)
What is the real work of an analytical chemist? My research group focuses on analysis of environmental and forensic samples. We are looking for pesticides in food, fruits, vegetables, bees and bee products. Furthermore, pharmaceuticals and explosives in water and soil samples. For identification of the relevant substances, we are using gas and liquid chromatography coupled with different detectors like electron capture detector, mass spectrometry or tandem mass spectrometry.

Cu and Ni recover from galvanic wastewater

Alessandra Falone - Undergraduate student at UNIVAQ (Italy)
During my bachelor's degree, I studied hydrometallurgical processes in order to recover Ni and Cu from galvanic wastewater. This is a way to talk about new technologies that lead to a circular economy.

Additive manufacturing in biomedical engineering

Francesco De Arcangelis - Undergraduate student at UNIVAQ (Italy)
Additive manufacturing is a new technological process that allows the creation of objects with complex geometry. Several engineering fields will be deeply changed due to the possibility of developing structures that cannot be produced until now. For sure, biomedical engineering and particularly the creation of orthopedic prostheses for rehabilitation would see in the next years an incredible improvement thanks to this kind of process.

Critical indicators for innovative circular processes in the chemical industry

Elias Nino Horn - Master student at TUW (Austria)
Brief overview of critical indicators in the circular economy for chemical processes. Background, methodology, initial results, expected results and further questions.

fMRI Analysis of Ketamine Effects on the Human Brain

Leonard Galustian - Master student at TUW (Austria).

In my master's thesis, in cooperation with the Medical University of Vienna, I investigated the effects of ketamine (vs. placebo) on the human brain using statistical modeling of fMRI scan data of healthy subjects.

Monitoring and Modelling of "forever chemicals" - PFAS at upper Danube catchment

Meiqi Liu - PhD student at TUW (Austria)
PFAS (Per- and polyfluoroalkyl substances) is a group of "forever chemicals" widely used in our daily society life. How well aware are you of the problem with these pollutants? In this presentation I will show you more and give you some tips on what we can do.

Technology, from Robots to AI – Paris room

Blue Smart Robotics

Alexandre Chalin - Undergraduate student at IMT (France)
Soar high, think light, an intelligent Robotic Solutions for Gliders.

The SustainGraph: A knowledge graph for tracking the progress of the Sustainable Development Goals

Christina-Maria Androna - PhD student at NTUA (Greece)
The SustainGraph is a knowledge graph centered around the Sustainable Development Goals (SDGs), that aims to track the progress towards their achievement at national, regional and local levels. It acts as a unified source of knowledge around information related to the SDGs by hosting and semantically aligning data of various types (e.g., time series indicators, policy documents) from diverse sources. Their representation in a graph through well-defined entities and relationships enables comprehensive analyses and the identification of hidden relationships considering both the temporal and spatial scale.

UrbanSync

Mohammad Mahdi Baghaei Saryazdi - Master student at LUH (Germany)
Citizens can report urban issues, propose solutions, and track their impact, earning rewards for their contributions and sustainable transport choices. Real-time air quality monitoring and personalized health recommendations make eco-friendly activities more enjoyable. VR/AR tools enable citizens to visualize and influence urban planning, ensuring developments meet community needs. A blockchain-based system increases transparency, tracking project progress and managing funds to build trust and reduce corruption. Start locally in Hannover, scale regionally, and aim for state-wide deployment to revolutionize urban planning and sustainability.

Open source autonomous UAS project

Javier Ruiz Ramos - Undergraduate student at URJC (Spain)
An autonomous UAS that utilizes open-source technologies, designed to democratize access to high-quality aerial technology. Our platform provides a robust, flexible, and fully customizable framework that anyone can use, modify, and improve. By leveraging the power of open source, we aim to create an ecosystem that addresses a wide range of applications.

VITAL-FL (Value of Information and Timing-Aware Scheduling for Federated Learning)

Muhammad Azeem Khan - PhD student at UNIVAQ (Italy)
Data possesses significant value as it fuels advancements in AI. However, protecting the privacy of the data generated by end-user devices has become crucial. Federated Learning (FL) offers a solution by preserving data privacy during training. FL brings the model directly to User Equipments (UEs) for local training by an access point (AP). The AP periodically aggregates trained parameters from UEs, enhancing the model and sending it back to them. However, due to

communication constraints, only a subset of UEs can update parameters during each global aggregation. Consequently, developing innovative scheduling algorithms is vital to enable complete FL implementation and enhance FL convergence. In this paper, we present a scheduling policy combining Age of Update (AoU) concepts and data Shapley metrics. This policy considers the freshness and value of received parameter updates from individual data sources and real-time channel conditions to enhance FL's operational efficiency. The proposed algorithm is simple, and its effectiveness is demonstrated through simulations.

Electric Small Aircrafts

A.M. Meshkatur Rahman - Undergraduate student at LUT (Finland)
Developing trainer aeroplanes that run on electricity.

General Introduction on my Previous Activities

Abdul Rehman - PhD student at UNIVAQ (Italy)
Introduction about my previous research and thesis.

Let's delve into Physics – Lappeenranta room

An Innovative Flap-Based Car Side Mirror Design for Noise Reduction & the Assessment of an Active Aerodynamic Approach for Drag Mitigation

Ioannis Chondromatidis - Undergraduate student at NTUA (Greece)
This project presents a novel approach to mitigate sound emissions from car side mirrors through the implementation of an innovative flap-based design. The study commences with a comprehensive review of existing literature, exploring advancements in addressing sound generation from car mirrors and the associated health concerns, including mental fatigue caused by continuous noise exposure. Additionally, the paper delves into the impact of drag on cars, emphasizing the need for aerodynamic solutions. Furthermore, the computational fluid dynamics (CFD) model, incorporating Reynolds-averaged Navier-Stokes (RANS) and the Proudman acoustic analogy, is described for simulating and analyzing the proposed designs. The subsequent sections detail various flap-based designs developed to effectively reduce sound emissions, with a focus on key configurations that exhibited significant improvements. Furthermore, the paper introduces an exploration of active aerodynamic concepts, offering design considerations that allow drivers to selectively reduce drag without compromising sound reduction. Material selection and finite element analysis (FEA) are discussed, highlighting the feasibility of constructing the flaps using 3D printing technology. The incorporation of such materials aligns with both practicality and efficiency in the proposed innovative design. In conclusion, the findings underscore the efficacy of the flap-based design in diminishing sound emissions from car side mirrors. The consideration of an active aerodynamic device adds a versatile dimension, allowing drivers to balance sound reduction and drag based on their preferences.

Depleted Uranium (DU): Applications and environmental effects

Dimitra Zontirou - Undergraduate student at NTUA (Greece)
An introduction to depleted uranium (DU) related to its origin and features. Emphasis will be given on the applications of depleted uranium in both everyday and specialized fields, as well as an overview of the environmental impacts of its utilization. Finally, the remediation technologies from the DU's contamination will be discussed.

Diagnosis of connected concrete layers by pulse echo method

Ondřej Lokos - Master student at BUT (Czech Republic)
This study deals with the measurement of the adhesion of the upper concrete layer to the underlying layer in a truck parking lot. The pulse echo method is used to detect delaminations of whitetopping. The aim of the work is to verify the efficiency of this method and its accuracy in measuring the adhesion of the concrete layer.

Possibilities of using magnetically active liquids in micro or millifluidics

Anna Glozigová - PhD student at BUT (Czech Republic)
Nowadays, miniaturization and nanotechnology are a relentless trend that is far from reaching its peak. Smart materials, in general, are widely used in modern technology. Magnetically active liquids are innovative solutions with a wide range of applications, not only in the field of microfluidics. Their specific properties can be used to precisely control and manipulate liquids at the microscopic level. In contrast to their well-established applications in biology, chemistry, and medicine, the use of magnetically active liquids in hydrodynamic components is still a relatively unexplored area with considerable potential for innovation and industrial improvement.

Application of Computational Fluid Dynamics methods in order to study an aortic aneurysm

Alessio Sciamanna - Master student at UNIVAQ (Italy)
My project is about computational fluid dynamics. It shows how an abdominal aortic aneurysm can be detected and studied through CFD methods. Analyzing blood pressure and blood flow it's possible to recognize symptoms caused by this pathology.

Levitated nanoparticles as super precision sensors

Florian Brandstätter - Undergraduate student at TUW (Austria)
We levitate SiO2 nanoparticles in intensely focus 1550nm laser light. Under these conditions the particle is very well isolated from its surroundings. At the same time the information about the tiny movements of the particle is encoded in the scattered light and can be used to use this nanoparticle as a very precise probe. All kinds of different experiments can be conducted with those basics. In our case, we spin the levitated particle with an additional (circularly polarized) laser beam and use its liberation to measure the damping rate of the residual gas in UHV conditions or use it as a gyroscope.

Carbon Nanotube Electron Gun for Low-Energy Cooling at CERN's ELENA Decelerator

Elisabeth-Sena Welker - Master student at TUW (Austria)
This master thesis project aims to develop, optimize, and characterize an electron gun based on Carbon Nanotube (CNT) Electron Field Emission (FE). Compared to traditional thermionic sources, the unique geometric properties of CNTs offer significant advantages, including strong field enhancement, low energy spread, and high emitted currents. These characteristics make CNT-based electron guns an exciting option for use in Electron Coolers at the Extra Low Energy Antiproton (ELENA) ring.

Green technologies – Hannover room

Solar Photovoltaic Energy Production Conditions in the Urban Environment of Vienna

Stavros Vigkos - Undergraduate student at NTUA (Greece)
Effects of clouds-aerosols on PV energy in Vienna & rooftop PV energy adequacy planning scheme.

Rice husk

Ahmed Hossam Ahmed Maarouf – Master student at LUH (Germany)
Eco-friendly cement to replace classic cement.

Corporation in the Development of World-Saving Technologies: A Case Study on Cultured Meat

Vivien Dos Anjos - Master student at LUH (Germany)
The development of cultured meat represents a significant advancement in world-improving technologies, aiming to address critical issues such as food security, environmental sustainability, and animal welfare. This study explores the collaboration among diverse stakeholders, including scientists, industry leaders, policymakers, and consumers, in the development and commercialization of cultured meat.

Alternative Leather: Utilizing Fungi and Sheep Wool to Promote a Circular Economy

Mária Bláhová - PhD student at STU (Slovakia)
The project for alternative leather made from fungi and sheep wool addresses the lack of eco-friendly substitutes for animal leather on the market, while also tackling the issue of waste sheep wool, which would otherwise end up as biological waste. This project combines the benefits of natural materials and innovative technologies, contributing to the development of a circular economy.

Lupin powder as a valuable source of proteins for bakery products

Tatiana Holkovičová - PhD student at STU (Slovakia)
In recent years, there has been growing interest in lupin as a novel ingredient in cereal-based products due to its high nutritional value. Lupin offers a significant source of gluten-free proteins, dietary fiber, vitamins, and antioxidants, making it an attractive option for enhancing the nutritional profile of baked goods. Moreover, the complementary amino acid profiles of lupin and cereal proteins create a balanced nutritional profile, addressing common deficiencies found in individual protein sources. This study evaluates the potential of lupin powder as a source of high-protein and high-fiber raw material for bakery products, specifically focusing on its application in baked rolls. The aim of this work is to investigate the thermo-mechanical properties of wheat flour blends with various proportions of lupin powder (0-25% substitution) using a Mixolab device. The research further focuses on the proximate composition, qualitative properties, and sensory characteristics of prepared baked rolls. It was found that lupin powder addition significantly modified the rheological behavior of wheat dough (increased water absorption, decreased dough stability, and reduced C2, C3, C4 and C5 values) and qualitative properties of rolls (reduced loaf volume and cambering). Moreover, sensory evaluation highlighted that no significant differences ($p < 0.05$) were found among rolls produced from flour blends containing up to 15% lupin and control sample (wheat rolls) in terms of taste, texture, and overall acceptability. The results demonstrated that baked rolls prepared from flour blends containing more than 10 % of lupin can be considered, according to EC Regulation No 1924/2006, as a foodstuff high in fiber and protein (products contained at least 6 g of fiber per 100 g and at least 20 % of the energy value of the rolls was provided by proteins). These findings support the potential of lupin as a valuable ingredient in the bakery industry, contributing to the development of innovative, nutrient-rich baked goods.

Feasibility study of Solar Panel use for high altitude UAV

Satyam Tiwari - Master student at BUT (Czech Republic)
This study explores the feasibility of using solar panels to power high altitude UAVs, focusing on their practicality in harnessing sunlight for flight.

The importance of hydrogen for the European energy transition

Philipp Rachle - Undergraduate student at TUW (Austria).

The power of Business and Socioeconomics – Brno room

Green Open Spaces and Coastal Gentrification: The case of the Athenian and French Riviera

Georgia TRITSINI - Undergraduate student at NTUA (Greece)
A study on the effects of the growing hospitality industry in green open spaces around coastal regions and the architect's response to the social phenomenon of gentrification on local population in Côte d'Azur (France) and Vouliagmeni (Greece).

MiMEC a volunteering journey: From students to trainers

Magdalini Mylona - Undergraduate student at NTUA (Greece)
Have you ever been expected to know something that no one explicitly taught you? Are there essential skills that are not yet addressed in traditional education? It is common for both students and new graduates to experience this gap when it comes to soft skills. The high demand for soft skills in the workplace is well documented by multiple organizations.

How can a volunteering group become the solution to this gap? Through a series of virtual and in-person events, MiMEC empowers participants to develop critical skills necessary for the challenges of tomorrow. Seminars, workshops, and other initiatives enable students to develop communication, leadership, and problem-solving skills among others. With more than 680 applications and collaborations with industrial and academic partners, MiMEC is proof that volunteering groups can bridge the skills gap and make a difference in their communities.

Uncover the Hidden Costs: Korea's Birth Crisis and Europe's Tech Struggles Exposed

Ella byullee Kim - Master student at LUH (Germany)
World-record low birth rate hits South Korea in relation to low women's rights and terrible social environment. Meanwhile, Europe is struggling a lot on innovation and economy while slowly facing low birth rate as well. This presentation explores the shocking truth behind it.

Mind the gap - Automation skills gap

Evelina Blomqvist - Undergraduate student at JU (Sweden)
Final thesis work: An exploratory case study of the growing automation skills gap. An analysis of the current situation for manufacturing companies and the future challenges they face with automation application and the lack of required skills for implementation and operations.

OMV's strategies and technologies for innovation and sustainability

William Acres - Undergraduate student at TUW (Austria)
How OMV is transforming its business from a linear to a circular economy. Main topics are sustainability, alternative energy and chemical recycling.

ISPIM - Research Impact Mentoring Programme

Kateryna Kryzhanivska - PhD student at LUT (Finland)
ISPIM (International Society for Professional Innovation Management) is excited to pilot the first edition of the Research Impact Mentoring Programme in autumn 2024, aimed at PhD students and early-career researchers. It provides an opportunity for emerging scholars to gain valuable insights into creating impact from research, receive guidance from experienced mentors, and connect with a network of professionals in innovation management. The programme is designed to help researchers refine their research impact strategies and receive community support in navigating challenges and translating academic work into real-world outcomes.

Digital & Green Transition: a challenge for EU

Vasilis Loukadakis - PhD student at NTUA (Greece)
Due to climate change, there have been significant efforts to develop new, "greener", technologies and adapt our existing solutions to account for these issues. At the same time, the development of Artificial Intelligence and other digital technologies invite us to re-imagine our daily activities, including work. What do these changes entail for the EU's future and self-sustainability? Join a discussion about Europe's Green Deal, the Critical Raw Materials Act and more and learn more about how we adapt to ensure a more resilient, resource-conscious tomorrow.

An impact on society - Jönköping room

BreatheWell

Hamza El Arji - Master student at IMT (France)
At BreatheWell, we're on a mission to revolutionize the way individuals with exercise-induced asthma receive support and assistance. Understanding the challenges faced by those with asthma during physical activities, we've dedicated ourselves to creating an innovative app that offers personalized guidance and support.

OMA-Fostering european cultural exchange through collaborative music projects

Martin Schmitt and Rebecca Attali - Undergraduate students at IMT (France)
OMA is an orchestra that aims to create links between students, professors and staff members. Opening the school to the city of Alès is also one of our top priorities. The Orchestra des Mines d'Alès aims to unite students across Europe through collaborative music events. By organizing annual performances with musicians and dancers from various universities, we will foster intercultural dialogue, mutual enrichment, and lasting connections, enhancing both educational and personal growth.

BNEI - The French Student Representation of Engineering Student

Youenn Le Gal - Master student at IMT (France)
How the Engineering Student are represented in France.

HBIM development of Palazzo Ducale di Gubbio (Italy) & Qala't Bu Mahir Fort (Bahrain)

Alexandros Koronakis - Master student at NTUA (Greece)
The project aims to present the heritage documentation progress of the Renaissance Palace Ducal of Gubbio in Italy and Bu-Maher Fort in Bahrain. The Scan to BIM process, which involves capturing data through 3D surveying technologies (UAV, TLS, MMS) and transforming them into detailed geometric parametric 3D models for use in BIM software like Revit, is regarded as a critical tool for preserving historical data and generating Building Information Models.

Augmented Reality, historical sites reconstruction

Volodymyr Tretyak - Master student at TUW (Austria)
The project is about 3D reconstruction of historical building located in Austria.

A Case Study in Greece: Remote Sensing our way towards the protection of Hymettus Mountain

Christos Kalantzis - PhD student at NTUA (Greece)
Cartography is a leading existential reaction of man to his inability to have a wider supervision of the Geospace. The presented project utilizes remote sensing and GIS methods to create civil protection and environmental protection Maps of Hymettus Mountain, in Attica, Greece. These maps will be used by an official volunteering organization recognized by the United Nations for its environmental activity.

Students in decision making

Lari Vanhala - Master student at LUT (Finland)
How students could be better considered when it comes to decision making in universities, local politics, and many more.

Annex 3. EULiST Fair Posters

RESEARCH – PROJECT EXAMPLE

Development of a model for the model-based restructuring of factories that makes it possible to determine which structural elements are affected by a change and consequently need to be replanned during a restructuring.

External drivers for change

... exert pressure for change on individual structural elements.

... result from the environment and have an impact on the factory.

Examples:
- Changes in legislation
- Changes in customer requirements
- Technological innovations
- New competitors on the market

Struktural elements

Internal drivers for change

... exert pressure for change on individual structural elements.

... often arise as a reaction to an external driver of change.

Examples
- Introduction of a new product
- Change in production targets
- Change in strategy

Dependency between two structural elements
Direct change driver influence on a force element
Indirect change driver influence on a force element
Change driver (internal or external)
Structural element

RESEARCH SUBJECTS

- Quantitative factory life cycle evaluation
- Development of a process model for multi-project planning and control in the factory
- Ensuring the future viability of SMEs in the VUCA world with the help of AI-based recommendations for measures to increase resilience and resource efficiency
- Development of a software-based calculator for estimating costs as the basis for sensible planning
- Development of factory planning guiding principles for planning flow-oriented hospitals with adaptable spatial, technical and organizational concepts
- Integration of agile quality management systems into the factory planning process in accordance with VDI guideline 5200

RESEARCH STRATEGY

The research objective of the Factory Planning group is to lead the factory planning process to a reproducible result in all its planning cases. The subsequent effects of planning decisions on the profitability and productivity of the factory are also to be modeled qualitatively and quantitatively.

The research object of the Factory Planning group is the factory in its global environment. The factory is described by its factory objects over the entire life cycle, with a particular focus on the processes for planning factories in all planning cases.

In order to realize our research goal, we first develop description and effect models for a comprehensive understanding of the factory system and its functioning. On this basis, decision models are developed for reproducible planning and evaluation of the quality of a factory. The holistic qualitative and quantitative evaluation of the factory requires, among other things, the use of parameters of economic efficiency (costs) and productivity (performance) as well as the other target fields of factory planning (e.g. transparency, communication, adaptability or material flow orientation). For this purpose, production and business management models are used as one of various building blocks, including the logistics models developed at the IFA. Innovative, new technologies and approaches are also continuously tested for their applicability in factory planning. The knowledge gained in this way is condensed into a reproducible, application-oriented process for planning and evaluating factories through the development of process models.

COURSES

INDUSTRY – PROJECT EXAMPLE

INDUSTRIAL OFFERS

Plant analysis and selection

„Using a standardized procedure, we support you in the systematic analysis and final selection of individual company locations."

Plant structure planning and development

„With the help of forecasting techniques and your expected production figures, we plan the development of your entire plant with you."

Green- and brownfield-planning

„Whether new construction on a greenfield site or reorganization of an existing production facility, we plan future-proof and versatile factory layouts for you."

Layout-Quick-Check

„Using standardized review concepts, we provide you with a valid expert opinion on your current factory layouts within a very short time."

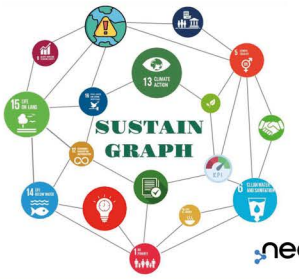
Poster Exhibited by the Institute of Production Systems and Logistics (IFA) from the Leibniz Universität Hannover (LUH) during the EULiST Student Conference 2024.

SustainGraph: A knowledge graph for tracking the progress and the interlinkages among the SDGs

NETMODE, Institute of Communication and Computer Systems, National Technical University of Athens

ARSINOE HORIZON 2020 Project, Climate Resilient Regions Through Systemic Solutions and Innovations

ARSINOE



neo4j

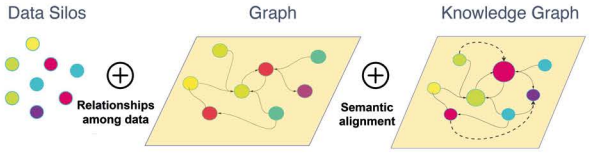
THE 17 SUSTAINABLE DEVELOPMENT GOALS

Set by the United Nations

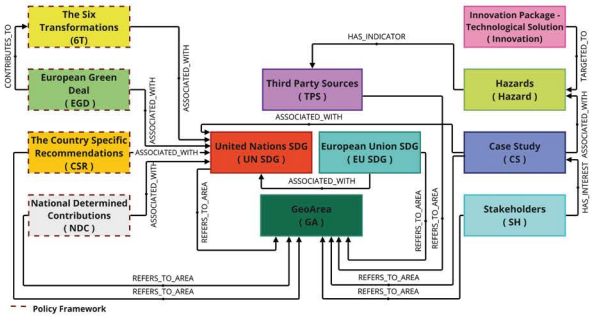
169	248	102
Targets	UN SDG Indicators	EU SDG Indicators

WHY DO WE NEED THE SUSTAINGRAPH?

- Vast amount of data and information about SDGs found in data silos
- Lack of standardization, different semantics
- Diversity of formats (time series data, text documents, data from APIs)
- Hidden interlinkages among this data



THE SUSTAINGRAPH OVERVIEW



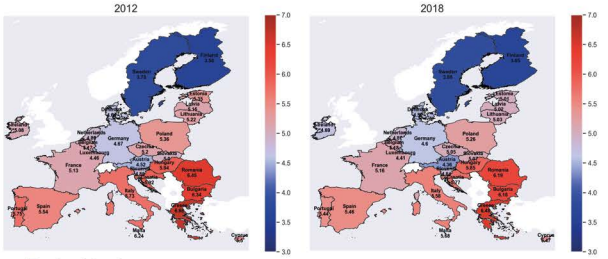
- ☑ Semantic alignment of data
- ☑ Unified and centralized source of SDG related data
- ☑ Dynamic relationships among entities
- ☑ Perform analyses over the SustainGraph and predict interlinkages
- ☑ Support participatory modelling and decision making

ANALYSES OVER THE SUSTAINGRAPH

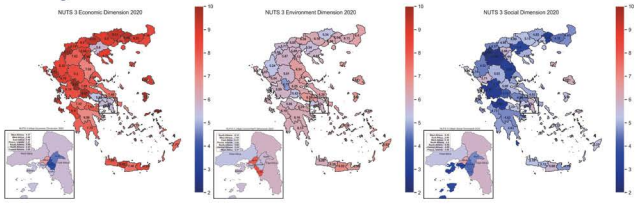
- Interlinkages among the Sustainable Development Goals and Indicators in Different Spatial Resolutions

- Indicator Based Vulnerability Assessment

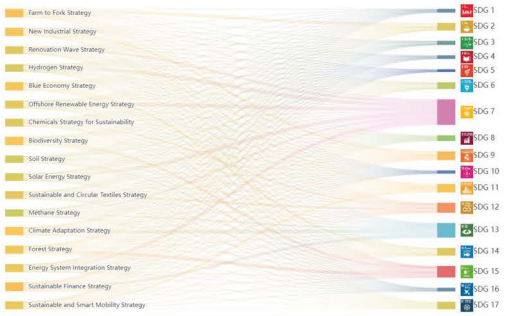
National level



Regional level



- European Green Deal Strategies Association with the SDGs through SDGDetector library



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Poster Exhibited by the NETwork Management & Optimal DEsign Laboratory (NETMODE) and the Institute of Communication and Computer Systems (ICCS) of the National Technical University of Athens (NTUA) during the EULiST Student Conference 2024.

TU WIEN Informatics

EULiST Student Conference 2024

TU WIEN TECHNISCHE UNIVERSITÄT WIEN

doctoral college RESILIENT EMBEDDED SYSTEMS

Fault Diagnostics for Safety-Critical Cyber-Physical Systems

Drishti Yadav

Technische Universität Wien
Institute of Computer Engineering
Cyber-Physical Systems Research Unit

EULiST

Motivation

Verification and Validation (V&V) of Safety-critical Cyber-Physical Systems (CPS) is important.

Quick and correct detection and diagnosis of faults

Viable and fully operational at all times

Undetected failures: costly, life-threatening

Fail-safe design and Verification of safety aspects

- Model-based development
- MathWorks® MATLAB/Simulink
- System-under-test (SUT): Simulink models

Problem Statement

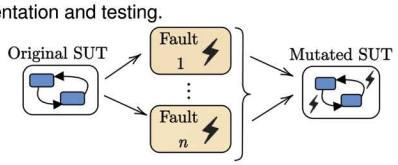
How does one determine the falsifying behavior and provide automated support for fault localization and failure explanation in CPS?

Research Questions

1. How to leverage automated and systematic **injection** of faults to allow scalable experiments?
2. How to improve CPS **falsification** and efficiently tackle the exploration-exploitation trade-off?
3. How to **localize** multiple faults accurately, improve the quality of failure explanation and provide an automated support for **debugging** faults?

Expected Results

- An automated and systematic toolkit to leverage fault injection in a SUT (i.e., a CPS designed in Simulink), allowing scalable experimentation and testing.



- Novel heuristic-driven algorithm(s) to aid falsification-based testing of CPS.
- Approach(es) to accurately localize multiple faults in a SUT at various hierarchical depths.
- Approach(es) to expose failures in CPS, refine failure explanation and provide automated debugging support.

State-of-the-art

Fault Injection and Mutation

- SIMULTATE [4], ErrorSim, FIBlock, MODIFI
- Not automated; Limited choice of fault types

CPS Falsification

- STL formalism [2]
- Metaheuristic algorithms
- Machine learning techniques

Fault Localization (FL)

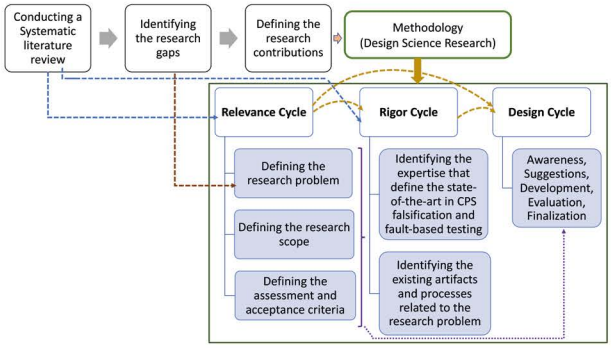
- Falsification, prediction models
- Statistical debugging
- Model slicing, CPSDebug [1]

Limitations of existing FL techniques

- Ad-hoc; Small number of fault models
- Single fault or multiple faults of the same type

Methodology

Based on **Design Science Research** methodology (by Hevner [3])



Literature Survey

- Fault injection, CPS falsification, Fault localization
- V&V, Testing, Mutation analysis
- STL and diagnostics

Assessment

- Empirical evaluation using scalable experiments
- Open-source benchmarks
- Case-study based analysis

Approaches

- Search-based testing with STL
- Mutation testing, Coverage-based testing

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[1] Ezio Bartocci et al. "CPSDebug: Automatic failure explanation in CPS models". In: *International Journal on Software Tools for Technology Transfer* (2021).

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Contact: drishti.yadav@tuwien.ac.at

Poster Exhibited by the TU Wien Informatics faculty at the Technische Universität Wien (TU Wien) during the EULiST Student Conference 2024.

Effect of molecular hydrogen on radiation-induced toxicity

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Abstract

Ionizing radiation is essential in medical diagnostics and cancer therapy but it can severely damage vital organs posing a significant challenge for healthcare professionals seeking protective measures this study investigates the therapeutic potential of molecular hydrogen (H_2) in mitigating radiation-induced damage to heart and lung tissues. Using an experimental model 1 year old Wistar rats were exposed to a 10 Gy dose of thoracic radiation followed by a 6 week H_2 treatment administered via inhalation (4%, 3 times per day). The study aimed to understand H_2 effectiveness by focusing on its impact on oxidative stress markers and inflammatory responses, protein expressions of Nrf2/Keap1, TNFα, and NFκB in lung and heart tissues were measured by using the Western blot method while blood plasma and tissue LDH activity were analyzed to evaluate tissue damage and H_2 protective effects.

Results showed that H_2 treatment significantly reduced LDH activity in blood plasma, lung and heart tissues highlighting its potential as a protective agent against radiation-induced toxicity. The study also revealed that H_2 treatment activated the Nrf2/Keap1 pathway in the lungs of irradiated rats. In cardiac tissue while TNFα and NFκB levels decreased after irradiation the H_2 treatment normalized NFκB to levels observed in non-irradiated animals. These findings suggest that H_2 functions as a protective shield and improving the safety and effectiveness of radiation therapy in clinical settings.

Introduction

Background:
Ionizing radiation is energy in the form of electromagnetic waves (gamma rays, X-rays) or particles (alpha, beta, neutrons) that can remove electrons from atoms, causing ionization. Ionizing radiation, characterized by its capacity to ionize atoms and molecules, is crucial in medical diagnostics and therapeutic applications, particularly in treating cancer. Its ability to precisely target and destroy cancer cells is why it is widely used in radiation therapy. However, the benefits of ionizing radiation come with significant risks, particularly radiation-induced toxicity, which causes severe side effects to critical organs, including the heart and lungs. These adverse effects happen through mechanisms such as oxidative stress, inflammation, and apoptosis, leading to compromised organ function and patient health. (*Figure 1*).

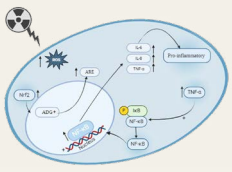


Figure 1: Effects of Ionizing Radiation on Cells

Problem Statement:
The challenge of mitigating radiation-induced toxicity remains a critical concern in clinical settings. Standard radiation therapy although effective in cancer treatment often causes unintended damage to nearby healthy tissues. This unintended harm requires the development of novel protective strategies to enhance patient outcomes and quality of life and understanding the underlying molecular mechanisms of radiation-induced damage is essential for devising effective protective measures.

Molecular Hydrogen (H_2):
Molecular hydrogen (H_2) has gotten a lot of attention for its potential therapeutic benefits in mitigating radiation-induced damage. H_2 being the smallest and lightest molecule can penetrate cellular membranes and specifically target and neutralize reactive oxygen species (ROS) responsible for oxidative damage caused by ionizing radiation. H_2 offers protection through antioxidant, anti-inflammatory and anti-apoptotic actions and modulating pathways such as Nrf2 and PI3K/Akt and reducing pro-inflammatory cytokines like TNF-α and IL-6. These mechanisms collectively underscore H_2 potential as a therapeutic agent in mitigating radiation-induced damage to critical organs like the heart and lungs.

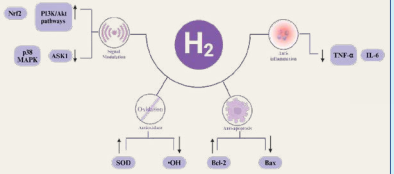


Figure 2: This figure shows how molecular hydrogen (H_2) protects against radiation damage, highlighting its antioxidant, anti-inflammatory, and anti-apoptotic actions.

Objectives

Main Goals of the Research:

- Evaluate the extent of oxidative damage and inflammation in heart and lung tissues post-radiation exposure:
- Assess the efficacy of H_2 inhalation in mitigating radiation-induced tissue damage:
- Elucidate the mechanism through which H_2 exerts its protective effects:

Materials and Methods

Experimental Design:

Animal Model:
The study utilized 1-year-old male Wistar rats, a common model for biomedical research due to their well-characterized physiology and susceptibility to experimental conditions.

Radiation Exposure Protocol:
Rats were exposed to a single dose of 10 Gy thoracic radiation using a pulsed linear electron accelerator (Elekta Harmony Pro). The irradiation targeted the mediastinum area with precise dosage delivery (4-5 Gy/min). Anesthesia was administered via inhalation of 2% isoflurane (4.0-5.0% for induction and 1.0-2.0% for maintenance) during the irradiation process to minimize stress and discomfort (*Figure 3*).

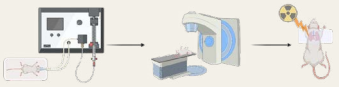


Figure 3: This figure shows the experimental setup for radiation exposure, including isoflurane anesthesia, the Elekta Harmony Pro for precise radiation delivery, and mediastinum exposure in rats.

H_2 Treatment Protocol:

Post-irradiation, the rats received molecular hydrogen (H_2) treatment through inhalation. The treatment involved administering 4% H_2 gas three times daily for 30 minutes over a period of six weeks. This protocol aimed to evaluate the protective effects of H_2 against radiation-induced damage (*Figure 4*).

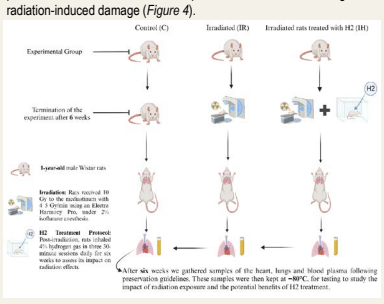
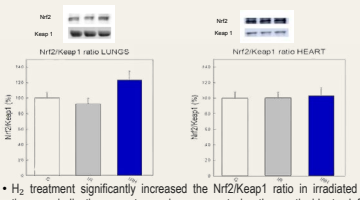


Figure 4: This figure illustrates the experimental design, detailing the control, irradiated, and H_2-treated groups, along with the procedure for sample collection and analysis after six weeks.

Result

Biomarker Analysis:

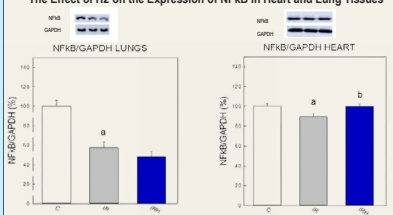
- **The Effect of H_2 on the Nrf2/Keap1 Ratio in Rat Heart and Lung Tissues**



- H_2 treatment significantly increased the Nrf2/Keap1 ratio in irradiated lung tissues, indicating a strong improvement in the antioxidant defense mechanism.
- H_2 treatment led to a slight increase in the Nrf2/Keap1 ratio in heart tissues, but this change was not statistically significant. The heart, being further from the entry point of H_2, received a lower dose, resulting in a smaller increase in its defense systems compared to the lungs. Additionally, the heart may have different natural defense levels, contributing to the smaller increase observed.

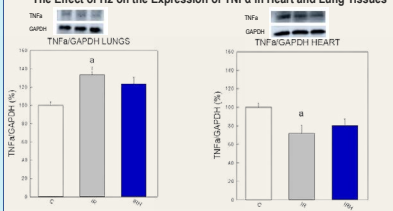
Result

- **The Effect of H2 on the Expression of NFκB in Heart and Lung Tissues**



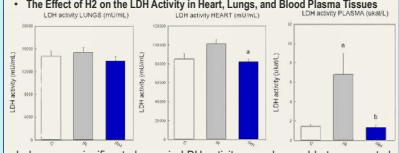
- H_2 treatment significantly reduces the NFκB to GAPDH ratio in irradiated lung tissues, indicating a strong mitigating effect on radiation-induced NFκB activation.
- H_2 treatment restores the NFκB to GAPDH ratio to near baseline levels in irradiated heart tissues, suggesting a healing effect.

- **The Effect of H2 on the Expression of TNFα in Heart and Lung Tissues**



- The left graph shows that radiation (IR) increases TNFα levels in lung tissues, indicating inflammation. Hydrogen treatment (IRH) reduces these levels, showing an anti-inflammatory effect.
- The right graph shows that radiation (IR) decreases TNFα levels in heart tissues. Hydrogen treatment (IRH) partially restores these levels, indicating a healing effect

- **The Effect of H2 on the LDH Activity in Heart, Lungs, and Blood Plasma Tissues**



- In lungs, no significant change in LDH activity was observed between control and irradiated groups, but in the IRH group, H_2 reduces oxidative stress in irradiated tissues.
- In heart tissues, LDH activity significantly increased in the irradiated group compared to the control group, indicating radiation-induced metabolic stress and cellular damage. However, in the IRH group, H_2 treatment significantly reduces LDH activity, indicating a strong protective effect.
- In blood plasma, there was a significant increase in LDH activity in the irradiated group compared to the control group, highlighting cellular damage due to radiation exposure. In the IRH group, H_2 treatment significantly decreases LDH activity, effectively mitigating radiation-induced damage in blood plasma.

Discussion

Our study demonstrates that molecular hydrogen (H_2) significantly reduces radiation-induced oxidative damage and inflammation in heart and lung tissues. The reduction in LDH activity and normalization of Nrf2/Keap1, TNFα, and NFκB levels indicate that H_2 effectively mitigates the adverse effects of ionizing radiation, enhancing the potential safety and efficacy of radiation therapy. These findings are consistent with previous studies, such as those by Ohsawa et al. (2007) and Terasaki et al. (2011), which reported similar protective effects of H_2 against oxidative damage. The activation of the Nrf2/Keap1 pathway in our study aligns with Qian et al. (2010), and the anti-inflammatory effects support the observations by Hirano et al. (2020).The study's limitations include the use of only male Wistar rats and the focus on short-term outcomes. Long-term effects and responses in different sexes or strains were not assessed. Further molecular studies are needed to fully understand the protective mechanisms of H_2. Future research should include a more diverse animal model and evaluate long-term effects. Detailed molecular studies and clinical trials are necessary to validate these findings and potentially integrate H_2 therapy into radiation treatment protocols.

Conclusion

This study demonstrates that molecular hydrogen (H_2) effectively reduces oxidative stress and inflammation in heart and lung tissues following radiation exposure. The significant reduction in LDH activity and normalization of Nrf2/Keap1, TNFα, and NFκB levels highlight H_2's potential as a protective agent against radiation-induced damage. Incorporating H_2 into radiation therapy could enhance its safety and efficacy by mitigating side effects and protecting vital organs. H_2 antioxidant and anti-inflammatory properties also hold promise for treating various conditions associated with oxidative stress and inflammation, such as cardiovascular and neurodegenerative diseases. Further research and clinical trials are needed to explore these applications and establish optimal protocols for clinical use.

Poster Exhibited by the Centre of Experimental Medicine of the Slovak Academy of Sciences and the Slovak University of Technology of Bratislava (STU) during the EULiST Student Conference 2024.

FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING
INSTITUTE OF WATER QUALITY AND RESOURCE MANAGEMENT

Research Unit Water Quality Management
www.tuwien.at/cee/iwr/wasser

Monitoring and Modelling of "forever chemicals" – PFAS at upper Danube catchment

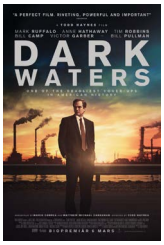
Meiqi Liu TU Wien, Institute for Water Quality and Resource Management

Meiqi Liu
Project Assistant | Research Unit Water Quality Management

What is PFAS?

- Per- and polyfluoroalkyl substances (PFAS) are a large group of human-made chemicals.
- PFAS are commonly used in a wide variety of household, commercial and industrial products for their properties.
- Known for their persistence in the environment, PFAS are often referred to as "forever chemicals".
- It first was invented in the 1930s and known as "Teflon", later applied to non-stick pan coatings.
- Today, some well-known PFAS like PFOA, PFOS, PFHxS are banned and restricted in the EU and the US.
- However, the types and uses of PFAS change over time, which makes it challenging to track and assess their environmental and health impacts.

City of Riverside (2020) https://riversideca.gov/press/understanding-pfas



Film Dark Waters (2019), dramatized the real story of an American laywer, Robert Bilotts' case against the chemical manufacturing corporation DuPont in PFAS (C8, known as PFOA) pollution. Image: https://image.tmdb.org/

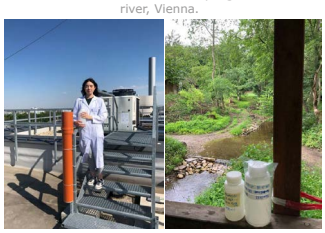
Why should we care about it?

- PFAS come from various sources, they are present in water, soil, air, food as well as materials at home.
- They also transport through the pathways above, and human can be exposed to them in various places at different life stages.
- Certain PFAS are known to be toxic, linking to negative reproductive and developmental effects.
- Some PFAS can increase the risk of certain cancers and harm immune systems.
- There are more than thousands of PFAS, with only a limited number banned under EU regulation.

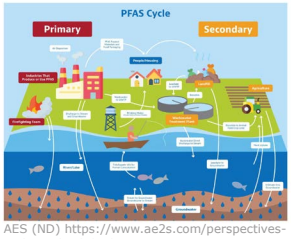
What am I doing?

- We conducted a 1-year monitoring at the upper Danube catchment, across five countries (AT, CZ, DE, HU, SK)
- We collected over 300 samples including groundwater, river water, wastewater, surface runoff and atmospheric deposition.
- PFAS was detected in 99% of the samples.
- We found that traditional barriers like wastewater treatment plants (WWTP) and bank filtration have limited effectiveness against PFAS.
- Currently we are developing a regionalised emission model (MoRE) to better understand PFAS emission from different pathways in the environment.
- We will identify the major sources at the catchment level, and estimate the level of PFAS pollution in rivers.

Our student assistant Elsa sampling at Danube river, Vienna.



Left: Me at rooftop where we set atmospheric deposition collector; Right: Sampling runoff



AES (ND) https://www.ae2s.com/perspectives-and-insights/pfas/

What can we do?

- Be aware of the issues! Let more people know this topic.
- Keep up with the latest research and regulations regarding PFAS.
- Avoid using products containing PFAS. Check here (https://pfascentral.org/pfas-free-products/)
- Buy products with "PFAS-free" label when possible.
- Avoid drinking water and consume products from known contaminated areas, check out local news and reports.
- Collaborate and support campaigns on phasing out PFAS, push local and international regulations to restrict the use of PFAS.
- As a EULiST student in STEM field, work on advanced technologies to remove and remediate PFAS contamination. ☺

PFAS FREE

PROMISCES Interested? Visit the PROMISCES website for more information on our work! (Case Study 2) https://promisces.eu/

Poster Exhibited by the Faculty of Civil and Environmental Engineering and the Institute of Water Quality and Resource Management of the Technische Universität Wien (TU Wien) during the EULiST Student Conference 2024.

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Leibniz Universität Hannover

Neuroimaging Crisis: Challenges, Impacts and Solutions

Research Question

- What are the primary factors contributing to reproducibility challenges in neuroimaging studies?
- How can the implementation of novel strategies and standards enhance the reliability and consistency of findings in the field?

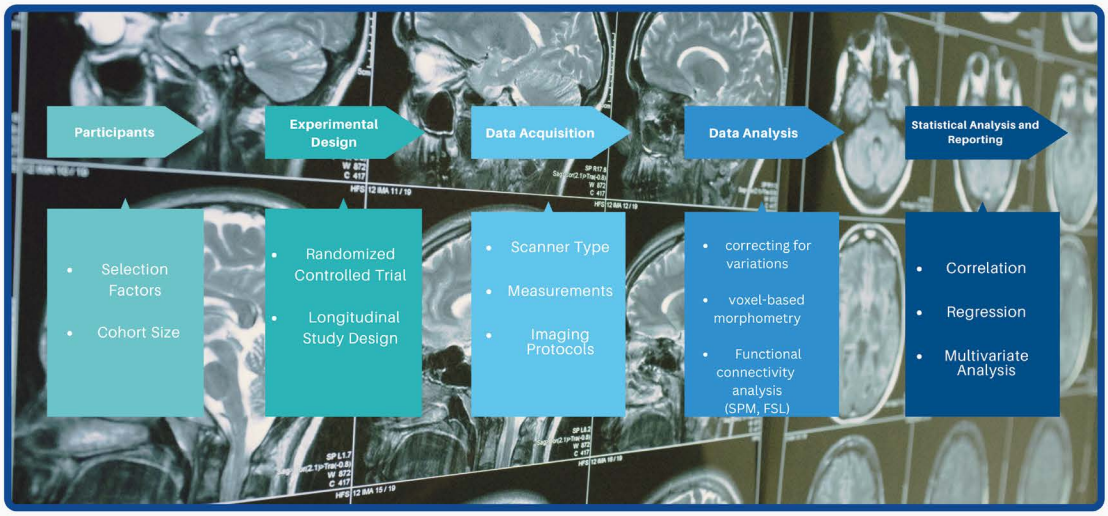
Information

- Different results obtained after reproduction of 250 openly published papers with shared data [1]
- Only 36 of the 100 studies findings in psychology could be successfully Replicated [2]

Hypothesis

Outline a structured and methodological approach to conduct a reproducible neuroimaging study using the functional Magnetic Resonance Imaging (fMRI) method

Materials and Methods



Conclusion and Discussion

AIM OF REPRODUCIBILITY	SIGNIFICATION OF NEUROIMAGING CRISIS	FACTORS CONTRIBUTING TO THE NEUROIMAGING CRISIS	SOLUTIONS TO IMPROVE THE NEUROIMAGING CRISIS
Ensures the reliability and validity of scientific discoveries	Reflects evolving challenges, extending beyond technical issues to include methodological inconsistencies impacting scientific development.	Challenges including technical limitations, low sample size, publication bias, flexibility in data analysis methods	Transparent and comprehensive reporting, pre-registration, data sharing, sample size considerations, cross-disciplinary collaboration and educational initiatives

[1] Hardwicke et al. (2021), [2] The reproducibility project: Aarts et al. (2015)

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Solar PV Energy Production Conditions in the Urban Environment of Vienna

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1. MOTIVATION & METHODOLOGY

An amalgamation of 2 separate similar but with slightly different focus studies [1,2] that make up the experimental simulation part of my thesis. This study deals with the effect of clouds and aerosols on solar photovoltaic energy in the urban environments and conditions of Athens, Cairo, Granada and Vienna, so that there is diversity in terms of cloud presence, aerosol types and irradiation levels. To this direction, satellite-based remote sensing data were used for a decade (2010–2019) from EUMETSAT in conjunction with Copernicus and radiative-transfer-modelled data. Furthermore, an idealized solar energy planning scenario, making the most of photovoltaics installed on the roofs of city buildings, was investigated in order to cover the electricity needs of the pilot cities and to promote local energy security and transition.

Fig. 1. Step-by-step description: entire process of estimating the final potential energy production from rooftop PV in each city.

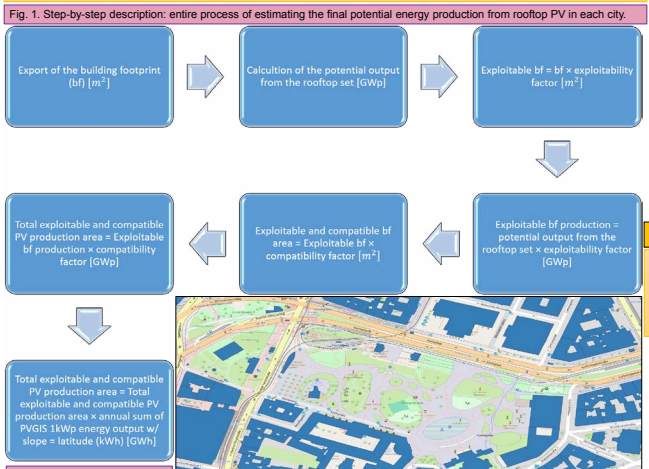


Fig. 2. TU Wien neighborhood and a better illustration of how houses' building footprints are "read" and extracted.

2. RESULTS

2.1. Aerosol and Cloud Effect on Solar Radiation

Aerosol effect on solar energy ↔ **Aerosol Modification Factor (AMF)**, calculated as: **AMF = GHI0/GHI00**, where **GHI0 represents clear sky radiation** and **GHI00 represents both clean (from aerosols) and clear (from clouds) sky radiation**.
Cloud Optical Thickness (COT) = dimensionless measure of irradiation attenuation produced by scattering and absorption generated by the cloud's optical properties and microphysics. To assess the effect of clouds on solar energy, **Cloud Modification Factor (CMF)** is computed using : **CMF = GHI/GHI0**, where **GHI denotes radiation under all sky conditions**.
AMF and CMF range from 0 to 1, with 1 signifying clear sky GHI0 (no cloud impact) and all lower values showing GHI with cloud effect. A GHI00 rating of 1 indicates a clean and clear sky.
This method calculates the separate impacts of aerosols and clouds on solar energy.

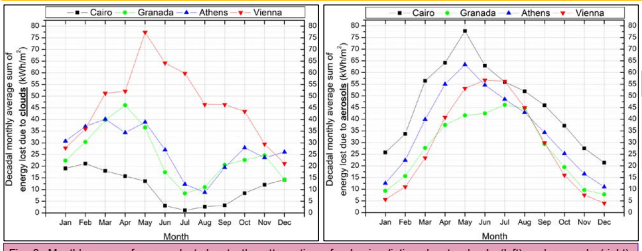


Fig. 3. Monthly sums of energy lost due to the attenuation of solar irradiation due to clouds (left) and aerosols (right), respectively, for the decade of 2010–2019.

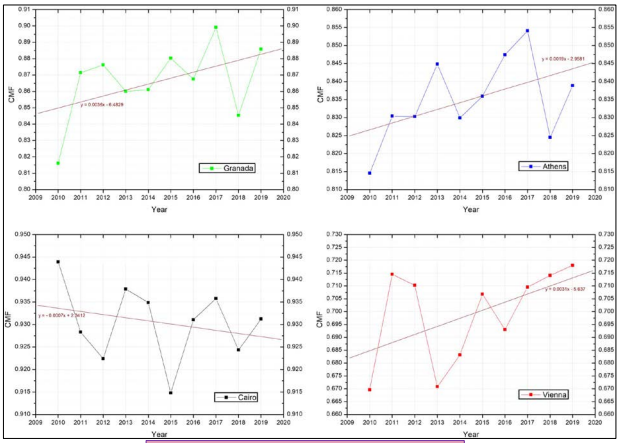


Fig. 4. The CMF for the 4 cities over the course of the decade.

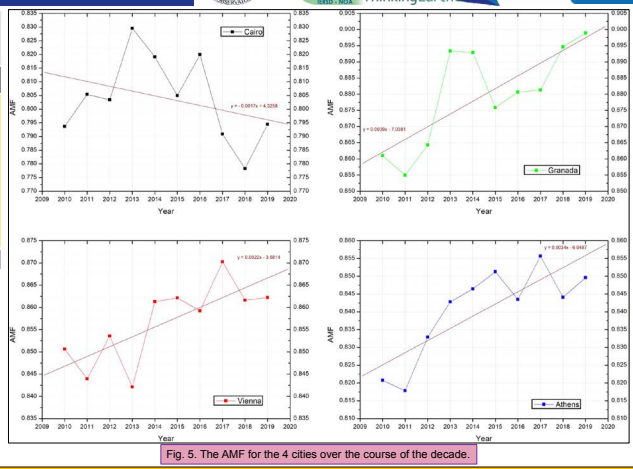
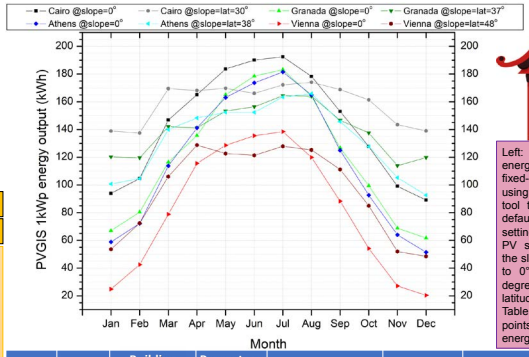


Fig. 5. The AMF for the 4 cities over the course of the decade.

2.2. Energy Planning Scheme

The optimum energy planning scenario focuses on making the most of the buildings' rooftops for PV installation. While assuming that an area of approximately **20,500 m² corresponds to 1 MWp**, the final PV energy production was estimated by converting each city's PV capacity (GWp) into energy (GWh) based on the annual cumulative PVGIS 1 kWp energy output for a slope equal to the optimized latitude for optimum energy production.



The step further:

Left: Fig. 6. Monthly energy output from a fixed-angle PV system, using the PVGIS online tool that was set to the default performance settings of grid-connected PV systems, as well as the slope that was first set to 0° then set equal in degrees to each city's latitude coordinate. Below: Table 1. The main key points of this study's energy planning scenario.

City	Area (km^2)	Building Footprint (km^2)	Percentage Coverage (%)	Rooftop Exploitable & Compatible Ratio	Consumption (GWh)	PV Production (GWh)	Adequacy Percentage (%)
Athens	412.00	75.35	18.0	0.42	8,817.00	2,962.35	33.60
Cairo	2,734.00	164.04	6.0	0.56	30,897.47	8,553.51	27.68
Granada	88.02	11.11	13.0	0.49	2,086.48	445.84	21.37
Vienna	414.90	92.38	22.0	0.35	40,048.00	1,821.57	4.55

2.3. Financial Analysis

By multiplying the average monthly electricity production output data from PVGIS by the Feed-in Tariff (FiT) for each city (**0.174 €/kWh Vienna**), the amount of money that could either be saved by making a building, for example, energy self-sufficient or to be a financial profit through the sale and injection into the grid might be roughly quantified.

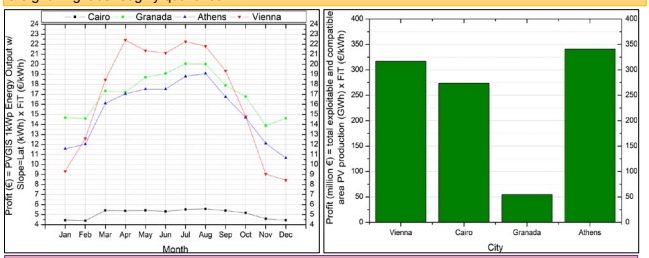


Fig. 7. The economic profit that can be obtained from a single rooftop PV module in a building in each city respectively (left) and the ideal maximum profit that each city could obtain, if it took fully advantage of the set of compatible and exploitable roofs of the buildings for PV installation (right).

3. DISCUSSION, CONCLUSIONS, LIMITATIONS AND FUTURE PROSPECTS

- In Europe, in recent years, air pollution and cloud cover have both decreased. **Maximum attenuation of solar irradiation due to clouds and 2nd lowest due to aerosols are observed in Vienna**, compared to Athens, Granada and Cairo.
- **Vienna could cover 5% of its energy needs, if all its building roofs were filled with PV.**
- A rather coarse approach, nevertheless realistic and promising, responding to today's challenges regarding green energy, energy transition and sustainability, may well be a starting point for further and more detailed studies.
- **Coming soon: "Energy communities management in lower Austria state: The effect of distributed solar photovoltaic electricity production", a more specialized study with real production and consumption data (and real time), a key task of the ThinkingEarth project.**
- More accurate assessment of solar potential, more detailed calculation of the effect of shading, more realistic maximum possible exploitable rooftop area extraction, investigation of not only PV on roofs, but also BIPV, e.g. on facades, for maximum possible exploitation of solar energy regardless of effects of exogenous factors of urban environment and season.

1. Vigkos, S.; Kosmopoulos, P.G.; Papayannis, A. Solar Photovoltaic Energy Production Conditions in the Urban Environment of Athens, Cairo, Granada and Vienna. Environ. Sci. Proc. 2023, 26, 24. https://doi.org/10.3390/environsciproc2023026024
2. Vigkos, S.; Kosmopoulos, P.G.; Papayannis, A.: Conditions for Producing Solar Photovoltaic Energy in European and North African Cities. IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 7-12 July, Athens, Greece, 2024.
3. Panagiotis Kosmopoulos, Harshal Dhake, Danai Kartoudi, Anastasios Tsavalos, Pelagia Koutsantoni, Apostolos Katranitsas, Nikolaos Lavdakis, Efthina Mengou, Yashwant Kashyap, Ray-Tracing modeling for urban photovoltaic energy planning and management, Applied Energy, Volume 369, 2024, 123516, ISSN 0306-2619, https://doi.org/10.1016/j.apenergy.2024.123516. (https://www.sciencedirect.com/science/article/pii/S0306261924008697)

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Repository Infrastructure Supporting Virtual Research Environments

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Introduction

Research increasingly becomes data-driven, with vast amounts of information being generated and analyzed to produce new insights and discoveries. This data deluge requires a combination of methods and technologies to store, process, share and reuse research data.

Repositories

The Center for Research Data Management in cooperation with the IT department (TU.it) started operating the **research data repository**[a] (TUWRD) based on InvenioRDM [1] to host non-structured data.

Algorithms and code can be reposited into the code repository **TUgitLab**[b] based on Gitlab. Publications, reports and presentations can be deposited into the publication repository **reposiTUm**[c], based on DSpace.

To complement these, the **database repository**[d] (DBRepo) [2] based on Java (Spring Boot), Python (Flask), open source components RabbitMQ, Keycloak, MariaDB and OpenSearch was developed that manages structured research data.

- Work with evolving research data
- Versioning and timestamping all changes
- Enable citation of subsets, views and databases

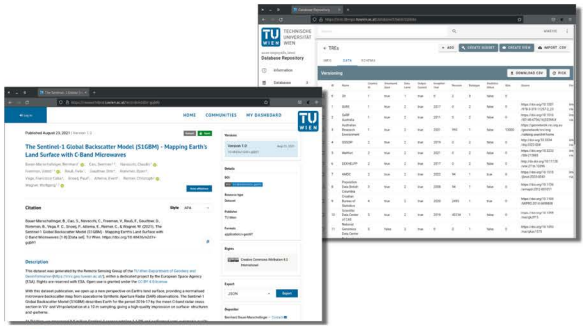

Figure 1: TUWRD repository for files and DBRepo for databases

Compute Platforms

Researchers at TU Wien that perform data science can use the managed **JupyterHub** environment, allowing for interactive processing on *high-performance computing* environments located also at TU Wien. Typically these notebooks are stored also in reposiTUm, from where the whole environment (Python version, packages) can be reproduced with **Binder**. The two data repositories TUWRD and DBRepo (or external sources) can be used as input for data streams visualized in **Grafana**.

[a]https://researchdata.tuwien.ac.at/
[b]https://gitlab.tuwien.ac.at/
[c]https://repositum.tuwien.ac.at/
[d]https://test.dbrepo.tuwien.ac.at/

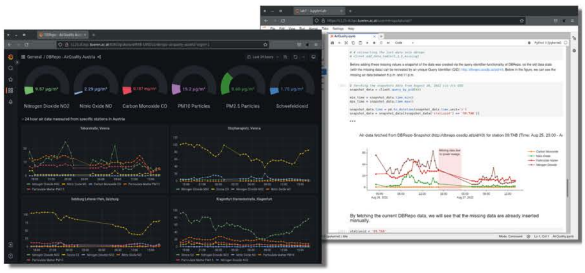

Figure 2: External analytic/monitoring tools connected to DBRepo

Results

The key is to connect each of these solutions (c.f. Figure 3) so that each record points to another with a persistent identifier and to offer data import and access capabilities for the user, to support the full lifecycle of research data while increasing external visibility of the data.

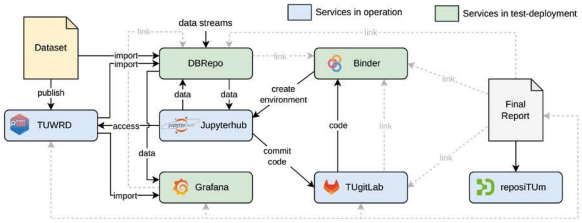

Figure 3: Repository infrastructure (TUWRD, DBRepo, TUgitLab, reposiTUm) supporting virtual research environments (Jupyterhub, Grafana, Binder).

We present a virtual research environment:

- 4 repository systems for files, databases, code and publications; connected to
- 3 compute platforms for analysis

Conclusions & Future Work

Separation of concerns is crucial: researchers work with their data, IT-experts take care of the operation and maintenance, while data stewards curate the data and handle persistent identifier registration of the repositories. Future work includes connecting this infrastructure further by implementing a cross-repository search regardless of the physical location of the data and automated reporting of available intellectual property in this infrastructure and the generation of a scientific knowledge graph.

References

[1] InvenioRDM. https://inveniordm.web.cern.ch/.

[2] M. Weise et al. DBRepo: a Semantic Digital Repository for Relational Databases. *International Journal of Digital Curation*, 17(1), 2022. doi:10.2218/ijdc.v17i1.825.

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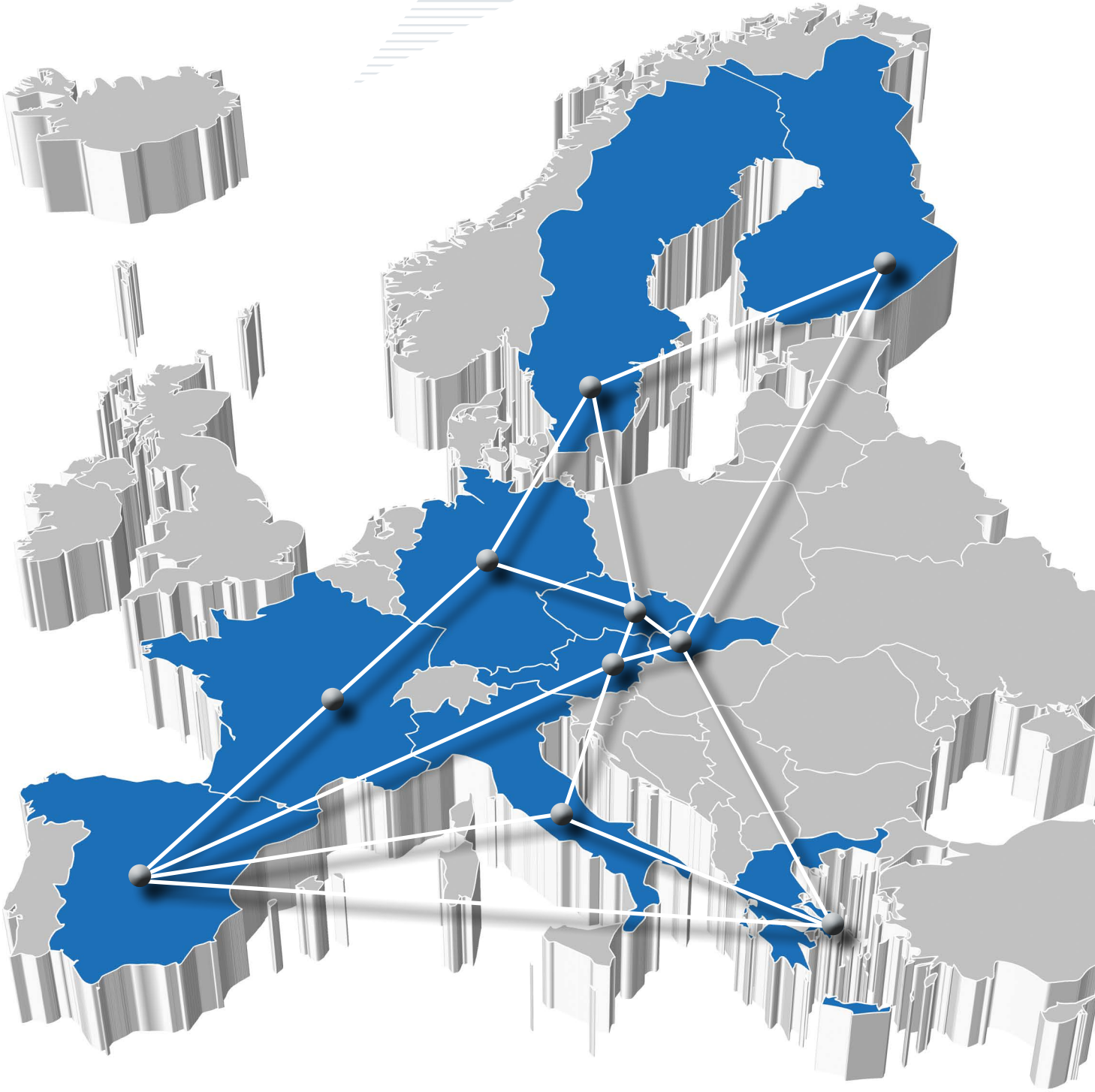

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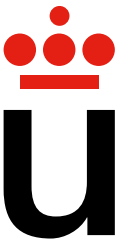

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