

# FORESTRY EDUCATION REIMAGINED: REFORM AND BEST PRACTICES FOR THE FUTURE

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## Conference Topic

### Forestry Education Reimagined: Reform and Best Practices for the Future

Forestry education stands at a crossroads. The classical model – rooted in centuries-old traditions – faces growing scrutiny amidst rapidly evolving societal, environmental, and economic demands. Today, technological advancements, especially in artificial intelligence (AI), add another layer of opportunity and challenge. Is classical forestry education reformable to meet these modern demands? Can we harness AI alongside proven best practices to ensure its relevance in a data-driven world?

Forests play a critical role in addressing global challenges, including climate change, biodiversity conservation, sustainable development, and the bioeconomy. At the same time, the rise of AI and digital tools is reshaping educational paradigms and offering innovative ways to analyze, simulate, and manage natural resources. Forestry education must adapt – not only to equip future foresters with traditional skills but also to empower them with competencies in AI, data analytics, and machine learning. This integration is essential for navigating complex environmental challenges and restoring trust and relevance within society.

This conference invites students, educators, and practitioners to explore and share perspectives on:

**Reforming Traditional Models:** How can established forestry education frameworks be updated to incorporate AI and other technological innovations?

**Exemplary Practices:** What are the best practices in curricula, teaching methods, and stakeholder collaboration that effectively blend traditional knowledge with AI-driven insights?

**Societal Alignment:** How can forestry education align with contemporary societal expectations and policy demands using AI-powered analytics and predictive modelling?

**Interdisciplinary Competencies:** What new skills—including AI, data science, and environmental informatics—are essential for addressing modern forestry challenges?

**Reclaiming Social License:** In what ways can education, bolstered by transparent, data-driven AI tools, help reclaim forestry's social license to operate?

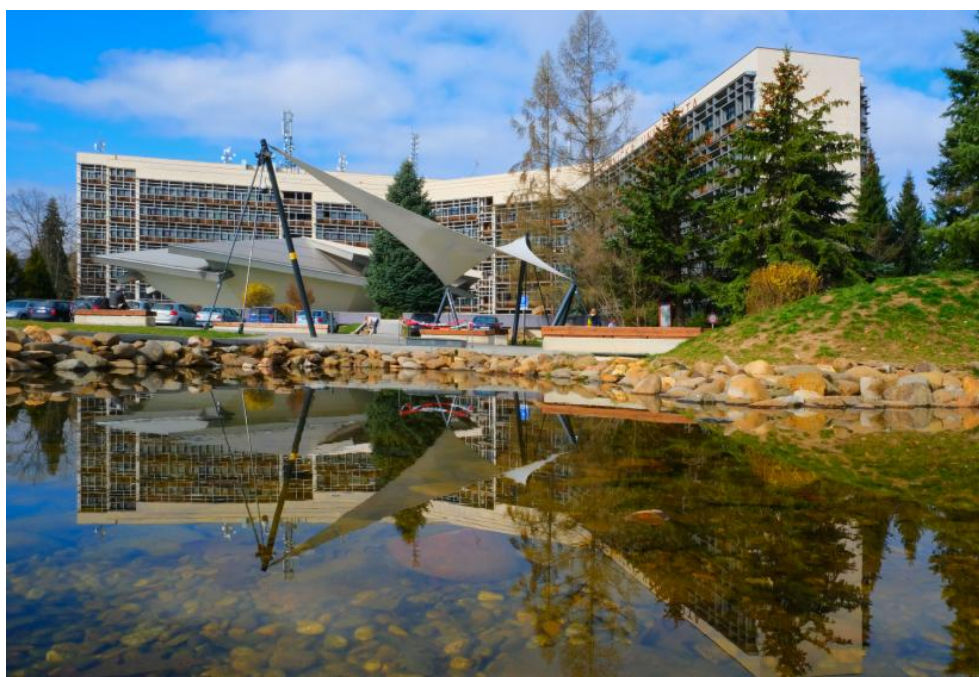
By integrating AI into the conversation, this conference aims to chart a course for a future where forestry education not only preserves its rich heritage but also leverages cutting-edge technology to tackle global challenges more effectively.





## Conference Program

Wednesday: May 21, 2025	
11.00 – 12.30	Registration & Welcome
12.30 – 14.00	<i>Lunch at the Dormitory of TUZVO</i>
14.00 – 14.30	<b>Welcome Address:</b> RUDOLF KROPIL, Rector of the Technical University in Zvolen <b>Conference Opening:</b> NORBERT WEBER, President SILVA Network & Chairman of Forest Policy and Forest Resource Economics, TU Dresden (Germany)
14.30 – 15.45	<b>Keynote Speech: Ethical aspects of the use of AI in academia</b> – SOŇA FTÁČNIKOVÁ, Slovak Centre of scientific and technical information (Slovakia) <b>Artificial Intelligence as a Tool for Strengthening Social License in Social Forestry: Towards Transparent and Participatory Forest Governance</b> – MARKÉTA KALÁBOVÁ, Czech University of Life Sciences, Prague (Czechia)
15.45 – 16.15	<i>Coffee break</i>
16.15 – 18.15	<b>Application of Artificial Intelligence in Education and Research at the Faculty of Forestry, University of Sopron</b> – KORNÉL CZIMBER, University of Sopron (Hungary) <b>Vertical Harmonization of Forestry Education in Hungary</b> – BÁLINT HEIL, GÁBOR KOVÁCS, LÁSZLÓ PAPP, ILDIKÓ BODOR, ISTVÁN LÜKÖ, University of Sopron (Hungary) <b>Green Business dual degree programme</b> – MIKA REKOLA, University of Helsinki (Finland) <b>Mediterranean Forestry and Natural Resources Management (MEDfOR)</b> – MUHAMMED RIZVAN AKRAM, University of Lisbon (Spain)
18:30	<i>Dinner at the Dormitory of TUZVO</i>



Faculty of Forestry, Technical University in Zvolen. Pixabay

Thursday: May 22, 2025	
9.00 – 10.45	<b>Keynote Speech: Dinner at the Dormitory of TUZVO</b> – TATIANE MICHELETTI, TUD Dresden University of Technology (Germany)  <b>Open Educational Resources (OER) and AI – the essence of quality</b> – MIKA REKOLA, University of Helsinki (Finland)  <b>Proposals for European Higher Education Cooperation within the SILVA Network</b> – BÁLINT HEIL, University of Sopron (Hungary)
10.45 – 11.15	<i>Coffee break</i>
11.15 – 12:15	<b>The Use of Artificial Intelligence in Academic Education Experiences at the University of Göttingen, Germany</b> – ACHIM DOHRENBUSCH, University of Göttingen (Germany)
12.15 – 14.00	<i>Lunch at the Dormitory of TUZVO</i>
14.00 – 14.45	<b>Discussion: Recommendations for integrating the AI in the curricula: Do's and Don'ts for higher forestry education</b> – SANDRA LIEBAL (Moderation), TUD Dresden University of Technology (Germany)
14.45 – 16.15	General Assembly of the SILVA Network
18.30	<i>Conference Dinner</i>

Thursday: May 23, 2025	
<b>8.00 – 16.00: Field trip: UNESCO city and municipal forests of Banská Štiavnica</b> Including: <ul style="list-style-type: none"> <li>- City Office of Banská Štiavnica – presentation by RÓBERT SEDMÁK, PhD. (TUZVO) about participative processes in forest planning in an area of world heritage</li> <li>- Sightseeing tour of Banská Štiavnica including the Plague Column in the Holy Trinity Square, the synagogue, birthplace of Dežo Hoffmann, the Botanical Garden, the Slovak Mining Archive</li> <li>- Guided tour through the Open Air Mining Museum</li> </ul>	



Kalvaria in Banská Štiavnica. Pixabay

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## 1 Foreword

Forestry education in Europe is undergoing a profound transformation. Rooted in centuries-old traditions and closely tied to national identities and natural resource stewardship, it now faces the unprecedented challenges of a rapidly changing world. Climate change, biodiversity loss, technological disruption, and shifting societal expectations are testing the resilience and relevance of our academic models. It is against this backdrop that the SILVA Network Annual Conference 2025 took place at the Technical University in Zvolen, Slovakia, from 21st to 23rd May 2025.

The theme of this year's conference, "Forestry Education Reimagined: Reform and Best Practices for the Future", captured the essence of the moment. Over three days, academic and professional delegates from across Europe convened to explore the potential – and the responsibility – of forestry education in shaping sustainable futures. Participants from countries such as the Czech Republic, Finland, Germany, Hungary, Ireland, Portugal, and Slovakia engaged in vibrant discussion, both in person and online, reaffirming the power of academic networks in a digital age.

While the classical foundations of the field remain indispensable – grounded in silviculture, ecology, forest engineering, and policy – new frontiers are emerging. Artificial intelligence (AI) and other digital technologies are reshaping the way we teach, learn, do research, and make decisions. From simulating forest dynamics to enhancing stakeholder participation, AI offers unprecedented opportunities. However, it also raises questions about ethics, data governance, and the human dimension of education. These issues were front and centre throughout the conference.

The Faculty of Forestry at the Technical University in Zvolen (TUZVO), the host of this year's conference, provided an ideal venue for these conversations. As one of the oldest and most respected institutions in forestry education in Central Europe, TUZVO has long played a pivotal role in advancing knowledge and practice. Its commitment to combining tradition with innovation is reflected not only in its academic curriculum, but also in its international engagement – of which the SILVA Network is a valued partner.

The conference program was thoughtfully designed to spark dialogue and collaboration. The opening keynote by Dr. Soňa Ftáčniková from the Slovak Centre of Scientific and Technical Information set the tone with a compelling address on the ethical dimensions of using AI in academia. Her presentation urged participants to reflect on the responsibilities that accompany technological progress and to ensure that digital tools are embedded within a value-driven framework.

Equally insightful was the second keynote by Dr. Tatiane Micheletti from the Technical University of Dresden, who joined remotely to discuss the application of AI in science and study. She

emphasized not only the technical potential of AI in analysing complex data, but also its transformative power in shaping how knowledge is produced, disseminated, and applied. Her message highlighted the importance of building digital literacy alongside traditional scientific competencies.

These keynotes were followed by a rich sequence of presentations demonstrating how AI is already being integrated into forestry education across Europe. Topics ranged from open educational resources and vertical harmonization of forestry curricula, to international degree programs and the use of AI in participatory forest governance. Notable contributors included representatives from the University of Sopron, University of Helsinki, Czech University of Life Sciences Prague, University of Lisbon, and University of Göttingen.

The sessions were moderated by experienced scholars from across the SILVA Network, and the discussions were characterized by openness, constructive critique, and mutual learning. Students from TUZVO were invited to participate, bringing youthful curiosity and thought-provoking questions to the table. Their involvement underscored a critical point: that any meaningful discussion of educational reform must be inclusive of those who are most affected – our students.

Beyond the lecture hall, the conference also fostered deeper engagement through informal gatherings, including a conference dinner in the historic town of Zvolen and a field trip to Banská Štiavnica, a UNESCO World Heritage Site. This excursion allowed participants to explore the historical and ecological dimensions of Slovak forestry, including a visit to the Municipal Forests of Banská Štiavnica and a tour of the Open-Air Mining Museum. These experiences highlighted the interdependence of cultural heritage, forest management, and community well-being – offering a living example of sustainability in practice.

A particular highlight of the conference was the General Assembly of the SILVA Network, where members reflected on the future direction of the network itself. One of the key outcomes was a commitment to further integrate digital competencies, including AI, into curricula across partner institutions. Participants also endorsed a continued focus on interdisciplinary approaches, international mobility, and stronger links between education and societal needs. As expressed during the moderated discussion led by Sandra Liebal, the challenge is not simply to add new tools, but to reimagine forestry education as an evolving ecosystem – adaptable, resilient, and reflective.

The General Assembly also marked an important transition in the leadership of the SILVA Network. We extend our deepest gratitude to Prof. Norbert Weber, who has served as president with vision, integrity, and unwavering dedication. Under his leadership, the SILVA Network expanded its impact and visibility across Europe. At the same time, we warmly welcome Prof. Bálint Heil as the new president of SILVA Network, and Dr. Mika Rekola as the new vice-president. Their combined expertise in educational reform, interdisciplinary cooperation, and academic innovation promises a vibrant future for the network.



Finally, we hope that the discussions held in Zvolen will continue to resonate within academic departments, research centres, and policy circles throughout Europe. As forestry education embraces reform, we must ensure that it remains not only scientifically rigorous but also socially relevant, ethically grounded, and well-integrated within the European context. The SILVA Network, through its vibrant exchanges and collective vision, offers a powerful platform to advance this mission.

**Jaroslav Šálka on behalf of the editorial and organizing committee**

*Zvolen, June 2025*

## 2 Ethical aspects of the use of AI in academia

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### **Abstract**

The presentation focuses on the issue of publication ethics in the age of AI and beyond. It explores the reasons behind the violation of fundamental principles of research integrity, such as honesty, reliability, respect, and accountability. A significant challenge in today's scientific landscape is the prevailing mindset of "publish or perish" and "funding or famine," which prioritizes the quantity of research over its quality.

This mentality has led to numerous negative impacts on academic practice, including a rapid increase in the number of publications, a marked decline in quality, the reproducibility crisis, the rise of paper mills and predatory journals, an increasing number of retractions of published work, and the inappropriate use of generative artificial intelligence (AI).

### *Acknowledgements*

ChatGPT (version CHPT-4, Open AI) was used to check grammar and improve syntax during the preparation of this summary. No content was generated by the AI model without author oversight, and all intellectual content is the author's own.

### 3 Artificial Intelligence as a Tool for Strengthening Social License in Social Forestry: Towards Transparent and Participatory Forest Governance

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#### **Abstract**

Social forestry represents an approach to forest management that emphasizes a balance between environmental sustainability, economic needs, and the active participation of local communities. In the context of growing public scrutiny over land-use decisions and declining trust in professional institutions, restoring the so-called social license to operate is a crucial precondition for the legitimate governance of forest ecosystems. This paper explores the potential of artificial intelligence (AI) as a means to enhance transparent communication, participatory decision-making, and trust-building among stakeholders in the context of social forestry. Drawing on theoretical frameworks of environmental justice and digital transparency, we analyze examples of predictive modelling, interactive data visualizations, and open digital platforms used for community engagement. Special attention is given to the role of forestry education in preparing professionals to use AI in ways that are ethically sound, socially responsive, and technically competent within community-based forest management settings. The paper argues that integrating AI into social forestry is not merely a matter of technological innovation, but also a cultural shift in approaches to natural resource governance.

## 4 Application of Artificial Intelligence in Education and Research at the Faculty of Forestry, University of Sopron

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### **Abstract**

Artificial Intelligence (AI) plays an increasingly important role in education and scientific research at our Faculty. We are supporting this with several initiatives, including introducing various free applications and launching subscriptions to AI-based tools such as ChatGPT 4.0 and Midjourney, which are accessible to Faculty staff. These tools can directly assist in curriculum development, task creation, and creative visualization. For decades, we have been utilizing machine learning techniques in research, particularly in image processing and large-scale spatial data analysis. Large language models are also employed for processing scientific literature, translation, and proofreading. Additionally, we have established Faculty guidelines for AI usage to help our educators and researchers engage with this emerging field.



## 5 Vertical Harmonization of Forestry Education in Hungary

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### Abstract

Forestry education in Hungary is undergoing significant transformation to ensure alignment with contemporary societal, technological, and environmental expectations. This presentation explores the concept of vertical harmonization in forestry education, spanning secondary vocational training, higher education, and professional continuing education. The initiative aims to establish seamless progression pathways between educational levels, strengthening competencies essential for sustainable forest management.

Building on insights from previous SILVA Network conference presentations, this study examines the structural and educational reforms at the **University of Sopron**, the establishment of the **Forest Knowledge Centre (Erdészeti Ágazati Tudásközpont - EÁTK)**, and the current collaboration with **Kisalföld ASZC Roth Gyula Forestry Technical School** in secondary-level forestry education. These initiatives aim to create a coherent educational framework that ensures knowledge continuity and professional development across different levels of forestry education.

A key aspect of this evolving cooperation is the expansion of joint activities through projects such as the „**Demonstration Enterprises Support Program**” under the "VP1-1.2.1-23" initiative. This project will establish cutting-edge demonstration sites where students and professionals can gain hands-on experience, bridging the gap between theoretical learning and practical application. We are planning a scientifically based vocational training and pedagogical experiment, in which forestry workers and technicians will solve project tasks together with forest engineering and PhD students.

The findings of this study highlight crucial structural changes, including competency-based training, interdisciplinary course development, and the increasing role of **digital tools, AI applications, and remote sensing in forestry education**. Strengthening cooperation between universities, vocational schools, and industry stakeholders is essential for fostering professional adaptability and lifelong learning. The presentation will conclude with recommendations for advancing a **balanced education model**, integrating traditional forestry expertise with modern technological advancements, ensuring forestry education remains relevant and future-ready in Hungary and beyond.

## 6 Green Business dual degree programme

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### **Abstract**

The Dual Master's Programme in Green Business is a joint programme between the University of Helsinki (UH) in Finland and the University of British Columbia (UBC) in Vancouver, Canada. Students start their studies at UBC in Canada and continue the second year at the UH in Finland. Upon graduation, students receive two degrees: a Master of Science in Agriculture and Forestry (MSc AF) from UH, and a Master of Forestry (MF) from UBC. Presentation discusses joint programme administration and online teaching using appropriate digital tools.

## 7 Mediterranean Forestry and Natural Resources Management (MEDfOR)

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### Abstract

Mediterranean Forestry and Natural Resources Management (MEDfOR) is a two-year English language world-class Master of Science program. It answers a call from the Mediterranean forestry community for a coordinated approach to develop reliable information and tools - based on sound science and multidisciplinary -, to improve forestry and natural resources management in the Mediterranean as well as in other regions facing similar challenges. MEDfOR brings together the best expertise, human resources and facilities in a consortium that involves seven universities in four countries (Portugal, Spain, Italy and Turkey) with outstanding education, research and outreach experience 1) to educate the next generation of leaders in forestry and natural resources and land management in the Mediterranean region and 2) to contribute to the solution of forestry, natural resources and environmental challenges throughout the region and the world. MEDfOR has developed and tested successfully over 12 former editions an innovative and integrated approach to graduate-level and specialization programs to provide students with advanced knowledge on all relevant domains. There is only one joint annual call, application, assessment and admission procedure. In the first year, students acquire a thorough graduate-level expertise tailored to the diversity of backgrounds and interests at either the University of Lisbon, the University of Lleida or the University of Padua. This provides the basis for the development of five 3rd semester specializations coordinated by the universities of Lisbon, Lleida, Padua, Tuscia and Valladolid, respectively. The thesis work builds from the specialization and may be developed in any of the seven partner universities. All MEDfOR students meet in a Winter School in the first year and in a Summer Event in the second year that combine field work, seminars and further communication and exchange opportunities between the 7 partner universities as well the 60 associated partners and 5 stakeholders from 26 countries (Albania, Algeria, Australia, Bolivia, Brazil, Canada, Chile, Ethiopia, Finland, France, Greece, India, Israel, Italy, Macedonia, Morocco, New Zealand, Palestine, Portugal, Serbia, Slovenia, South Africa, Spain, Tunisia, Türkiye, USA, Vietnam). Master candidates may obtain either a double or a triple degree as well as a joint degree, all fully accredited.

## 8 The use of AI in Study and Science

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### **Abstract**

Artificial intelligence (AI) is nimbly integrating into both academic study and scientific research, fundamentally reshaping how knowledge is acquired, processed, and disseminated. This transformative presence introduces significant efficiencies and new capabilities, but also poses important challenges that demand attention. In the realm of academic study, AI tools can enhance learning processes through personalized content delivery, efficient information synthesis, and support for language and writing proficiency, particularly for non-native speakers. These applications foster greater inclusivity and can democratize access to educational resources, enabling students to navigate complex subjects and communicate ideas more effectively. For researchers, AI accelerates scientific inquiry by aiding data analysis, streamlining literature discovery and assisting in initial manuscript drafting and data organization, boosting overall research productivity. However, the widespread adoption of AI is not without its complexities. AI models, especially generative ones, are prone to factual inaccuracies (denoted “hallucinations”) which can introduce misinformation into scholarly work if outputs are not critically verified. Inherited biases from training data also mean AI systems can inadvertently perpetuate stereotypes or skewed perspectives, demanding human oversight to ensure fair representation and unbiased analysis. The integrity of scholarly work is further challenged by the potential for AI-generated content to dilute originality and complicate accountability, particularly in authorship and peer review. The emergence of sophisticated AI-generated visual and textual content also necessitates enhanced verification strategies. Effective integration of AI into study and science requires a balanced approach. This involves maximizing AI's beneficial applications while implementing robust strategies for quality control. Emphasizing critical human evaluation of AI-generated content, fostering AI literacy, and establishing transparent guidelines for its use are crucial steps. Ultimately, the responsible and informed use of AI can unlock new frontiers in both education and scientific discovery, provided a commitment to human judgment and integrity remains paramount.



## 9 Open Educational Resources (OER) and AI – the essence of quality

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### Abstract

Open Educational Resources (OER) have been used for over 20 years to promote open learning. Online platforms enable the publication, modification, and reuse of various educational materials, thereby improving the accessibility and quality of education. Materials could be various such as PPT-presentations, videos, podcasts, course syllabuses, lecture handouts, instructor insights, or assignments.

OER platforms have not yet fulfilled its potential, but the increased use of artificial intelligence (AI) could significantly change this situation. The presentation examines the functionality, management systems, and incentives for using OER platforms, especially from the perspective of new technology. The increasing use of AI complicates rights management, necessitating new solutions and business models. The focus here is on the quality of the materials, monitoring, recognition, and appreciation of teachers who produce it with the aim of enhancing the quality of university education globally.

Artificial intelligence can be used in the automatic content analysis of OER materials to ensure certain quality standards, such as fact-checking, readability, and accessibility. In ensuring the quality of materials through peer review systems, AI can identify the best reviewers for each material and automate the review process. AI can support personalized learning experiences by analyzing students' performance and adapting learning materials to individual needs.

The threats of AI with OER are related to so-called hallucination errors, which can result in learning materials containing incorrect information or their quality being misjudged. AI models can inherit biases and inequities from their training data, thereby undermining the diversity and comprehensiveness of the materials.

Using OER platforms forest science professors and programme leaders could benchmark other programmes about their curricula. Teachers could share their teaching materials and find good materials by others and potentially earn credits similar to scientific publications. The role of AI in OER systems is demonstrated and discussed around university level forest education.

## 10 Proposals for European Higher Education Cooperation within the SILVA Network

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### Abstract

With the proposals outlined in our presentation, we aim to support the operation of the SILVA Network. We will review European international higher education umbrella organizations and their forms of cooperation, with a particular focus on their success while also highlighting critical limiting factors and challenges. Based on this information, we will propose the launch of a specific multi-degree program, including individual courses, potentially linked to other networks, which forestry higher education students across Europe could join.

We propose initiating a framework and operational model that would allow higher education partners to incorporate the most pressing and relevant topics into these programs. These topics could include climate change and climate mitigation, artificial intelligence and the smart forest concept, the most advanced remote sensing techniques, and the applications of robotics in forestry. Additionally, we will suggest ways to ensure vertical alignment in forestry education (from secondary/technical education through BSc, MSc, PhD, and postdoctoral levels) within these collaborative frameworks.

## 11 The Use of Artificial Intelligence in Academic Education Experiences at the University of Göttingen, Germany

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### Abstract

The use of artificial intelligence has already become a reality in many areas of our lives. This is especially true in academic education. The question of "if" is no longer "if," but rather "how" it should be applied. Staff members of the study organization and lecturers at 16 institutes of the Faculty of Forest Sciences and Forest Ecology were surveyed on the use of artificial intelligence. A distinction was made between applications in teaching, research, and administration. All respondents now use AI applications in some form, primarily for translation, text correction, and language optimization, as programming aids, or for image analysis. Depending on the field, other application options exist. The group with the most frequent AI software use is international doctoral students. The university's IT department has compiled a comprehensive list of AI software that is available to all members of the university. There are currently only a few special courses that teach students about the possibilities, but also the risks, of AI applications. These courses are primarily offered by research assistants. However, professors certainly see a need to expand the offerings in this area in the future. The problem of grading written examinations (term papers, bachelor's and master's theses), which makes it difficult to clearly distinguish between the student's own work and that of AI (Chat GPT), is assessed differently by lecturers. Examination regulations have since been amended so that, for example, master's theses should only be graded in conjunction with a defense.

## 12 Discussion Results

Discussion Topic:

Recommendations for integrating the AI in the curricula: Do's and Don'ts  
for AI in higher forestry education

During the discussion, diverse Do's and Don'ts have been collected and clustered. In order to integrate AI into higher forest education, we should:

- Establish AI as a content and teaching method in forest study programs: Students should know how to use it (wisely).
- Foster critical thinking also with regard to AI: Don't believe everything AI says, review everything!
- Allow common experience by co-creating knowledge, sharing best-practice and continuously learn about further developments: Do what you praise and train the different methods and tasks AI offers!
- Provide rules and guidelines for the application of AI both for teachers and students
- Harmonize the legal background between universities and education facilities
- Re-think how to assess learning processes and outcomes: Are AI-supported thesis acceptable when considering that AI use needs various skills (e.g., in prompting, checking results and references)?
- Provide the infrastructure for AI, e.g., local storage options for uploaded content, access to full versions of AI software, regular surveys about how students and teachers use AI, whitelists for journals which are peer-reviewed and not solely AI-reviewed

We all agreed that AI has emerged to stay. It doesn't make sense to forbid or avoid it. We should develop (it) together.



## 13 Group photos



Group photo in the conference room



Group photo taken on the excursion

## 14 Change of presidency

In the General Assembly of the SILVA Network Meeting in Zvolen, Prof. Dr. Bálint Heil (University of Sopron, Hungary) was officially elected as the new President of the SILVA Network. He will be supported in his work by the newly elected Vice President Dr. Mika Rekola (University of Helsinki, Finland).

We would like to express our sincere gratitude to the former president, Prof. Dr. Norbert Weber (Dresden University of Technology, Germany), for his longstanding and dedicated commitment to the SILVA Network. Through his tireless efforts and continuous support, the Network has gained considerable visibility and recognition as a reliable cooperation partner. His invaluable contributions have successfully guided SILVA Network through a period of changing societal expectations and structural transformations in higher forestry education. We are deeply thankful for his outstanding achievements.



Prof. Dr. Norbert Weber (left) and Prof. Dr. Bálint Heil (right)