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COMMENT

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Shaping the scientific future of environmental sciences in times of multiple crises: a summary of the 12th SETAC Young Environmental Scientists Meeting in Landau in der Pfalz 2023 -

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Abstract

SETAC has a long-standing history of supporting students and early career scientists in the fields of ecotoxicology and environmental chemistry. The Student Advisory Council (SAC) advocates for the diverse interests of young SETAC members offering guidance to peers and serving as a resounding voice for aspiring scientists in dialogues with the SETAC Europe Council.

Founded and shaped by a rewarding liaison between SETAC Europe and its German Language Branch, the SAC now has a strong international representation, with its members being distributed all over Europe. With this publication, we want to build upon the relationship between the SETAC Europe students and the SETAC German Language Branch.

The Young Environmental Scientists (YES) Meeting, which was first held as a regular conference 14 years ago, is a keystone event organized by the students of SETAC and the SAC. This year, in 2023, the 12th YES meeting took place in Landau in der Pfalz, Germany.

Not only has it been the first European *in-person* YES Meeting since the COVID-19 pandemic, but with this year's iteration, the YES meeting returned to its roots in Landau, where 2009 the very first YES meeting was hosted. From August 28th to September 1st, 107 participants from 37 countries and five continents had the opportunity to showcase their research in seven thematic sessions, engage in four workshops, listen to six expert/career talks, and two keynotes from established scientists. In reference to the meeting-motto *science through crises*, this comment pays special emphasis on topical program points in touching the ongoing multiple crises. We are convinced that sharing our experience from hosting this conference will underline the importance of continuing this unique meeting format and hopefully inspire future scientific events organized *by students for students*.

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Background

SETAC has a long-standing history of supporting students and early career scientists in the fields of ecotoxicology and environmental chemistry, who make up about 25% of the SETAC Europe membership. Their interests have a strong voice within the community and are represented through the Student Advisory Council (SAC), where every student member can stand for election or become active as an associate member.

Founded and shaped by a rewarding liaison between SETAC Europe and its German Language Branch [1], the SETAC Europe Student Advisory Council now has a strong international representation, with its members being based in various countries all over Europe. In May 2021, SETAC Europe members changed the societies articles of association to enable the students of SETAC to have a representative voice with voting privileges within SETAC Europe governance in the form of a Student Representative in the SETAC Europe Council [2].

The Young Environmental Scientists (YES) Meeting, which was first held as a regular conference 14 years ago, is a keystone event organized by the students of SETAC and the SAC. The YES meeting is traditionally organized for students by students, in recent years with support from the office of SETAC Europe. Attended by students and recent graduates from across the world, this unique meeting format enables a low-key and friendly atmosphere among peers at the same or similar career stage while still maintaining the characteristics of a professional, scientific conference. For many attendees, the YES meeting is the very first scientific conference attended, thus setting the bar for future conference experiences. This is especially valuable as the attendee can give a presentation to an audience of peers while promoting networking between young researchers; forming friendships, future collaborations, and/or (with a twinkle in the eye) rivalry. To ensure broad inclusivity, no registration fee is charged for participation, and fundraising campaigns ideally ensure grants for all students requiring additional travel support. The only requirements for attending are an active SETAC Europe Student membership and contributing with a scientific presentation on their sound scientific research in environmental sciences.

This year's iteration of the Young Environmental Scientists meeting, the 12th in order, returned to Landau in der Pfalz (Germany), where the very first YES meeting took place in 2009 [3, 4]; now under the lead of Frederik Meyer (Meeting Chair), Sophie Oster (Meeting Co-Chair), and Tobias Schmitt (Meeting Co-Chair). After months of intensive planning, the first *in-person* YES meeting in Europe following the COVID-19 pandemic took place from August 28th–September 1st, 2023.

Aside from the passion for science, students and early career scientists share the fact that they are immediately impacted by the multiple ongoing crises (e.g., biosphere, chemicals, climate, economy, energy, pandemic, social injustice, wars, to name a few) affecting all of us right now [5, 6]. These crises do not exist in a vacuum alone but interact and synergize with the uncertainties of our shared future. Especially the younger generations must navigate these uncertainties with fewer experiences than those from the "older" and established generations. Hence, this year's YES meeting's overarching theme, "***Science Through Crises***", provided a broad platform to discuss current scientific, but also personal challenges among the attendees. For the first time, the YES meeting dedicated a whole session to the concept of "*One Health*", an increasingly popular field of research with the aim to understand and disentangle the complex interdependencies between possible negative impacts of damaged environments and human wellbeing. Framed by two overarching keynotes and a variety of career and expert talks, the week offered plenty of insights into ongoing environmental research, topics beyond the normal scientific discourse and new perspectives on how the current crises can be challenged. In this short communication, we want to present the highlights of the 12th Environmental Scientists Meeting (Figs. 1, 2).

Monday—opening

Monday evening kicked off what was to be a full week of science and networking (Fig. 2, Table 1). The meeting chairs, Frederik Meyer, Sophie Oster, and Tobias Schmitt, greeted the newly arrived participants, followed by welcoming statements by the SAC chair, Markus Schmitz, and former SETAC Europe president, Mirco Bundschuh. After these warm and welcoming words, Prof. Dr. Henner Hollert delivered a memorable opening plenary. In his presentation, he introduced the audience to stimulating thought-starters on the meeting's overarching topic, "*Science Through Crises*", covering the triple crisis we are all facing and the urgency of actions with a presentation titled *"Environmental Impacts of Chemicals—Beyond the Planetary Guardrails?"*. Notably, Henner delivered his presentation as a literal graphical abstract of biodiversity loss and global change—dressed as a dinosaur! Being a long-standing SETAC member and SETAC Fellow Award holder, he also underscored the ongoing

Fig. 1 Group picture with the attendees of the YES2023 Meeting

The 12th Young Environmental Scientists Meeting: Facts & Numbers:

When?	From August 28th to September 1st, 2023
Host:	By the SE SAC at the RPTU Kaiserslautern-Landau in Landau in der Pfalz, Germany
Number of organizers:	
- Meeting (Co)Chairs:	3 (Frederik Meyer, Sophie Oster, Tobias Schmitt)
- LOC-members:	Current SAC
- Volunteers:	27
- Scientific Commitee members:	11
Total number of abstracts received:	153
Total number of participants (inc. Organizers):	107
Standing funding support from SETAC Europe:	10,000 €
Tital amount of funding acquired:	8,893 €
Total amount of travel grants provided:	28 Grants totalling 4,325€
Countries represented:	32 (continents represented: 5)
Program:	7 scientific sessions, 4 Workshops, 6 Career/expert talks, 2 Keynotes
Scientific contributions:	50 Talks; 53 Posters:
Associate members joined the SAC:	+ 6
Preparatory meetings:	monthly, beginning 1.5 years before the YES + whenever needed for specific purposes

Fig. 2 YES2023 meeting metrics

and historical traditions of the YES meeting and of the SETAC community.

For an opportunity to sample some local cuisine, participants enjoyed wine and flammkuchen while making new connections and reuniting with old friends (Figs. 1, 3). Soon, everyone found a team to participate in the following Pub Quiz. Through several entertaining rounds, the knowledge from different subject areas such as music, biology or definitions was tested. After the winning team was coronated, tables were moved to the side, and the music turned up a little louder until everyone found their way back home to rest and prepare for the next day's intense program. It was an excellent start to the week, and it was wonderful to see how everyone was looking

Table 1 Overview of Platform-Presentations at the YES2023 Meeting

Session	Author	Title
Aquatic ecotoxicology	Bruno et al., University of Aveiro, Portugal	Toxicity of Antineoplastic drug mixtures to Danio rerio larvae
	Bertold et al., GU Frankfurt, Germany	Ecotoxicological Implications on Releasing Reverse Osmosis-Concentrates and Antiscalants into the Environment
	Carneiro et al., CESAM & University of Aveiro, Portugal	Effects of a Nanomaterial and an Antineoplastic Agent in Zebrafish
	Costa et al., CESAM—University of Aveiro, Portugal	Does light pollution affect zebrafish embryos response to the antineoplastic drugs?
	Janhal et al., Goethe University Frankfurt, Germany	Impact of Salt of the Toxicity in Textile Dyes in Neurotoxic Endpoints in Danio rerio and Genotoxicity on Cell-Based Level
	Kempkens Palacios et al., Goethe University Frankfurt, Germany	Integrated toxicological analyses of marine micro- and nanoplastic particles using in vivo and in vitro bioassays
	Kokotovic et al., University of Zagreb, FoS, Croatia	Exploring The Combined Effects of Emerging Contaminant and Elevated Water Temperature on Aquatic Moss
	Nelles et al., University of Bremen, Germany	Acute Toxicity of Four Pesticide Formulations in Binary Mixtures on Daphnia magna
	Ohanessian et al., LIEC- université de lorraine, France	Effects of di-n-butyl phthalate (DBP) on life history traits of Daphnia magna: comparison of two exposure windows
	Padilla et al., University Federico II, Italy	Why is pH an important factor when testing Rare Earth Elements toxicity?
	Rodriguez Satizabal et al., NIVA, Norway	Early Developmental Effects of Copper (II) Sulfate Pentahydrate on the Green Sea Urchin Strongylocentrotus droebachiensis
	Stadelmann et al., University of Amsterdam, Netherlands	Aquatic Ecotoxicity of Safe and Sustainable by Design Organophosphate Flame Retardants
	Vannan et al., RPTU Kaiserslautern Landau, Germany	Direct and Indirect Effects of a Chemical Mixture towards Periphyton and its Grazer Cloeon dipterum
	Zetzsche et al., Örebro Universitet, Sweden	Transgenerational Behavioral Effects of Perfluoroalkyl Substances (PFAS) in Zebrafish
One health	Dhananjalee et al., University of Peradeniya, Sri Lanka	Geo-environmental implications of the progression of Chronic Kidney Disease of unknown etiology (CKDu) in the dry zone of Sri Lanka
	Limke et al., IUF—Leibniz Research Institute, Germany	Tire components and rising temperatures accelerate aging pathways and neurodegeneration
	Dong et al., University of Amsterdam, Netherlands	The influence of bio-based fertilizers on the sorption behaviour of pharmaceuticals in soil
	Lalas et al., Tokyo City University, Japan	Germination as a Carbon Reduction and Nutrient Enhancing Solution: A Life Cycle Assessment on Novel Cultivation Method for Plant-based Meat
	Saarloos et al., Wageningen University, Netherlands	Pesticide Exposure Assessment in (Migratory) Birds
Terrestrial ecotoxicology	Ehigie et al., Helmholtz Centre for Env Res—UFZ, Germany	Pharmaceuticals and Personal Care Products; Ecological and Environmental Concerns for Soil Fauna
	Kluczek et al., Goethe-University Frankfurt, Germany	Toxicity of Arsenic-Contaminated Soils to Folsomia candida After a Short-Term and Long-Term Exposure
	Korz et al., RPTU, iES Landau	Effect of Deoxynivalenol on Soil Nitrification
	Reiff et al., RPTU Kaiserslautern Landau, Germany	Fungicide reduction enhances beneficial arthropods in grapevine
	Timofieieva et al., Jagiellonian University, Germany	Metal Transfer from Insects to Bats in a Metal-contaminated Environment

Table 1 (continued)

Session	Author	Title
Analytical chemistry	Bankole et al., University of Granada, Spain	Eco-friendly elimination of 14C-phenanthrene by the newly isolated marine-derived fungus, Mucor irregularisusing response surface methodology
	Beloqui Ezquer et al., Linköping University, Sweden	Study of Short- and Medium- Chain Chlorinated Paraffins (S/MCCPs) in indoor dust using High-Resolution Mass Spectrometry (HRMS) in Negative Chemical (NCI) and Electron Impact (EI) ionization modes
	Faisal et al., Dalian Maritime University, China	Contamination Patterns and Sources of Heavy Metals in a Typical Urban Zone
	Harsha et al., University of New Orleans, USA	Into the Unknown: Examining Analytical Techniques for Monitoring Hydrocarbon Oxidation Products in Ballast Water Treatment
	Honert et al., iES Landau, RPTU, Germany	Pesticide Residues Over the Course of a Year in Soil and Vegetation of Fields and Meadows
	Moslah et al., Center Mahmoud Yaccoub for Urgent Medical Assistance (CAMU), Tunisia	Sewage Analysis as an Effective Tool for Monitoring Contaminants of Emerging Concern, Including Drug of Abuse and New Psychoactive Substances, in Tunisia
	Werz et al., Örebro University & Ragn-Sells, Sweden	A novel Accelerated Solvent Extraction Method for Comprehensive Pollutant Profile Characterization in Sewage Sludge
Microplastic	Al Jabri et al., Sultan Qaboos University, Oman	Effects of Microplastics on the Gut Microflora, Behavior & Histology of Zebrafish
	Bučaitė et al., Nature Research Centre, Lithuania	Assessing Risks Associated With Microplastic Exposure: Cytogenetic Evaluation On Different Ontogenesis Stages Of Salmonid Fish
	Cüpper et al., Goethe University Frankfurt, Germany	In-vitro toxicity of highway runoff samples using mechanistic reporter-gene assays
	Davies et al., University of Birmingham, United Kingdom	The Suitability Of Standard Soil Assays To Study The Biodegradation Of Microplastics
	Teggers et al., INVITE GmbH/Fraunhofer IME, Germany	The inclusion of supplementary analysis within a standardized biodegradability testing framework has the potential to provide enhanced comprehension of microplastic degradation
	Pavlíková et al., Masaryk University, Czech Republic	Plastic Microfibres in Remote Scottish Soils: What Influences Their Distribution and Abundance?
	Rozman et al., University of Ljubljana, Slovenia	Microplastics in wastewater can affect nutrient removal in constructed wetlands
	Ugwu Hernandez et al., MTM Örebro University, Sweden	High levels of small microplastics (> 40 µm) in compost samples from Scandinavia: An important contributor to soil toxicity?

Table 1 (continued)

Session	Author	Title
Computational ecotoxicology & alternative to animal testing	Allner et al., GOBIO, Germany	Assessing Molecular Initiating Events in vitro to replace animal testing
	Luckner et al., Fraunhofer IME, Germany	Transcriptomic Profiling of Clobetasol Propionate Induced Immunosuppression During TLR-7-Dependent Immune Challenge in Zebrafish Embryos
	Ashfield et al., University of York, United Kingdom	Development and Evaluation of Simplified Machine Learning Models for the Prediction of Sorption Coefficients for Ionisable Pharmaceuticals in Soils and Sludge
	Bürger et al., Osnabrück University, Germany	Performance and Robustness of General Unified Threshold model of Survival (GUTS) Models on Acute and Chronic Stressor Datasets
	Herrmann et al., iES, RPTU Kaiserslautern Landau, Germany	Temporally extended occurrence of pesticides based on monitoring databases – Knowledge from Europe
	Scharlach et al., Osnabrueck University, Germany	Comparing Simple Fate Model Estimates to Data from Surface Water Monitoring for the Identification of Important Input Parameters
	Schröder et al., RWTH Aachen University, Germany	Multivariate Time-Series Analysis for Sensitive Evaluation of Behavior Data From the Light/Dark Transition Test With Zebrafish Larvae
Mechanistic ecotoxicology	Aldehoff et al., Helmholtz UFZ Leipzig, Germany	Exploring Lysine Acetylation and Phosphorylation in Adipocyte Differentiation and their Exposure to Emerging Plastic Additives
	Gallois et al., LIEC—CNRS/UL—Nancy, France	Combining Multi-Omics Approaches to Reveal the Response of a Microbe-Poplar Holobiont to a PAH Contamination Gradient
	Jafari et al., University of Stavanger, Norway	Eye Development Effects of Antidepressants Amitriptyline and Metabolite Nortriptyline in Zebrafish on Multiple Levels of Organisation
	van der Most et al., Wageningen University, Netherlands	Exploring the Complexity of Antidepressant Effects in Ecotoxicology: Low Dose and Non-Monotonic Effects of Fluoxetine on Caenorhabditis Elegans Behaviour

forward to meeting peers in person, talking, and forming bonds.

Tuesday through thursday

The first full day of the YES Meeting began with several workshops that occupied the whole morning; all highly participated and resulting in positive and constructive feedback both from attendees and invited trainers (Fig. 4). Three PhD students from the research training group Systemlink funded through the German Research Foundation (DFG) [7], Franziska Fiolka, Stéphane Mutel and Agnes Schöndorfer, offered an interactive workshop about "*The Transfer of Anthropogenic Stress from Aquatic to Terrestrial Ecosystems—Perspectives from Young Researchers*". Dr. Jochen Zubrod, a former SAC member and organizer of the 3rd YES meeting in 2013 in Poland [8], gave a collaborative workshop about "*Data Science, Machine Learning, and Artificial Intelligence and their Potential for Environmental Protection and Nature Conservation*". Dr. Pranoti Kshirsagar dealt with the very important topic of science communication in her workshop "*Build your Digital Brand—Scientist Edition*". Last but not least, Eric Bollinger gave the attendees interesting insights into "*Stable Isotopes in Ecotoxicology—an Introduction to Concepts, Methodology and Applications*".

After a gain of knowledge in the morning and a strengthening lunch break, the first scientific sessions started—"*Aquatic Ecotoxicology*" and "*One Health*" (see Additional file 1). Feedback and questions from the audience generated very interesting discussions and even potential collaborations. The poster sessions during coffee breaks proved to be very important moments for participants' networking in a relaxed way and for fruitful discussions. Posters were, overall, well attended; the layout of the poster session—on the walls of the main square of the conference, where the breaks took place—also helped interactions and interest in the work presented. As the day was heading to an end, Dr. Patrick Baudy-Groh (BASF) kicked off his expert talk by delving into the "*Challenges of Testing the Aquatic Toxicity of 'Difficult Test Chemicals' for Regulatory Purposes*"—one of many talks emphasizing the need for transdisciplinary

Fig. 3 Flammkuchen and preparing for science

Fig. 4 Workshop at the YES2023 Meeting

thinking to bridge the gap between ecotoxicological testing and application of scientific result in regulation and governance. Thus began the social programme of the day, starting with the launch of the workshop series *SAC Café*, snacks and board games. The day was rounded off with a gathering in an Irish pub, karaoke and the famous student party with Fola Ogumgbemi on the turn tables.

The third day of the conference started with a career talk given by Dr. Clara Mendoza-Lera (Research Associate and Stream Biogeochemistry Team Leader at the RPTU Kaiserslautern-Landau), who told the attendees *a "Gender-Biased Tale of Flow and Nutrients"*. In her talk, Clara gave valuable insights into the constant challenges and opportunities of young researchers aiming to continue working in academia by guiding the audience through the keystones of her own career. Afterwards, poster and platform sessions filled the day, which was concluded with an expert talk about "*Reducing Vertebrate Testing in Pesticide Risk Assessment"* by Dr. Elena Adams and Dr. Daniel Faber from Bayer Crop Science. A voluntary fitness course was offered by personal trainer Tayfun Simsek for the evening program to gather new momentum after half of the meeting. The second last day was again filled with exciting platform presentations and the second career talk, this time held by Jun.-Prof. Dr. Elisabeth Berger (Leader of the Social-Ecological Systems group at RPTU Kaiserslautern-Landau) about the "*Perks and Challenges of Academic Careers"*. In her talk, Elisabeth emphasized the importance of a truly supportive and caring network for maintaining your mental health. Eventually, there is no right or wrong way to find one's place in this world after graduating, and her presentation relieved a lot of pressure from "thinking in different (predestined) career pathways." Dr. Leonie Müller (RWTH Aachen University & Altertox Academy) rounded off the day with her expert talk on "*Policy and Environmental Science—Cross-Roads, Chances and Challenges"*. Leonie presented inspiring insights into how scientific evidence can be communicated in different ways to be applied in regulation and governance and shared her own perspectives from her experience working at the interface of science and governance and lobby. In the afternoon, an excursion to the Julius-Kühn-Institute (Federal Research Centre for Cultivated Plants) in Siebeldingen gave insights about how they develop resource-conserving, economically viable and socially acceptable crop production systems against the backdrop of climate change on the example of viticulture (Fig. 5).

Friday—closing

Friday was the fifth and final day of the conference. In the morning, sessions began with a career talk from Marissa Kosnik of Eawag. Marissa Kosnik is a new tenure-track Group Leader in Systems Biology in the Department of Environmental Toxicology, where her group researches the multi-level biological impacts of stressors on aquatic ecosystems. She was kind enough to discuss how "*Going with the Flow and Enjoying the [unexpected] Journey*" has helped her through setbacks and has carved the path for her career up to this point. In her very personal presentation, Marissa shared her own journey step by step, encouraging the audience not to be intimidated by insecurities and always take a step back when needed and re-evaluate one's own current situation. She also discussed things she would do differently in her career path in hindsight, things she wishes she'd known sooner, and the importance of being willing to follow a moving target. This talk provided valuable insights for participants who are currently in the process of forging their own early career paths. Following the career talk, participants joined morning presentation sessions.

The two morning platform presentation sessions were focused on "*Microplastics*" and "*Mechanistic Ecotoxicology*". After platform presentations were concluded, participants joined a lunch break and poster session. Participants enjoyed flammkuchen (one more time), discussed remaining posters, and took pictures to commemorate a great YES2023 Meeting.

Jutta Paulus, a member of the Greens/EFA in the European Parliament, gave the final Keynote of the meeting *"Between Healthy and Toxic—From Nature Restoration Law to REACH—an Unfiltered Update from the European Parliament"*. In her talk, she discussed the realities of navigating varying perspectives in policy-making and advised attendees to remain optimistic and effective in the face of frustration and environmental crises. After a whole week of science and insightful career and expert talks, this plenary was a perfect climactic summary of how environmental sciences are needed to inform governance and what challenges scientists face when communicating findings to regulatory bodies. Moreover, the talk was a motivating plea for continuing engagement in providing environmental sciences a powerful lobby in politics despite all pressure from various sites. Finally, the Student Advisory Council closed the meeting with a brief presentation, looking back on the meeting. Participants were asked to reflect on the friends they had made, the science they had learned, and the perspectives they had gained over the course of the week. With special thanks to the volunteers and the Local Organizing Committee, the YES2023 Meeting was called to a close.

Conclusion

Not applicable.

Fig. 5 YES2023 Meeting attendees in vineyards of the Julius Kühn-Institute

Supplementary Information

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Additional file 1: YES Programme Book_Final.pdf.

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Author contributions
MS: conference organisation/project administration, supervision, conceptualization, writing—original draft, writing—review and editing, funding acquisition. FM: lead conference organisation/project administration, supervision, conceptualization, writing—original draft, writing—review and editing, proof reading, funding acquisition. SO: lead conference organisation/project administration, supervision, conceptualization, writing—original draft, writing—review and editing, proof reading, funding acquisition. TS: lead conference organisation/project administration, supervision, conceptualization, writing—original draft, writing—review and editing, funding acquisition. BD: conference organisation/project administration, funding acquisition, writing—review and editing. BG: conference organisation/project administration, writing—review and editing. HL: conference organisation/project administration, writing—review and editing. CPR: conference organisation/project administration, writing—review and editing. MS: conference organisation/project administration, writing—original draft, writing—review and editing. MW: conference organisation/project administration, writing—original draft, writing—review and editing. KW: conference organisation/project administration, writing—original draft, writing—review and editing. AN.M. E: conference organisation/project administration, supervision, writing—original draft, writing—review and editing.

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Availability of data and materials
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Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
All attendees of the YES2023 meeting agreed to use photos taken at the conference for publication. This agreement was part of the conference registration form, and a list can be provided upon request.

Competing interests
The authors declare that they have no competing interests.

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Publisher's Note