

### **“The health impacts of climate change are real, immediate, and often felt most acutely by vulnerable communities”**

**An Interview with lead scientists Dr. Kathrin Foshag (Geography) and Dr. Kathrin Zangerl (Medicine)<sup>1</sup> on their project “Stay Cool! Interdisciplinary Perspectives on Heat and Health” that created digital learning materials for fostering climate-health literacy and societal engagement**



**HINT:** Welcome Dr Kathrin Foshag and Dr Kathrin Zangerl, and thank you for taking the time to speak with us about your recent interdisciplinary teaching project “Stay Cool! Interdisciplinary Perspectives on Heat and Health”. Before we get into the details of this fascinating initiative that brings together two disciplines on questions of climate change, health and societal engagement, it would be great to learn more about your academic backgrounds, and what led you to this field.

**Zangerl:** Sure. I am a pediatrician and global health researcher with a particular focus on planetary child health. My research interest in this field grew out of my clinical experience in both the Global North and the Global South, where I saw firsthand how environmental changes profoundly affect human health – and especially child health. I am excited to explore how we can improve child participation and citizen science in general in the areas of decision-making processes, adaptation planning, and heat-health action plans on the one hand. On the other hand, I am interested in how we can improve child health and well-being. The huge range of different impacts climate change – and heat in particular – have on human health raises crucial questions on how we can better educate health professionals. However, it also calls on different disciplines coming and working together, like medicine and geography, for example. We can start this

**“Environmental changes profoundly affect human health – and especially child health.”**

<sup>1</sup> Pictures: Kathrin Foshag (above, source Florian Freundt), Kathrin Zangerl (below, source: Ilan Kelmann)

effort by including these issues in our teaching and improving our teaching materials from a very early stage – in nurseries, kindergartens, schools and, of course, at university.

**Foshag:** My background is in physical geography, but in recent years I have been focusing on the impacts of climate change especially on urban areas. I am increasingly interested in the effects of heat and other health-related issues in these areas. My main interest is adaptation: that is, questions of how urban areas and cities deal with climate change and heat. Additionally, I am intrigued to find out how cities implement formats of interaction with and participation of citizens. Another important aspect in both my research and teaching is education for sustainable development (ESD) – an issue which is transdisciplinary in nature and very much connected to our project “Stay Cool!”. Transdisciplinarity here not only means bringing together different academic disciplines, but also including perspectives from the public.

**HINT:** You just mentioned the project’s transdisciplinarity, and, Dr. Zangerl, you also talked about the need for more collaboration across academic disciplines. Could you tell us how “Stay Cool!” first came about? Since you come from very different fields, how did you find each other, and how did you start your collaboration?

**Zangerl:** The original idea for our joint initiative grew out of an experience we shared a few years ago at the Federal Garden Exhibition (*Bundesgartenschau*, or Buga) in Mannheim. We were both invited to take part in a public-facing science communication event that mixed expert input with live improv theater. We were asked to give a talk about climate

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change, heat, and health, and instead of delivering a traditional talk, we had to react in real time to actors who embodied different community perspectives. This experience was literally eye-opening for both of us, and we started to realize how powerful it can be when you move away from traditional frontal lectures and create spaces where science becomes tangible and participatory. It showed us that people, whether

from the public or from different disciplines, connect much more deeply when learning is interactive and linked to lived experience. In the aftermath of the event, we started thinking about how we could bring this spirit of engagement into research and later into university teaching, especially for a topic like climate change and heat, which is complex, interdisciplinary, and deeply connected to daily life. This experience was literally the seed for developing our project.

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**Foshag:** Exactly. We then started to develop the project and the course and its title “Stay Cool!” quite quickly. We really wanted to focus on interdisciplinary perspectives on heat and health. Therefore, we tried to address the growing health impact of climate change with a special spotlight on heat exposure and urban environments. Our course, offered as part of the project, was interdisciplinary in more than one sense: not only do the two of us come from different backgrounds, but we also had students from geography and from medicine. The students explored together how climate change affects individual and public health, and how societies – or they themselves, as experts – can respond to it. With our very participatory and engaging activity at Buga in mind, we tried to integrate this spirit into our course. Thus, we implemented activities like case-based learning, expert input, digital tools, and plenty of reflection formats into the teaching-and-learning setup. Our goal was to foster competencies in interdisciplinary exchange, critical thinking, and solution-oriented learning. Overall, we wanted to strengthen climate and health literacy and empower student to act as informed and responsible citizens.

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**HINT:** It is great to hear that the Buga in Mannheim, with all its learning opportunities for the public, triggered your academic collaboration. However, developing an interdisciplinary teaching project always sounds challenging. Was it difficult for the students, coming from these distinct backgrounds of geography and medicine, to adjust to this innovative and very active teaching and learning format? How did they react?

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**Zangerl:** I would say that students (12 prospective geographers and 16 physicians) responded with a lot of curiosity and surprise. They told us that this format felt more relevant and personal than traditional lectures. It not only connected the disciplines, but academic content with lived experience as well. The design of the

course encouraged them to think critically about the future and about their own professional future and roles in society in particular. Nevertheless, it was a challenge to develop a shared language among students from these distinct disciplines. On the one hand, the medical students tend to approach problems from an individual clinical angle. Students from geography, on the other hand, are more likely to think in terms of systemic and spatial structures. At the outset, this led to some disconnect in our initial discussions and group work. Over time, however, bringing together these different perspectives became one of the most enriching aspects of the course. The students began to appreciate the strength of our

interdisciplinary approach since it mirrored the complexity of real-world challenges like urban heat and heat equity. In the end, the student feedback on mixing disciplines was overwhelmingly positive.

**HINT:** Was this a difficult process for you as lecturers? Perhaps my own bias as someone from neither discipline is too strong here, but I would assume that the different student groups are normally used to very different approaches in teaching and learning, right?

**Foshag:** That is definitely true to some extent. Geography as a discipline lies at the intersection of the natural sciences and the humanities or social sciences. Therefore, teaching in geography quite naturally has a broad, interdisciplinary, and partly participatory outlook. In our discipline, we use a lot of different methods from both natural and social sciences. We

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have a lot of projects that involve other disciplines and/or citizens and we teach outside the classroom quite regularly, in excursions and field trips, for example. Stepping outside the classroom was also a key element of “Stay Cool!”, for example when we went on an excursion to the Bahnstadt, a rather recent city quarter here in Heidelberg.

These experimental learning opportunities alongside the participatory learning methods resulted in the students getting to know each other beyond their disciplinary backgrounds. I would say that these forms of active learning, working in groups, and dedicated reflection formats were more familiar to geography students initially. However, we were surprised that, after a brief moment of irritation for some students, the interdisciplinary groups worked really well almost from the beginning.

**HINT:** Did you treat the students any differently once the course started? We know that, if we look closely, all classes are heterogeneous in terms of their composition. Yet, having students from different disciplines might be a new challenge for you as teachers.

**Foshag:** We knew about the heterogeneity beforehand, of course, so we made some distinctions and differentiated some of the course materials for both disciplinary setups. Before the start of the course, for example, we provided interactive self-study material on Moodle highlighting both basic information about climate change and the heat-health interconnection. While these tasks were mandatory for geographers, they were only recommended for medical students due to different module requirements. Nevertheless, the self-study materials offered different learning paths to address the two groups’ needs (for example, we assumed that geographers would already have a good understanding of the causes of climate change). This process laid the groundwork for what was to come. During

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the course itself, we did not make any further difference between the students from geography or medicine.

**HINT:** From a didactical perspective, it is indeed a good idea to meet the heterogeneity of any group of learners by developing a common knowledge base before the real work starts. This also helps students identify their blind spots towards a particular topic – even if they come from the same discipline. Could you give us a brief overview of what you covered in the self-study section students had to complete before the beginning of the course?

**Foshag:** As already mentioned, “Stay Cool!” addresses the growing health impact of climate change with a focus on heat exposure. We wanted to concentrate not only on the individual adaptation, but also on the public health aspects of how experts and members of society can respond to that challenge. The self-learning phase on Moodle included interactive H5P elements that were prepared by us and our team. This phase ensured that all participants gained basic knowledge in three fields: the first element was focused on geographical basics and on the natural science of climate change and its global impact; the second, on heat as a distinct effect of climate change; and the third, on the vulnerability of human health and its interconnection with climate change. Apart from this, the self-learning phase also included some games, role-playing activities, and reflective formats to equip the students not only for the topics, but also the methods of the course.

**HINT:** How did the course then proceed after the online phase?

**Foshag:** The course itself took four days, one of which we spent as a field trip to Bahnstadt. The city of Heidelberg purposefully designed this new district on the old railway site with certain aspects of sustainable urban planning in mind. This makes Bahnstadt a suitable space for us to study and learn. We also visited an exhibition there about thermal imagery, took city walks, and conducted a photo experiment. The remaining three days were spent at the institute. We designed one of these three days as a conference format, inviting experts to give keynotes and bachelor students to present the results of their theses conducted within the project. We also held interactive sessions and discussions in innovative formats, such as role plays, case discussions, and mapping activities. This allowed the students to get to know each other and learn from their different perspectives. After the four course days, the medical students had completed their requirements, since the students from medicine do not receive as many credits as the geography students. The geography students, however, had to create their own material for a science

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communication project: either learning material for schools and other educational institutions or information material for the public to raise awareness on the climate-heat-health interconnection. They were asked to focus on one aspect and one method or tool they would like to work with (e. g. a self-recorded podcast, the design of a school excursion, or an interactive learning video).

**HINT:** Thank you for allowing us an inside look at your course setup. You already mentioned that the whole project was strongly transfer-oriented, and we could already get an idea about you going outside of the traditional classroom from what you just described. Still, could you tell us a little more about this transfer orientation? It seems that you put an emphasis on bridging the gap between university and society through science communication – is that correct?

**Zangerl:** Exactly. Building on what Kathrin just said, I would argue that transfer is at the heart of our teaching concept. We want students to understand that the health impacts of climate change, especially extreme heat, are not abstract and they are not distant. They are

real, they are immediate, and they are often felt most acutely by vulnerable communities living in what we call the “urban heat islands” (cities are warmer than their surrounding areas during the day and especially at night due to land use, sealing, reduction of green spaces and anthropogenic heat emissions). Therefore, we are convinced that we as university teachers need to facilitate the transfer of knowledge from academia to the public.

Let me elaborate a little bit more on that: we collaborated closely with a local community advocate who is engaged in the Bahnhof district. This allowed us to ground our teaching in real-life settings and challenges. Students were asked to re-imagine themselves as part of a vulnerable group such as elderly people, young children in strollers, pregnant individuals, or individuals with chronic illnesses.

**HINT:** How did you do that?

**Zangerl:** Students had to take part in a city walk through these urban spaces guided by material prepared beforehand and with assigned tasks. On this walk, we assigned them specific roles such as “elderly person” or “baby in a stroller”. The exercise invited them to put themselves in these different roles and to adopt another perspective by using all the vulnerability characteristics we discussed earlier. On the one hand, this exercise was meant to help students feel and observe the built environment not just as passive observers, but as if their own health and safety depended on it. This was supported by reflection tasks in the form of group discussions about sustainable infrastructure in order to link their observations to urban planning, public health, and social equity. On the other hand, this

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experience led to your second question about science communication and to what extent science communication was a central goal or even skill to be supported by the teaching-learning scenario. Through this transfer, science communication became more than just a skill. It became ingrained in the mindset of students. Thus, they learned how to translate academic knowledge into societal relevance. They were encouraged to think critically about their own roles as future professionals and citizens engaging with the public or playing a part in policy making. Both groups of students – the medical students at least during course days – had to develop materials and small science communication projects, as Kathrin already mentioned.

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**HINT:** That sounds really interesting. Coming back to the experiential part of the course (my apologies that this might sound a little silly!): how can we imagine being a baby in a stroller?

**Zangerl:** This particular exercise of the guided city walks took place at the end of the course and it was a case study to imagine how it could feel if you were an elderly person or a small child or a pregnant individual. Students could choose their scenario, and we had been building up these case studies throughout the course, providing them with the information they needed in order to imagine themselves as such a person in a vulnerable context – for example, to consider the extent of shading on sidewalks, at bus stops, and on playgrounds; the availability of rest areas such as benches; the condition of the pavement, including width and surface, etc. This exercise has its limitations, of course, but I think this is the best we can do in order to try to re-imagine yourself as another person.

**HINT:** Thank you for giving us all a better idea of how this shift in perspective might work. Thinking about what students may have learned from this experience, could you elaborate on how this course prepares students from medicine and geography for their respective future roles, especially in juxtaposition to one another?

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**Zangerl:** It is important to note that we really mixed the groups so that they could learn from each other. The case scenarios were not different for the students from the different disciplines; we always considered them as one group. This really worked out well after a short phase of adaptation.

One could call it a holistic approach, and the ideas from the various groups on how to react

to climate-heat-health challenges showed that medical and clinical perspectives went hand in hand with those from urban planning and geography.

**Foshag:** One might add that in such an interdisciplinary project, naturally, you cannot always go into meticulous disciplinary depth. Nevertheless, we wanted to encourage the participants to consider the perspectives of “others” (e.g., vulnerable groups) in their future roles as physicians, teachers, or geographers. This will enable them to empathize with these groups and know where to find relevant information and data to support heat adaptation.

**HINT:** Speaking of interdisciplinarity: in the realm of transfer-oriented teaching and ESD, there is a lot of talk about transdisciplinary approaches rather than interdisciplinary ones. Could you clarify the difference between the two and whether you identify your project as interdisciplinary, transdisciplinary, or both?

**Foshag:** Sure. Frankly, we also talked about that division. We would define our course as interdisciplinary with transdisciplinary elements. Transdisciplinarity for us means that we overcome academic and disciplinary borders and transfer knowledge from academia into society and actual practice. This, for example, includes taking into account stakeholder knowledge and citizen perspectives as we did in our formats. We did bring together multiple disciplines to deal with particular topics – that would be a classical interdisciplinary approach. However, we then encouraged students to connect the interdisciplinary findings with the relevant real-life social context. “Stay Cool!” was not completely transdisciplinary since we had experts from the two fields coming in for keynotes on their particular academic research. But as Kathrin mentioned earlier, we integrated perspectives from the public, such as the representatives from the neighborhood club at Bahnstadt, and our students were engaging with them and citizens there. Thus, we had the transdisciplinary element that was extremely fruitful for our students to harmonize these experiences with their academic knowledge. These elements were definitely among the highlights of our course.

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**HINT:** Thanks for the clarification. Do these settings affect your role as university teachers?

**Foshag:** Our role has definitely changed. We tried to act as facilitators. That means that we try not only to provide the students with broad academic content, but we need to facilitate interdisciplinary discussion among students and – due to the transdisciplinary elements – between our students and the stake holders from the public. Therefore, we implemented



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formats of dialogue and exploration such as role play, positioning exercises, and group-based station work with several opportunities for in-depth study.

**HINT:** Acting as facilitators is, from our perspective of higher education, an important step towards the future of teaching. Does this demand certain competencies from you, especially in this kind of environment? And does it also need a different approach from the students’ side to fully benefit from inter- or transdisciplinary formats?

**Foshag:** First and foremost, it meant that we as teachers or facilitators need to be very flexible. Not only did we set out to experiment with interdisciplinary co-teaching ourselves, which needs a lot of planning, conversation, and agreement on the subject matter. We also wanted to be able to create new learning spaces that support the open dialogues we just mentioned. Furthermore, our approach demanded a high degree of openness from the students, which is absolutely crucial since it goes beyond their prior disciplinary academic training. It might be new to them to work on their communication skills, on their critical thinking, and their ability to navigate a complex, interdisciplinary field. Complexity, after all, is at the heart of our topic of the climate change-health-heat connection. In general, I would say that we experienced our co-teaching to be very enriching, even though we also tried out many of the formats for the first time. The student feedback was overwhelmingly positive as well, despite or perhaps because of the openness, the flexibility, and the experiential and reflective elements.

**Zangerl:** Coming back to your first question, I think that a mixture of methods when delivering the actual teaching is very fruitful. When you have these two distinct disciplines meet, it was particularly vital to lay a common groundwork of basic knowledge and terminology. Thus, we had to establish a shared language. That was crucial, and therefore we had to deliver classical knowledge, like we did in the online phase. In conclusion, I would second what Kathrin just mentioned: the main skills that teachers and students need for a project like this are openness and flexibility.

**HINT:** This sounds fruitful as well as time-consuming...

**Zangerl:** Indeed, it was time-consuming – definitely more than just preparing traditional frontal lectures, which are very common in medicine. However, it really has been a great pleasure to co-develop this course across disciplinary boundaries. Working together with a colleague from a different discipline was incredibly enriching since Kathrin brought a completely different lens to the problem I was working on. I think this collaboration

pushed both of us to rethink the way we teach and forced us to reflect on questions of what valuable knowledge really means when we talk about real-life challenges. We were both reminded that teaching – when done creatively and collaboratively – can be a transformative experience, and we learned a lot from each other.

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**HINT:** Could you both pinpoint your greatest challenge and greatest highlight from the course?

**Foshag:** I guess the main challenges were logistical. On the one hand, for example, the coordination between both subjects, institutions, curricula and, after all, between different ideas about teaching. Bringing together students and staff from geography and medicine meant navigating different academic calendars, teaching cultures, and expectations. Students from geography also receive more credits for the course, so we had to differentiate the assignments and requirements here as well – but to do that in a meaningful manner involved quite a few negotiations with students and institutions. On the other hand, it was also slightly challenging to organize our participatory activities outside the classroom in Bahnstadt. Coordinating these field trips, external experts, and stakeholders was rather complex. Last but not least, we were dependent on the weather because a hot day was crucial for our experiential parts. Gladly, this worked out.

**HINT:** What about your greatest highlight or joy?

**Foshag:** My highlight was really the experience that not only we as a teaching team, including student assistants, but also the students themselves simply had great fun during the course. This was epitomized in our field trip to Bahnstadt, where students practically experienced the topic on a different level. This trip really exemplified the strength of interdisciplinary group efforts with a transdisciplinary outlook.

**HINT:** Thank you, Kathrin Foshag. What about you, Kathrin Zangerl? What did you perceive as the main challenges and highlights?

**Zangerl:** The main challenge to me was addressing the varying levels of prior knowledge in our heterogenous group of students. Naturally, we had different levels of experience and competence with topics like climate change, public health, and science communication. As mentioned, some students came in with a strong background in environmental issues, but

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had limited understanding of health systems. Others were well versed in clinical topics, but were new to thinking about social determinants of health or spatial analysis. This diversity is a strength, but it requires careful scaffolding of content and flexible teaching approaches to ensure that everyone is engaged and able to contribute meaningfully. Otherwise, the course will become too superficial for some, or too advanced for others in one group. This has been the biggest challenge to me.

**HINT:** I see. And what was your highlight?

**Zangerl:** It was incredibly rewarding to observe the creativity and initiative the students showed in their final projects! On the last day, they were presenting their ideas. They had not fully worked out and developed the final project yet – that is a process for the geography students as a final assignment. However, I really liked this initial step of brainstorming of geography and medicine students together on the very last day. It was fascinating to see how the students consistently came up with well-developed, innovative ideas when given the freedom to explore formats such as real-world applications for schools or neighborhood-based heat awareness camps. This really demonstrated what they had learned and how they had benefited from our interactive teaching tools. It was incredibly gratifying to see how they took ownership of the material and challenges. For me, this showed how new teaching formats can translate into real-life projects that have the potential to inform and empower others. These moments are proof that our course is not only deepening the academic understanding, but also nurturing a sense of agency and the kind of public engagement that we actually need as a society.

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**HINT:** Thank you for sharing your insightful and inspiring experiences that were challenging, time-consuming, and rewarding at the same time. One thing that we did not mention so far is that you received funding for the project. Could you tell us a little more about that? Would the project have been possible without it?

**Foshag:** That is true. We are very grateful for the funding we received in the digifellows II program from the State of Baden-Württemberg and the Stifterverband. This funding

allowed us to pilot the course, to experiment with new methods, and to develop the interactive digital materials to be integrated into Moodle. The funding also gave us the time and flexibility to design and refine the course for our very complex setting, including building up new networks with external experts and stakeholders. Funding, of course, also means recognition for our teaching and our research and hints at the relevance for teaching projects like this at the intersection of health, climate, and education. The course would definitely not have been possible in this way without the funding. Nevertheless, we are looking towards a long-term integration of the course into our curricula. We are also very thankful for the chance to talk about the project here, in order to raise visibility for projects like this and maybe get in contact with other teachers and researchers.

**HINT:** That would be a great effect indeed, and we are always happy to feature innovative teaching like yours. When you met at the Buga, however, you did not know that you would have funding, right? The idea for the course was already there. What are your plans now,

especially with the material that you developed? Will you scale up the course? It would be a shame if all of this would disappear into some virtual desk.

“Our key inspiration is to build a broader interdisciplinary teaching community.”

**Zangerl:** That is an important point. We would love to anchor this teaching format more firmly within the university – both structurally and conceptually. After all, we are convinced that the issues of climate change, urban planning, geography, and various aspects of human health are not elective concerns. From our point of view, these are essential for the education of future professionals in both medicine and geography. Therefore, we aim to move beyond a pilot and institutionalize the format within the core curricula of our disciplines. This would give the topic the continuity and visibility it deserves. At the same time, we see a lot of potential for scaling up and adapting the approach for different contexts. Not in the sense of a one-size-fits-all model, of course, but by developing modular teaching elements that we already have that can be integrated into diverse academic fields. This includes transferable tools, such as community engagement methods, reflection formats, and feedback scenarios that other educators can use. Our key aspiration is to build a broader interdisciplinary teaching community. We would love to facilitate a network of educators, teachers, researchers, but also practitioners committed to this transformative, socially engaged education in the climate and health space.

**HINT:** This sounds very ambitious!

**Zangerl:** It might be, but for us, this is not just a didactic experiment. We consider this effort part of a wider shift in how universities position themselves in relation to societal challenges – and climate change definitely is one of them. We would argue that it is even

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one of the most pressing issues of our times. The grant we received was an important catalyst and it gave us room to experiment, reflect, and grow. Now we would hope to deepen this work through partnerships within and beyond the university by continuing to involve students, local actors, and policy stakeholders in order to shape the way forward. We are actually already planning to further develop the course next summer and potentially offer it again, and we will also make our materials publicly available through open educational resources.

**HINT:** We are excited to see how this project will grow and develop further. Best of luck with this important work and thank you, Kathrin Foshag and Kathrin Zangerl, for this fascinating conversation.

*This interview was conducted by Petra Eggensperger*

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