

LINDAU
NOBEL LAUREATE
MEETINGS

Annual Report 2020
Online Science Days
28 June – 1 July 2020



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Online Science Days 2020

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Against the Odds, Science Brought Us Closer Together

No year without scientific exchange – the Lindau Nobel Laureate Meetings stayed true to this tenet in 2020, even if circumstances required us to approach the challenge quite differently than usual. Around 40 Nobel Laureates and roughly 1,000 young scientists and young economists as well as Lindau Alumni met online in versatile digital formats.

With the outstanding support of the German Federal Ministry of Education and Research, science came closer together during the Lindau Online Science Days 2020, across different generations, disciplines, cultures and continents. Apart from profoundly scientific and passionate discussions, the distinguished scientists used the virtual podium for appeals to politics, society – and science itself. Their pleas concerned an equitable corona pandemic response; a continued fight against climate change, in particular through better communication

towards politics and society; and both a call and a self-imposed obligation to conduct science worldwide in a sustainable and cooperative way – in the spirit of the Lindau Guidelines. If we had to highlight a favourite from the programme, then perhaps the conversation with centenarian Nobel Laureate Edmond H. Fischer – not an everyday opportunity.

In addition to the Nobel disciplines from the natural sciences, economic challenges and solutions were also addressed in the course of the three-day programme. All these aspects of the pandemic are part of discussions in the political and the public sphere, and activities in Lindau can contribute in many ways – among others through our virtual Innovation Forum on pandemic threats where health industry CEOs met with Nobel Laureates as well as health policy-makers and advisers.



Countess Bettina Bernadotte af Wisborg – President of the Council for the Lindau Nobel Laureate Meetings

Jürgen Kluge – Chairman of the Board of Directors of the Foundation Lindau Nobel Laureate Meetings

Also gratifying, if in a different manner, was the opportunity to involve the Lindau Alumni in a more profound way: besides peer review for the Next Gen Science Sessions, our former participants were integral to our newly developed Online Sciathon, a format based on the principle of a hackathon event. In fact, since June a number of groups have pursued their projects, thus also confirming that this science competition shall be part of our future activities.

Looking ahead leads to obvious questions: although the conditions next summer are hard to predict based on where we stand today and even though recent COVID-19 developments are not encouraging, we are utterly determined to both hold a Lindau Nobel Laureate Meeting in 2021 and celebrate the 70th anniversary of the Meetings first held in 1951. Our ambition is to enable

as large a participation of scientists and guests as possible – in line with the restrictions in place at that time.

Event planning seems like a bit of a science in itself these days, especially when it is impossible to know all the answers right away. But then it helps to reflect on what we stand for: Educate. Inspire. Connect. The Lindau Meetings have always been and will continue to be the place to come together, to discuss, to engage with each other and to strive for even better answers. And at this time, this is exactly what we need now more than ever.



Opening

The event was opened with a varied afternoon. In addition to the first scientific debate, the programme also included a warm welcome by Countess Bettina Bernadotte. She sent greetings from Lindau Harbour around the globe.

The Lindau Nobel Laureate Meetings in a Nutshell

Countess Bettina Bernadotte, President,
Council for the Lindau Nobel Laureate Meetings
Moderator Karan Khemka, Director of Global Education
Companies and Institutions, United Kingdom/Singapore

Welcome and Kick-Off

Countess Bettina Bernadotte

Addresses

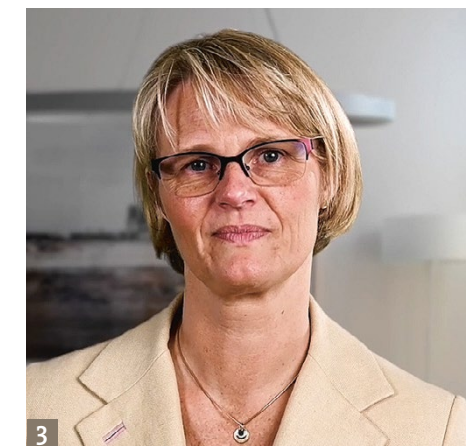
Anja Karliczek, Federal Minister of Education and Research,
Germany
Bernd Sibler, Bavarian State Minister for Science and the Arts,
Germany

Debate: International Scientific Collaboration

Yeka Aponte, Barry C. Barish, Toby Brown, David J. Gross,
Sir Konstantin S. Novoselov, Sir Venkatraman Ramakrishnan,
Moderator: Jan-Martin Wiarda

Lindau Impressions

Greetings from Lord Mayor Claudia Alfons – Host Family
Birgit and Kenneth Strachan – Edmond H. Fischer on his First
Invitation to Lindau – Nobel Lab 360° with Wolfgang Ketterle



- 1 Countess Bettina Bernadotte
- 2 Karan Khemka, moderator of the first programme session
- 3 Federal Minister Anja Karliczek
- 4 Lord Mayor Claudia Alfons

Federal Minister for Education and Research Anja Karliczek

A Good Time to Give Progress a New Dynamic



The fact that a small virus can turn the world upside down – nobody can appreciate this better than you, dear Laureates and dear young scientists. Tens of thousands of people have died in many countries. Schools were closed. The lockdown led to social and economic challenges on an unprecedented scale.

But there is also another side to this crisis for research and science. Science has never received as much attention as it has over the past months – particularly the health sciences. What really helps against the pandemic? Who will find the right medications and vaccines?

People from all around the world are suddenly interested in the results of scientific investigation. They listen to virologists' podcasts. They debate with one another, and the realisation that progress and research go hand in hand has become more obvious. This applies to the health sector, as well as to the mitigation of climate change and digital transformation.

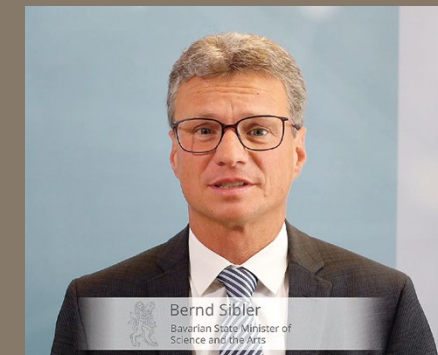
Therefore, now is a good time for a new dynamic. After every crisis, the countries need new impulses in order to get back on track. We in Germany are contributing to this with an additional €10 billion for research and innovation. I am confident this money is well spent, for Germany, for Europe and for the world as a whole. Because digital transformation and tackling climate change do not know any boundaries – just as little as a virus does.

And perhaps one of our younger guests will travel to Stockholm one day because he or she has done ground-breaking research in one of these areas. I would be very pleased.

Greetings from the Free State of Bavaria

“In Bavaria science and research are part of our DNA. With our substantial new high-tech initiative we are willing to go the extra mile – putting the focus on IT and artificial intelligence. We are about to establish 1,000 new professorships.”

Bernd Sibler
Bavarian State Minister of Science and the Arts



Greetings from the Federal State of Baden-Württemberg

“You are being heard more clearly than before. And so you have a responsibility to speak up. This a chance for everyone, from Nobel Laureates to young early-career researchers, to make an impact, be it locally or globally.”

Theresia Bauer
Minister of Science, Research and Arts
Baden-Württemberg



	Monday, 29 June	Tuesday, 30 June	Wednesday, 1 July
05			
06	Lindau Impressions Debate Corona – The Role of Science in Times of Crisis Peter C. Doherty, Alice Fletcher-Etherington, Michael Levitt, Saul Perlmutter, Enrique Lin Shiao, Adam Smith (M)	Lindau Impressions Talk Innovation by Evolution: Bringing New Chemistry to Life Frances H. Arnold	Mainau Impressions Countess Bettina Bernadotte, Theresia Bauer Video on Active Learning Don't Lecture Me! Carl E. Wieman
07		Conversation The Politics of Climate Change Steven Chu, Brian P. Schmidt, Magdalena Skipper (M)	Debate Women in Science Elizabeth H. Blackburn, Maria Leptin, Ruchira A. Mishra, Christiane Nüsslein-Volhard, Cora Uhlemann, Ingrid Wüning Tschol (M)
08	Conversation Immunity Bruce A. Beutler, Jules A. Hoffmann, Sir Gregory P. Winter, Adam Smith (M)	Debate Green Chemistry – Green Fuels Fatima Enam, Hartmut Michel, Ryoji Noyori, Kwadwo Owusu, Robert Schlögl, Magdalena Skipper (M)	Debate Starting Careers J. Georg Bednorz, Serge Haroche, Sir Konstantin S. Novoselov, Amy Shepherd, Lillian Tugume, Alaina G. Levine (M)
09	Conversation My Brain & Me Edvard I. Moser, Erwin Neher, Adam Smith (M)		
10	Expo & Networking Networking	Expo & Networking Academic Partners Expo & Networking	Expo & Networking Academic Partners Expo & Networking
11	Lindau Impressions Next Gen Science Four presentations of the best research submitted by young scientists, economists and alumni	Lindau Impressions Next Gen Science Four presentations of the best research submitted by young scientists, economists and alumni	Mainau Impressions Next Gen Science Four presentations of the best research submitted by young scientists, economists and alumni
12	Sciathon Results Capitalism after Corona Groups: Abdelmageed, Jonelis, Maier	Sciathon Results Communicating Climate Change Groups: Barreda, Bisztray, Enniful	Sciathon Results Implementing the Lindau Guidelines Groups: Clifton, Elmiger, Mărgineanu
13	Next Gen Science Four presentations of the best research submitted by young scientists, economists and alumni	Next Gen Science Four presentations of the best research submitted by young scientists, economists and alumni	Next Gen Science Four presentations of the best research submitted by young scientists, economists and alumni
14	Expo & Networking Next Gen Science Expo & Networking	Expo & Networking Next Gen Science Expo & Networking	Expo & Networking Next Gen Science Expo & Networking
15	Lindau Impressions Talk Inequalities and COVID-19 Sir Angus S. Deaton	Lindau Impressions Conversation A New Measure: the Revolutionary Reform of the Metric System William D. Phillips, Rainer Blatt (M)	Mainau Impressions Talk The Impact of COVID-19 on Children Kailash Satyarthi
16	Conversation Corona: Developing Country and International Perspectives Abhijit Banerjee, Esther Duflo, Michael R. Kremer, Romesh Vaitilingam (M)	Talk Batteries M. Stanley Whittingham	Conversation A Scientist's Life Edmond H. Fischer, Countess Bettina Bernadotte
17	Debate Corona and the Economy: Mitigating the Crisis Peter A. Diamond, Bengt R. Holmström, Novaira Junaid, Robert J. Shiller, Jean Tirole, Jurgen Willems, Romesh Vaitilingam (M)	Debate Communicating Climate Change Levke Caesar, Steven Chu, Mario J. Molina, Brian P. Schmidt, Georg Schütte, Brian Malow (M)	Debate Lindau Guidelines Elizabeth H. Blackburn, Martin Chalfie, Tanmoy Laskar, William E. Moerner, Liubov Poshyvailo, Karan Khemka (M)
18	Lindau Impressions	Lindau Impressions	Literature Lecture A Time of Lethal Ambiguities Wole Soyinka Goodbye



High Stakes in Turbulent Times

Kicking off the scientific programme of the Online Science Days 2020, a panel of scientists debated the need for better international scientific cooperation in turbulent times.

Early on in the current COVID-19 crisis, Chinese and Australian researchers made the genome of the novel coronavirus SARS-CoV-2 freely available. Online repositories, such as medRxiv and bioRxiv that openly share academic research before it has been peer-reviewed and published in journals, have been inundated with studies on the virus from all corners of the Earth. However, this unity demonstrated by the scientific community is at odds with the global political response to the crisis, which has been at best disjointed and at worst calamitous.

Moreover, as scientists have been collaborating and openly exchanging knowledge to find a vaccine, some governments have been attempting to hoard knowledge for their own advantage. Related to this is a recent surge in nationalist sentiment and isolationism – closing countries off at a time when scientific openness is the key to successfully fighting the pandemic.

In such an atmosphere of distrust, prejudice and bias, can international scientific collaboration flourish? Can science live



Debate: International Scientific Collaboration

Yeka Aponte, Barry C. Barish, Toby Brown, David J. Gross, Sir Konstantin S. Novoselov, Sir Venkatraman Ramakrishnan, Moderator: Jan-Martin Wiarda

up to its principles of having no boundaries or biases? And is our current level of international cooperation sufficient to deal with global crises?

Differences in priorities between the Laureates and other participants became clear right from the start: “The increasing forces of nationalism and economic and military competition that are beginning to strangle free flow of movement of ideas and people is a significant danger to science,” said David J. Gross.

Konstantin Novoselov highlighted the change scientific collaborations have seen over the past decades: “The last 40 years were really the golden time for us in collaborations.” At every research institution, you would find young scientists coming from and educated all over the world. But now, he concludes, “the conditions are not welcoming”.

Lindau Alumna Yeka Aponte envisions international cooperation as key to breaking the glass ceiling for women: “If we work together as an international global team on issues like changing institutional cultures, making sure that women are included, recognised and heard; if we stop being active bystanders when it comes to bullying and harassment-type behaviour [...] we will definitely be able to attract and retain females in science at the leadership level and we will be promoting gender equality.”

Young scientist Toby Brown added: “There has to be more young people coming into science from diverse backgrounds,

but we should also ensure that every step of the way, those people are supported because, at the moment, they face an uphill battle compared to their peers. No one is saying science itself is racist, but the institutions and the way in which we operate clearly have a problem.”

“Scientists don’t tend to be very active politically,” said Barry C. Barish. “But in a time like this, I think it’s very important that we are voicing our opinions and trying to influence as much as possible.” One suggestion made by Aponte was to push for an international legal obligation to share genetic sequence data or resources during pandemics in order to ensure the fastest possible response from the scientific community.

“COVID-19 has lifted the bandage and shown us a lot of the existing wounds of society across the world,” concluded Gross. Now that we see those wounds, perhaps we can build more open, inclusive and comprehensive international scientific cooperation to help heal them.

“Scientists are humans and they operate in their own culture. And so to say that science is not racist is a slight misconception.”

Sir Venkatraman Ramakrishnan



The Lindau Guidelines 2020

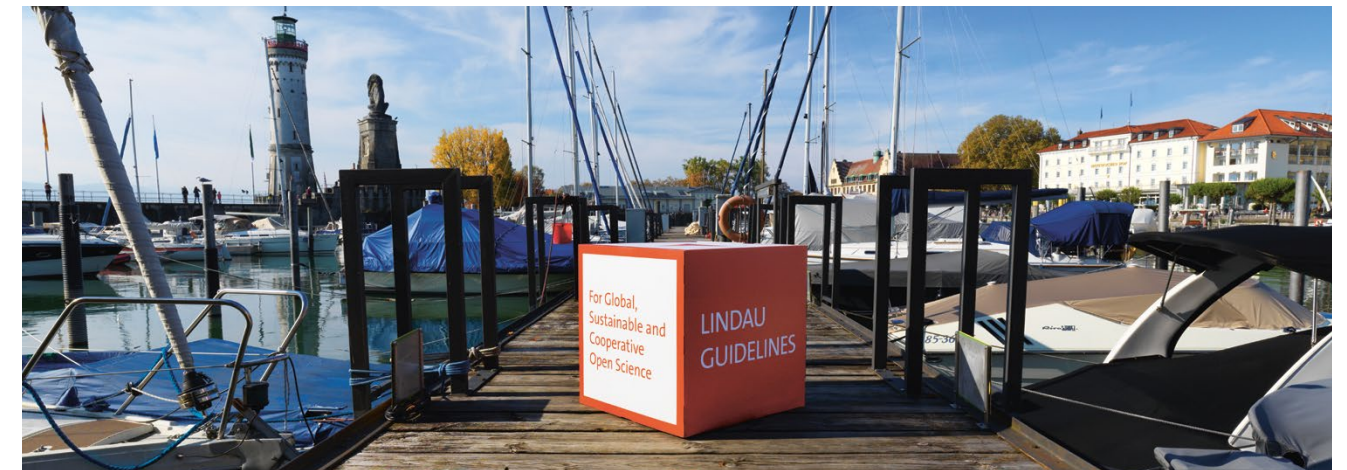
At #LINO18 Nobel Laureate Elizabeth H. Blackburn suggested a new approach for global, sustainable, cooperative open science. After two years of intense discussions, the Lindau Guidelines are now ready for adoption, signing and usage.

The Lindau Guidelines 2020 are based on an initiative first introduced by Elizabeth Blackburn during the 68th Lindau Nobel Laureate Meeting held in Lindau in June 2018. She called upon the 600 young scientists in the audience to develop and support a new approach for global, sustainable and cooperative open science.

While it was formulated with basic research as its primary focus, its principles and goals can be applied to all types and disciplines of science. This initiative was met with very positive feedback from the audience and was discussed widely during the remainder of the Meeting. Incorporating this input,

Elizabeth Blackburn and the Lindau Nobel Laureate Meetings started to explore what such a project would encompass and how to bring it to fruition.

As the Lindau Nobel Laureate Meetings focus on young scientists at all stages of academic training as well as early-career independent researchers, the idea emerged of developing helpful and practical guidelines for scientific research and conduct that will support global, sustainable and cooperative open science in the long-term.



Draft Process

After a first draft had been developed, it was published as a “work-in-progress”, along with an invitation to all scientists worldwide to comment, contribute and discuss. An online ideation platform was created, where anyone could collaborate on the development of the goals. And many did: several of the goals were refined over time, and even a completely new goal (#1: Adopt an Ethical Code) was added. This process was the first step of what the guidelines call for – open global collaboration.

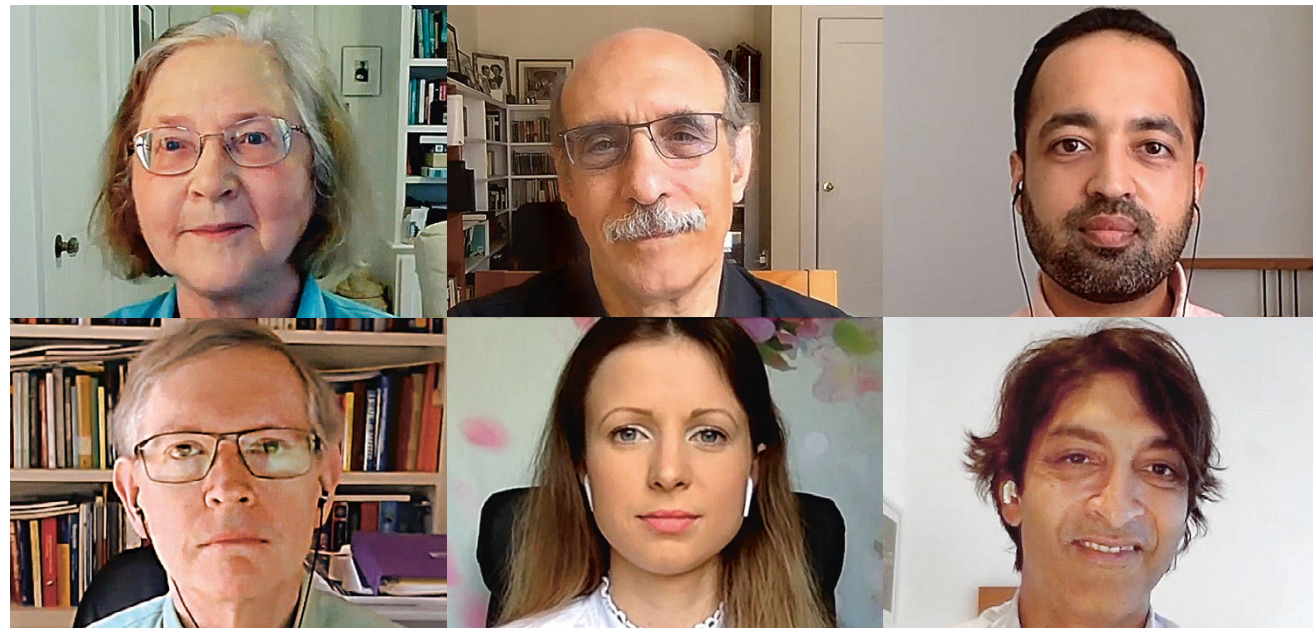
Originally, it was planned to use the week of the 70th Lindau Nobel Laureate Meeting in 2020 to collectively discuss final changes and then announce the completion and release of the guidelines on the last day of the meeting. The coronavirus pandemic changed these plans.

However, the Online Science Days 2020 and particularly the Online Sciathon provided ample opportunity for more in-depth discussions. The final panel debate led to significant further adjustments, particularly with regards to inclusion and diversity, which was a special concern of Tanmoy Laskar and Liubov Poshyvailo, two Lindau Alumni on the panel. Both aspects had been covered in the Guidelines before, but they are now more strongly featured. Contributions also came from the Nobel Laureates: for example, Martin Chalfie, who had discussed the guidelines in detail with the team working in his lab, provided many detailed suggestions for more precise – and often stronger – wording.

The Sciathon, which featured “Implementing the Lindau Guidelines” as one of its three categories, focused on the more practical side of the initiative and aimed at developing ideas on how to translate the goals into reality. Some 180 participants worked on 23 projects. The results of the competition’s finalists can be found on page 60 as well as at sciathon.org.

Once all this input had been evaluated and integrated, Elizabeth Blackburn and the members of the Council for the Lindau Nobel Laureate Meetings agreed in October 2020 that this version shall be published as the 2020 edition of the Lindau Guidelines. The “Lindau Guidelines for global, sustainable and cooperative open science in the 21st century”, while intended for all those engaged in scientific research, are especially important for those embarking on independent careers. Their goals are to inspire and foster exchange of information and to raise awareness about the impact of their research and the need for collaborative efforts to sustain public support for science. The guidelines also respond to the current emergence of distrust in science in many parts of the world. Furthermore, public opinion and scientific consensus increasingly diverge drastically, with probably very serious consequences for humankind.





Debate: Lindau Guidelines
Elizabeth H. Blackburn, Martin Chalfe, Tanmoy Laskar, William E. Moerner, Liubov Poshyvailo, Moderator: Karan Khemka

Next Steps

The Lindau Guidelines are now available for everyone. The text as well as background information and additional material is accessible at lindau-guidelines.org. Every scientist and every institution is invited to adopt these guidelines for their own research and operations. Individuals and institutions who want to express their support by adhering to the guidelines in a comprehensive way are invited to officially sign the guidelines online.

It will be a substantial challenge to adhere to the guidelines in full in everyday practice – and while we encourage everyone to do so, the guidelines are not a certification that will be checked upon or that can be lost. They shall provide guidance on a path to a more global, sustainable and cooperative open science. Everyone is free to choose their own speed and degree of implementation, and everyone is responsible for staying true to the goals. The Online Sciathon 2020 projects may serve as sources of inspiration for how to fill the guidelines with life.

Any kind of feedback will allow us to further develop the guidelines, but also to provide support and inspiration along the way, e.g. by publishing your experiences, case studies or best practices.

The 2020 Lindau Guidelines are intended to remain unchanged for the foreseeable near future, which may encompass the next three to five years. But they are not set in stone. To stay relevant, they will have to be refined at some point. We invite everyone to join the discussion.

“We Nobel Laureates, we’ve had our fun. We still love science, but it is you, the younger scientists, who will carry it forward.”

Elizabeth H. Blackburn



Contributions From the Sciathon

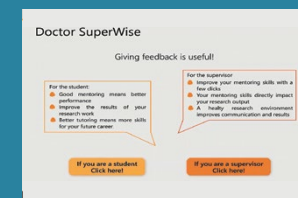
The implementation of the Lindau Guidelines was a main topic of the Online Sciathon 2020. Participants were invited to rethink science culture and to work on practical applications of the goals. The finalists are presented on page 60.



Be Part Of It: The members of Group Lerch argue that the pandemic has shown the benefits of a comprehensive understanding of scientific reasoning and revealed the importance of education at a societal level. They worked on a proposal to motivate more people to become engaged as citizen scientists. By doing science for society, this increased engagement from citizens would help the public and researchers to work towards a better world by solving global problems.



Find all Online Sciathon groups on sciathon.org



Doctor SuperWise: Group Grimmel set out to tackle the problems in PhD supervision that lead to discontent on all sides, widespread and deep-seated frustrations or worse. Convinced that most senior researchers are highly motivated to be good mentors, they conducted a survey during the Sciathon looking into the important elements of the supervisor-student interaction. The group now works on a digital tool that allows for a better feedback culture in the research environment: Doctor SuperWise.



RevEasy: By combining digital technology with the Lindau Guidelines, Group Wernicke sought to make the scientific peer review process transparent, unbiased and efficient. After 48 hours, they proposed RevEasy, a digital platform for an improved review process that explicitly includes measures to achieve those goals, including automated reviewer matching, enhanced discourse, acknowledgement and feedback. In addition, the platform would be set up to be fair by default.

Actively Working Towards an Inclusive Culture of Science



Debate: Women in Science
Elizabeth H. Blackburn, Maria Leptin, Ruchira Mishra, Christiane Nüsslein-Volhard, Cora Uhlemann, Moderator: Ingrid Wüning Tschol

Prompted by moderator Ingrid Wüning Tschol of the Robert Bosch Foundation, the panellists in this debate discussed their motivation for getting into – and staying in – science. Throughout the debate, the importance of support, confidence and representation became clear. The anecdotes of both Nobel Laureates and questions during the Q&A section showed that support and representations is not only an individual question, but one of structural measures. #LINO70 young scientist Ruchira Mishra pointed out: “Introducing policy changes and programmes to incentivise women participation is only half the job.”

Nobel Laureate Elizabeth H. Blackburn stressed the importance of scientists of diverse backgrounds for the necessary creativity in research, adding: “I think it is so important for science that we are really wildly inclusive.” The discussion focused on the way implicit biases combined with a flawed incentive system continues to be an obstacle for diversity overall.

Maria Leptin, director of EMBO, argued for a shift in the definitions of success: “Other things need to be rewarded, otherwise we don’t get the diversity we want, the diversity of approaches.” Lindau Alumna Cora Uhlemann agreed, adding that with the current system, “we generate the same kind of personalities, no matter what kind of gender they might have.”

Looking back at her life in science, Nobel Laureate Christine Nüsslein-Volhard stressed that: “It has changed very much to the better. It is now much more supportive of women.” The Online Science Days debate between researchers of different generations, positions and disciplines showed just how far women have come in science, and how far remains to go.

“We should be fair in judging the abilities of people regardless of gender or prejudices or quota.”

Christiane Nüsslein-Volhard



“Women in Research” – a Series on the Lindau Blog

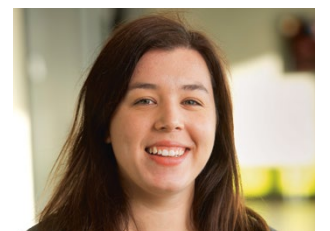
To increase the visibility of women in research, we are continuing our interview series with young female researchers invited to the 70th Lindau Nobel Laureate Meeting and 7th Lindau Meeting on Economic Sciences. Interviews this year included:

Katrin Fürsich (Germany)
PhD student at the Max Planck Institute for Solid State Research, Stuttgart

Lucy Ombaka (Kenya)
Alexander von Humboldt Postdoctoral Research Fellow at Leibniz University Hannover

Kate Secombe (Australia)
PhD student at the University of Adelaide

Mengqiao Du (China)
PhD student at the University of Mannheim Business School



Find the complete interview series with young female scientists in our blog



Know One Thing That Was Not Known Before



Debate: Starting Careers
Johannes Georg Bednorz, Serge Haroche, Sir Konstantin S. Novoselov, Amy Shepherd, Lillian Tagume, Moderator: Alaina G. Levine

“Careers” has been an oft-discussed theme in Lindau debates. At the Online Science Days, the participants focused on academic and non-academic paths and asked for alternatives, especially against the backdrop of the pandemic.

By definition, failure is an integral part of science and Johannes Georg Bednorz, 1987 Nobel Laureate in Physics for the discovery of superconductivity in ceramic materials, shared advice on how to deal with these situations:

“In case of failure, you have to decide if you are entering a blind alley, or if there’s still some hope at the end of the tunnel. So you have to face those situations that sometimes, if you are self-critical and reflect about what you have done, will end up in you saying stop and abandoning that project.”

The role of luck in one’s career was a topic for Sir Konstantin S. Novoselov, recipient of the Nobel Prize in Physics 2010 “for groundbreaking experiments regarding the two-dimensional material graphene”. He insisted on a conscious attitude to this phenomenon:

“Luck and some serendipity accidents, they are important in science. But accidents do not happen accidentally. So it’s the job for

the scientist to increase the probability of this accident. That’s what science is about: to find something new and that’s the issue which is very, very difficult to teach. But once you know how to do it, you know that you are a proper scientist.”

During the live Q&A, discussions were had concerning changing institutions during different phases of one’s career, the importance of mentors, possible risks in striving for “superstar labs” and training for young scientists in regard to the responsibility of science towards society. In this respect, young scientist Lillian Tagume described her approach to fulfilment in work, as science does not take place in outer space but has tangible relations to its environment, to society:

“What impact am I trying to have with my career, with my research? The impact that a lay person or a non-scientist can feel that we’d like to have.”

Tagume also mentioned the importance of actively managing one’s networks, and Lindau Alumna Amy Shepherd also had something to say about this:

“Not only networking but building really good relationships with collaborators helps build out those networks. So the soft skills of working with people and learning to manage people in both a research and a non-research setting are really, really important.”

Alternative paths were the cue for an impassioned contribution from Serge Haroche, Nobel Laureate 2012 also in Physics for methods that enable measuring and manipulation of individual quantum systems.

“The odds to get promoted in the academic career are so low because there are not enough positions. But the other side of this coin is the fact that you have much more positions now outside the academic world, all the challenges that we are facing today, for startups, for all kinds of companies. If young scientists are not positioned then we’ll not solve the problems that we’re facing and then it will not be a matter of young people not finding a position, it will be a matter of survival for our own civilization.”

In concluding, the panel moderator Alaina Levine picked up on Bednorz’ distinction between mere jobs and career opportunities which he sees in science:

“When you enter into an employment in science, of course it is a job in the sense that you are going to be paying me to work in your research group, but it is an exchange of value: I am adding something to the lab that is going to help the two of us create something new that’s going to help us lift the veil and be able to see more about the universe around us.”

“If we get an answer from nature which we don’t understand, we asked the wrong question and have to repeat it in a different way.”

Johannes Georg Bednorz



The Centenarian

“Doubt in Science is Very Important”

Like about 70 other Nobel Laureates, Edmond H. Fischer had intended to come to Lindau this year – after celebrating his 100th birthday with many dear friends. On this occasion, he was awarded the Lennart-Bernadotte-Medal, the highest honour of the Council for the Lindau Nobel Laureate Meetings. And when the Online Science Days 2020 materialized, it was clear for him that he would be online as well – he conversed with Countess Bettina Bernadotte for more than an hour about his life as a scientist, his experiences in Lindau and the importance of being curious.

Fischer has often shared the wisdom that he has accrued for instance during the 63rd Lindau Nobel Laureate Meeting 2013: “Doubt in science is very important, the feeling that you are never certain about anything. If all the public could have this idea [...] that they might be wrong it would be the end of fanaticism – political, moral, ethnic, racial and religious.”

In fact, even before he was awarded the Nobel Prize for Physiology or Medicine in 1992, Fischer was already enthusiastic about the intergenerational scientific exchange in Lindau. When – coincidentally – the following year the Meeting took place in “his” discipline he attended immediately – together with 20 other Laureates and 375 young scientists. Since then he has supported the Lindau Nobel Laureate Meetings with his work all over the world in many ways and has become a true “Lindau Friend”. For example, the first institutional endowment of the Lindau Meetings by a US foundation can be traced back to his mediation and expertise. In 2018, an “Eddy Fischer Fellowship” was established by the Bert and Kuggie Vallee Foundation’s Eddy Fischer Fund. It enables outstanding young female post-doctoral scientists in medicine or physiology to participate in the Lindau Meetings.



Visit the Edmond Fischer
Centennial Gallery





Scientific research cannot be divorced from its consequences, and neither can a scientist's actions. An ethical code provides ethical and moral foundations that help one to consider the likely consequences of one's actions. [...]

Principles of the The Universal Ethical Code for Scientists: rigour, honesty and integrity – respect for life, the law and the public good – responsible communication: listening and informing.

For the complete text of this goal see lindauguidelines.org

Supercharged Science

As the pandemic continues its relentless spread in all corners of the world, this debate focused on the role of science during such times of crisis, which includes the shaping of policy decisions and engaging in science communication.

A recurring topic of conversation in this debate was the misconceptions held by many non-scientists about how the scientific process works. Saul Perlmutter, who teaches a critical thinking course at the University of California, Berkeley, believes that sharing the reality of scientific discovery with the public will help bridge the gap between scientists and non-scientists.

“If we were able to teach a generation of students this style of approaching the world, I think they would do much better when they were faced with these complex periods of uncertainty,” said Perlmutter. “You have to take in that science is an iterative process, that it’s a group process, that it gets some things wrong, and then it tries to correct. And that’s where all of our strength comes from.”

Lindau Alumnus Enrique Lin Shiao chimed in with his perspective from the USA, where public distrust of science in some parts of society is worryingly high. He feels that it comes from a place of confusion, as people are being bombarded with

contradicting pieces of information from sources both trustworthy and unreliable. Shiao listed three ways that scientists can increase public trust: improving science communication, allowing uncertainty and negative conclusions to be more accepted in scientific publishing, and increasing diversity in science.

Another issue covered by the panel was how the COVID-19 pandemic has simultaneously uncovered considerable strengths and deficiencies in scientific collaboration. Michael Levitt, a data scientist who has been studying COVID-19 time trajectories, harshly criticized some of the world’s leading scientific organisations for not taking the lead on creating a committee that would pool together resources to swiftly combat the disease. “Deciding what to do in this situation is really, really difficult. We cannot rely on one or two voices. There should have been a committee formed in the middle of February when this was coming down the road. And we should have discussed this,” said Levitt. “Instead, we let economics and politics dictate the science.”



Debate: Corona – The Role of Science in Times of Crisis
Peter C. Doherty, Alice Fletcher-Etherington, Michael Levitt, Saul Perlmutter, Enrique Lin Shiao, Moderator: Adam Smith

Young scientist Alice Fletcher-Etherington brought up the fact that UK’s government has been criticized for relying too much on the word of epidemiologists. “The Scientific Advisory Group for Emergencies (SAGE) makes recommendations to the government during crises like COVID-19. [...] However, the group consists of mostly epidemiologists and clinicians with no public health policy experts and very few immunologists or virologists.”

As a point of contrast, Doherty described the situation in Australia, whose government listened to the advice of epidemiologists and went into lockdown. He believes the death toll would have been much worse – 14,000 deaths instead of only around 100 – if policymakers hadn’t paid attention to the models. Regardless of whether the work of epidemiologists have merit, he emphasised that he could only really speak from his perspective as a laboratory scientist working to solve the problem by developing better treatments and vaccines. In that arena, the Nobel Laureate has witnessed supercharged science happen at never-before-seen levels of speed and collaboration.

“I think science has been working the way it’s supposed to work, and it’s been working extremely well. People are listening to the scientists and taking notice, and there’s much greater interest than we’ve seen for years. We’ve got the politicians listening and the population listening,” said Doherty. “Whether we’ll get a vaccine fast, I don’t know, but we’re doing our utmost, and nothing has moved as fast as this before.”

“People don’t like to see people dying around them, it upsets them, for very strange reasons.”

Peter C. Doherty



Strengths and Limits of Our Immune System



Conversation: Immunity
Bruce A. Beutler, Jules A. Hoffmann, Sir Gregory P. Winter, Moderator: Adam Smith

The hot topic of “Immunity” was discussed with three Nobel Laureates who are renowned experts on immunology. They talked about the innate and the adaptive arms of the immune system.

“Immunology is a vast topic, and we have an audience of extreme specialists and total non-specialists”, moderator Adam Smith said in the beginning of this session. So the Laureates introduced the two main strands of immunological response, which do not represent opposites, but build on each other. Then they focused on the fight of our immune system against viruses.

Sir Gregory P. Winter, who received the Nobel Prize in Chemistry 2018 “for the phage display of peptides and antibodies”, referred to vaccines against SARS-CoV-2:

“The problem is [...], you’ve got to roll this out on a vast scale – not just to a cage of mice and monkeys, [...].”

Whether our immune system is actually successful was a point of argument between Bruce A. Beutler and Jules A. Hoffmann, who were awarded the 2011 Nobel Prize in Medicine for their research on innate immunity.

“I would start with the point of view that it’s not very successful. [...] We know from our species that if they live in the wild they don’t live very long [...].” (Beutler)

“I have the impression that when we travel, we meet so many microbes [...] there must be fantastic protection.” (Hoffmann)

The conversation also shifted to what researchers can do to enjoy a successful career. According to Sir Gregory P. Winter, academia and industry both come with pros and cons – one of the topics he discussed during the live Q&A with young scientists.

“If you’re happy with a life where you’re making new discoveries but you have a massive pressure, then science is the right profession.”

Gregory P. Winter



An X-Ray Machine for Society

During his first participation in a Lindau programme, Sir Angus Deaton talked about how the society in the USA is coping with the pandemic. He worries about social inequalities in the USA.

Which impact does the coronavirus crisis have on society in the USA?

I would like to quote the American television commentator Anderson Cooper: “A situation like this highlights problems that already exist in society [...]. It’s like an x-ray machine.” A pandemic exposes and often exaggerates longstanding inequalities between people and between groups.

What in your opinion divides American society?

In the United States, the four-year college degree has become a great marker that’s splitting society [...], it’s the great separation between the people who are doing well and the people not doing so well. [...] Suicide by drug overdose, alcoholic liver disease, have risen rapidly in the US, but only for those without a four-year college degree, without a BA, for the last 25 years.

Where is the link to the situation during a pandemic?

If you’re an essential worker, you risk your life because you’re doing things that bring you in contact with other people: health personnel, bus or subway drivers, people who work in eldercare, food retail, food manufacturing, delivery, people who are working in chicken processing plants, meat packing plants – very dangerous. [...] They lose the unemployment benefits if they choose not to work.



Talk: Inequalities and COVID-19
Sir Angus Deaton, Moderator Q&A: Romesh Vaitilingam

Labor markets and COVID

	H5 no college	BA or more
UNEMPLOYMENT 25 +		
March 2020	4.4	2.5
April 2020	17.3	8.4
May 2020	15.3	7.4
EMPLOYMENT TO POPULATION RATIO, 25+		
March 2020	54.9	71.2
April 2020	45.1	65.6
May 2020	46.6	66.6

“In some cases being alive or dead is the largest possible inequality.”

Sir Angus Deaton



Learning for the Next Crisis



Conversation: Corona – Developing-Country and International Perspectives
Abhijit Banerjee, Esther Duflo, Michael R. Kremer, Moderator: Romesh Vaitilingam

Nobel Laureates Abhijit Banerjee, Esther Duflo and Michael R. Kremer were the perfect interlocutors to talk about the consequences of the pandemic for developing countries and to introduce ideas for how to deal with the crisis.

Could you describe the impact of COVID-19 on your work?

Duflo: Thousands of projects all over the world involve working directly with poor people, not only collecting data but also carrying out interventions that usually involve meeting them. You have to turn your big, big ship on a dime. I have been really amazed by how nimble and flexible actually our staff, our partners on the ground, all the professors working on the project have been. So what needed to happen in the first place was to stop surveying people in person, but fortunately we had a lot of infrastructure in place in many countries to be able to survey people on the phone. A lot of research got switched to become COVID-relevant. What people did in many countries all around the world including India, several countries in Africa, et cetera, is pivot their operation to start doing research that was relevant to COVID. That happened very quickly and it

allowed many projects to go on. We have to put our energy and our drive and our talent to these new topics.

What do you think about the measures against the spread of COVID-19 and the consequences of the lockdown in India?

Banerjee: I think there is actually a reasonable system of social protection if you happen to live in your domicile. The combination of the public distribution system, which now covers 75 percent of the population, and the rural employment guarantee is sometimes patchy, but still a very large source of income transfer to people. And there's lots of research showing that it has raised wages substantially. So there is social protection and it does work moderately well when people are doing what they are conventionally assumed to be doing. I think that's one very good reason to start thinking about a welfare

scheme much more portable and which you can take with you wherever you go. And this is not a new idea, this was discussed when Aadhaar, the national ID, was first mooted in 2011. There was a discussion, we were actually part of that discussion on making it portable, using this, once you have a national ID – why not use it to deliver welfare?

How can the world be better prepared for such a situation in the future?

Kremer: There are a lot of systems that were designed for the past, and we actually have many new opportunities now due to mobile phones. We're dealing with a particular crisis right now, COVID-19, and that's obviously the appropriate focus for now, but we're going to keep having shocks, with climate change, there's going to be weather shocks, invasions by locusts or fall armyworm, other shocks will come in.

What would you tell young researchers who develop their career in the shadow of this crisis?

Banerjee: Maybe I'm too optimistic, but I feel that, if I were building a research career, I would be thinking of this as being an opportunity to do something interesting. But in the end, I

think that research careers are built for durability. And there'll be other crises.

Esther Duflo, you are providing training to young people in many countries around the world. What is your goal with that programme?

Duflo: There are so few African American or Latinx students in the elite institutions and in economics in general, which is a huge loss. Not just for them, but for the field, because without the diversity in this perspective, you cannot get a social sense that has the richness that it needs to have. I think we are not nearly doing enough, but this has really energised us to try and do much better.

“I'd love to see more international cooperation and there are some encouraging signs of that.”

Michael R. Kremer



Back to Business or Build Better?



Debate: Corona and the Economy – Mitigating the Crisis
Peter A. Diamond, Bengt R. Holmström, Novaira Junaid, Robert J. Shiller, Jean Tirole, Jurgen Willems, Moderator: Romesh Vaitilingam

Four Laureates who received the Prize for Economic Sciences, a young economist and a Lindau Alumnus discussed how the economy will be changed by the pandemic: What now and what next?

For a short introductory perspective Peter A. Diamond articulated the most important aspects of the crisis: “I’m concerned about the quality of government and private interactions and spreading of information.” For Bengt R. Holmström fear is a big driver of the crisis. In his opinion, “we have to follow the crisis and learn from the pandemic – basically have a fire department come out as soon as infections rise.” Robert J. Shiller agreed with him that the economy should integrate different fields: “There’s a lot of insights that you need to understand a crisis like this. For example, epidemiology should be a bigger part of economics.” In this way the economy could be better prepared for a future crisis. Jean Tirole talked about the idea of social science fiction: “We need to think ahead of time!”

Young economist Novaira Junaid described the situation in Pakistan and presented a proposal for the situation: “I believe that the creation of a consortium of the developed nations and the financial institutions will be needed.” 2017 Lindau Alumnus Jurgen Willems shared his views about investing in the public sector, particularly in healthcare, as a key element of the crisis: “The reason that we have a lot of problems now in dealing with this crisis is that in the last few years, maybe decades, there have been a lot of restructurings in the public sectors.” Jean Tirole underlined this thought: “It is important to spend the money right.”

The plenum also discussed the impact of the coronavirus pandemic on education and especially on teaching – and there were more topics in the Q&A. The whole session is available for viewing in the mediatheque and includes discussion of the following points:

- How will the current crisis influence globalisation?
- What do you think of developing more intersections between economics and psychology on dealing with behavioural change?
- What do you think may be the most important long-term impacts on lifestyles – for example working from home, online teaching, wearing a mask?

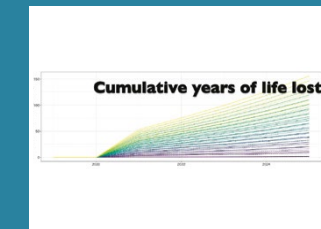


“Think of this crisis as if we suddenly had 100 earthquakes or 100 hurricanes or tornados or a mix of them.”

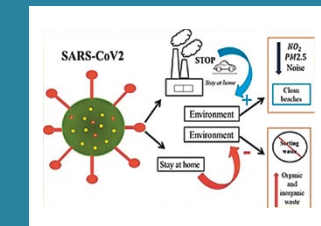
Peter A. Diamond

Contributions from the Sciathon

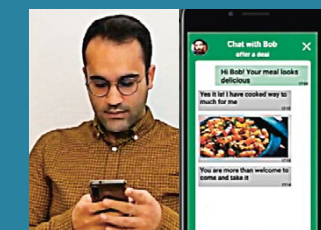
Find the finalists of the Capitalism After Corona topic on page 62.



World Wide Vaccination: Group Richardson collected and analysed data on the perspectives of all stakeholders involved in vaccine development.



Towards A Greener Economy: Focusing on energy consumption during the lockdown, Group Al-Riyami made recommendations for moving the world towards a Green Economy.



ByLocal: Group Mills-Howell drafted a concept for a mobile app for better resource allocation. The ByLocal project was selected for the UNLEASH+ pre-accelerator programme.



Find all Online Sciathon 2020 project groups at sciathon.org

Getting the Coronavirus Crisis Under Control

Fifty Nobel Laureates, chief executive officers, chief science officers, political leaders and senior scientists discussed how to get the coronavirus crisis under control during this year's high-profile Innovation Forum.

"Pandemic Threats" had been selected as a topic for the Lindau Foundation's Innovation Forum already before the coronavirus pandemic. This timely choice attracted almost 30 Nobel Laureates to participate in the lively online discussion, and they were joined by a select group of industry leaders as well as representatives from politics, civil society and academia, allowing for a discussion that covered many important facets of the COVID-19 pandemic.

In his analytical conclusion, German Federal Minister of Health Jens Spahn pointed out the importance of a common approach:

the German federal system allows for targeted counteraction by implementing different measures in different places, depending on the local situation and development. But sending the right messages is key: once communication becomes inconsistent, and no clear framework is visible, people start losing trust in measures. That, apart from vaccine development, might be the most critical factor in avoiding a second wave.



Innovation Forum: Pandemic Threats

Welcome

Jürgen Kluge, Chairman of the Board of Directors, Foundation Lindau Nobel Laureate Meetings

Introduction and Status Quo

Stefan H. E. Kaufmann, Council for the Lindau Nobel Laureate Meetings and Max Planck Institute for Infection Biology

Session I – Medicine: Diagnostics, Antivirals, Vaccines

Vaccines

Uğur Şahin, CEO BioNTech

Antivirals

Thomas R. Cech, University of Colorado Boulder

Diagnostics and Epidemiology

Gérard Krause, Helmholtz Centre for Infection Research

Stimulating Vaccine Research and Production

Michael R. Kremer, Harvard University

Discussion

Session II – Economics, Politics and Society: Lessons Learned

Reopening Economies and the Importance of Mass Testing
Paul M. Romer, New York University

Coordinated Response in a Federal System

Jens Spahn, Federal Minister of Health, Germany

The WHO and the Global Pandemic

David Nabarro, Special Envoy of WHO Director General on COVID-19

Accelerating Vaccine Development and Access at a Global Scale

Trevor Mundel, President Global Health, Bill and Melinda Gates Foundation

Improving Epidemic Preparedness

Richard Hatchett, Coalition for Epidemic Preparedness Innovations

Discussion

Moderation

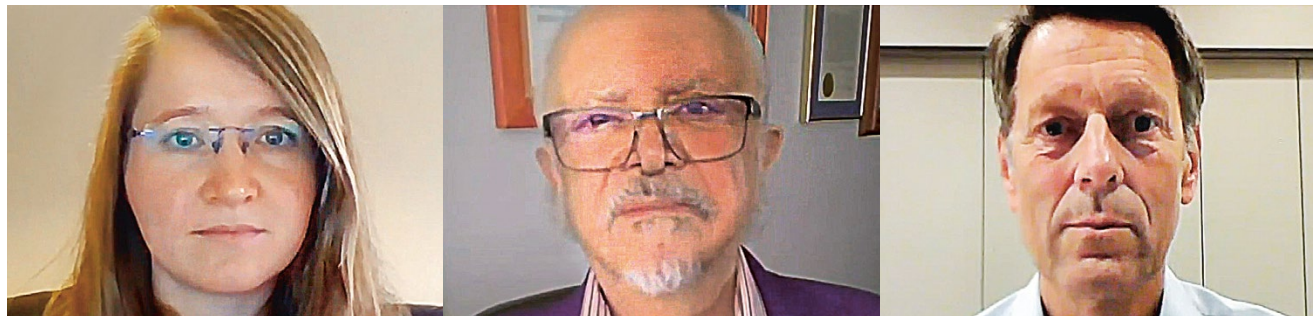
Jan-Martin Wiarda



The vast majority of the most pressing problems of today are global in nature: They affect large parts of the world and its population, they do not stop at borders, and they cannot be solved alone.

Therefore, scientists, funders and politicians must cooperate globally to increase efficiency, speed, and effectiveness. While the creative benefits of differing approaches and the stimulus of competition are to be acknowledged, inefficiency by unnecessary parallelism or obstruction must be avoided.

Personalising the Narrative



Debate: Communicating Climate Change
Levke Caesar, Mario J. Molina, Georg Schütte as well as Steven Chu, Brian P. Schmidt (pictured on next page), Moderator: Brian Malow

The consensus in the Lindau community is clear: unchecked anthropogenic climate change is one of the most serious challenges facing mankind. How to best communicate this was at the centre of several discussions at #LINOSD.

The debate “Communicating Climate Change” touched on two general approaches: convincing the broader public of the realities of climate change and focusing efforts on influencing key leaders who need to make the crucial decisions. Nobel Laureate Steven Chu drew from his experience of interacting with citizens during his tenure as US Secretary of Energy and stressed the importance of gaining the public’s trust through visual, everyday evidence and personal stories.

While most panel members agreed with this approach, Lindau Alumna and climate scientist Levke Caesar was critical of the effectiveness of this strategy given the timeline of the crisis: “Communicating climate change isn’t working. Do we need to get at a different angle? Is it really necessary to convince most of the public that we have to act? Or is it just necessary to convince the politicians?” Nobel Laureate Mario Molina had a more optimistic view, based on his research and advocacy:

“We have to concentrate on decision-makers because that’s what we did with the ozone layer. It worked extremely well, and we were able to convince the public subsequently.”

During the subsequent Q&A session, Lindau Alumna Tanja Bhuiyan raised the question of whether the emphasis on non-scientific, overly personal stories might cross the line into manipulation and propaganda. In response, Nobel Laureate Brian Schmidt pointed out: “I don’t have any problem using stories or things that stick with people, as long as they’re actually aligned to the science. We really have to self-police – it’s about your own ethics.” Georg Schütte, General-Secretary of the Volkswagen Foundation, took a different tack in his response: “Propaganda seems to be a somewhat outdated mode of one-way communication. We have to engage in dialogues and this needs to be honest, it needs to be open, it needs to be based on evidence.”

Towards the end of a debate between optimism, pragmatism and pessimism regarding the future, Nobel Laureate Steven Chu urged the Lindau community to keep trying: “As soon as we tell ourselves it’s too late, what’s the sense? You’ve given up. And when you give up, it’s a disaster.”



“The young people on the planet are now helping us with the climate change issues. They understand that it’s a matter of social responsibility.”

Mario J. Molina

Contributions from the Sciathon

The finalists of the Communicating Climate Change topic are on page 61.



The Product Returns Pandemic: Group Rudnicki focused on online shopping and returned goods, showing how small, responsible change can prevent waste.



Climate Eye: This proposal by Group Altman wants to change our view of the impact of the climate crisis by combining citizen science and drone photography technology.



Environmental Binoculars: This project by Group Uzbas aims at communicating the outcomes of individual actions through visuals that are easy to comprehend.



All Online Sciathon 2020 project groups on sciathon.org

How to Get the Global Community to Act



Conversation: The Politics of Climate Change
Steven Chu, Brian P. Schmidt, Moderator: Magdalena Skipper

In a separate Conversation moderated by Nature’s Editor in Chief Magdalena Skipper, Nobel Laureates Steven Chu and Brian Schmidt discussed another aspect of tackling climate change: politics.

Both discussants shared their views on the relative merits of different policies and technologies that could reverse the effects of climate change, as well as how society can sway the perspective of policymakers. They stressed the importance of comprehensive worldwide measures against climate change and drew parallels to the response to the COVID-19 pandemic.

It was in their live Q&A where they offered practical advice for all scientists on influencing popular and political opinion. “The only people who can get citizens to behave coherently are leaders who control the narrative,” said Schmidt. “Can scientists become those leaders?,” asked one young scientist. Based on his experiences as the 12th US Secretary of Energy from 2009 to 2013, Steven Chu had a unique personal insight: “It’s necessary to have practising scientists in the real inner circles of power.”

The Nobel Laureates emphasised the need to frame the climate narrative around the motivations of the particular audience. Whether it’s the re-election hopes of a politician or the impacts on an individual’s livelihood, they argued that climate change needs to be made real for people by sharing genuine and personal experiences and stories.

“The way the world is moving now, there won’t be a magical vaccine that will pull us out of this.”

Steven Chu



The Mainau Declaration 2015 on Climate Change



During the 65th Lindau Nobel Laureate Meeting, a group of Nobel Laureates including Steven Chu and Brian P. Schmidt initiated the Mainau Declaration 2015 on Climate Change.

“If left unchecked, our ever-increasing demand for food, water and energy will eventually overwhelm the Earth’s ability to satisfy humanity’s needs, and will lead to wholesale human tragedy,” reads the Mainau Declaration 2015 on Climate Change. With their signatures, 76 Nobel Laureates urgently warned world leaders of the consequences of climate change.

The Mainau Declaration 2015 was presented to then-President of France, François Holland, in advance of the United Nations Climate Change Conference, COP 21. That conference led to the Paris Agreement, a global agreement on the mitigation of climate change initially signed by 174 countries.

The first Mainau Declaration from 1955 was an appeal against the use of nuclear weapons. Initiated and drafted by the Nobel Prize-awarded German nuclear scientists Otto Hahn and Max Born, it was circulated at the 5th Lindau Nobel Laureate Meeting and presented on Mainau Island.

“Failure to act will subject future generations of humanity to unconscionable and unacceptable risk.”

Mainau Declaration 2015





Knowledge becomes most powerful when it is shared with others. By sharing information, progress can be achieved faster and ultimately more efficiently. This includes sharing information about failures or negative results of studies.

Thus, all scientific results and data shall be made openly available, first within research groups, and once reliable, to the whole scientific community.

Modern technologies allow for systems that can guarantee correct attribution of ideas to those who generated them.

Furthermore, scientists shall engage in fighting false or fake information and data.

Bringing New Chemistry to Life

Few people better understand the impact advances in chemistry have had on technological progress than Frances H. Arnold. The 2018 Laureate talked about her work in "evolving" new protein catalysts.

We owe much of our recent technological progress to advances in chemistry and few people understand that better than Frances H. Arnold, recipient of the 2018 Nobel Prize in Chemistry "for the directed evolution of enzymes." During her first participation in a Lindau programme she explained how evolution can be used to create new protein catalysts and expand the space of enzyme functions. Arnold takes the process to the next level and relies on the evolution of enzymes instead of organisms. Her talk and the subsequent Q&A truly achieved the goals of the Online Science Days in stimulating a session that was encouraging, engaging and, indeed, interactive.



Talk: Innovation by Evolution – Bringing New Chemistry to Life
Frances H. Arnold, Moderator: Magdalena Skipper

Sarika Goel @01Sarika

Excellent talk by Prof. @francesarnold at #LINOSD. Thanks @lindaunobel and @Magda_Skipper for the opportunity to engage! Loved Prof. Arnold's emphasis on creative and engaging ways to communicate science. #WomenInSTEM #inspired

Oleg Borodin @Borodin_O_

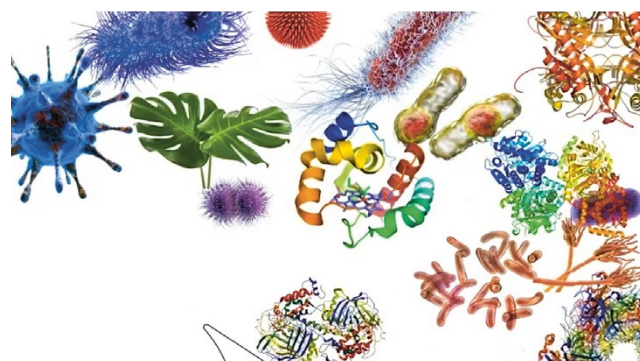
Sooo fascinating talk by @francesarnold. I really hope that new chemistry made possible by directed evolution will change an every day life of organic chemists. Thanks to @lindaunobel for the opportunity to talk to Nobel laureates! #LINOSD

Debanjan Das @DebanjanD92

Today @lindaunobel we found Prof. @francesarnold was not satisfied with the pace of evolution, so she took matters in her own hands!

Nicole Foster @NicoleRFoster

Absolutely loving prof Frances Arnold's talk for #LINOSD. Such an inspiring #WomenInSTEM, on the edge of my seat listening to this! Such exciting work! #LINO70 #LindauAussies #phd-chat #AcademicChatter @Science_Academy @lindaunobel



"To me, it's like a Beethoven symphony. It's beautiful, it's intricate, and we haven't learned how to write like this."

Frances H. Arnold



Reasons to be Both Concerned and Excited

Widely regarded as the "Father" of the lithium-ion battery, 2019 Chemistry Laureate M. Stanley Whittingham used his talk to discuss the transition to renewable energy.

M. Stanley Whittingham, who was awarded the Nobel Prize for Chemistry in 2019 is widely regarded as the 'Father' of the lithium-ion battery. During the Online Science Days, he discussed recent progress and future prospects, and why there are reasons to be both concerned and excited.

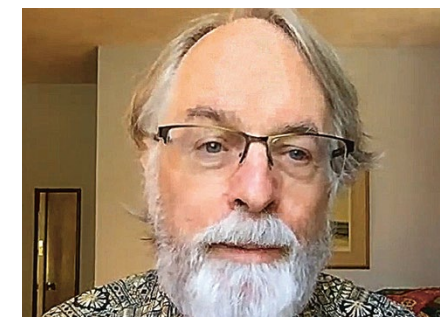
"With solar and wind, the energy output varies second to second, so you have to smooth it and batteries are good at that."

It is perhaps ironic that Whittingham's invention of the lithium-ion battery is now so instrumental in our transition from fossil fuels to renewable energy: Whittingham invented the device while working at a company now known as Exxon-Mobil – the world's largest fossil fuel company.

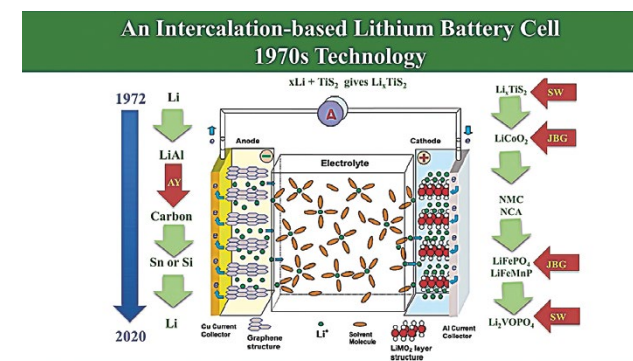
Lithium-ion batteries were developed as an innovation in electrochemical energy storage. However, they are now being exploited to enable the large-scale introduction of renewable energy, as well as for electrifying transportation, which would permit a cleaner and more sustainable environment for the next generation.

"It is my anticipation that major city centres – like London, Stockholm, Tokyo, New York – in ten or twenty years will be restricted to electric vehicles."

There are ample scientific opportunities to further improve the performance and safety of batteries. Today's cells attain only 25% of their theoretical value. However, as the energy density is increased, the safety tends to be compromised. M. Stanley Whittingham went into detail about examples like the soft TiS_2 lattice, the layered oxides, LiMO_2 and Li_2VOPO_4 , a proof-of-concept for two-electron transfer. These opportunities and the technical challenges that need to be overcome led to a lively discussion. The search for alternatives that are cost-effective and sustainable – an international challenge – is one that continues.



Talk: Batteries
M. Stanley Whittingham, Moderator: Brian Malow



"Science is interdisciplinary and knows no national boundaries. Challenges are international and cross national boundaries."

M. Stanley Whittingham



Time for Renewables to Take the Driver's Seat?

Fossil fuels brought economic prosperity and growth but have also contributed significantly to environmental pollution. This panel discussed opportunities and challenges related to green chemistry and green fuels.

In late April 2020, for the first time in history the oil price dipped below zero – not the best circumstances for advancing renewable energy sources. While no one knows for sure how the oil price may affect the economy in general and carbon-reduction measures in particular, the imminent threat of climate change has not disappeared. Neither has the need for alternatives to carbon-based fuels and for a transition to a green chemistry in industry worldwide.

“The problem isn’t necessarily that we don’t have the fundamental science or the technology to transition to renewable energy, the problem is political and social,” argued Robert

Schlögl. The Managing Director of the Max Planck Institute for Chemical Energy Conversion in Mülheim an der Ruhr is adamant that innovation must also come from industry and not only from academia.

“We need better batteries if we want to transition to renewables,” argued Hartmut Michel, Nobel Laureate in Chemistry. He was awarded the Nobel Prize in 1988 for helping unravel the chemical mysteries of photosynthesis. “We’ve become quite good at emulating photosynthesis ourselves,” he said, “and in a way, our technology is actually better than photosynthesis. Plants store around 1% of the energy they receive from the sun,



Debate: Green Chemistry – Green Fuels
Fatima Enam, Hartmut Michel, Ryoji Noyori, Kwadwo Owusu, Robert Schlögl, Moderator: Magdalena Skipper

whereas solar panels nowadays have an efficiency of around 20%. But we need robust and reliable batteries to spread this energy according to our needs – and we need them to be economically viable.”

“In order for batteries to be economically viable, we need to consider different materials. Lithium is expensive and impossible to recycle,” added young scientist Kwadwo Owusu from Wuhan University of Technology. The task is to find alternatives that are cost-effective and sustainable, and that will be an international challenge. Thankfully, researchers have proven tremendously resourceful when it comes to generating solutions.

“I’m very proud of being a chemist, because chemistry is capable of generating high values from nothing,” said Ryoji Noyori, a Japanese synthetic chemist who was awarded the Nobel Prize in 2001. However, the problem is not a simple one. “We should realize what the limits of our planet are and that the

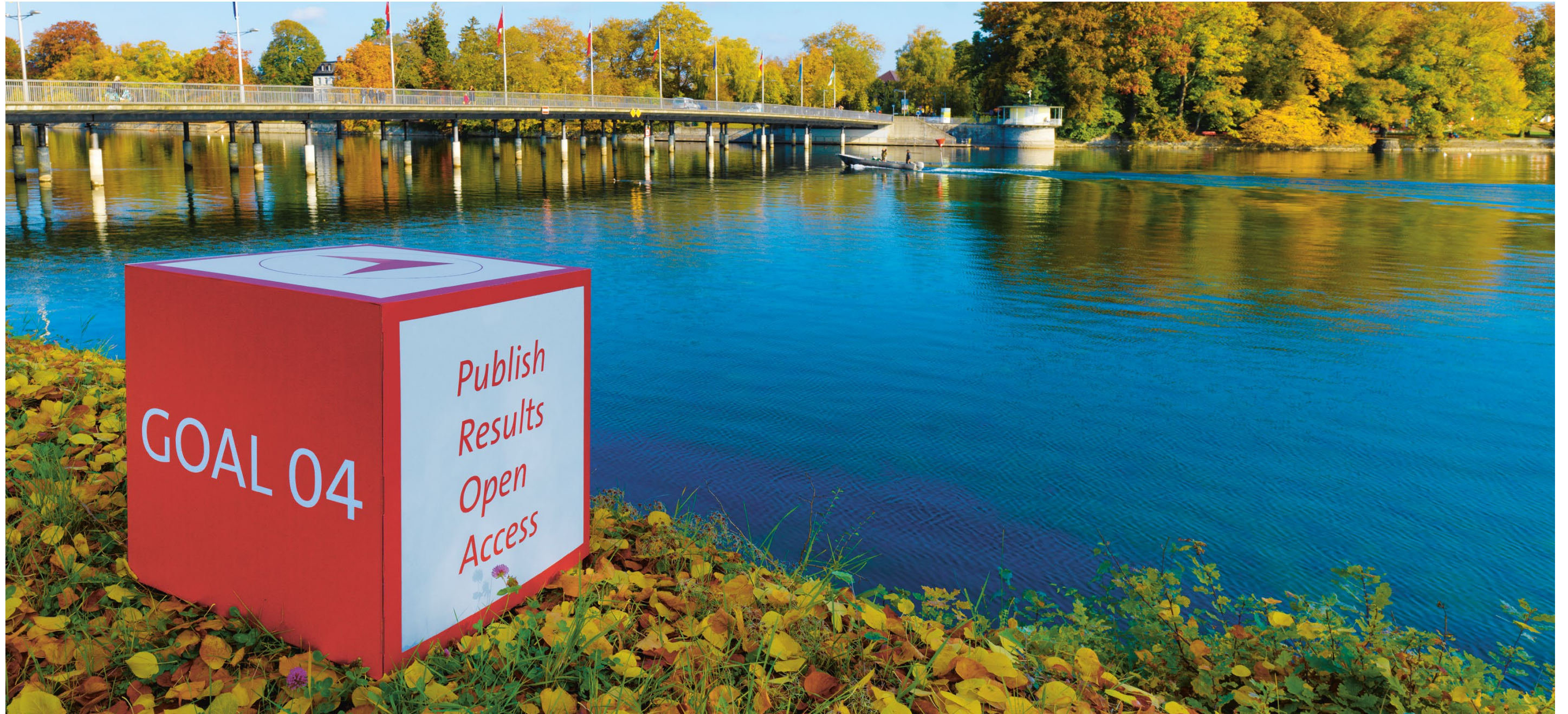
future is unpredictable.” So, can the world realistically switch to a sustainable future in time, by 2030? Michel was cautiously optimistic. “There might be ‘happy’ islands on the earth, but I don’t think you can achieve sustainability all over the world.”

Young scientist Fatima Enam, postdoctoral fellow at Stanford University, was more pessimistic: “As long as fossil fuels are still being used, renewable energy will be backseating.” Schlögl, however, ended on a positive note: He agreed with the sustainable islands idea, “but the islands can be pretty big. The science is already there.” What is needed is social change – and that’s something all of us can help with.

“I believe microorganisms are much better chemists than we are.”

Fatima Enam





Scientific results shall be published in an open access mode. Many approaches such as open access journals or pre-print archives as well as new initiatives already exist. While it is not yet clear which modes and models will ultimately succeed, it remains imperative to publish all relevant scientific findings in an open access mode.

Published science shall not refer to unpublished data, code, materials, etc., in ways that obstruct further reference, use, and sharing.

Rectifying a Scandalous Situation



Conversation: A New Measure – the Revolutionary Reform of the Metric System
William D. Phillips, Rainer Blatt, Moderator: Brian Malow

20 May 2019 was probably a normal Monday for most people. For Nobel Laureate William D. Phillips, however, last year’s annual World Metrology Day was a milestone, if ever he saw one: The new SI (Système International) came into force.

In his talk, Phillips explained why it was necessary to redefine the base units second, metre, kilogram, ampere, kelvin, mole and candela. By this reform, all seven base units are defined by natural constants instead of through comparison to a prototype. Apart from his thoughts about the SI, the conversation between William D. Phillips and Rainer Blatt was the most practical session during the Online Science Days as Phillips brought a replica of the International Prototype of the Kilogram with him.

“I’m holding it with a white glove pretending that it’s a real kilogram. If this were the kilogram, and if I were to leave a fingerprint on it, that would change the mass of this thing. But, by definition, it cannot change. This thing is always a kilogram. And so if I leave a fingerprint on it, you lose weight”, he told interlocutor Rainer Blatt. “It cannot change and this is simply intolerable. Actually, I found that pretty scandalous, when I first learned about it.” No doubt, William D. Phillips can convey science in a very entertaining way. What we already knew from his seven visits and counting to Lindau has now also been proven for the global virtual stage.

A Short History of Measurements

- 1799** After the French Revolution a system “for all times, for all people” was installed to define a metre and a kilogram
- 1983** New definition of a metre by the speed of light
- 2019** Reform of SI by a new basis that builds all units on physical sizes



Learn more about the SI with the Mini Lecture in our mediatheque

“It’s pretty clear we don’t have a definition for time that is timeless now.”

William D. Phillips



Bottom-up Meets Top-down



Conversation: My Brain and Me
Edvard I. Moser, Erwin Neher, Moderator: Adam Smith

Our brain is an extremely complex system, so the field of neuroscience is highly interdisciplinary and makes use of a variety of different methods. Two of these methods were presented during the Online Science Days 2020.

Erwin Neher and Edvard I. Moser, two Nobel Laureates in Physiology or Medicine, who approach the brain from two different angles, discussed this topic in a varied session.

As a biophysicist, Erwin Neher, awarded with the Nobel Prize in Medicine 1991, works out the mechanics of signal transduction. This view is described as bottom-up.

“My way of trying to understand the brain is from the bottom-up, starting with molecules as ion channels, trying to understand action potential synapse transmission, again trying to understand modulation, and more and more complex things.”

Edvard I. Moser comes from the perspective of higher brain functions which is regarded as top-down. He received the 2014 Nobel Prize in Medicine.

“I was interested in higher brain functions, anything from memory, to language, to attention, planning, thinking, abstract thinking. Very, very complicated brain functions that involve thousands or millions of neurons. My interest was in understanding the mechanisms: how do these brain functions arise among neurons?”

Edvard I. Moser and Erwin Neher in the mediatheque

Learn more about the two Nobel Laureates and their research. In the Nobel Lab 360°, Edvard I. Moser and his co-recipient May-Britt Moser give an insight into their work. The Topic Cluster “The brain and how it works” provides the chance to dive deeper into neuroscience. Lectures by Edvard I. Moser and Erwin Neher are part of this Topic Cluster.



“I’m coming from the top. Erwin is coming from the bottom and we meet somewhere in the middle.”

Edvard I. Moser



Most Vulnerable Section of Society



Talk: The Impact of COVID-19 on Children
Kailash Satyarthi, Moderator Q&A: Karan Khemka

In his talk, Kailash Satyarthi made a powerful appeal to the audience all around the globe to raise their voices for the children who are suffering from poverty and injustice.

Satyarthi predicts that children from marginalized and vulnerable sections of society will be particularly affected by COVID-19. An estimated 44 to 66 million children have fallen or will fall into extreme poverty as a result of the pandemic. These children could be forced into labour to bear the burden of sustaining their families, forgoing the opportunity for an education.

Satyarthi emphasized these intolerable figures with personal fates: Jamlo for example was 12 years old when she was sent back home from her job on a chili farm because of the lockdown. “The employers are leaving their child labourers in the mercy of God.” Jamlo died of hunger, thirst and helplessness when she was about to reach her village.

“What can I directly do to make a difference?” – comes the question during the live Q&A. Ensure visibility, for example, using social media, advised Satyarthi. And, he concluded, scientists have the chance to develop measures for better preparation in the next crisis.

His Work

Kailash Satyarthi received the 2014 Nobel Peace Prize for his work against the exploitation of children for labour. In 1980 he founded the organization Bachpan Bachao Andolan, which has freed thousands of children from slave-like conditions in his home country of India (bba.org.in).

Spearheaded by Satyarthi, 88 Nobel Laureates and global leaders issued a joint statement in May 2020 calling for the world’s governments to unite and prioritize children globally during lockdowns and their aftermaths.

“How can a civilised society tolerate slavery, how can corporate culture civilisation go hand in hand with slavery of children?”

Kailash Satyarthi



Plea to Humanity



Literature Lecture: A Time of Lethal Ambiguities
Wole Soyinka

The Online Science Days 2020 were closed with a committed presentation by Wole Soyinka, Nobel Laureate in Literature 1986, on a topic no less weighty than the current situation of the world. Read an excerpt of his speech here.

A good place to begin, I would like to suggest, takes us back to that moment during the war. For war, it certainly is, when news came that a German company appeared to have made a breakthrough in the search for a COVID cure or vaccine. What promptly followed? The leader of that nation with the most, the United States, made an instant bid to corner the entire product of the pharmaceutical firm. The irony is this, despite my notorious antipathy for that leader, I did feel a twinge of sympathy for him. [...]

Nonetheless, I was truly appalled. I made a mistake of thinking that the world had inched much closer after centuries of powerful lessons in humanistic choices to a basic recognition that, confronted with the generalised assault on humanity in its totality, governments could not fail to recognise their seizure as agencies of a collective mandate from humanity. That mandate being simply that humanity shall not go into extinction. [...]

The time of lockdowns comes and goes, but we should permanently lock out, that we should lock out permanently the unfortunates of society from our humanity. This truly would represent a brutal victory for a cruel pandemic. And so, to conclude, a plea for those liminal products of the monumental ambiguities of our humanity, which is now itself placed under unremitting curfew.

“Some of us, alas, are closet optimists.”

Wole Soyinka





Publishing is not limited to scientific findings. Any kind of data found, generated or used shall also be archived in appropriate data repositories. As this means storing vast amounts of data, the technological and administrative infrastructure must be continuously improved and adapted to guarantee safe and secure long-term storage.

The publication of data, formulas, algorithms and other background used to generate findings will become a new requirement of scientific publishing. All scientific content shall be preserved, connected and versioned to foster discovery, accumulation of evidence, but also respect for uncertainty.

Based on the principle of a hackathon event, the Online Sciathon 2020 gave our community two full days (19 – 21 June 2020) to work on their group project.

The idea for the Online Sciathon 2020 was born out of the need to offer the Lindau Meetings' community a platform for exchange and collaboration after the postponement of this year's Meetings.

Nobel Laureates Elizabeth H. Blackburn, Edmond H. Fischer and Brian P. Schmidt acted as patrons of the Sciathon and offered words of encouragement from afar.

Lindau Alumni had the opportunity to submit a project idea in one of three subject areas: Lindau Guidelines, Communicating Climate Change and Capitalism after Corona. This resulted in a broad range of projects for which Lindau Alumni and the young scientists and young economists invited to the 2020 Lindau Meetings could register.

The Online Sciathon was also a competition: after 48 hours, each group presented a short concept paper that introduced their specific ideas for implementing their project and showed a short video that they created. A jury of 13 judged the projects on the creativity and feasibility of the ideas as well as the quality and relevance of the results and decided on the finalists and winners of the Online Sciathon 2020. In addition to prize money, the three finalists in each topic category had the opportunity to present their ideas to the international audience of the Online Science Days (see pages 60–62).

Over the course of 48 hours, almost 500 researchers from 87 different countries worked together in 48 interdisciplinary project groups. Roughly 190 Lindau Alumni, representing 24 different Lindau Meetings from the last 40 years, worked together with young scientists and young economists.

The participants' efforts resulted in an astonishing variety of innovative and highly promising concepts. Hopefully, the participants will spread these ideas around the world and realise their ideas. The Lindau Nobel Laureate Meetings will support the groups, for example by providing access to the Lindau Alumni Network.

"Science exploring new tracks
to cope with the challenges affecting
the world and the individual."

Sciathon Trailer



Sciathon Jury

A jury comprised of scientific chairpersons, scientists, journalists and friends of Lindau decided the winners of the competition:

Sybille Anderl

Lindau Alumna 2010,
Frankfurter Allgemeine Zeitung

Hans Bachor

Australian Academy of Science

Andrew B. Holmes

University of Melbourne

Karan Khemka

Director in Global Education Companies
and Institutions

Jürgen Kluge

Foundation Lindau Nobel Laureate Meetings

Hendrik Leber

Acatis Investment GmbH

Adeline Lim

National Research Foundation, Singapore

Wolfgang Lubitz

Council for the Lindau Nobel Laureate Meetings

Phillipe Narval

European Forum Alpbach

Jeanne Rubner

Bayerischer Rundfunk

Felix Rundel

Falling Walls Foundation

Daniel Samoilovich

Columbus Association

Klaus Schmidt

Council for the Lindau Nobel Laureate Meetings

Himla Soodyall

Academy of Science of South Africa

Ernst-Ludwig Winnacker

International Human Frontier Science
Program Organization

Implementing the Lindau Guidelines

Sciathon finalists had the opportunity to present their projects on the stage of the Online Science Days and received up to €1,500 in prize money to support their work.

1st Place

Lindau Mentor Hub

The members of Group Mărgineanu used their 48 hours to formulate a concept for an international mentoring network in line with the Lindau Guidelines and considering the manifold challenges and opportunities of global scientists. In collaboration with the Lindau Nobel Laureate Meetings, the group will further develop the idea into a diverse mentoring system that will serve the Lindau community.



A slide from Group Mărgineanu's presentation during #LINOSD

2nd Place

authentiSci

In response to Lindau Guidelines Goal 1 (Adopt an Ethical Code – Rigour, Respect, Responsibility), Group Clifton developed a web browser extension to combat misleading information. With authentiSci, scientists can read and verify scientific information online, and the public can also request the verification of scientific data. AuthentiSci is available for Google Chrome and Mozilla Firefox.

3rd Place

ANANSIWebinars

Group Elmiger sees the transition to online seminars as a positive trend this year. They propose a central database for sharing and finding open access webinars to support a global, sustainable and cooperative open science community. The group has begun collaborating with researchseminars.org.

“Get your thinking caps out, be prepared to work together in new ways. I look forward to the solutions we can hopefully share with the world.”

Brian P. Schmidt

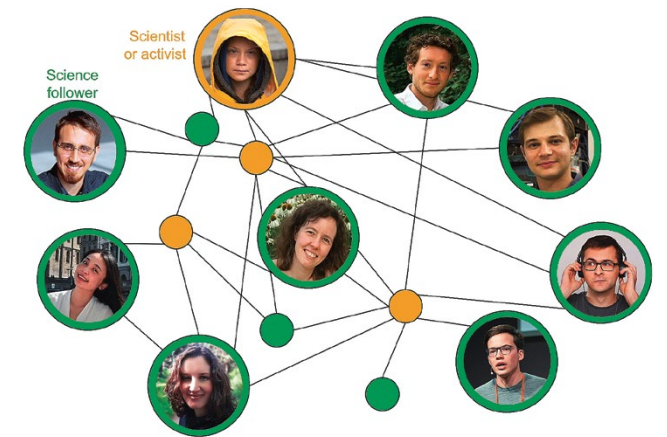


Communicating Climate Change

1st Place

Climate Change Communicated in Style

Group Bisztray took a very specific approach to the problem of efficiently communicating the climate crisis, targeting the increased division of scientists and the public into separate information bubbles, particularly on social media. Using big data social network analysis, they proposed targeted ways to find relevant influencers who have not yet communicated climate change – and who can raise awareness outside of a social bubble.



The members of Group Bisztray in a network

2nd Place

#BeeAClimateChangeCommunicator

Group Barreda created an artistic video, featuring a time-traveling bee, warning of the effect of climate change on bees and pollination. This example supported their argument for a more engaging science communication targeting young and old. The group is currently in discussions to turn the video into a children's book.

3rd Place

Climaguide

Based on comparisons they made to the current pandemic, Group Enniful prepared guidelines for the effective communication of climate change. Drawing on early lessons learnt from the COVID-19 crisis, they propose a multilateral structure centered on an engaging and educational smart device application.

Watch the results videos of the Sciathon finalists



Capitalism After Corona

1st Place

Opportunities Emerging from Crisis

Group Abdelmageed analysed two challenges for the global economy: digital transformation and the lasting effects of COVID-19 on labour markets. In their paper and video, they described the common hardships particularly faced by low-skilled and vulnerable workers. They propose a set of short-term remedies and medium or long-term solutions to use the opportunity of 2020 to create a more compassionate form of capitalism and “creative destruction”.

2nd Place

Individual COVID-19 Narratives

Can individualised COVID-19 narratives guide societies to a more social form of capitalism? This was the core question for Group Maier. The resulting project wants to provide a platform for people affected by the pandemic to share their stories and underline the importance of the social aspects of societies.

3rd Place

Search Me Baby One More Time

Group Jonelis examined whether public interest in the novel coronavirus affected government responses by analysing online search interest and comparing it to the stringency index of public policy responses. They also used Google Maps data to get insights into behavioural responses to governmental lockdown measures.



Young scientist Gracious Nyoni in Group Abdelmageed's video

#Sciathon on Twitter



Behind the Scenes

As well as benefiting from the inestimable knowledge of the Nobel Laureates, the Online Science Day panels were also enriched with the insights of young scientists and economists. Kwadwo Asare Owusu was part of the debate “Green Chemistry – Green Fuels” and describes his experience of the Online Science Days 2020.

How did the preparation for the session proceed in practice?

I had the chance to test my equipment, internet speed, sound and lighting with the production team and address all technical problems in advance of the main recording and live Q&A. Video interactions during the live debates and in the backstage area went smoothly. The production team was always available for support when I had some internet problems for example.

Could you describe your experience in the virtual backstage area before all discussants went live?

The atmosphere was cordial and relaxed, even with the opportunity for small talk. Countess Bettina Bernadotte engaged me in a light-hearted conversation on how I was coping with the pandemic in Wuhan/China.

What did you gain personally from your participation in the Online Sciences Days?

Meeting the Nobel Laureates virtually during the debate was an awe-inspiring experience for me. Not only did I gain new knowledge for the goal of achieving a clean and sustainable carbon-free energy – I got motivation and inspiration to pursue my research interests and career goals seriously.



Kwadwo Asare Owusu, a chemical engineer from Ghana who is currently working at Wuhan University

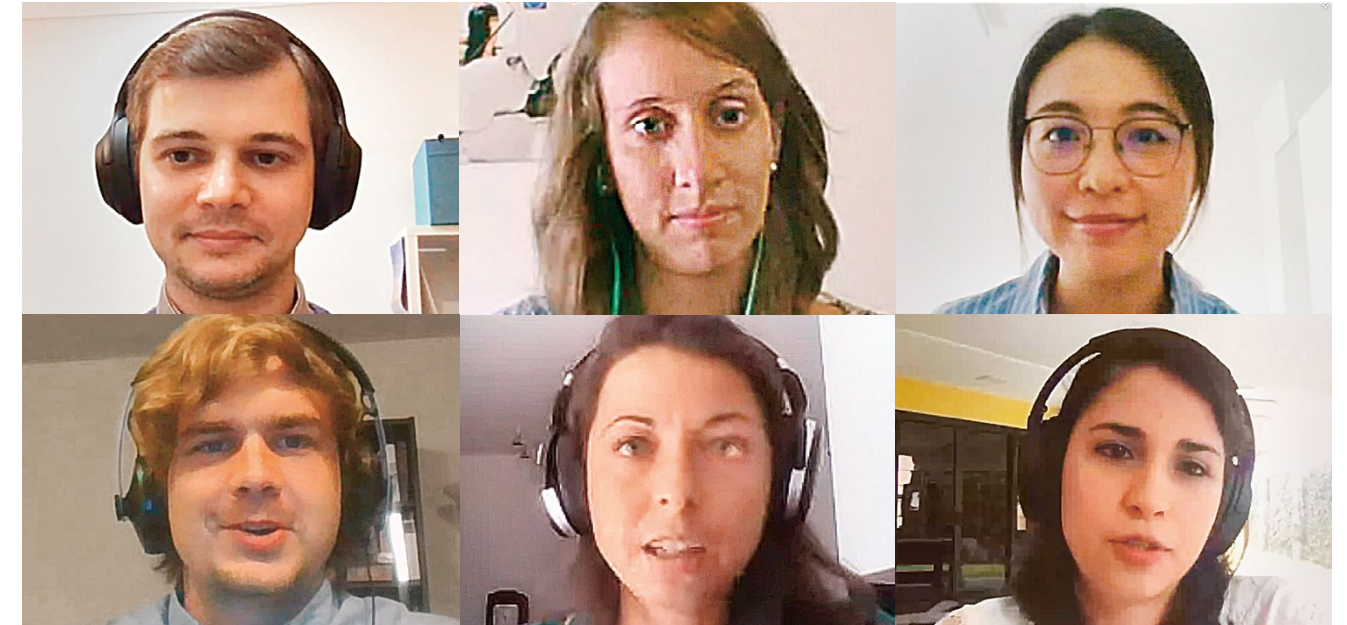
Young scientist Kwadwo Asare Owusu during the Q&A on lithium-ion vs. sodium-ion batteries



Cutting-Edge Research



Malin Alsved, Michael Grau, Lieselotte Obst-Huebl, Bo Peng, Mats Persson, Daniel Reiche



Yauhen Sachkou, Erica Zeglio, Mengqiao Du, Sebastian Ottinger, Marcia Valente, Diana Maria van Patten Rivera

24 selected Lindau Alumni, young scientists and young economists had the opportunity to present their work and discuss their projects in a virtual expo.

Physics

Eight physicists presented their work in various Next Gen Science sessions:

Airborne Viruses in Hospitals During Disease Outbreaks

Malin Alsved, Lund University, Session I

Nonlinear Interaction Signatures in Cancer Data and Beyond

Michael Grau, Philipps-Universität Marburg, Session V

Laser-Particle Acceleration Enables Interdisciplinary Research on a Budget

Lieselotte Obst-Huebl, Lawrence Berkeley National Laboratory, Session III

Designing Controllable Topological Quantum Materials for the Future

Bo Peng, University of Cambridge, Session III

Next-Generation X-Ray Computed Tomography for Imaging COVID

Mats Persson, KTH Royal Institute of Technology, Session I

Research on Nothing: Quantum Thermodynamics of Fluctuation-Induced Phenomena in Nonequilibrium

Daniel Reiche, Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Session V

Quantum Cyclones in a Superfluid Droplet

Yauhen Sachkou, The University of Queensland, Session III

Bio-Functionalized Organic Electronic Devices for Biological Interfacing

Erica Zeglio, KTH Royal Institute of Technology, Session I

Economic Sciences

Four young economists invited to the 7th Lindau Meeting on Economic Sciences presented their work during the Next Gen Science Session II on Monday:

Do Counter-Stereotypical Female Role Models Impact Women's Occupational Choices?

Mengqiao Du, University of Mannheim

Immigrants, Industries and Path Dependence

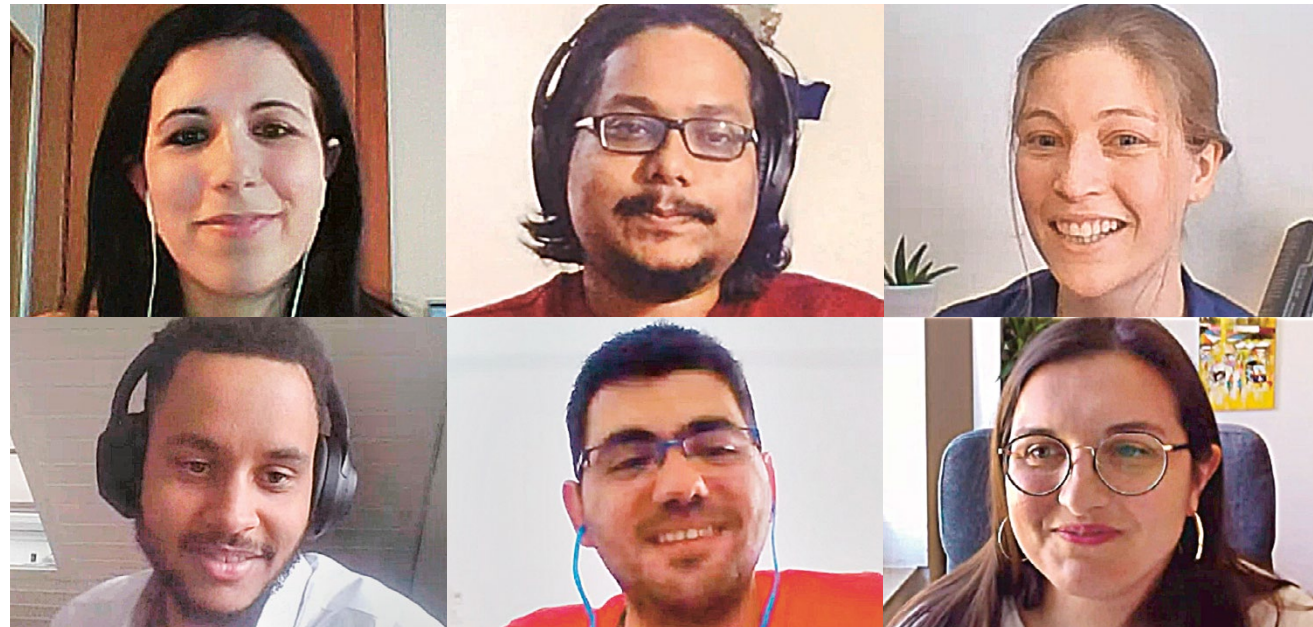
Sebastian Ottinger, University of California, Los Angeles

When Pricing Waste Succeeds (and Fails): Understanding Heterogeneous Policy Effects

Marcia Valente, German Institute for Economic Research – DIW Berlin

Multinationals Market Power and Local Development: Evidence From The United Fruit Company

Diana Maria van Patten Rivera, Princeton University



Sara Cembellin, Anuvab Das, Stephanie Grimmel, Vincent Kadiri, Marios Kidonakis, Karina Pombo-Garcia



Lorenz Adlung, Anna Blakney, Steffen Bruenle, Steve Doo, Özge Karayel, Marie-Nicole Theodoraki

Chemistry

Six Lindau Alumni and #LINO70 young scientists presented their projects in two Next Gen Science sessions:

Past, Present and Future of Manganese C-H Activation

Sara Cembellin, Autonomous University of Madrid, Session IV

In Situ Characterization of Reactive Metal Nitrenoid Intermediates

Anuvab Das, Texas A&M University, Session VI

Automated Exploration Of Chemical Reaction Networks: A Journey Through Chemical Space

Stephanie Grimmel, ETH Zürich, Session IV

Active Gene Delivery to Cells via Magnetic Nanopropellers

Vincent Kadiri, Max Planck Institute for Intelligent Systems, Session IV

Activation of Interelement Si-H, Si-B and B-B σ Bonds by Au Particles: The Midas Touch

Marios Kidonakis, University of Crete, Session VI

Spatiotemporal Map of the Tight Junction Formation During Epithelial Tissue Polarization

Karina Pombo-Garcia, Max Planck Institute of Molecular Cell Biology and Genetics, Session VI

Physiology/Medicine

Six young scientists invited to the interdisciplinary 70th Lindau Nobel Laureate Meeting discussed their work in biology, physiology or medicine:

Fatbook & Obese-IT: Systems Biology Towards Discoveries in Adipose Tissue

Lorenz Adlung, The Weizmann Institute of Science, Next Gen Science Session VI

A Self-Amplifying RNA Vaccine for the Prevention of SARS-COV-2

Anna Blakney, Imperial College London, Next Gen Science Session I

Structural Insights Into the Human CC Chemokine Receptor 7

Steffen Bruenle, Paul Scherrer Institute, Next Gen Science Session V

Attributing Climate Change Impacts On Coral Reefs

Steve Doo, Leibniz Centre for Tropical Marine Research (ZMT), Next Gen Science Session IV

Accurate MS-Based RAB10 Phosphorylation Stoichiometry Determination As Readout For LRRK2 Activity In Parkinson's Disease

Özge Karayel, Max Planck Institute of Biochemistry, Next Gen Science Session V

Plasma-Derived Exosomes Reverse Epithelial-To-Mesenchymal Transition After Immune Therapy in Patients With Head and Neck Cancer

Marie-Nicole Theodoraki, Ulm University, Next Gen Science Session III



Academic Partners

Our academic partners play a central role in allowing us to connect talented young scientists from around the world with Nobel Laureates. A virtual exhibition during the Online Science Days 2020 showcased the work and aims of several of our academic partners.

- The Academy of Science of South Africa (ASSAf) was our partner for last year's International Day.
- The Australian Academy of Science prolonged the partnership with Lindau Nobel Laureate Meetings for ten more years.
- The Columbus Association is serving all of Latin America.
- The European Commission is serving all countries in the European Union.
- The German Academic Exchange Service (DAAD) has a global, diverse and multicultural network.
- The National Research Foundation, Singapore, has a longstanding partnership with the Lindau Nobel Laureate Meetings, which has been extended for five further years.

Apart from the above-mentioned academic partners, the Lindau Nobel Laureate Meetings maintain a strong global network of more than 200 academic partner institutions to ensure the scientific excellence of participants. The network is continuously expanded.

We would like to thank all our academic partners and nominating institutions for their support.



Application Process



Requirements

Undergraduates, Master or PhD Students, or Post-Docs
<35 Years of Age

Top 5% of Class
Recommendations

Application



Exception:
Open Application
(If No Academic
Partner Is
Responsible)

Evaluation & Selection

Review Panel of the Council
400-600 Participants
(Depending on Meeting Type)

Participation

One-Time Only



Lindau
Alumni
Community

35,000 Former Participants
Since 1951



Research must be transparent and truthful:

First, in methodology, data and findings, meaning that these have to be performed and documented in the most precise and comprehensible way.

Second, in communication, and collaboration, meaning that relevant findings shall be communicated and provided to others in a precise, timely and constructive manner. Third, in disclosure of funding, affiliations and political or ideological motivations, meaning that all motivations outside of a pure scientific interest shall be communicated openly.

Nobel Laureates on #LINOSD

Inspiration in Difficult Times

In setting up the online programme, we became increasingly aware that this plan would require quite some technical effort on the part of the Nobel Laureates. We are all the more thankful about the reactions we received from the Laureates before, during and after the Online Science Days.

“Thanks for allowing this to happen.”

Jean Tirole

“I enjoyed doing it, as well as the Q and A.”

Sir Angus S. Deaton

“I have been listening to sessions each day.”

M. Stanley Whittingham

“I am glad to give the young people some hope and inspiration in difficult times. I hope to attend in person soon.”

Frances H. Arnold

“Thank you so much for organising such a wonderful event. It was really interesting. Looking forward to next year.”

Sir Konstantin Novoselov

“I look so much forward to receiving the recording we made today. It was marvelous having all of you in my home. Uff wiederluege. Eddy.”

Edmond H. Fischer

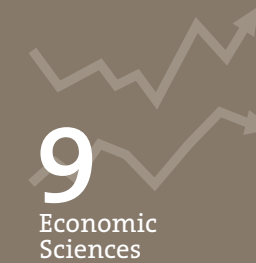
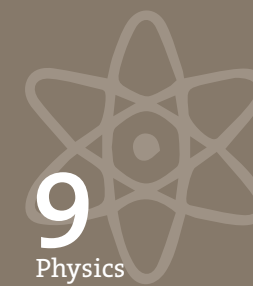
“I’m all ready to come to Lindau next year...”

Brian P. Schmidt

“I enjoyed the event very much, and congratulations to you and your team on putting together an excellent event.”

William E. Moerner

39 Laureates on Stage



and 13 Laureates in the online audience

Nationalities



Age

Youngest
Konstantin S. Novoselov (46)

Oldest
Edmond H. Fischer (100)

Records

First Participations

Frances H. Arnold
Abhijit Banerjee
Barry C. Barish
Thomas R. Cech
Angus S. Deaton
Esther Duflo
Michael R. Kremer
Paul M. Romer
Robert J. Shiller
M. Stanley Whittingham
Gregory P. Winter

Most Participations

Hartmut Michel (23)
Erwin Neher (17)
Edmond H. Fischer (12)

Earliest Award

Wole Soyinka (1986)

Lindau Alumni on #LINOSD

Contrarian Opinions

“I feel honoured to be part of such a great family. I would like to thank the team profoundly for all of your efforts aimed to educate, inspire and connect curious professionals and academics all over the world.”

Hluf Hagos Shiqar,
Lindau Alumnus 2014

“I really enjoyed that there were contrarian opinions in the debates, providing more possibility of discussion. I would have loved to hear more voices from other regions of the world.”

Enrique Lin Shiao, Lindau Alumnus 2018

“Thank you for the opportunity to enjoy the Lindau spirit again! It’s nice to see that you could create such a special platform for so many brilliant discussions despite the physical distance.”

Márta Bisztray, Lindau Alumna 2017

“The Online Science Days were a wonderful experience. I understand that this is a one-off format for the current situation, but I hope you can continue the online aspect in the coming years as well.”

Stanislav Varbev, Lindau Alumnus 2019

“Amazing scientists gather during #LINOSD to share their experience and motivate us all to do what we love the most!”

Greta Babakhanova, Lindau Alumna 2019

“This was a really great event – organised very well, interesting sessions and discussions, options to dive deep into topics and even to network.”

Kathrin Göbel, Lindau Alumna 2016

“I was impressed how we were able to work in a team. I could never imagine before that during 48 hours it is possible to do so much!”

Liubov Poshyvailo, Lindau Alumna 2019

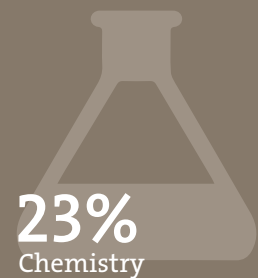
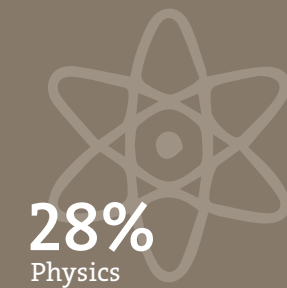
Lindau Alumni, Young Scientists and Young Economists

Several thousand viewers around the world followed the Online Science Days. Here are a few key facts about the largest group of participants.

963 From 104 Countries



Interdisciplinarity



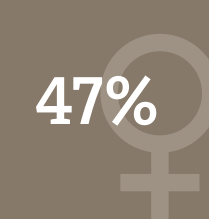
33 Lindau Meetings Represented

Lindau
Alumni
39%

Young
Scientists
43%

Young
Economists
18%

Gender Balance



Young Scientists and Young Economists on #LINOSD

Highly Political

“My first impression of the Online Science Days is that they are highly political. Considering the sadly still-current challenges of a lack of trust in science and deficiency of diversity, let alone increasing nationalism, there is a need for scientists to step and speak up!”

Lukas Heumos, University of Tübingen, Germany

“Thank you so much for your efforts in conducting such an event in spite of all odds thrown at us by nature. These events helped in our overall development, especially the Sciathon brought out some hidden skills.”

Praveen Kumar M, PGIMER Chandigarh, India

“In a pandemic-free reality, I would be in Germany today, for the 70th Lindau Nobel Laureate Meeting. As disappointing as it is, I am extremely grateful that they are hosting the Online Science Days. Super excited for the lectures and discussions!”

Khadija Deniece Wilson, University of Pennsylvania, USA

“Excited to rub shoulders with the giants, although online, but equally fulfilling.”

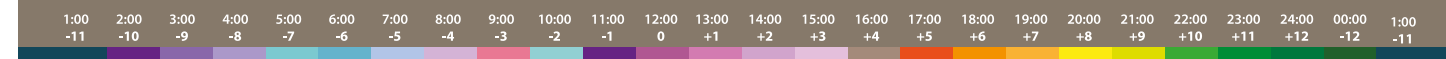
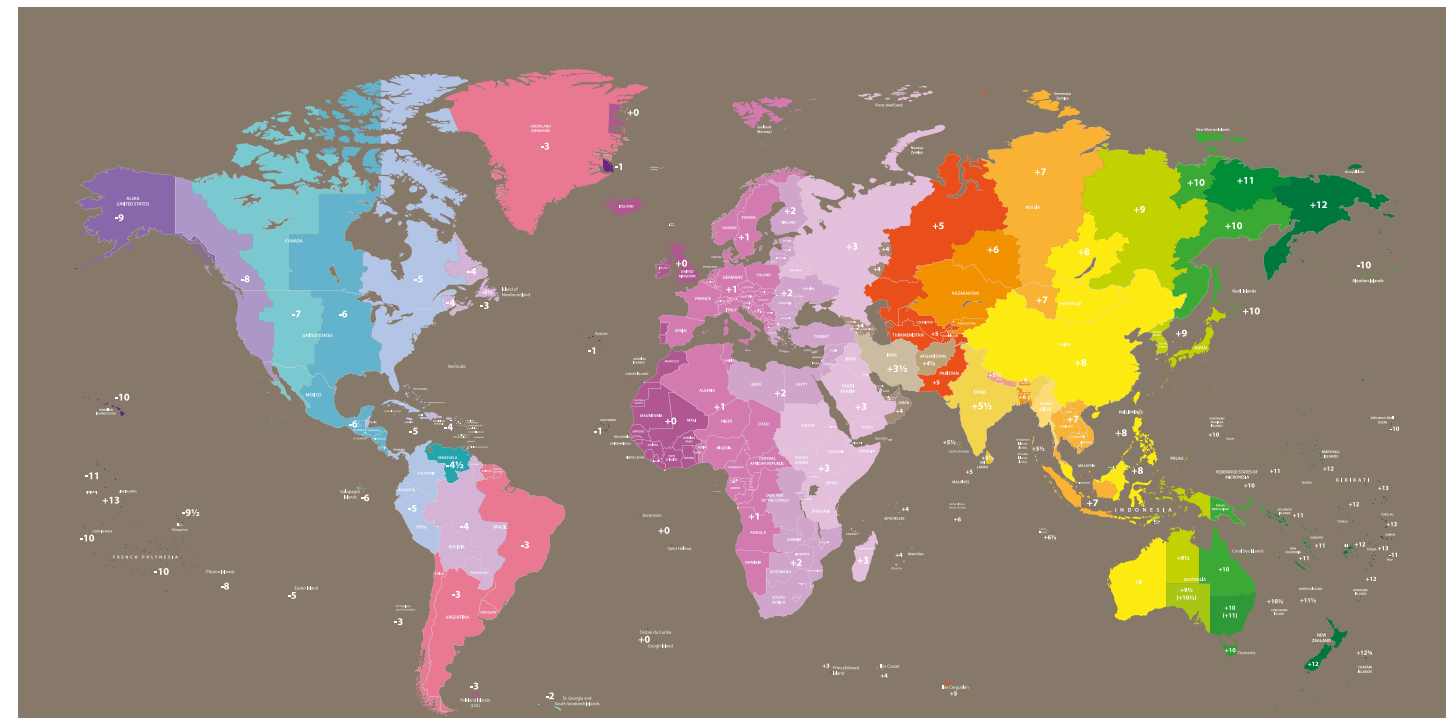
Farhad Zulfiqar, COMSATS University Islamabad, Pakistan

“Happy to be part of the first ever Online Science Days. Though all #LINO70 young scientists wished more than anything to be in Lindau, COVID-19 gave us a once in a lifetime opportunity of being invited to the Lindau Meetings for two consecutive years.”

Marwa Shumo, University of Bonn, Germany

“We scientists have the social responsibility to change and shape the future in a better way for the human civilization.”

Apurv Dash, Forschungszentrum Jülich, Germany



Time Zone	CEST (DST)	UTC	AEST	JST	CST	MSK	BST (DST)	SAST	ART	EDT (DST)	PDT (DST)
City	Lindau		Canberra	Tokyo	Beijing	Moscow	London	Jo'burg	Bue. Aires	Boston	Stanford
	+2	+0	+10	+9	+8	+3	+1	+2	-3	-4	-7
Morning Programme 06.00–09.30	06:00	04:00	14:00	13:00	12:00	07:00	05:00	06:00	01:00	00:00	21:00 ⁻¹
	07:00	05:00	15:00	14:00	13:00	08:00	06:00	07:00	02:00	01:00	22:00 ⁻¹
	08:00	06:00	16:00	15:00	14:00	09:00	07:00	08:00	03:00	02:00	23:00 ⁻¹
	09:00	07:00	17:00	16:00	15:00	10:00	08:00	09:00	04:00	03:00	00:00
Midday Programme 10.30–13.30	10:00	08:00	18:00	17:00	16:00	11:00	09:00	10:00	05:00	04:00	01:00
	11:00	09:00	19:00	18:00	17:00	12:00	10:00	11:00	06:00	05:00	02:00
	12:00	10:00	20:00	19:00	18:00	13:00	11:00	12:00	07:00	06:00	03:00
	13:00	11:00	21:00	20:00	19:00	14:00	12:00	13:00	08:00	07:00	04:00
Afternoon Programme 14.30–18.00	14:00	12:00	22:00	21:00	20:00	15:00	13:00	14:00	09:00	08:00	05:00
	15:00	13:00	23:00	22:00	21:00	16:00	14:00	15:00	10:00	09:00	06:00
	16:00	14:00	00:00 ⁺¹	23:00	22:00	17:00	15:00	16:00	11:00	10:00	07:00
	17:00	15:00	01:00 ⁺¹	00:00 ⁺¹	23:00	18:00	16:00	17:00	12:00	11:00	08:00
	18:00	16:00	02:00 ⁺¹	01:00 ⁺¹	00:00 ⁺¹	19:00	17:00	18:00	13:00	12:00	09:00
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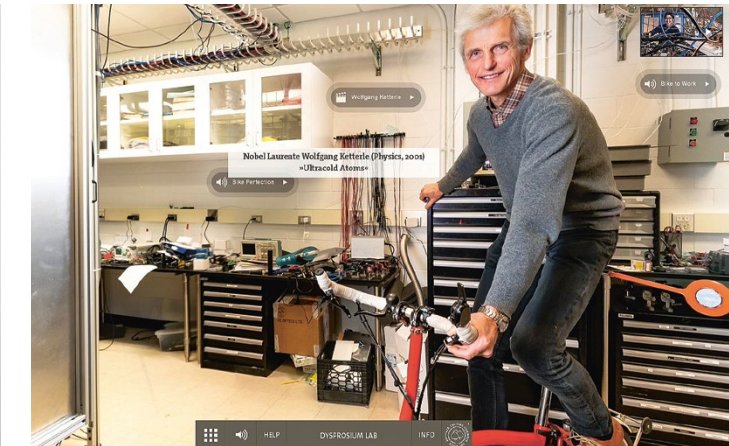


Currently, investing in transparency, openness, accessibility, collaboration etc. is not appropriately rewarded. For the future, implementation and adherence to the aforementioned practices must be rewarded, e.g. in reviewing and job employment and promotion.

Evaluations of scientists shall be based on both the significance and quality of their research as well as the aforementioned processes by which discoveries were made, not on where the results are published or where the research has been performed. Credit will also be given for generating useful data, authoring code or creating resources that can be reused by others. Evaluation criteria and metrics shall always be made transparent.

Sharing the Unique Atmospheres of the Two Islands

Lindau and Mainau Impressions



There are many things that contribute to the Lindau experience: be it the thrilling atmosphere during the Meeting, a stroll through Lindau's old town, the interaction with a host family or the Science Picnic on the last day on Mainau Island. In our Lindau and Mainau Impressions, which appeared throughout the programme, we tried to convey the idea of the Lindau Spirit around the globe.

Greetings from host families and Meeting hostesses – Birgit and Kenneth Strachan, Stephan Förbs, Ula Below, Carin Föhr

Further visual impressions from the Lindau universe – our Sketches of Science and Nobel Labs 360° series featuring Nobel Laureates Françoise Barré-Sinoussi and Wolfgang Ketterle, among many others

Mainau Impressions – the rose garden and a very different Science Picnic 2020



"These guests from all over the world create a very special spirit of peace and inspiration – pretty much the spice in the soup here in Lindau."

Birgit and Kenneth Strachan



Fostering the ‘Lindau Spirit’

Staying Engaged

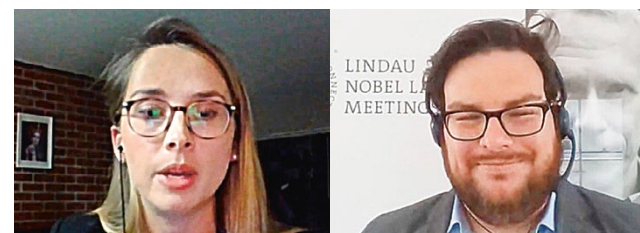
In every crisis there is an opportunity. This oft-cited phrase rang true this year for our former participants who could get involved in the 2020 Lindau Meetings’ activities – a good example for new possibilities that can arise out of difficult situations. In fact, Lindau Alumni were the driving force behind the Online Sciathon 2020 (pages 58–62). The ideas they pitched through the Lindau Alumni Network turned into the group projects for the event and many great initiatives that hopefully will continue to grow. In advance of the Sciathon, an online seminar with Brian Malow gave Lindau Alumni a crash course in how to present your results and your work online in engaging video productions and presentations.

During the Next Gen Science sessions of the Online Science Days 2020, Lindau Alumni, along with young scientists and young economists, also had the opportunity to present their current research to the Lindau community. (See p. 64–67).

As part of the application for this new programme format, the Lindau Meetings received a wealth of abstracts from all disciplines. Continuing the collaboration of the last two years, former participants got involved in the review process for these sessions. Lindau Alumni are closely connected to current, cutting-edge research, have already experienced the Lindau Meetings and are in a unique position to review the work of their peers and the new young scientists and young economists.

The response to the call for peer reviewers was outstanding, with more than 120 Lindau Alumni willing to give back to the Lindau Meetings community by volunteering their time and expertise. We would like to thank all Lindau Alumni reviewers for getting actively involved in the online activities in this way. We are looking forward to continuing this successful cooperative effort for the next Lindau Meetings as well.

As the Lindau Alumni initiative aims to extend the ‘Lindau Spirit’ beyond the boundaries of a weeklong conference, the Executive Secretariat will continue to organise meet-ups, online seminars and similar events. Two further developments will expand this strategy: the Lindau Mentor Hub, in development with the Sciathon winner Group Mărgineanu, will create new opportunities for exchange and growth. Finally, the creation of local chapters will give our Lindau Alumni community more localised opportunities to reconnect and to get engaged in our global network. So stay tuned for further news soon.



Lindau Alumna Lieselotte Obst-Huebl and Alumni Manager Christoph Schumacher during the Next Gen Science session

To find out more about the Lindau Alumni initiatives or to suggest further projects, log in to the Lindau Alumni Network or write to alumni@lindau-nobel.org.



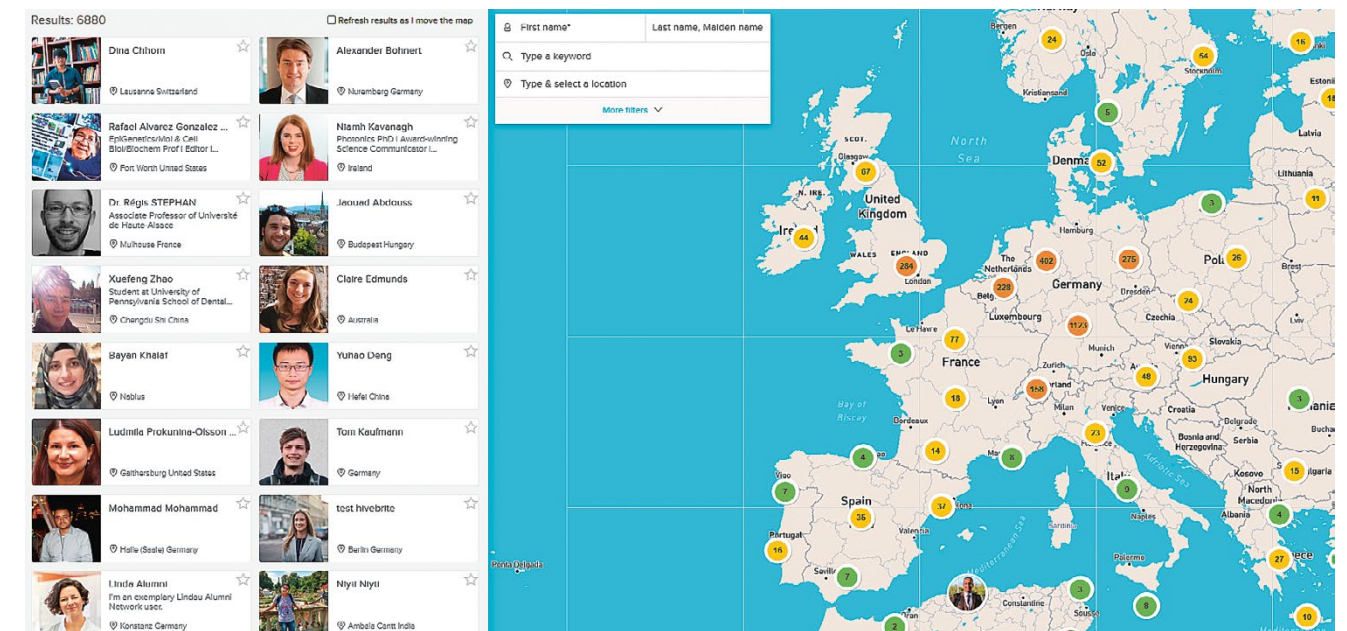
Staying Connected

Participating in a Lindau Nobel Laureate Meeting is a once-in-a-lifetime experience for young scientists and young economists that hopefully has a lifelong impact. The unique ‘Lindau Spirit’ creates memories and ideals shared by all generations of Lindau Alumni. The Lindau Meetings aim to bolster this community by identifying existing connections and retying loose ends. The Lindau Alumni Network, a social online platform exclusively for former participants, is the centrepiece of this effort.

Since 2017, the Lindau Alumni Network has been the digital space for Lindau Alumni. This online community includes tools that enable users worldwide to find fellow alumni, share

their work, swap stories and register for Lindau Alumni events. Updates in 2020, including a relaunch of the mobile app and the possibility to host virtual events within the network, will enhance the ability of the Lindau Alumni Network to educate, inspire and connect.

The Lindau Meetings express their sincere gratitude to the German Federal Ministry of Education and Research for supporting the project. All former and future participants are invited to join this community and to enrich it with their own ideas and perspectives.





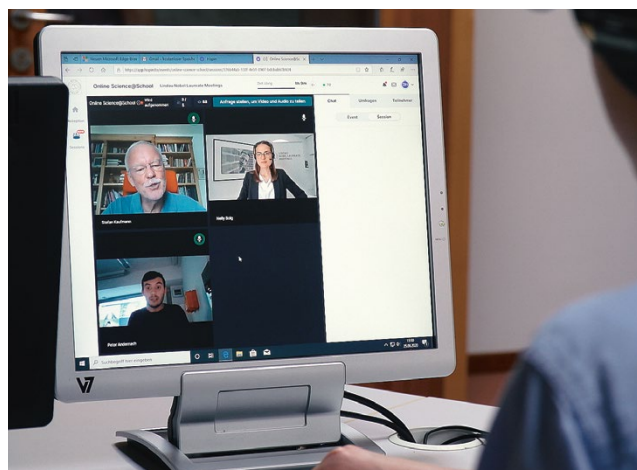
Scientific talent exists in all parts of the world and all parts of society. All work and research environments as well as all structures related to that shall support scientific talent regardless of its background in an inclusive, diverse and non-discriminatory manner. Equal access and opportunities shall be provided and actively promoted.

Virtual School Visit – Transregional Audience

The renowned immunologist Stefan H. E. Kaufmann warned against the dangers of a pandemic as early as 2008. So, was this pandemic predictable? Kaufmann explains the background, as well as possibilities and perspectives for dealing with SARS-CoV-2.

The educational outreach activities of the Lindau Nobel Laureate Meetings aim to spark interest in research and science among the younger generation. For this reason, the Lindau Nobel Laureate Meetings organise an annual school visit for a dialogue between a scientist and secondary school students from the four-country region of Lake Constance. As at the time of the school visit there were still restrictions on face-to-face teaching, we gave the exchange a virtual platform and organised Online Science@School, enabling not only regional schools to participate but also students from Magdeburg and Koblenz.

The online lecture was held by Stefan H. E. Kaufmann, member of the Council, scientific chairperson for physiology and medicine of the Lindau Meetings and Emeritus Director of the Max Planck Institute for Biophysical Chemistry in Göttingen. His main research focus is the development of a vaccine against tuberculosis, which could also be used to treat COVID-19. In his lecture, Professor Kaufmann provided insights into e.g. the causes of the spread of SARS-CoV-2, the effects in the body and the development of a vaccine. The immunologist believes that a return to everyday life will only be possible once a vaccine is available. During the 90-minute event, the students had the opportunity to address their questions directly to the scientist.



“Knowing about the science is helpful to shape one’s opinion in the future.”

David Harrer, Valentin Haider
Gymnasium, Lindau



New Content for Increasing Online Demand

Platform for Learning – Space to Discover

With unique content dating back to 1952, the mediatheque of the Lindau Nobel Laureate Meetings maps their 70-year history of scientific dialogue. The mediatheque hosts more than 700 original lectures by Nobel Laureates, including the recent conversations, talks and debates held during #LINOSD.

Find Edmond H. Fischer’s life lecture on the occasion of his 100th birthday and in-depth information about the Laureates and their research. This year, new Mini Lectures, Topic Clusters and Nobel Labs 360° were produced based on the growing collection of video material from the Meetings.



Nobel Labs 360°: Donna Strickland

By means of a panoramic photography technique, Nobel Labs 360° make the labs of the Nobel Laureates virtually accessible to all. Nobel Laureates and young scientists give first-hand insights into their work. Embedded video and audio recordings add to the experience of a virtual lab tour. Visit Donna Strickland’s Nobel Lab and learn more about the creation and use of ultra-short laser pulses.



Online Seminar

Reaching fellow scientists as well as members of the public online has assumed increasing importance for researchers. With this in mind, science comedian Brian Malow explained how to share your research results in an engaging way with a general audience via video recordings. Recordings of past online seminars address other issues often encountered by scientists: how to find your career path, communicating with the media, networking at conferences etc.



Mini Lectures: Dorothy Crowfoot Hodgkin

Learn more about the 1964 Nobel Laureate in Chemistry. She was the Grande Dame of x-ray crystallography and, with the Pugwash movement, advocated for peace and disarmament.



Topic Clusters: The Quest To Explain Everything

Featuring the attempts of physicists to unpick the fundamental forces of our universe, this Topic Cluster contains lectures from Nobel Laureates including Paul Dirac, Subrahmanyan Chandrasekhar and David J. Gross.

Start your personal journey through the various multimedia formats in our mediatheque



Teaching Material for Use in School

The Lindau Mediatheque is gradually being revamped to provide a learning platform and research source for scientists and those fascinated by science. Much of the material in the mediatheque is well-suited for use in schools. To meet the rising demand for teaching and didactic material, the Lindau Nobel Laureate Meetings continue to expand the educational section based on the discoveries of Nobel Laureates.

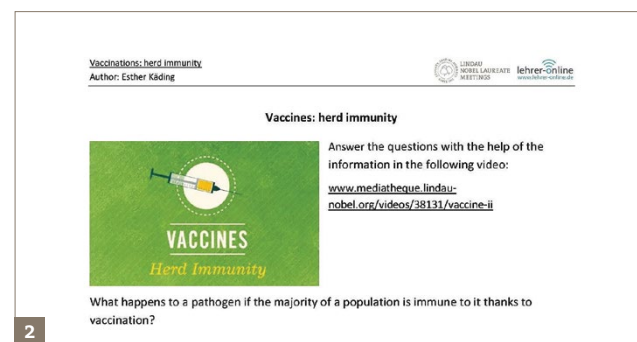
Teaching Guides

So far, 24 teaching guides have been published covering socio-economic topics as well as various themes in chemistry, physics and medicine. These have been developed in collaboration with Lehrer-Online, one of the leading and most renowned providers of learning materials in German-speaking countries. Each unit consists of a precise lesson design proposal, worksheets and other training materials, which can be downloaded both in German and in English.

The teaching guides include mediatheque content: Mini Lectures, Topic Clusters, Nobel Labs 360° and Nobel Posters. This allows for a multimedia approach in schools and lets students and their teachers explore the various topics.

Nobel Posters

Every year, the Royal Swedish Academy of Sciences and the Karolinska Institute publish posters explaining the discoveries of the Nobel Laureates in Swedish and English. These posters are presented during the Nobel Week in December. The Lindau Nobel Laureate Meetings with the support of the Christa und Hermann Laur-Stiftung translated the posters for the 2019 Nobel Prizes into German and distributed them among secondary schools in Germany and the region of the International Lake Constance Conference (IBK): Austria, Liechtenstein and Switzerland.



- 1 The poster explains the Nobel Prize in Chemistry 2019, Nobel Laureate M. Stanley Whittingham attended #LINOSD.
- 2 Teaching Guide on vaccinations in cooperation with Lehrer-Online



Teaching guides and Nobel Posters are available for download

Cooperating in Education

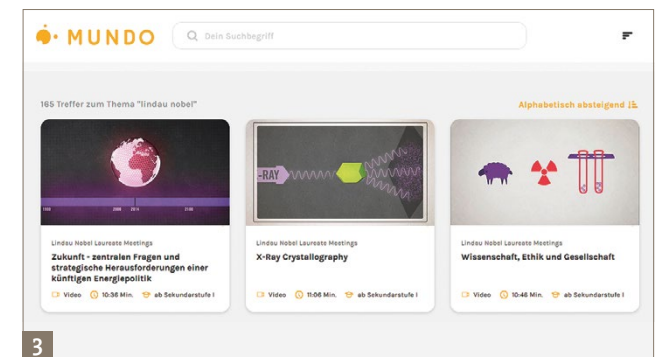
The Lindau Nobel Laureate Meetings aim to share the fascination with science and the archived knowledge that is represented by the Lindau Mediatheque with a larger community, including schools, universities, and the general public. Thus, we embarked on a strategy to collaborate with non-profit providers of digital educational content, mainly public providers of didactic material for teachers. Especially in times of digitalisation and home schooling, access to digital educational content is of critical importance. A selection of videos from the mediatheque that are particularly suitable for use in classrooms can be accessed from our partners' media platforms.

Educational Content Provider MUNDO

With the aim of promoting the educational media infrastructure in Germany, the federal states have committed themselves to establishing a media portal for reviewed, freely accessible and primarily digital educational content. A selection of videos from the Lindau Mediatheque that are particularly suitable for use in classrooms can be accessed from the partner's media portal MUNDO.

Experimenta Science Centre in Heilbronn

On an area of 25,000 m², Experimenta Science Centre in Heilbronn is a unique world of knowledge and experiences where visitors can interactively connect with science, research and matters pertaining to the future of mankind. Video material from the Lindau Nobel Laureate Meetings complements this unique world of discovery.



- 3 Media platform MUNDO
- 4 Experimenta Science Centre

In The Footprints of Nobel Laureates

In Lindau you can walk in the footsteps of Nobel Laureates – and many of them even visited Lindau themselves! On the Lindau Science Trail you can learn more about the scientists who won the Nobel Prize and took part in a Lindau Meeting and how they contributed to science.

The Nobel Laureate Pier Off- and Online

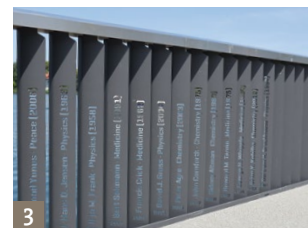
A central station of the Lindau Science Trail is the Nobel Laureate Pier. All Nobel Laureates who have ever been to Lindau are listed on the guard rail with their name, the year of the Nobel Prize and the year of the first visit to Lindau – currently nearly 400 Laureates are featured.

The Nobel Laureate Pier can be visited digitally to learn more about the Nobel Laureates. A new online function has been installed to allow users to search for Nobel Laureates on the pier by the year of the award, the year of their first visit to Lindau and the discipline in which they were honoured.

The Lindau Nobel Laureate Pier could be realised thanks to the support of the Beisheim Stiftung and the City of Lindau.



Visit the Virtual Science Trail and the digital version of the Nobel Laureate Pier on our redesigned website.



- 1 Search function
- 2 Countess Bettina Bernadotte at the Nobel Laureate Pier
- 3 Currently nearly 400 names and dates are included in the Pier

Explaining the Nobel Prizes



- 1 Heiner Linke
- 2 Rainer Blatt
- 3 Katharina Werner

At the beginning of the year, the residents of Lindau were expecting a normal summer – that is, with the visit of many Nobel Laureates. Also traditionally, and marking its 10th anniversary, the matinee for Lindau citizens was held in January with presentations about the 2019 Nobel Prizes.

The Nobel Prize in Physics:

James Peebles, Michel Mayor, Didier Queloz

Rainer Blatt, Member of the Council and scientific chairperson of the Lindau Meetings dedicated to Physics, Professor for Experimental Physics at the University of Innsbruck and scientific director of the Institute for Quantum Optics and Quantum Information (IQOQI) of the Austrian Academy of Science

The Nobel Prize in Chemistry:

John B. Goodenough, M. Stanley Whittingham, Akira Yoshino

Heiner Linke, Professor for Nanophysics at Lund University, scientific chair of the Lindau Nobel Laureate Meetings dedicated to Chemistry and member of the Council

The Nobel Prize in Physiology or Medicine:

William G. Kaelin, Jr., Sir Peter J. Ratcliffe, Gregg L. Semenza

Stefan Koschnick, specialist for internal medicine, nephrology and cardiology, HND Centrum Lindau

Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel:

Abhijit Banerjee, Esther Duflo, Michael R. Kremer

Katharina Werner, Lindau Alumna 2017, post-doctoral researcher/Assistant Professor at the School of Business, Economics and Information Systems, University of Passau

Partners

City of Lindau
Schwäbische Zeitung/Lindauer Zeitung
Sparkasse Memmingen-Lindau-Mindelheim



Science has a distinct responsibility to communicate its procedures and results to society. Not only is most basic research funded by tax-payer money, research and its applications have all-pervasive effects on people's lives. Particularly for global issues such as climate change or epidemic threats, proper communication becomes an important duty.

The scientific community must also constructively work on providing usable information to the decision-making process in politics, society, industry and other areas. Furthermore, the importance of science in general as well as of basic science shall be emphasized more clearly.

Communications

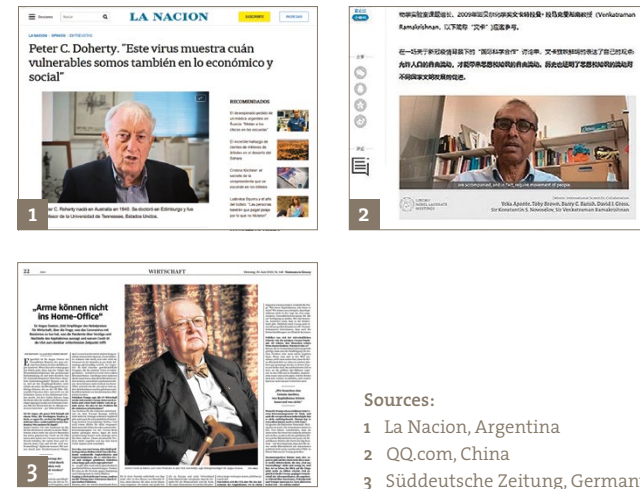
Announcing the postponement of the 2020 Lindau Meetings was a critical element of this year's communications activities. The news, when it was communicated in the spring, was well received by participants and our stakeholders, who mostly heard it via social media.

Although programme formats were virtual and Nobel Laureates, young scientists and young economists could only be contacted using online tools, nearly 100 journalists and communications professionals from around 25 countries requested accreditation for the Online Science Days 2020, among them news outlets such as Times Higher Education (UK), Ciencia del Sur (Paraguay), The Jakarta Post (Indonesia) and Chemistry Views (Germany).

One of the frequently cited programme sessions was the very first debate on "The Role of Science in Times of Crisis" with coverage ranging from international media to culture news reviews in Germany. In comparison to our regular school visit of Nobel Laureates, this year's Online Science@School had the advantage of both allowing students participating from beyond the Lindau region and of enabling access to journalists, for instance from Munich, resulting in reports also on this format. Similar communications opportunities arose from the Online Sciathon 2020.

Our increasing communications activities with academic partners were a particularly rewarding development in this challenging year. In Africa, for instance, news on the selection of a group of young scientists was mentioned in several hundred online publications.

Further typical activities such as supplements in German national dailies, our cooperation with International Journalists' Programmes and press talks during the Meeting had been planned yet did not materialise in the context of the online activities.



Sources:
 1 La Nacion, Argentina
 2 QQ.com, China
 3 Süddeutsche Zeitung, Germany

Communications Milestones 2020



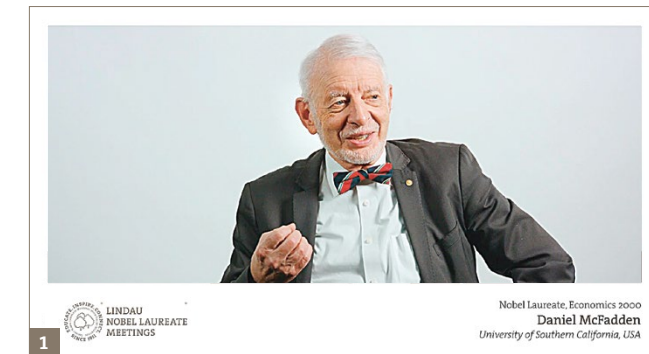
Video Productions

At the very beginning of the year, we still had no inkling of the big changes in store for our video productions in 2020. With the support of London-based Econ Films we recorded testimonials from Nobel Laureates and Lindau Alumni during the American Economic Association ASSA Annual Meeting in San Diego – these in-person interviews seem to have been conducted a very long time ago.

Subsequent productions had to be organised remotely, e. g. interviews by our media partner ARD-alpha. The challenge here was ensuring HD quality from the homes of the Laureates for

TV broadcasting, which we managed thanks to the patience and commitment of the Nobel Laureates involved.

Finally, we were provided with moving images from our Sciathon online competition: In the trailer we featured Nobel Laureates, members of our Council and many Lindau Alumni. And each of the 48 participating groups produced a short video as part of their results package – some of them incredibly entertaining!



1 Nobel Laureate, Economics 2000
 Daniel McFadden
 University of Southern California, USA



2 Lindau Alumni 2019
 Jompoj Wongphechauxsorn



3 Nobel Laureate Barry Barish talking to Sybille Anderl for ARD-alpha



4 Timothy in the Sciathon production #BeeAClimateChangeCommunicator

- 1 Nobel Laureate Daniel McFadden talks about improvements in the economic sciences
- 2 Jompoj Wongphechauxsorn, one of many Lindau Alumni in the Sciathon trailer
- 3 Nobel Laureate Barry Barish talking to Sybille Anderl for ARD-alpha
- 4 Timothy in the Sciathon production #BeeAClimateChangeCommunicator

Playlist with all videos of the Sciathon finalists



Our Blog

The blog of the Lindau Nobel Laureate Meetings features exciting topics related to science and research. Here you will find articles on new scientific findings, reports by Lindau Alumni about their Lindau experiences, interviews with

young scientists/economists about their work and their expectations as well as texts by researchers, which they contribute as guest authors.

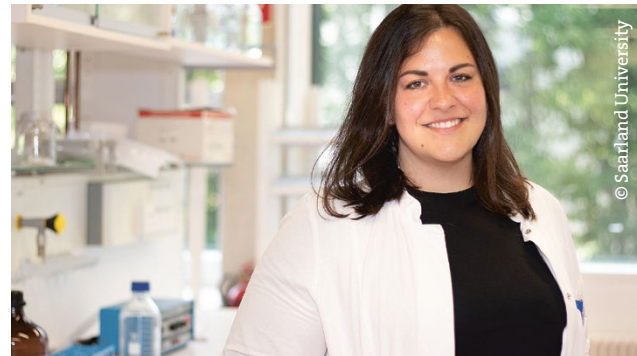
Thoughts About Online Meetings



Support for Low Carbon Economy



New Approach to Tumour Diseases



Tackling the Plastic Problem



Social Media

A central part of the Lindau Meetings' mission is to connect people and to promote the exchange of ideas. In 2020 particularly, connecting people through social media and on other digital platforms has proven to be more crucial than ever.

Facebook

More than 16,500 users have 'liked' the official Lindau Nobel Laureate Meetings Facebook page. Select sessions from the Online Science Days 2020 were livestreamed on our page. Throughout the year, we update our community on news from Lindau, share our own and our partners' content and engage in discussions on science-related topics.

Twitter

In a primarily virtual year, our digital space on Twitter created by Lindau Alumni, young scientists, young economists and users at home was particularly important. We continuously share news, videos and other related content. We reached 10,000 followers at the start of #LINOSD and are already looking forward to continuing the #LINO70 and #LINOecon conversations.

LinkedIn

We're using the official Lindau Meetings' page on the networking community for professionals to create and uphold relationships with partners and friends of Lindau and particularly to reconnect with Lindau Alumni.

Instagram

A growing audience engages with us on Instagram, sharing snapshots from the Online Science Days from their homes as posts and interactive Instagram stories. Every week, we share visual highlights from past Meetings, new blog posts and other digital content.

YouTube

This year, several highlight clips from #LINOSD with Nobel Laureates and other panellists have been added to the Lindau Meetings' YouTube channel. Interviews with Laureates and Lindau Alumni recorded at the American Economic Association Annual Meeting by UK-based Econ Films are a precursor of the discussions to come. Our recent Mini Lectures supplement educational content on a platform widely used by a younger audience.

FlickrR

A collection of images from past Lindau Meetings are accessible to everyone on our Flickr page, be it to relive memories of their meeting participation or to find high-quality pictures for reports on the Lindau Meetings. Editorial use is free, but the copyrights must be appropriately acknowledged.



This is a small selection of current topics – more in our website's blog section



While research is at the core of the scientific discovery process, engaging in the education of the next generation is equally crucial. Enabling and supporting aspiring young pupils, students and scientists ensures a sustainable process of mutual learning and empowers the subsequent cohort of researchers.

Engaging in education can take multiple forms, from classroom lectures to mentoring, from cooperative lab-work to off-campus activities. Fostering this engagement requires appropriate resources to educate the educators.

Organisation

The Council

The non-profit Council for the Lindau Nobel Laureate Meetings was finally founded in 1954 to run the Lindau Meetings first held in 1951. To organise the annual Lindau Meetings nowadays, it maintains an executive secretariat based at the Lennart Bernadotte-Haus on Lindau Island.

Honorary President

Count Lennart Bernadotte af Wisborg †

Board

Countess Bettina Bernadotte af Wisborg
President
Wolfgang Lubitz
Vice-President
Helga Nowotny
Vice-President
Nikolaus Turner
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Stefan H. E. Kaufmann
Jürgen Kluge
Heiner Linke
Hartmut Michel
Torsten Persson
Reinhard Pöllath
Klaus Schmidt

Corresponding Members

Lars Bergström
Astrid Gräslund
Hans Jörnvall

Permanent Guests

Claudia Alfons
Christof Widmer

The Foundation

The non-profit Foundation Lindau Nobel Laureate Meetings was established under German law in the year 2000 by 50 Nobel Laureates. Its main purpose is to ensure the continuance and further development of the Lindau Meetings. As of now, 350 Nobel Laureates have agreed to serve as advocates for the Lindau Spirit in the founders' assembly.

The Honorary Senate is the prestigious committee of the Foundation Lindau Nobel Laureate Meetings' friends and supporters, distinguished ambassadors for the cause of the Lindau Meetings.

Honorary Presidents

Count Lennart Bernadotte af Wisborg †

Roman Herzog †

Honorary Chairman

Wolfgang Schürer

Board of Directors

Jürgen Kluge
Chairman
Nikolaus Turner
Managing Director
Countess Bettina Bernadotte af Wisborg
Thomas Ellerbeck
Reinhard Pöllath



Newest member of the founders' assembly: Reinhard Genzel, 2020 Nobel Laureate in Physics

Executive Secretariat

Wolfgang Huang
Director

Conference Management

Susanne Wieczorek
Head and Deputy Director
Olivia Diener
Sabrina Lummer
Nelly Bolg

Young Scientist Support and Academic Partner Relations

Nadine Gärber
Head
Lara Nell
Greta Meier
Karen Otto
Said Göksu
(03-09/2020)

Communications

Wolfgang Haaß
Head
Daniela Thiel
(since 04/2020)
Christoph Schumacher
Stefanie Unterguggenberger
(until 08/2020)
Philipp Reichle
(05-09/2020)

Guest Relations, Secretariat and Accounting

Anke Elben
Monika Reichert
Marion Möstel

Office of the Foundation

Nikolaus Turner
Managing Director

International

Benefactor Relations

Franziska Castell

Secretariat

Margit Stützle



For the closing credits of the Online Science Days 2020 take a time-lapse video tour all around Lindau Island



Preliminary Account 2020: Revenues

Grants, donations, funds and donations in kind from the meetings' Significant Benefactors (Bundesministerium für Bildung und Forschung (BMBF)), **Principal Benefactors** (Bayerisches Staatsministerium für Wissenschaft und Kunst, Dieter Schwarz Stiftung gGmbH, International Lake Constance Conference (IBK), Jacobs Foundation, Klaus Tschira Stiftung gGmbH, Mars Incorporated, Merck KGaA, Rolex SA), **Benefactors** (BASF SE, Christa und Hermann Laur-Stiftung, Stiftung van Meeteren) **and from the Foundation Lindau Nobel Laureate Meetings with its Principal Maecenates** (Klaus Tschira Stiftung gGmbH, Mars, Incorporated), **Maecenates** (AstraZeneca, Bayer AG, Ecoscientia Stiftung, Freistaat Bayern – Bayerisches Staatsministerium für Wissenschaft und Kunst, Robert Bosch GmbH, Rolex SA, SAP SE, Thomas Schmidheiny, Verband der Bayerischen Metall- und Elektroindustrie), **Principal Patrons** (Bertarelli Foundation, Carl Zeiss Stiftung, Monika and Wolfgang Schürer, National Research Foundation Singapore, Novartis International AG, Siemens AG, Südwestmetall Verband der Metall- und Elektroindustrie Baden-Württemberg e.V., Swiss Re Ltd, Verein der Bayerischen Chemischen Industrie e.V.), **Patrons** (LafargeHolcim Ltd, Sino-Singapore Guangzhou Knowledge City Investment and Development Co. Ltd), **Principal Donors** (Boehringer Ingelheim GmbH, Carl Zeiss AG, Croucher Foundation, Hansjörg Wyss Medical Foundation, Jacobs Foundation, Jörnvall Foundation, maxingvest ag (Tchibo Holding AG), Merck KGaA, Synthes-Stratec Inc., Verband der Chemischen Industrie e.V. (VCI)), **Donors** (Alexander and Katalin Dembitz, Andreas Büchting, AnneMarie Lynen, Artur Fischer, Bert Sakmann, Brian P. Schmidt, Charles Townes, Christian de Duve, Christopher Schläffer, Continental Division Chassis & Safety Lindau, Daniel and Greta Wilm, Edmond H. Fischer, ETO GRUPPE,

Eva Lynen, Familie Graf Lennart Bernadotte af Wisborg, Fondazione Fidinam, Fredy and Regula Lienhard, Fresenius SE & Co. KGaA, George Pinto, Hendrik Leber, Herbert and Irmgard Lütkestratkötter, Innovative Business Foundation Ltd., Jack Steinberger, Jerome Karle, Johann Deisenhofer and Kirsten Fischer Lindahl, Joachim and Bärbel Milberg, Jörn Wilkening, John Robin Warren, Lemann Foundation, Leopoldina Nationale Akademie der Wissenschaften, Lindau Alumni Fund, Lyndon L. Olson and Mrs. Olson, Maja Dornier, Paul Crutzen, Paula Jean Hirsch, Peter D. Dornier, PwC PricewaterhouseCoopers AG, Richard C. Barker, Robert Stolze, Ruth Schilling, Salus Charity Foundation, Schindler Aufzüge AG, Simon W. and Alice I. Newman, Sparkasse Memmingen-Lindau-Mindelheim, Stiftung GAMBIT, Stiftung Hilfe zur Selbsthilfe, The Bert L and N Kuggie Vallee Foundation, Ulrich B. Stoll, Werner Arber, William E. and Sharon Moerner, Zumtobel Lighting GmbH), **and the friends of the Foundation and Lindau Alumni.**

Total Revenues	1,527,239.66
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Please note: The calculated revenues refer to the Online Science Days and selected outreach projects. Deficits have been covered by the Foundation Lindau Nobel Laureate Meetings as guaranteed to the Council for the Lindau Nobel Laureate Meetings.

Preliminary Account 2020: Expenditures

	(in Euro)
Travel	
Nobel Laureates (Cancellation Fees)	118.43
Young Scientists	0.00
Media	0.00
Others	4,995.40

Lodging	
Nobel Laureates (Cancellation Fees)	8,075.00
Young Scientists	0.00
Media	0.00
Others	4,943.44

Boarding	
Nobel Laureates	0.00
Young Scientists	0.00
Media	0.00
Others	3,032.18

Meeting Organisation	
Scientific Programme & Selection of Young Scientists	11,592.08
Rental Fees Locations	0.00
Technical Equipment	3,098.12
Utilities & Services	17,207.60
On-Site Staff	10,757.60
Supporting Programme	0.00
Printed Matters	48,849.69
Expendable Items	2,771.08

Online Science Days	
Audio, Video & Web Productions	209,802.54
Science & Media Services	34,891.76
Platforms (Mediatheque, Alumni)	95,665.36
Website	3,815.12

Further Expenses	
Telecommunications, Postage	21,946.99
IT Services, Hardware, Software	60,467.09
Accounting, Legal Advice, Insurances	20,696.89
Other Costs	4,792.25

Executive Secretariat	
Staff	857,589.19
Office Operating Costs	98,131.17
Office Supplies & Equipment	4,000.67

Expected Total Expenditures	1,527,239.66
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Please note: The total expected costs include €318,006.88 of expected costs for October–December 2020. The budget does not include costs of the Online Science Days covered directly by the Foundation.

Many Thanks to Our Supporters

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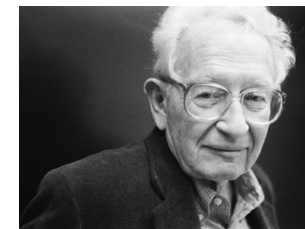
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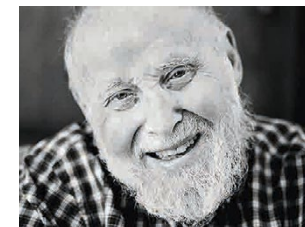
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In Memoriam



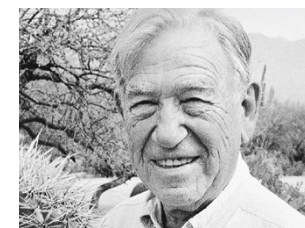
Philip W. Anderson
1923–2020

Nobel Laureate
in Physics
1977



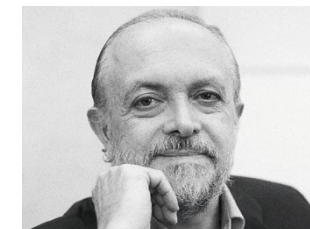
Arthur Ashkin
1922–2020

Nobel Laureate
in Physics
2018



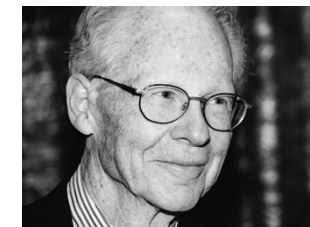
Stanley Cohen
1922–2020

Nobel Laureate
in Physiology or Medicine
1986



Mario J. Molina
1943–2020

Nobel Laureate
in Chemistry
1995



Oliver E. Williamson
1932–2020

Laureate
in Economic Sciences
2009



Sten Orrenius
1937–2020

Founding Member
of the Foundation,
Member of the Council
1993–2003
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Member since 2003



Upcoming Lindau Meetings

2021

70th Lindau Nobel Laureate Meeting
Interdisciplinary #LINO70

2022

71st Lindau Nobel Laureate Meeting
Chemistry

7th Lindau Meeting on Economic Sciences
#LINOecon

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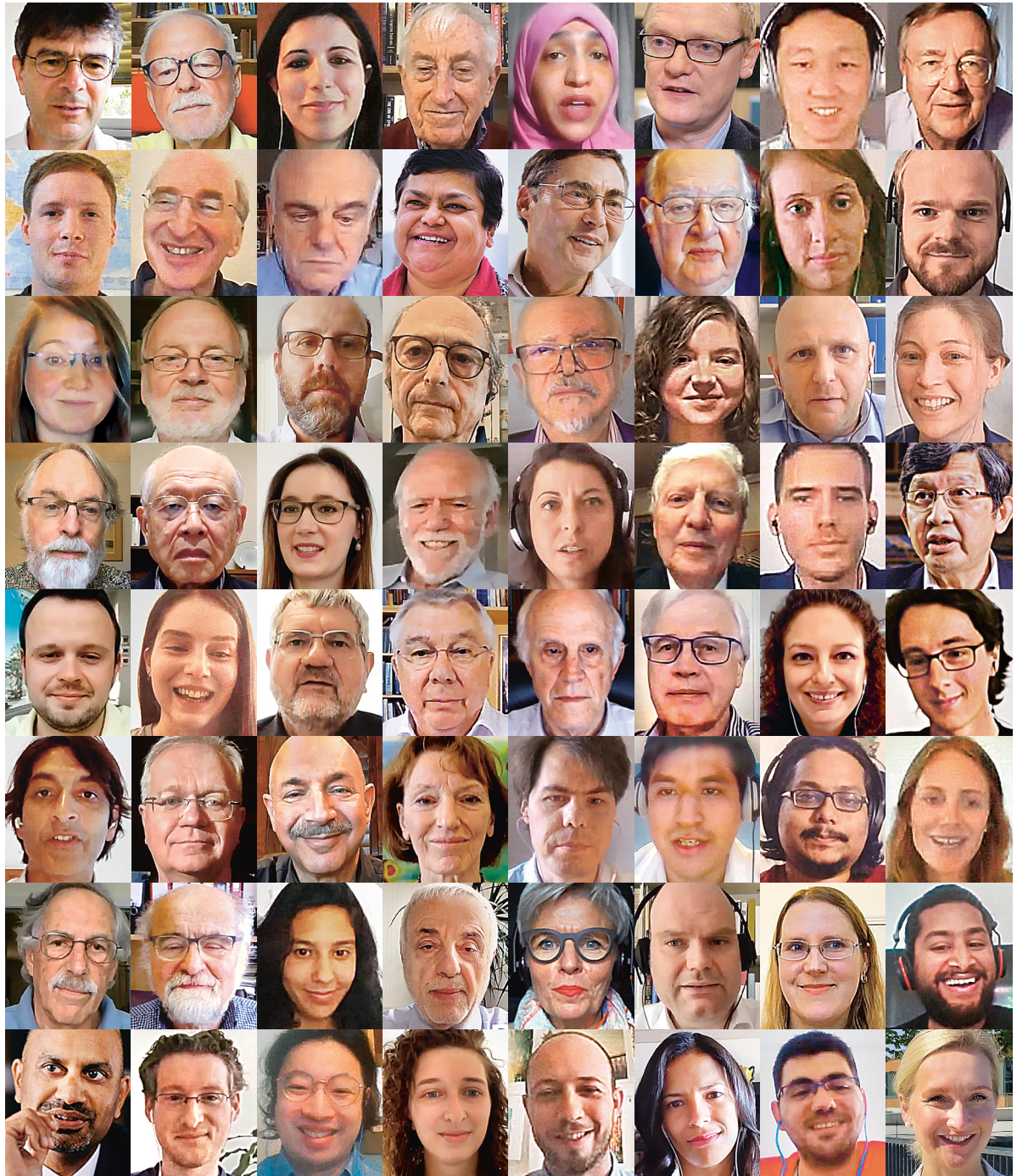


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