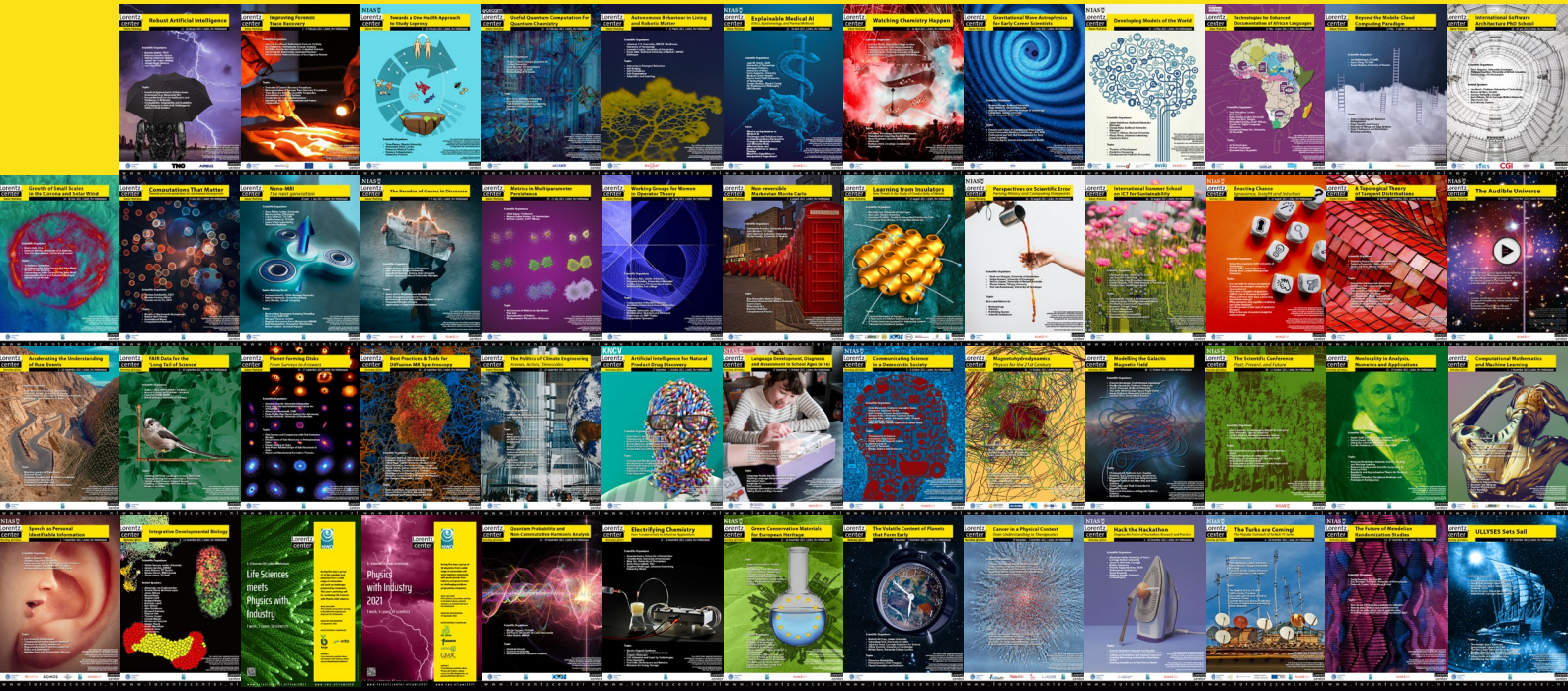
Lorentz center

Lorentz Center
Annual Report
2020-2021



Organizers and participants about the Lorentz Center

Excellent workshop, a real pity we could not meet in person, yet the online activities run very smoothly and the organizers made a terrific job in taking care of everything. Overall, a great success

Thank you for keeping the workshop online. I think it was very helpful, indeed

Ability to select attendees from postdoc/young faculty career stage made discussions better, less rigid ideas, more exchange

I liked the possibility to meet scholars with other perspectives on the same scientific field

A very friendly team!

Despite having to adapt to an online format, preparatory meetings and support was good

Although I had experience with Zoom meetings, the workshop was my first experience with an online conference. I was very impressed. The discussions were very orderly and thoughtful

It was well organized online, I really enjoyed it

A great place to start new collaborations and work in new directions for junior participants

I liked the format a lot, especially the emphasis to have some discussion.

This is something much more difficult to establish online compared to a physical meeting, but the organizers showed good attempts how more informal meetings can be realized online

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FROM THE DIRECTOR

The year 2020 started with the visit of the evaluation committee chaired by Vinod Subramaniam (presently President of the Executive Board of the University of Twente). The evaluation was jointly organized by NWO and Leiden University, as was the previous evaluation in 2014. Of course we are very happy with, and proud of, the conclusions of the committee:

Scientific quality	1 (world leading/excellent)
Quality of procedures	1 (world leading/excellent)
Societal relevance	1 (world leading/excellent)
Viability	2 (very good)

The excellent scores acknowledge the achievements of the team and merits of 'the Lorentz Center formula'. The committee deliberately chose for a slightly lower score on 'Viability' to call the attention of the key stakeholders, NWO and Leiden University, to the long term support and financing of the Lorentz Center. In the course of the last two years, both NWO and Leiden University have indeed decided to structurally support the Lorentz Center. On 28 May 2022, the *Raad van Bestuur* of NWO and the *College van Bestuur* of Leiden University, i.e. both governing boards, signed a covenant to officially declare their long term collaboration regarding the Lorentz Center. Indeed, a milestone in the now 25 year long history of the Lorentz Center!

We have been working on setting up the now established solid foundation of the Lorentz Center for many years, and although we are – again – happy with and proud of this achievement, this has not been the most pressing thing on our minds during the last two years – for most of the time.

Of course, the years 2020-2021 have been the years of the COVID-19 pandemic. The Lorentz Center lives and breathes by bringing people – scientists – together. Not having been able to host visitors for most of the last 2 years was a serious challenge to the Center. Especially the beginning of the pandemic was frustrating to the team: we were more busy with cancelling and trying to reschedule workshops than we usually were with 'just' organizing them. And although we had already started to think about setting up more structural online activities – our visitors have become very aware of their ecological footprint – this was still very much in its infancy. The entire Lorentz Center had to go through a very steep learning curve in setting up online and hybrid activities of 'Lorentz Center quality'.

The duration of the pandemic was also longer than originally anticipated. Since we needed to keep our program timely, and to create space within our program for new proposals, we had to decide in the beginning of 2021 to not (automatically) postpone workshops for a second time: there would have been a gap of more than 3 years between the initial proposal and the eventually organized workshop. Having to decide to 'not organize' a series of approved workshops is also something we never expected to have to do at the Lorentz Center.

On the positive side, due to the pandemic the Lorentz Center has become skilled in organizing and supporting virtual and hybrid workshops and (summer)schools. Our online and hybrid events rapidly became successful alternatives to our classical face-to-face workshops. For some of the postponed workshops, we supported short kick-off meetings, which also fast-tracked our experience-building in virtual environments. This rapid development would not have been possible without the support, creativity and flexibility of the workshop

organizers as well as participants. Throughout, they generously shared experiences and ideas and were willing to try out the new possibilities, also in their very early incarnations.

Virtual workshops also have clear advantages: we could allow more participants in online workshops and some recorded lectures obtained more views than they would have in a purely in-person setting. We expect that we'll keep on organizing virtual and hybrid workshops in the coming years.

During the 'dynamics' of the COVID-19 pandemic, our team – and especially its composition – was even more dynamical than we have become used to through the years. Apart from organizing online workshops, we have become very experienced in setting up online interview sessions and developing hybrid onboarding programs to familiarize new team members with the Center and its mission. Nevertheless, it was very strange, for instance, to have workshop coordinators working in our team for about half a year who never experienced 'real life guests' at the Lorentz Center. Of course, our regular team meetings also took place online: during the pandemic there were many forces at work that made it hard to 'forge' the Lorentz Center team – while our team perhaps is our most important asset. However, given its drive, its cohesion, its pure quality and enthusiasm, I don't think it's an exaggeration to claim that the present team is one of the very best teams ever at the Lorentz Center.

Arjen Doelman
Director Lorentz Center

CONTENTS

1.

PEOPLE

The Lorentz Center is specialized in organizing international workshops in all scientific disciplines and for everyone who is active in research, at all levels and in all scientific fields. Lorentz Center workshops focus on new collaborations and on interactions in highly diverse groups of researchers. We hold that diversity of scientific viewpoints, geographic origin as well as seniority, gender and culture is essential for research.

In the following section, some of our stakeholders introduce themselves and talk about their role in the Lorentz Center.

a. The employee

The Lorentz Center team is led by the director, supported by an institute manager, a scientific manager and a communications advisor. The scientific team assists our advisory boards and supports researchers in developing their ideas into new workshops. The team of workshop coordinators helps the organizers with all organizational aspects. Operational assistants, mostly part-time student assistants, ensure that everything runs smoothly behind the scenes.

The director, Arjen Doelman is active as professor of mathematics, and the institute manager, the scientific manager and the scientific coordinators have a PhD, so they have first-hand experience with the passion of doing research. The fact that we are embedded in the Faculty of Science of Leiden University helps us in running a relatively large operation with a small, dedicated team.

Wendy van der Linden, Planning and Program Coordinator

I started working at the Lorentz Center in 2018 as a workshop coordinator. Because of the COVID-19 pandemic we had to adapt the way we work, from greeting participants on Monday morning to hosting online meetings. It was challenging but it's great to see that even online we can create the Lorentz Center 'vibe' and still reach the scientific goals of the workshops. However, I think I can speak for all of my colleagues that nothing beats a real life Lorentz Center workshop at our 2 venues. We all enjoy the bustle of the common room, hear passionate debates or see participants write their ideas on the blackboard walls.

Recently, I got the chance to become the Planning and Program coordinator. This job made me see every aspect of the Lorentz Center. Where I used to practically organize the workshops, I now get to see how the process works for applying and approving workshop proposals with our boards and to fill our calendar with 80 workshops per year. It's wonderful to see how involved our board members and chairs are and how passionately they share our goals. The result: high quality workshops within an enthusiastic organization.

When people ask about my job they usually say that is sounds so diverse, international and gratifying. And I couldn't agree more. It makes me think about what Louis Pasteur said: 'Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world'. I'm proud to be a small part of that process.

Sam Melief, operational assistant / student-assistant

I started working as a student-assistant at the Lorentz Center in January 2021, in the midst of the COVID-19 pandemic. Since then I have only known working from home (barring a few exceptions). But despite knowing most of my colleagues only through a digital lens, I must say the colleagues have been by far the greatest aspect of working at the Lorentz Center.

In these challenging times, everyone has always been very understanding of whatever situations arose. Furthermore, no matter what rules and regulations are laid out, someone always comes up with clever ways to keep the Lorentz Center going in the best way possible.

My responsibilities come down to dealing with technical problems and keeping all the administrative records in order. I have always felt part of the team. Definitely a great place to work, even in such a comparatively small role.

b. The scientific advisory board member and chair

The Lorentz Center strives to host innovative and timely workshops of high scientific quality. Our advisory boards play a key role in this: the opinion of the boards is decisive in issues involving scientific content and is leading in the scientific policies of the Lorentz Center. Currently, the Lorentz Center has eight scientific advisory boards: Astronomy, Chemistry, Computational Science, Informatics, Life and Medical Sciences, Mathematics, Physics, and Social Sciences & Humanities (NIAS-Lorentz board), see *Appendix 2*.

Marieke Huisman, Informatics board, University of Twente

The first time I heard about the Lorentz Center was in 2012 when I was invited to join the Informatics board. In the computer science community, Dagstuhl is a very well-established place to organize workshops, and I was very excited to learn that a similar facility also existed in the Netherlands. I had been working in France for several years, and joining the board was a great way for me to familiarize myself again with the Dutch computer science community.

After I joined the board, I became very enthusiastic about the concept behind the Lorentz Center workshops, the open atmosphere and the excellent venue. Thus, I submitted several workshop proposals myself. When running the workshops, I was highly impressed by the excellent feedback and support I received from the Lorentz Center staff, which really helped me to turn the workshops into great events.

Thus, when Jos Roerdink asked me if I would be interested to take over his role as chair of the Informatics board, I was very happy to get this opportunity, and I quickly accepted. As a chair, I have tried to encourage many of my colleagues to apply for a Lorentz Center workshop. In my experience, once they have been to one Lorentz workshop, people always want to come back. Often, on the last day of the workshop, participants are already discussing who will submit the next proposal, because this has been such a great week. I am glad to see that during the last years, we have had a stable number of submissions from the computer science community, and that in the Netherlands, most computer science researchers now are aware of the great possibilities of the Lorentz Center.

After having served on the Informatics board for almost 10 years, I felt it was time to hand over my position to new people. I am glad to have found a great successor, however, I will miss my direct involvement in establishing the program of the Lorentz Center, and I hope that in the future there will be many occasions for me to come back to the Lorentz Center.

The advisory board sees it as its central task to foster this spirit for the present and future generation of scientists and for the Dutch research landscape. The outside world is rapidly changing and consequently the organizational structures and the procedures of the Lorentz Center correspondingly have to adapt, but it should happen in the spirits of serving science and scientific exchange, and the Advisory Board wants to support the Director and his team to achieve this.

c. The workshop organizer

Any researcher or group of researchers can apply for organizing a workshop at the Lorentz Center. These organizers deal with the scientific aspects of the workshop, while the staff of the Lorentz Center takes care as much as possible of the practical organization. We are pleased to see that many researchers return to the Lorentz Center time and again.

Maria J. Arche (left), University of Greenwich &

Angeliek van Hout (right), University of Groningen

Maria Arche and Angeliek van Hout coordinated a NIAS-Lorentz Theme Group in fall-winter 2021 on language development in the school ages (6-16 years).

Maria is a professor of linguistics at the University of Greenwich and director of its Centre for Research and Enterprise in Language. Her research interests lie in theoretical linguistics and second language acquisition, focusing on the argument structure and temporal interpretation of verbal and non-verbal predicates (nouns and adjectives).

Angeliek is a professor of linguistics at the Center for Language and Cognition Groningen at the University of Groningen. Her research field is first language acquisition. She has investigated many topics of sentence structure and sentence meaning, ranging from event results to nominal reference, in children learning Dutch and English, and also learners of a variety of Slavic and Roman languages.

> *We organized an interdisciplinary workshop at the Lorentz in fall 2021 for which we not only invited researchers from three different disciplines—Linguistics, Health Sciences and Education—but also non-academic participants, including parents, teachers, language policy consultants, speech & language therapists and medical doctors. All presented their views on the language needs of school children in the age range of 6 to 16. It was exciting to see how this highly diverse group of people, most of whom did not know each other before the workshop, truly came together and reached a joint conclusion, calling for more awareness and more research insights into the language needs of children and adolescents, not hindered by the hybrid format of the workshop. The workshop was the ideal starting point for our NIAS Theme Group project, as it enabled us to establish what were the most urgent research actions for our follow-up work at NIAS.*
>
> *The Lorentz staff shared many important insights about how to develop a workshop format uniquely geared towards our goals, namely, creating an international network and, by the end of the week, drafting a manifesto with all present. Thus, our workshop secured a maximum of interaction among participants, with equal respect for all, and a continuous clear focus on our goals.*

2.

COLLABORATIONS

The Lorentz Center has become thoroughly embedded in the (inter)national scientific community, because of collaborations with sister-organizations and the many friends and supporters (e.g. participants, organizers, board members and other ambassadors). In this section, we reflect on the highlights of our collaboration with partners like the Netherlands Institute for Advanced Study in Humanities and Social Sciences (NIAS), Centre Européen de Calcul Atomique et Moléculair (CECAM), the Netherlands eScience Center, Rijksmuseum Boerhaave, to name a few. We are very grateful to all of our partners for their support which enables us to organize additional events for specific target groups. For example, workshop participants gave lectures at the weekly science presentations of the Faculty of Science of Leiden University in the series of ´This Week's Discoveries' and public lectures in Rijksmuseum Boerhaave, see *Appendix 3*.

a. NWO

Together with Leiden University, the Dutch Research Council (NWO) has been our main supporting partner since our very first years. Every five years this partnership is evaluated. In 2020 the current partnership cycle ended successfully. In 2021 it was renewed, with an additional possibility of growth by further investing in the collaboration between industry and the academic world and applied research, supported by the National Research Agenda (NWA)

Since 2017 Yvette Tuin has been our contact person at NWO, who has been extremely supportive, very knowledgeable and always willing to help. She was instrumental in the organization of the evaluation process as well.

Yvette Tuin, Team leader Mathematics and Computer Science NWO

When I am at the Lorentz Center and I walk into the common room, I always feel the energy of exited scientists. These scientists are creating new knowledge while working together during the workshop, which even continues during the breaks. And that is what I see when I visit the Lorentz Center.

My visit is to meet the people at the Lorentz Center who make this possible. Their enthusiasm creates the energy of the scientists. They know how to organize a great workshop within disciplines, but also across disciplines. And their promise is true: you do the science, we do the rest.

I am honored to be able to contribute to this in a small way as contact person from NWO. It is a great pleasure to work with the enthusiastic people at the Lorentz Center.

In the course of the years NWO has extended its support to all disciplines of the natural sciences, technological sciences, the humanities and the social sciences. Part of this collaboration encompasses working together on the so called 'with industry workshops'. Every year, NWO and the Lorentz Center jointly organize the Physics-, ICT- as well as Life Sciences with Industry workshops. Due to the interactive, hands-on character of the 'with industry' workshops, they could not take place during the pandemic and resulting COVID-19 restrictions in November 2020 and in January 2021. In November 2021 the Physics and Life Sciences with Industry workshops were successfully organized again.[1] (see *Appendix 1*)

b. NIAS

In 2021 the Lorentz Center and NIAS looked back on 15 years of fruitful collaboration. The NIAS-Lorentz Program promotes cutting-edge interdisciplinary research that brings together perspectives from the social sciences & humanities with the natural & technological sciences, the original core scientific areas of the two institutes. The NIAS –Lorentz Program includes the selection of the yearly NIAS Lorentz Theme Group (NLTG) and Distinguished NIAS Lorentz Fellows (DNLF), residing at NIAS. The NLTG is an international group of 3 to 5 researchers. All NLTG members hold fellowships at NIAS, providing them the opportunity to work as a team and engage in the kind of intensive interdisciplinary collaboration that is often difficult to realize in a regular academic setting.

The DNLF is awarded annually to a leading researcher to work on cutting-edge research at the interface between the humanities and social sciences on the one hand and the natural and technological sciences on the other. In addition to their residential fellowship at NIAS, the NLTG and DLF are awarded a workshop to be organized at the Lorentz Center – in fact, it is a prerequisite of the fellowship. Table 1 lists the respective workshops in 2020 and 2021.

1. For this edition, the Life Sciences with Industry was changed into Life Sciences meets Physics with Industry.

The collaboration, and the NIAS-Lorentz scientific advisory board, also support the SSH workshops at the Lorentz Center, which do not have a direct natural science/technological link (see *Appendix 1*).

DNLF 2019 - 2020	Hall Caswell	Population Health: A New Comprehensive Framework
DNLF 2020 - 2021	Iris van Rooij	Tools for theory: Improving the theoretical foundations of psychological science
NLTG 2020	Juan M. Durán	Explainable Medical AI: Ethics, Epistemology, and Formal Methods
NLTG 2021	María J. Arche	Language Development, Diagnosis and Assessment in School Ages (6-16): Next steps in research and practice

Table 1. Overview of the DNLF and NLTG workshops '20 - '21

c. CECAM

The highlight of our collaboration with CECAM is the yearly CECAM-Lorentz Competition for a workshop in computational sciences, aiming at daring initiatives in modeling and simulation at different scales. The workshops are held since 2014, alternately at Lorentz Center in Leiden and at CECAM HQ in Lausanne.

CECAM-Lorentz workshop 2020	Miguel Bessa, Mark Pauly, Pedro Reis, Martin Van Hecke	Computing complex mechanical systems	CECAM HQ, Lausanne
CECAM-Lorentz workshop 2021	Thomas O'Brien, Markus Reiher, Barbara Terhal, Lucas Visscher	Useful Quantum Computation For Quantum Chemistry	Lorentz Center@ Online, Leiden

Table 2. Overview of the price winning CECAM workshops '20 - '21

d. Netherlands eScience Center

Each year, the Netherlands eScience Center and the Lorentz Center invite researchers to join the eScience Center – Lorentz Competition. The winning workshop brings together researchers and experts from the academic community and the public / private sector, each year with a different focus. In 2021 we started to expand the collaboration Joris van Eijnatten the CEO of the Netherlands eScience Center explains below.

Joris van Eijnatten, CEO of the Netherlands eScience Center

The eScience Center has a long-standing collaboration with the Lorentz Center, a partnership that works so well and so pleasantly that in 2020/2021 we agreed to invest even more effort and resources into projects that benefit us both. We adapted the objective of the existing eScience Center-Lorentz workshop to better fit our common strategy. To foster awareness and nourish knowledge of research software, the eScience Center-Lorentz competition now seeks to maximize its impact by not only aligning the workshop topic more closely with the expertise areas of the eScience Center, but also by offering the participation of multiple Research Software Engineers from the eScience Center throughout the workshop. We have high expectations concerning the first workshop based on this new model, which focuses on Explainable Artificial Intelligence.

Our ambitions reach much further, however. We also established a cooperation with the Lorentz Center to launch a whole series of workshops through the eScience Center's Open eScience Call 2021. No less than six early-career researchers will have the opportunity to organize a Lorentz Center Workshop on the use of research software within their field of expertise. For the eScience Center, one reason for setting up this collaboration relates to the Lorentz Center's excellent national and international reputation – there's really no better way for us to give a serious boost to a talented early-career researcher. That, and the spirit of openness, mutual trust and professionalism in which our conversations are conducted and on which our relations with the Lorentz Center have been built, suggest that we both have a fruitful future ahead of us.

eScience Center – Lorentz Call 2020	Sara Petrollino, Felix Ameka, Daan van Esch, Mmasibidi Setaka, Emmanuel Prof Ngue Um	Technologies for Enhanced Documentation of African Languages: creating synergies
eScience Center – Lorentz Call 2021	Dim Coumou, Maurice Schmeits, Daniela Domeissen, Jakob Runge, Michael Scheuerer	Boosting (sub) seasonal forecasts with Explainable AI

Table 3. Overview of the winners the eScience – Lorentz Call '20 – '21

e. Rijksmuseum Boerhaave

rijksmuseum boerhaave

The partnership with Rijksmuseum Boerhaave allows us to reach out to the broader public. This partnership dates from 2013 and aims at communicating the latest international scientific developments to a general audience. In 2020 and 2021 we again organized several very successful public events in the museum.

In pre-pandemic times, the Lorentz Center organized about 6 public lectures a year. Due to the COVID-19 restrictions many public lectures were canceled. In August 2020 our first online public lecture attracted 75 participants. In 2021 only 1 public lecture was organized. We turned successfully to a hybrid format: 80 persons (20 in person, 60 online) attended the first hybrid public lecture. (See *Appendix 3* for further details).

f. The Huibregtsen prize

Since 2016, the Lorentz Center has been involved in the 'Avond van Wetenschap en Maatschappij' (Night of Science and Society). This annual event is organized on behalf of the Ministries of Economic Affairs and of Education, Culture and Science to put academic research in the Netherlands in the limelight. The event welcomed prominent representatives from the academic world, culture, business, politics, media and sports online in 2020 and in the Hague in the Nieuwe Kerk in 2021.

On this evening, the Huibregtsen prize is awarded to a researcher who performs highly innovative research with social relevance. In addition to a cash prize and a bronze sculpture, the winner is awarded a Lorentz Center workshop. The presence of the Lorentz Center at this evening contributes to establishing new contacts and maintaining existing relationships, both with researchers and policy makers. In 2020 the prize was awarded to Johan Hoorn and Elly Konijn and in 2021 to Sandjai Bhulai and Rob van der Mei.

Henriette Jensenius (scientific manager Lorentz Center), Sandjai Bhulai (winner Huibregtsenprijs 2021), minister Ingrid van Engelshoven of OCW, Ineke Sluiter president KNAW, Rob van der Mei (winner Huibregtsenprijs 2021), Arjen Doelman (director Lorentz Center). Picture taken by: Roemer Overdiep

g. KNCV

Initiated in 2019, the Lorentz Center, together with KNCV, invited tenure track researchers for the first time to participate in the Chemistry Competition. This competition was initiated by the Chemistry Advisory Board, to enhance our chemistry workshop program and to put young scientists in the limelight. Since 2020 the invitation has been broadened, now also postdocs are welcome to participate.

Jan-Willem Toering, director KNCV

An important objective of the KNCV is to make chemistry and its applications in daily life, but especially the chemists behind it, visible. The KNCV does this in various ways, for example by organizing scientific meetings, webinars and workshops, making eye-openers (short video clips in which young chemists present themselves), publishing articles in the Chemisch Weekblad (C2W) and much more.

The KNCV therefore also applauds the activities of the Lorentz Center, as these offer chemists the opportunity to organize workshops on current and scientifically relevant topics, in which mutual interactions, scientific discussions and the formulation of new scientific and/or social goals are important components.

The KNCV has sponsored the Lorentz Center chemistry competition in recent years. The chemistry competition is a tool with which young chemists, who are still at the beginning of their careers, can organize a 'free' chemistry workshop for and with their colleagues, which is not only scientifically important, but also puts those young chemists in the spotlight and thus contribute to their visibility within their own scientific field. That ultimately contributes to their chances of publishing articles in top journals and having project applications honored, which are, after all, assessed by the same scientists.

Chemistry Competition 2020 - Winner -	Marnix Medema, Gerard van Westen, Anna Hirsch, Serina Robinson, Roger Linington	Artificial Intelligence for Natural Product Drug Discovery
Chemistry Competition 2020 - Runner up -	Amanda Garcia, Ning Yan, Timothy Noël, Siegfried R. Waldvogel, Elena Pérez-Gallent	Electrifying Chemistry: From Fundamentals to Industrial Applications
Chemistry Competition 2021	Sonja Pullen, Line Næsborg, Sebastian Beil	Photocatalysis - challenges and future perspectives

Table 4. Overview of the winners of the Chemistry Competition '20 and '21

3.

HIGHLIGHTS

a. Online and hybrid workshops

Before 2020, all our workshops were 'in person' workshops: scientists from all over the world came to the Lorentz Center to attend their workshops in the special 'Lorentz atmosphere'. When the COVID-19 pandemic broke out, we were forced to switch to online workshops overnight, due to lock down and travel restrictions. This was a huge challenge: we had no experience in organizing virtual events, but we responded very quickly and after only a few weeks we started to organize small online events, followed in August 2020 by our first online workshop. We tried to create the 'real Lorentz Center experience' as much as possible with the online workshop set up on one platform: presentations, break-out rooms and social gatherings. After logging in, the participants could attend the workshop 'as if it was onsite'. Organizers were at first hesitant, but soon they became enthusiastic.

In September 2020, when the COVID-19 restrictions allowed, we supported the first hybrid workshop. Some organizers and participants attended the workshop at the Lorentz Center, others participated online. It was fantastic to have scientists at the Lorentz Center again. By now the Lorentz Center is fully equipped for organizing online and hybrid workshops (including screens, cameras and microphones). The workshop coordinators are now skilled in working with different virtual platforms and provide support to the workshop participants. The scientific team members have developed skills to advise on formats to design interactive virtual and hybrid sessions.

b. Lorentz Center Evaluation

In early 2020, the Dutch Research Council (NWO) and Leiden University appointed an external assessment committee consisting of distinguished members of the research community, led by Prof Vinod Subramaniam, to conduct an evaluation of the activities of the Lorentz Center. The committee reached its conclusions based on the Lorentz Center self-evaluation report and other documentation and on-site interviews with relevant stakeholders including workshop organizers, chairs and members of our scientific and advisory boards, the Dean of our faculty, Lorentz Center team members and management, and the heads of our funding agencies (NWO and Leiden University). The committee rated the Lorentz Center's performance as world

leading/excellent in terms of scientific quality, impact, quality of procedures, organization of workshops, societal impact and relevance. Despite some concerns with regards to continued funding, accommodation and the governance structure, the committee rated its viability as very good.

In addition to appreciation of the achievements, the committee recommended that the Lorentz Center provide more flexibility by exploring new activities and workshop formats, while adapting its governance structure in line with its evolving character. Furthermore, the committee recommended to take practical steps to enhance the current performance in terms of sustainability, diversity, digital follow-up and placing greater emphasis on underrepresented areas such as the humanities and the social, medical and chemical sciences, as well as reaching beyond the academic world to engage the wider society (citizen science, commercial knowledge transfer).

c. Sustainability

In 2019, we set up the project team 'Sustainability @ Lorentz Center' with the overarching aim of reducing the carbon footprint of our institute. The project team, comprised of one scientific coordinator, two workshop coordinators and the institute manager, defined concrete steps with respect to sustainability.

To decrease our "food footprint", we included vegetarian options during the welcome reception and workshop dinner. In addition, constant monitoring in close collaboration with the catering enabled a significant reduction of food waste during the receptions. In the office, we dramatically reduced the amount of paper used to print posters, information material for the participants, and by distributing our reports electronically. We choose to collaborate with external partners (hotels, caterers) who are taking measures to secure sustainability. For example, our partner hotel has a 'green key' certification.

The most impactful action, imposed by the COVID-19 pandemic, was to enhance our capabilities in hosting and facilitating virtual, and later hybrid workshops, thereby reducing travel-related emissions. We keep working on developing policies to stimulate sustainable travel beyond the pandemic times and continue to critically assess every step in our workflow to further reduce the related carbon emissions. We will also seek to establish collaborations with LUGO (Leiden University Green Office), to align our efforts with ongoing initiatives at Leiden University.

d. Lorentz Center team

In 2021 the Lorentz Center team underwent significant changes: we welcomed 7 new colleagues (2 new scientific coordinators, 4 new workshop coordinators and a PR coordinator) in addition, one workshop coordinator made the switch to program coordinator. All our new colleagues have onboarded fast and successfully, even though most of the onboarding took place during the lock down. We are very grateful for the team for a constructive team spirit! We thank all the colleagues "old and new" for all their contribution and dedication to the Lorentz Center.

4.

NUMBERS

a. Workshop program

On average, we organize around 80 workshops per year. As shown in table 3, in 2020 we had 76 planned workshops on our program and in 2021 the number of workshops planned was 80. Due to the pandemic, the Lorentz Center could host 23 workshops in 2020 and 55 in 2021. In 2020, 17 workshops were in person, 5 online and 1 workshop was organized in a hybrid format. In addition, 14 online kick-off events took place for the workshops which were rescheduled.

In 2021, more than half of the workshops were online (36 of 55), 17 workshops were organized in a hybrid format and 2 workshops were completely in person (Appendix 1). As many workshops had to be rescheduled to 2021 or 2022, we were recruiting fewer proposals in 2020 and 2021 to allow space on our agenda for these rescheduled workshops.

In general, we welcome around 3100 participants annually. Sometimes virtual and hybrid formats allow more participants, hence the total number of participants in 2020 and 2021 was higher than expected based on the number of workshops.

Table 5 shows the Lorentz Center program in numbers

	2020	2021
Submitted proposals	67	78
Planned workshops	76	80
Organized workshops	23	56
- online	*5*	*35*
- hybrid	*1*	*19*
- in person	*17*	*2*
Natural sciences workshops	17	35
SSH workshops	6	21
Participants	960	2767

Table 5. Overview of the workshops in numbers '20 and '21

Figure 1 indicates the broad scientific spectrum of our workshops (all workshops approved per scientific advisory board). Multidisciplinary workshops, which are typically approved by several boards, are shown with each of the boards. Due to the success of the Chemistry Competition and increased attention to this area, the number of workshops in chemistry has increased from 3 workshops in 2018 to 10 in 2021. The share of computational science workshops has increased in the last 2 years as well.

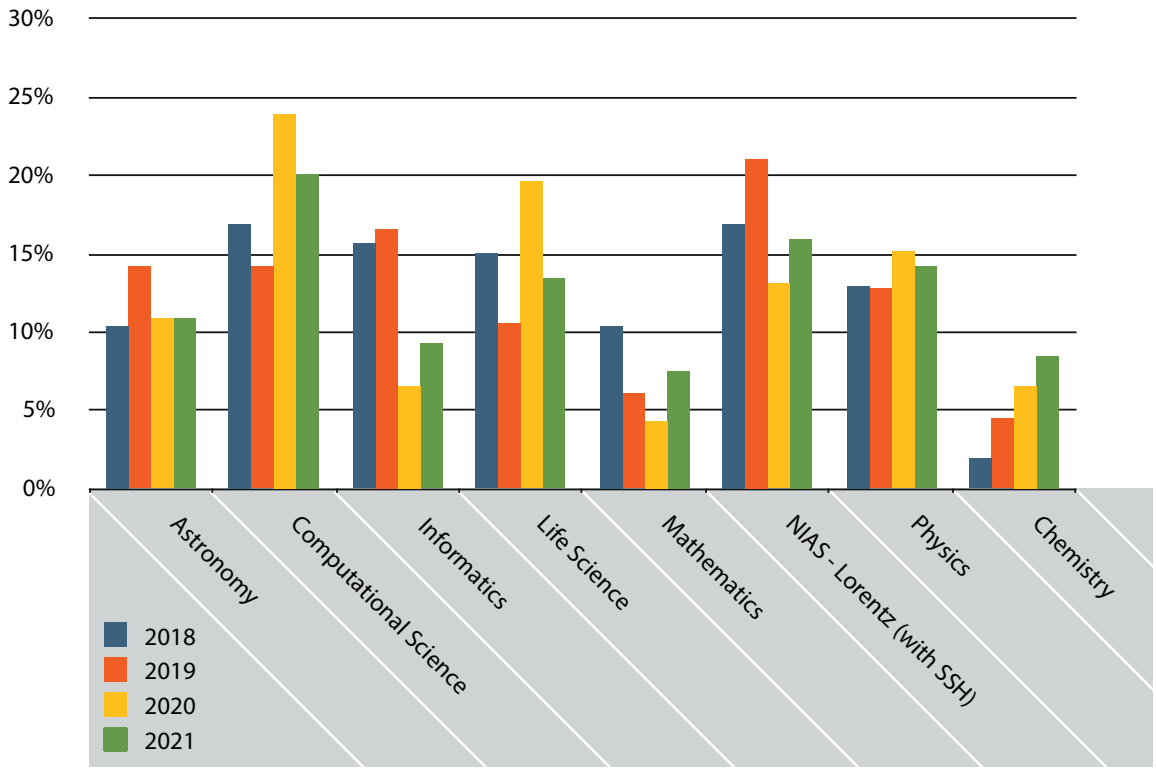


Figure 1. Percentages of workshops per scientific advisory board in 2018 - 2021. Multidisciplinary workshops are counted multiple times.

b. Budget

The basic funding of the Lorentz Center is comprised of two major sources provided by Leiden University and the Dutch Research Council (NWO). A third significant source is the external funding obtained by the organizers earmarked to their specific workshop. Finally, we are grateful for other organizations as well for providing steady support to specific workshops, e.g. the Lorentz Fonds, CECAM and the Netherlands eScience Center (see table 6). Due to the pandemic, several workshops got cancelled or rescheduled, in addition, many participants could not attend in-person. This meant that not all the allocated financial support could be used, the table indicates the factually used amounts of funding[2].

2. Unused funding was returned to the respective funding source

Funding per year (k€)	2020	2021
Leiden U Faculty of Science	320	327
Leiden U (for SSH) allocated	500	0
- *of which used for workshops*	*217*	*341*
NWO allocated	765	765
- *of which used for workshops*	*712*	*613*
External funding of workshops	494	471
Others	8	10

Table 6. Overview of Lorentz Center funding in 2020 and 2021 (k€)

In *Table 7*, the expenditures are shown along two dimensions: on staff and material as well as on workshops; since the organized workshops largely determine our expenditures, the number of workshops per year is added as reference.

Expenditures per year (k€)	2020	2021
FTE costs	1000	1146
Material costs	138	109
Workshop Costs		
Workshop costs total	927	1089
of which external funding	82	99
Number of workshops	23	55

Table 7. Overview of Lorentz Center expenditures in 2020 and 2021 (k€)

c. Diversity & Inclusiveness

The Lorentz Center is committed to hosting workshops that bring together people with different ideas, experiences, backgrounds, and perspectives. At our workshops we stimulate diversity of the participants (e.g. in gender, age, seniority and experience, disability, ethnicity, and social- and economic background). We aim for our workshops to be an inspiring place where everyone can feel comfortable contributing to scientific discussions and voicing their opinion. We also aim to continuously work on improving access to our facilities and our workshops, and to let everyone feel at home at the Lorentz Center. At our locations a nursing room, a silent room and gender-neutral toilets are available.

To support and stimulate diversity we have created a diversity fund. The diversity fund is available to all researchers who plan to attend one of the Lorentz Center workshops. Participants are eligible if their situation meets one of the following criteria (or other situation that requires financial support):

- In need of childcare support
- Extra support connected to an impairment
- Financial support for underrepresented groups (e.g. geographical location, socioeconomic status)

Nursery room at Snellius. Picture taken by Elodie Burrillon.

In August 2021 we hosted the online workshop 'The Audible Universe' with several participants with a visual impairment. This required several changes to the usual online program. The in-person follow-up of this workshop is planned in 2022.

The gender balance has a high priority on our agenda: we are constantly striving to improve this. The Lorentz Center had 39% female participants in 2021 versus 30% in 2018. The percentage varies significantly among disciplines and individual workshops.

	2020	2021
Male	59%	58%
Female	38%	39%
Neither / I'd rather not say	3%	3%

Figure 2. Gender distribution of participants in 2020 and 2021

The majority of our visitors still comes from Europe, shown in figure 3, although representatives of more than 50 nationalities visit the Lorentz Center annually. In 2020 and 2021 pandemic-related travel restrictions imposed limitations on in-person participation, hence the majority of participants were online. In particular, diverging time zones posed a challenge for active and interactive online participation.

Top 5 Countries in 2020 and 2021

1. Netherlands
2. United States
3. United Kingdom
4. Germany
5. France

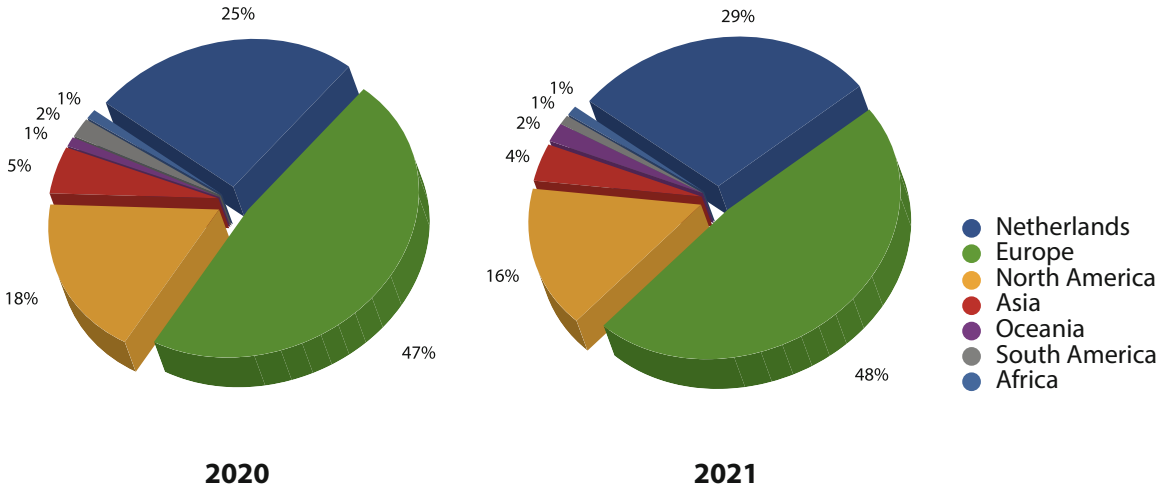


Figure 3. Geographical distribution of participants in 2020 and 2021

d. Quality

Since early 2017 we survey all participants after the workshop on the quality of the workshop, the facilities and our support. In addition to the general questions to all participants, further questions are put forward to the organizers on the application procedure and the support to the organizers. The results of the survey are shared with the organizers of the respective workshop and, in case required, we also discuss the survey outcomes in a meeting. The feedback helps us to improve the quality of our services. In this section we present the results of the last two years.

In the period of virtual meetings the response rate has decreased from 42% to 24%. In order to increase the response rate, we took a critical look at the survey and shortened and simplified it starting in 2022.

Participants

More than 94% of the survey respondents assessed the scientific level of the workshops as high or very high, whereas 74% of them indicated that the workshop inspired them to new research lines. The total weighed average score for workshop was 8,7 on a scale of 10.

Organizers

82% of the respondents found the support of the Lorentz Center during the application procedure (very) helpful and 85% of them found the feedback on their proposal (very) useful. 73% of the organizers found the application instructions on the website (very) helpful[3]. The support of the workshop coordinator was assessed as (very) helpful by 89% of the respondents. The total weighed average score was 8,9 on a scale of 10.

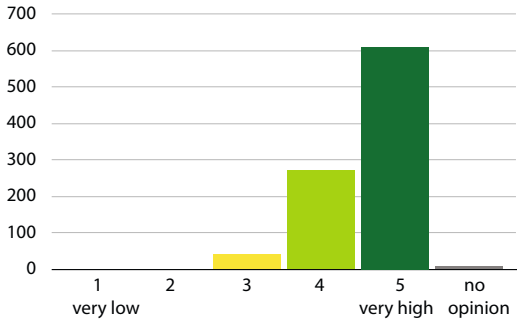
3. Often one or two organizers deal with the application on the website, this may explain why a significant part of the organizers chose 'no opinion' here

More than 70% of all participants and organizers are new to the Lorentz Center. Others are returning for the first time (14%), whereas 2% had participated in our workshops more than 5 times before.

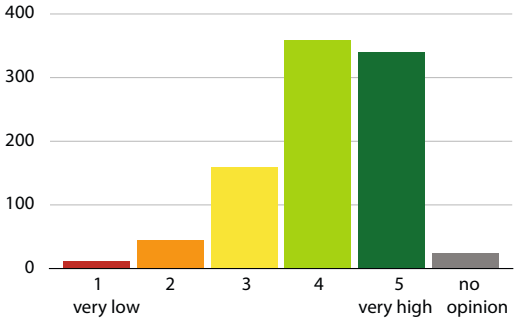
In conclusion, we may say that in general the survey results are very positive. However, we strive for a higher response rate.

Survey results of workshop participants

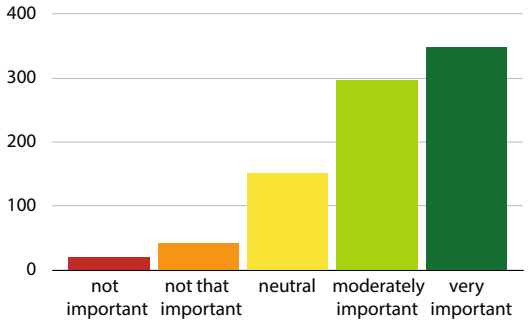
What do you think of the scientific level of the workshop?



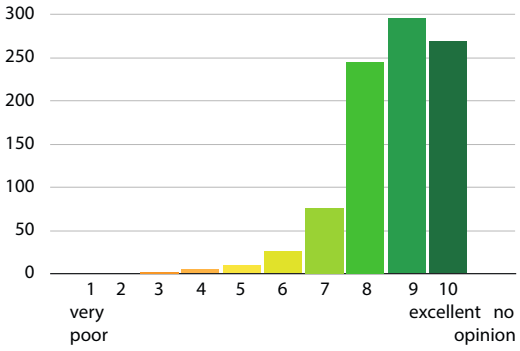
To what extent do you expect this workshop will inspire you to new research lines?



How important was your Lorentz Center workshop coordinator?



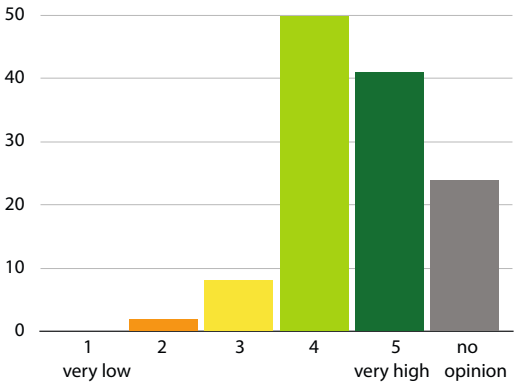
Total score for this workshop at the Lorentz Center



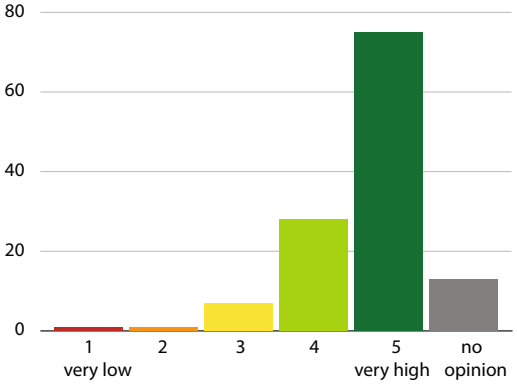
Survey results of workshop organizers

How useful/helpful did you find:

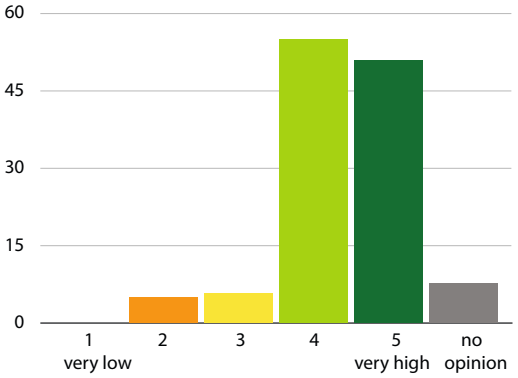
The instructions on the application procedure on the website?



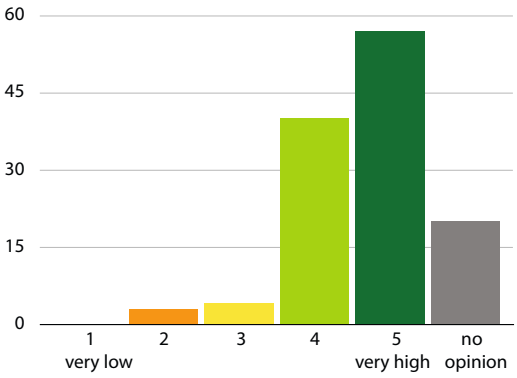
The support of the Lorentz Center during the application procedure?



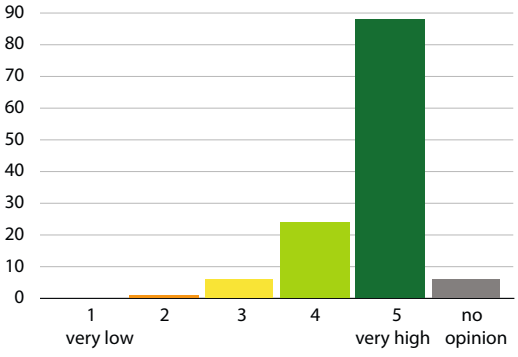
The feedback on your final proposal?



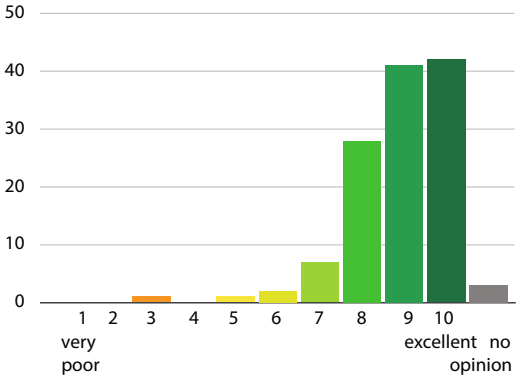
The intake meeting?



The support of the Lorentz Center workshop coordinator?



Overall score for the procedure and support for organizing a workshop:



APPENDIX 1

OVERVIEW WORKSHOPS 2020 - 2021

2020

Week	Venue	Workshop Title	Astronomy (A)	Computational Science (C)	Informatics (I)	Life Science (L)	Mathematics (M)	NIAS - LC & SSH (N)	Physics (P)	Chemistry (Q)	Applied / Technological sciences (TTW)	Medical Sciences (MS)	
			5	11	3	9	2	6	7	3	5	2	
3	@Snellius	Dynamics of Dominance of Females Relative to Males in a Group				x							
3	@Oort	Extreme Physics, Extreme Data		x					x				
4	@Snellius	Bridging Material Science and Interaction Design		x	x				x	x	x		
4	@Oort	ICT with Industry 2020			x								
5	@Snellius	Science based rules on plastic: Regulating plastic pollution				x		x		x			
5	@Oort	The Cosmic Web in the Local Universe	x										
6	@Snellius	Individual Heterogeneity in Animal's Life Histories – More than Meets the Eye				x							
6	@Oort	Mixing in Porous Media		x					x				
7	@Snellius	Noise Reduction Technologies with Meta-Materials		x					x		x		
7	@Oort	Tackling the Complexities of Substellar Objects: From Brown Dwarfs to (exo-)Planets	x										
8	@Snellius	Processing Ancient Text Corpora		x				x					
8	@Oort	Dynamical Reconstruction of Galaxies	x	x									
9	@Oort	Fundamental Physics at the Crossroads	x						x				
10	@Snellius	Positive Affect: Nature, Neurochemistry and Function				x		x					
10	@Oort	Intersectional Analysis of the Sexed/Gendered Brain				x		x					
11	@Snellius	Hot but Habitable: Innovating to Adapt to Heat Waves of the Future		x		x					x	x	
11	@Oort	Automated Workflow Composition in the Life Sciences		x		x							
35	@Oort	Modeling Shape and Size in Biological Development of Animal and Plant Development		x		x	x						online
40	@Oort	(Dis)continuing Antipsychotic Medication		x		x						x	hybrid
45	@Oort	Nanomaterial Formation at Fluid-Fluid Interfaces							x	x	x		online
47	@Snellius	Modelling of Social Complexity in Argumentation		x	x			x					online
48	@Oort	Space Science for Societal Challenges	x					x			x		online
50	@Oort	Hypergeometry, Integrability and Lie Theory					x		x				online

In addition to the workshops 14 online kick-off events took place of workshops that have been postponed due to the pandemic.

2021

Week	Venue	Workshop Title	Astronomy (A)	Computational Science (C)	Informatics (I)	Life Science (L)	Mathematics (M)	NIAS - LC & SSH (N)	Physics (P)	Chemistry (Q)	Applied / Technological sciences (TTW)	Medical sciences (MS)	
			13	24	11	16	9	19	17	10	17	10	
2	@Snellius	Robust Artificial Intelligence		x	x						x		online
5	@Oort	Improving Forensic Trace Recovery				x				x	x		online
6	@Oort	Towards a One Health Approach to Study Leprosy - Migration and Transmission Patterns				x		x				x	online
8	@Snellius	Useful Quantum Computation For Quantum Chemistry		x						x			online
10	@Oort	Clash of the Titans: the Enigmatic Role of Mergers in Galaxy Evolution	x										online
10	@Snellius	Autonomous Behaviour in Living and Robotic Matter							x				online
11	@Oort	Bringing Stellar Evolution and Feedback Together	x										online
13	@Snellius	Artificial Social Intelligence		x	x								online
15	@Oort	Explainable Medical AI: Ethics, Epistemology, and Formal Methods		x	x	x		x				x	online
15	@Snellius	Watching Chemistry Happen								x			online
18	@Oort	Gravitational Wave Astrophysics for Early Career Scientists	x						x				online
20	@Oort	Developing Models of the World		x		x		x				x	online
22	@Snellius	Technologies for Enhanced Documentation of African Languages: Creating Synergies".		x	x			x			x		online
22	@Oort	Beyond the Mobile-Cloud Computing Paradigm		x	x						x		online
23	@Snellius	Othering and Polarisation		x				x					online
24	@Snellius	Growth of Small Scales in the Corona and Solar Wind	x						x				online
24	@Oort	International Software Architecture PhD School			x						x		online
25	@Snellius	Computations that Matter	x	x					x				online
26	@Oort	Nano-MRI: The next generation							x				online
27	@Oort	The Paradox of Genres in Discourse		x				x					online
29	@Snellius	Metrics in Multiparameter Persistence					x						online
30	@Oort	Working Groups for Women in Operator Theory					x	x					online
31	@Oort	Non-reversible Markovian Monte Carlo			x		x		x				online
32	@Oort	Learning from Insulators: New Trends in the Study of Conductivity of Metals					x		x				online
33	@Oort	Perspectives on Scientific Error: Parsing History and Comparing Viewpoints				x		x				x	hybrid

Week	Venue	Workshop Title	Astronomy (A)	Computational Science (C)	Informatics (I)	Life Science (L)	Mathematics (M)	NIAS - LC & SSH (N)	Physics (P)	Chemistry (Q)	Applied / Technological sciences (TTW)	Medical sciences (MS)	
33	@Snellius	International Summer School on ICT for Sustainability		x	x						x		online
34	@Oort	Enacting Chance: Ignorance, Insight and Intuition						x					hybrid
35	@Oort	The Audible Universe	x	x				x			x		online
35	@Snellius	A Topological Theory of Tangent Distributions					x						online
36	@Oort	Accelerating the Understanding of Rare Events		x					x	x			hybrid
36	@Snellius	FAIR Data for the 'Long Tail of Science'		x		x							online
37	@Oort	Planet-forming Disks: From Surveys to Answers	x										online
38	@Oort	Best Practices & Tools for Diffusion MR Spectroscopy				x					x	x	hybrid
38	@Snellius	The Politics of Climate Engineering: Actors, Arenas, Timescales				x		x					hybrid
39	@Oort	Artificial Intelligence for Natural Product Drug Discovery		x		x				x	x	x	hybrid
39	@Snellius	Language Development, Diagnosis and Assessment in School Ages				x		x			x	x	hybrid
40	@Snellius	"Communicating Science in a Democratic Society"		x		x		x			x	x	hybrid
41	@Oort	Magnetohydrodynamics: Physics for the 21st Century	x	x			x		x				hybrid
42	@Snellius	The Scientific Conference: Past, Present, and Future						x		x			hybrid
42	@Oort	Modelling the Galactic Magnetic Field 2021	x						x				hybrid
43	@Snellius	Nonlocality in Analysis, Numerics and Applications		x			x				x		online
44	@Snellius	Speech as Personal Identifiable Information		x	x			x			x		hybrid
44	@Oort	Computational Mathematics and Machine Learning	x	x	x		x		x				hybrid
45	@Oort	Integrative Developmental Biology		x		x			x				online
45	@Snellius	Life Sciences meets Physics with Industry 2021				x			x		x		on site
46	@Snellius	Quantum Probability and Non-Commutative Harmonic Analysis					x		x				hybrid
46	@Oort	Physics with Industry							x		x		on site
47	@Snellius	Green Conservation Materials for European Heritage		x				x	x	x			online
47	@Oort	Electrifying Chemistry: from Fundamentals to Industrial Applications								x	x		hybrid

Week	Venue	Workshop Title	Astronomy (A)	Computational Science (C)	Informatics (I)	Life Science (L)	Mathematics (M)	NIAS - LC & SSH (N)	Physics (P)	Chemistry (Q)	Applied / Technological sciences (TTW)	Medical sciences (MS)	
48	@Snellius	Cancer in a Physical Context: from Understanding to Therapeutics				x			x	x		x	hybrid
48	@Oort	The Volatile Content of Planets that Form Early	x							x			online
49	@Snellius	The Turks are Coming! The Popular Outreach of Turkish TV Series						x					hybrid
49	@Oort	Hack the Hackathon: Shaping the Future of Hackathon Research and Practice	x	x	x	x		x			x		online
50	@Oort	The Future of Mendelian Randomization Studies		x		x		x				x	online
50	@Snellius	ULLYSES Sets Sail: Massive Star Spectroscopy with the HST and the ESO VLT	x										online

APPENDIX 2

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APPENDIX 3

PUBLIC EVENTS

2020

28 January
Plastic Pollution
venue: Rijksmuseum Boerhaave
Thijs Bosker, Leiden University, the Netherlands

27 August
Turing Patterns on Turing Machines
Online public lecture, Rijksmuseum Boerhaave
James Sharpe, EMBL Barcelona, Spain

2021

5 October 2021
Animal testing – the Dutch transition
venue: Rijksmuseum Boerhaave
Jan-Bas Prins, Leiden University, the Netherlands

LECTURES AT THE FACULTY IN THE 'THIS WEEK'S DISCOVERY' SERIES

2020

28 January
Punyakoti Ganeshaiah Veena, RUG and University of Tartu
"The cosmic ballet: spin and shape alignment of haloes and galaxies in the cosmic web"

4 February
Emmanuel Villermaux, Aix-Marseille Université
"Evaporation of dense sprays and disease transmission"

3 March
Rebecca M. Jordan-Young, Barnard College
"The Influence of Testosterone on Risk-Taking: Is it a Zombie Fact?"

COLOPHON

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The Lorentz Center organizes international workshops in all scientific disciplines. We believe that research thrives by open interaction. We promote innovative research, at the scientific frontiers as well as on complex societal challenges. Our strength is to foster collaboration between research communities, reaching also beyond academia. Our workshops are characterized by ample time for active discussions and informal interactions.

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cecam
Centre Européen de Calcul Atomique et Moléculaire

netherlands eScience center

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