

# Annual report 2023

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## 1. Director's review

The year 2023 marked the 20th anniversary of the establishment of the first LUMA Centre and the 10th anniversary of the founding of the LUMA Centre Finland network. The year 2023 was very rewarding and active. Together, we have achieved significant results in terms of the goals set for our national duties. During the year, we focused on developing innovations based on close collaboration and research, from early childhood education all the way to higher education, to support the national core curriculum.



In 2023, with the support of the Finnish National Agency for Education, we implemented several popular LUMAn lumoa ('The charm of STEM') and Ulos luokasta ('Out of the classroom') training events online and across the country. We successfully organised the national LUMA Days in Nurmes in conjunction with the ULOS-UT-OUT event, and the national LUMA Weeks early in the year continued their popularity. We have spread science education throughout Finland by offering plenty of remote access activities and free high-quality online materials for teaching through the VituaaliLUMA scheme.

Events of the national and international LUMAT Science Research Forum continued our research-based activities, in addition to which we are publishing the LUMAT journal established in 2013. Numerous theses and publications were completed at universities, and many educational institutions developed models for students to serve as science ambassadors in various forms.

Approximately 80 schools, vocational colleges or early childhood education units from around Finland participated in the activities of the LUMA development community, with LUMA activities reaching over 100,000 individuals in Finland during the year. Teachers play a key role in our activities, and their contribution is invaluable in building a sustainable future. A special highlight was study visits to the popular LUMA science classes. Visitor numbers have doubled from the previous year, and almost 45,000 children or adolescents visited LUMA science classes in 2023.

Our LUMA science education model attracts widespread interest internationally, and specialists from universities in our network are actively involved in international activities. We warmly thank the university leaders, operators, cooperation partners, and funders for their excellent cooperation during the past year. Together we can have a good and sustainable future!

*Kind regards, Maija Aksela  
Director of the LUMA Centre Finland network  
Professor of Science Education  
University of Helsinki*

## 2. National task

The Ministry of Education and Culture awarded LUMA Centre Finland funding for its national task for the period 2021–2024. The funding is aimed at securing a high level of mathematical, scientific and technological expertise as well as a sufficient number of experts in Finland. The board and operators of LUMA Centre Finland determined three key operational measures to carry out the national task in the period. The implementation of the measures will be reviewed annually at the network's development seminar and adjusted for each subsequent year. In the following sections, we will discuss the realization of the objectives of the national task in 2023.

### Supporting teachers' continuous professional development

The numerous continuing education events that took place at 12 localities can be considered the highlight of 2023. The events provided diverse opportunities to get to know teaching outside schools through physical and virtual learning environments. Teachers were in particular interested in teaching in natural environments and new teaching materials, such as snow and animal studies, related to nature.

In 2023 LUMA Centres supported curriculum implementation at schools and early childhood education units in a number of ways, including by offering teaching equipment for loan, developing learning materials and organising study visits both on-site at university premises and online.

Over the course of the year, so-called *LUMA developer teachers* convened for three development seminars, in addition to which four theme groups held monthly meetings online. In the spring, new schools and daycare centres were also selected as LUMA developers. Dozens of daycare centres and schools from all over Finland participated in the theme groups, with roughly 140 teachers or instructors participating during the year.

- The group for higher education, researcher and business collaboration included 17 learning communities.

- In the group focused on nature as a learning environment, there were 26 learning communities.
- The group for technology education, programming and mathematics included 13 learning communities.
- The group for project-based learning and models that support inclusivity included 23 learning communities.

In addition to the above-mentioned support, LUMA Centre Finland started LUMA/STEAM certification cooperation with Technology Industries of Finland. In autumn 2023, 16 schools received the first [LUMA/STEAM certificates](#) as proof of the systematic development of an operational culture promoting skills in mathematics, science and technology.

## **Strengthening collaboration between universities**

During 2023, members of the LUMA Centre Finland network collaborated closely. Joint training sessions and projects brought people together. After the pandemic, more on-site events and meetings were organised than in recent years.

Over the course of the year, the activities reached some 700 university students who took LUMA courses. This is 200 more students than the previous year. International networking and the visibility of LUMA activities in society were also considered important. In 2023 LUMA activities were presented at various events and conferences to international and domestic audiences, which numbered in the thousands.

## **Extending the reach of free-time LUMA activities for children, adolescents and families**

Leisure time activities were developed and organised at various locations in Finland. Library cooperation, such as science education activities and LUMA equipment available for loan from libraries, is now an established part of the activities. The Finnish model for leisure activities and various virtual camps and clubs has also been established as part of the

operations of the LUMA Centres, and these were extremely popular in 2023.

### 3. STEM Strategy and Action Plan

The STEM strategy published by the Ministry of Education and Culture enhancing skills in the fields of science, mathematics, engineering and technology provides guidelines for the 31 concrete measures published at the beginning of 2023. LUMA Centre Finland has been named as one of the responsible parties [for eight of these](#). In addition, the LUMA Centre Finland network contributes to measures designated for higher education institutions, science centres and other actors in the field as applicable. The network is committed to implementing the following measures to achieve the objectives identified in the strategy by 2030.

[The National LUMA Advisory Board](#), which serves as the advisory discussion forum for the Board of LUMA Centre Finland, is responsible for one measure: *LUMA Centre Finland's advisory board monitors the implementation of the measures of the STEM strategy and reports on it annually to the Ministry of Education and Culture*. In August 2023, the advisory board established a monitoring group tasked with piloting the assessment of the strategy and the implementation of its action plan. The monitoring group convened four times during the autumn, and the results were reported to the LUMA Advisory Board and the Ministry of Education and Culture.

### 4. Collaborative projects

Two LUMA Centre Finland's joint projects funded by the Finnish National Agency for Education were concluded in 2023: LUMAn lumoa and Ulos luokasta. A new LUMATTIKA+ project funded by the Finnish National Agency for Education commenced.

#### LUMAn lumoa

The Finnish National Agency for Education granted LUMA Centre Finland a state grant for staff training in education and early childhood education

in 2021–2022. The project was granted an extension, allowing the training elements to continue in 2023. The funding was used for implementing the learning module LUMAn lumoa: Eheyttävää ja laaja-alaista opiskelua ja opetusta monimuotoisissa oppimisympäristöissä ('The charm of STEM: Integrative and broad-based learning and teaching in diverse learning environments') for the DigiCampus online course platform. The project was launched in September 2021, and all training elements were opened for completion in early 2022. In 2023, approximately 660 teachers, educators or instructors participated in the training sessions. Some of the project courses are still available on the [DigiCampus platform](#) for self-study.

## **Ulos luokasta**

In early 2022 the Finnish National Agency for Education granted LUMA Centre Finland a second state grant for staff training in education and early childhood education. The Ulos luokasta – Innostavaa opiskelua monimuotoisissa oppimisympäristöissä ('Out of the classroom – Inspiring studying in diverse learning environments') project was implemented in 2022 and 2023. The project focused on three online course extensions and several on-site training offerings across Finland. The design and implementation of the online course extensions were largely completed in 2022, and the courses as well as the on-site training options were made available to the target groups in early 2023. In all, 700 teachers, educators and instructors participated in the training sessions, which were extremely well-liked.

## **LUMATIKKA+**

LUMATIKKA, a continuing education project focused on the teaching and learning of mathematics and funded by the Finnish National Agency for Education, was concluded at the end of 2022. Online courses implemented in 2018–2022 were published in self-study versions on the DigiCampus learning platform at the beginning of 2023. This allowed flexible use of the courses even after the project had ended. In addition to self-study courses, video playlists and material banks provided support for teachers in teaching mathematics. Self-study courses have proven to

be popular. Approximately 670 teachers participated in LUMATIKKA online courses in 2023.

In May 2023, we received a positive decision from the Finnish National Agency for Education on our government subsidy application submitted in the spring. During the autumn, we focused on building an updated programme package for the LUMATIKKA continuing education programme, LUMATIKKA+, which focuses on the broad-based development of basic skills, special education and diverse assessment in mathematics. With the help of the government subsidy, the LUMATIKKA+ project will be implemented at least until the summer of 2025 in the form of online courses and a few on-site training events.

The coordinator of the project organised two on-site training events early on, while the online courses were still under development in the autumn. The first of these was an onsite training session in basic mathematics called *Matematiikka liikuttaa* ('Mathematics on the move – multidisciplinary and physical basic education in mathematics'), using multidisciplinary and physical exercise and focused on classroom teaching, which was organised in conjunction with the ULOS-UT-OUT event. The second was the *Tuumasta toimeen!* on-site training session held at the Finnish Association of Teachers of Mathematics, Physics, Chemistry and Informatics (MAOL) autumn seminar in Kokkola, focusing on concrete and activity-based mathematics subject teaching.

## 5. Publications and reports

A number of research articles, reports and news items were published during the year, including the following experiment handbooks for teachers:

Pesonen, R. M.; Hellen, Z. A.; Kauremaa, A. E. A.; Haatainen, O. M. (Ed.); Takala, A. M. J. (Ed.); Pernaa, J. (Ed.); Aksela, M. (Ed.); & Pyper, K. (2023). University of Helsinki

- [Kemianluokka Gadolinin kokeellisuusopas: Suosituimmat kokeelliset työmme lapsille viidentoista vuoden ajalta](#)

- Kemianluokka Gadolinin kokeellisuusopas: Suosituimmat kokeelliset työmme yläkouluun viidentoista vuoden ajalta
- Kemianluokka Gadolinin kokeellisuusopas: Suosituimmat kokeelliset työmme lukioon ja ammattikouluun viidentoista vuoden ajalta



*The selection of the Finnish delegation for the 2024 Science on Stage festival was held in the autumn of 2023. In all, 50 teachers participated in the application process with their own teaching projects or practices, from which the expert jury selected the 30 best to participate in the event as exhibitors.*

## 6. Reach of operations

In addition to funding granted by the Ministry of Education and Culture for the completion of its national duties, the funding of the LUMA Centre Finland network and its centres comprises funding granted directly by the participating universities and, for example, support provided by businesses. LUMA Centre Finland also receives funding, for example, from the Finnish National Agency for Education for continuing education projects. The table below summarises the key figures related to the reach of the LUMA Centre Finland network and regional LUMA Centres. During the year, our operations reached a total of approximately 102,800 people in Finland. Our target groups include teachers of different educational levels as well as children and adolescents.

### **The reach of support for the high-quality implementation of the national curricula in 2023**

- 26,313 children and adolescents attending workshops or events as part of the school day
- 43,993 children and adolescents visiting LUMA Centres on study visits
- 684 adolescents taking part in university or online courses
- 144 TET work try-out participants
- 1,381 Finnish teachers and pupils participating in the Finnish science competition
- 8,798 loans of teaching equipment or material
- 12,353 children, adolescents and teachers visited schools and daycare centres
- 4,124 Finnish and 270 international teachers attending continuing education

### **Reach of free-time activities in 2023**

- 1,101 children or adolescents participating in clubs and virtual clubs
- 567 children or adolescents participating in camps and virtual camps
- 326 children participating in science-themed parties

## **7. Events**

LUMA Weeks were held from 1 February to 10 February. The theme for 2023 was 10 years of LUMA Centre Finland network activities. Over the weeks, the network distributed, among other things, ready-made materials, event tips and ideas for organising LUMA Weeks in schools and daycare centres throughout Finland.

The LUMA Days in summer 2023 took a new form when they joined forces with Finland's largest outdoor learning event [ULOS-UT-OUT 2023](#) coordinated by the LUMA Centre of the University of Eastern Finland. The theme of the event was Siltoja rakentamassa – yhdessä tulevaisuuteen ('Building Bridges – together towards the future'). The event took place in Nurmee on 13–15 June 2023. The LUMA Centre

Finland network acted as one of the producers of the event, organising several workshops focusing on the teaching of STEM subjects, aimed especially at subject teachers. The event attracted 314 participants in a total of 67 workshops.

**LUMAT research seminars** were held four times in 2023, with seminar presentations covering topics such as mathematics teaching, computing and software, sustainable development and agency.

The network celebrated its 20th anniversary in the form of an anniversary seminar on Friday, 10 November at the ceremonial facilities of the University of Helsinki. Minister of Science and Culture Sari Multala and Vice-Rector Kai Nordlund of the University of Helsinki spoke at the festive event. In addition, Laura Taajamaa, Senior Ministerial Adviser at the Ministry of Education and Culture, shared insights on the STEM strategy and its significance. At the seminar, 13 learning communities as well as all the LUMA Centres were handed recognition awards.



*Teachers awarded at the anniversary seminar on 10 November. LUMA recognition diplomas were awarded for long-term and innovative LUMA collaboration and communal activities.*

The Board of LUMA Centre Finland, the highest decision-making body of the network, convened five times over the course of the year. The National LUMA Advisory Board, which serves as the advisory discussion forum for the Board of LUMA Centre Finland, convened once. In addition, the operators of LUMA Centres held regular, monthly remote meetings. Besides the meetings, the entire network convened in Kokkola in October for a development seminar to review the past year and to set new goals for the following year.

## 8. Communications

LUMA News on the LUMA Centre Finland website (<https://www.luma.fi/>) published 34 items in Finnish ([luma.fi/sanomat/](https://www.luma.fi/sanomat/)), six items in Swedish ([luma.fi/sv/nyheter](https://www.luma.fi/sv/nyheter)) and nine items in English ([luma.fi/en/news](https://www.luma.fi/en/news)). There were 49 multilingual publications on the website in 2023, 60 percent more than in 2022. There were almost 30,000 visits to the website. The most popular content on the website was the LUMA Days, continuing training for teachers and digital learning materials.

To celebrate the anniversary of LUMA Centre Finland, a blog called Joka kolkkaan ja niemeen – Till hela landet ('All across Finland') was founded. Over the year, the blog featured 13 contributions from teachers, business leaders, professors and LUMA operators. All the blog entries are collated at the end of the last entry.

The number of followers of and likes on social media channels continued to rise: Instagram (+123 followers), YouTube (+69 subscribers), Facebook (+81 likes). The reach of the Facebook page during the year was 36,155 visits and that of the Instagram account 7,155.

The LUMA newsletter reached thousands of readers in 2023, with a better average click-to-open rate than the previous year: 43.6% (+13%). The click-to-open rate of the English-language newsletter reached a record high at 47.85 percent. The number of newsletter subscribers grew during the year.



*The anniversary blog was illustrated with a ‘postmark’ identifying the blog entries on the frontpage.*

## **LUMAT Journal**

In 2023, LUMAT published three special issues and one general issue. The general issue was expanded from a domestic issue to a Nordic issue. The themes of the special issues were designed with the editorial staff to support the current scholarly debate. The themes were (Contemporary Issues in) Technology Education, Technology in Mathematics Education, and Sustainability and Education. The special issues were edited by invited researchers from Finland and the Nordic countries: Veli-Matti Vesterinen (University of Turku), Ásthildur Jónsdóttir (University of Iceland), Mika Koskenoja and Topi Törmä (University of Helsinki), Johanna Naukkarinen (LUT University) and Sonja Niiranen (Tampere University). Johannes Pernaa, Docent of science education in chemistry at the University of Helsinki, served as the editor-in-chief of the journal. The editorial staff comprised approximately 25 distinguished researchers from all over the world.

Overall, 111 articles were received, of which 20 were accepted and 19 published. The acceptance rate was 15 percent, and, accordingly, the rejection rate was 85 percent. In 2023, articles were read and downloaded through the LUMAT website approximately 125,000 times. In addition, they were read tens of thousands of times through Scopus, the DOAJ portal and ERIC databases. The H-index of the LUMAT journal is 8 after 2023, which makes it the leading journal on science education in the Nordic countries from the perspective of Scopus data. Further information: [On the Scopus statistics of LUMAT](#). LUMAT journal [article statistics for 2023](#).

LUMAT-B published a general issue containing six articles, three book critiques and three abstracts. In addition, an international chemical safety conference publication was published, which contained six summaries. The conference European Conference on Chemical Safety in Science Education: Conference Proceedings was organised by the University of Helsinki. In 2023, articles published in the LUMAT-B journal were read and downloaded from the website approximately 25,000 times. Johannes Pernaa, Docent of science education in chemistry at the University of Helsinki, served as the editor-in-chief of the journal.

## **9. A brief overview of the year 2023 at the regional LUMA Centres**

### **Aalto University Junior**

For Aalto University Junior, the year was again a record-breaking one. The number of participants in our activities grew by 10 per cent from the previous year. Over the course of the year, our practices reached more than 31,000 children, adolescents, teachers and parents. The participants were from 150 different municipalities. Thanks to hybrid activities, half of them were reached online.

## **University of Helsinki Science Education**

In 2023, science labs in science education continued their popularity, and important activities were carried out, such as study visits, leisure time science activities and teacher training. During the year, 380 groups and 8,200 learners from various levels of education visited the labs, showing an increase compared to the previous year. In particular, remote study visits in geography retained their popularity, and additional new innovative teaching methods were developed. For example, new kinds of remote chemistry workshops were developed for preschoolers and grades 1–3 with the themes colourful chemistry, volcanoes and bioplastics reaching over 1,000 participants all over Finland from Nauvo to Sodankylä.

## **LUMA Centre of the University of Eastern Finland**

The University of Eastern Finland's LUMA Centre's year 2023 was strongly marked by the Ulos-Ut-Out event organised in June in Nurmes. The LUMA Centre Finland was one of the organisers of the event and the annual LUMA Days were combined in the same event. The LUMA Centre at the University of Eastern Finland also participated extensively in other events during the year, reaching more than 1100 people. The partnership with PREIN, the flagship of Photonics, was consolidated through the Light for Families event, with over 400 children and adults attending. Science lectures as a leisure activity for children, launched in autumn 2022 with the Joensuu Main Library, consolidated its place in children's after-school activities. Dozens of children visit the Science Lectures during the year. In addition, new schools and teachers were reached through visits to both the LUMA laboratory and schools.

## **LUMA Centre of Central Ostrobothnia**

In 2023, the LUMA Centre equipped a second science lab facility in the University Consortium premises, which beautifully supplements our laboratory-grade science lab in the Centria University of Applied Sciences. We have also reached considerably more children and adolescents belonging to our target group through institution visits and equipment loans. We have continued to promote our regional networking and cooperation in the context of LUMA activities, which further strengthens our operations.

## **Central Finland LUMA Centre**

In May 2023, the Central Finland LUMA Centre participated in organising the Muuttolintujen kevät ('Spring of migratory birds') event, which launched a citizen science application and organised a bird-watching trip for school groups on the Seminaarinmäki campus. The app and the event received a great deal of media attention. In August, we organised Luma Klubi, a continuing training event for teachers, in collaboration with the Jyväskylä Teacher Training School, the Faculty of Mathematics and Science and the local association for Central Finland of the Finnish Association of Teachers of Mathematics, Physics, Chemistry and Informatics (MAOL). The event attracted a total of about eighty participants from all over Finland. In the autumn, a pilot STEM study track for small general upper secondary schools in Central Finland was launched. A 'high-altitude camp' as an introduction to the track was offered to the pupils in the LUMA study track at Konnevesi Research Station, after which the activities have been continued every two weeks in online meetings and by collaboratively completing the University's open courses.

## **LUMA Centre of Southwestern Finland**

One of the new activities at the centre was the Open Science evening events, which are now organised once a month (excluding summer holidays) and are conducted in cooperation with University researchers in various fields. The researchers involved have not only been from the field of science but also from elsewhere in the University. Another significant change was that the workshops aimed at schools were made free of charge in the autumn, and a booking calendar replaced emails as a tool for arranging the workshops. This greatly increased the number of classes participating in the workshops and consequently the reach of LUMA activities in Turku and neighbouring municipalities.

## **LUMA Centre Lapland**

In the spring, a workshop tour was organised for a course belonging to training in environmental studies for class teacher students. The students arranged 67 workshops, which reached 1,293 children or adolescents and 107 teachers and educators. In the autumn, we organised a one-week

tour of Northern Lapland. We visited Inari, Karigasniemi, Kilpisjärvi, Karesuvanto and Enontekiö. We arranged continuing training for teachers and workshops for comprehensive school pupils. The continuing training efforts and basic operations of LUMA Centre Lapland reached large numbers of teachers and educators teaching STEM subjects, also those teaching in the Sámi languages. Science education activities through the science lab have continued steadily throughout the year, including guided workshops as contact and remote instruction, an equipment borrowing service, and science education materials produced by experts. A top-level publication on STEAM pedagogy, Mustikkamagiaa, ('Blueberry magic') with its accompanying materials was created through student collaboration. Materials in the Northern Sámi language were produced for the teaching needs of STEM subjects. The materials are openly available online through the LUMA Centre Lapland website.

## **LUMA Centre of Ostrobothnia**

Statistically, 2023 was the best year of the centre's history. The centre reached its target group extensively through various functions. The highlights of the year included a science day for juniors at meeting point Huudi, the completion of the Globaalit sankarit ('Global heroes') board game for the use of school classes and other enthusiasts as well as the LUMASTER challenge and festival where the joy of project learning was shared. One of the highlights of the autumn was the Oivalluksia ja ideoita ('Insights and ideas') tour of a few provincial schools, which provided pupils insights in the form of workshops and ideas for teachers in the form of teacher training. The whole year was boosted by a very successful collaboration with both old and new partners.

## **Junior University**

In a busy 2023, the Junior University reached over 8,000 people. The Uniori and Imatran Universoma operations in Lappeenranta integrated into curricula started up at full speed. The Pikkuyrittäjät ('Little entrepreneurs') activities, which reach all fifth graders in Lappeenranta, climaxed in the first on-campus LUTra festival covering the entire age cohort. The whole age cohort of approximately 700 pupils was also reached during the World Water Day tour of 3rd grades and the sustainable housing workshops at LUT aimed at 8th graders. All 8th

graders of Imatra also visited LUT primarily during workshops organised by the City of Imatra's partners. A lot of content was developed for the science lab Polku, in particular within the framework of the Finnish Cultural Foundation–funded Junior LAB project, and the delayed science lab opening was finally celebrated in August. The grant received in the Discover Science call for applications of the Finnish Cultural Foundation for mobile LUMA activities enabled several workshop visits to schools, daycare centres and various events. The project will continue in 2024. In collaboration with general upper secondary schools, study visits were arranged for groups visiting from other municipalities, while campus visits were organised for science study track students of the general upper secondary schools of Lappeenranta. The maths ambassador activities reached all of the city's general upper secondary school pupils during their first mathematics course. Leisure activities for primary school children were organised in the form of holiday science camps and clubs. Jamie Hyneman, honorary doctor of LUT University, visited the opening of the art exhibition organised at the end of the autumn Art & Technology Club.

## **LUMA Centre of the University of Oulu**

In 2023, the LUMA Centre of the University of Oulu was involved in organising remote visits of researchers to general upper secondary schools and visits of general upper secondary pupil groups at University campuses. The visits increased considerably compared to previous years, and for example, the chemistry teaching laboratory was a popular destination. The Lukustartti ('Number start') workshop for students intending to complete the advanced syllabus in mathematics in the Finnish matriculation examination continued to maintain its popularity, and it was possible to extend the maths competition to an increasing number of Oulu region municipalities and lower secondary schools. We participated in the Toivon Agenda 2030 ('Agenda of hope 2030') set of events and the Teachers' Days of Northern Finland. We continued to put out the Sivistyksen supervoimia ('Superpowers of education') podcast for teaching and education staff together with the Northern Finland Regional State Administrative Agency and the City of Oulu's Education and Culture Services.

## **LUMA Centre Päijänne Tavastia**

In terms of reach statistics, the year 2023 was the best in the centre's history. The reach of the activities increased by 1,000 to almost 4,000 individuals, most of whom participated in the visiting activities of the science lab SOLU. The activities ranged from early childhood education to secondary education, including visits and general upper secondary school courses. All 9th graders from Lahti visited the science lab for the fifth academic year in a row. Mobile LUMA activities were further developed to expand their reach in the form of boxes available for loan (science classroom in a box) and visits. New ideas for the activities were sought from Scotland, when the centre experts visited the University of St Andrews to explore its GeoBus activities together with LUT Junior University. Specialist Noora Kivikko carried out a Finnish National Agency for Education project together with the municipality of Asikkala where she, as part of her doctoral studies, investigated the meaningfulness experienced by pupils in geography teaching and developed geography science content. In November, the LUMA Centre Päijänne Tavastia celebrated its 10-year journey, while the science classroom SOLU had its 6th anniversary.

## **Skolresurs**

Skolresurs had a very good year statistically. A total of 181 different events were offered to teachers, children and adolescents during the year. This figure is the second highest annual figure over a 11-year monitoring period (2013–2023). Of the events, 97 were for teachers, while children and adolescents were offered 84 events. The participation numbers were also good from a Finland-Swedish perspective. In all, 1,268 people participated in the events for teachers, and 2,426 people in the events for children and adolescents. It is pleasing to note that the numbers are back at the pre-pandemic levels of 2017–2019. Furthermore, it is gratifying to note that the rising numbers during the years 2017–2019 coincide with Åbo Akademi University's joining the LUMA network in 2016. Skolresurs has benefited greatly from being part of the LUMA network.

## **Tampere University Juniversity**

The reorganised activities of Juniversity were launched at the beginning of 2023, and cooperation with student recruitment was further intensified. Of the activities, various events, science cafés, the Children's academy lecture series, science lab workshops, a science equipment lending service, learning environment visits and student ambassador activities reached almost 20,000 individuals. Many of the service forms were further developed with collaboration with faculties as one of the focus areas evident, for example, in joint course implementations. In September 2023, Juniversity was awarded the Tampere University's Societal Impact Award, which demonstrated the significance of long-term efforts.

## **10. Contributors**

The names are listed in alphabetical order by last name.

### **Network administration (University of Helsinki)**

Maija Aksela, director

Topias Ikävalko, financial affairs

Oona Kiviluoto, administrative assistant to management

Johannes Pernaa, editor-in-chief of LUMAT journals

Maikki Roiha, LUMAT layout

Marianne Scott, event coordinator from 1 September

Jemima Unger, communications specialist from 1 February

### **LUMATIKKA+ continuing education project for teaching and learning mathematics**

#### **Project coordination**

Eveliina Hietakymi, project planning officer, University of Helsinki

Alisa Uusi-Kilponen, project manager, University of Helsinki

#### **Material production for online courses**

Kim-Erik Berts, Åbo Akademi University

Mats Braskén, Åbo Akademi University

Hanna Hankaniemi, University of Vaasa

Leena Ikonen, LUT University

Riikka Keto-Tokoi, Aalto University

Outi Kurri, University of Vaasa  
Sanna Launiainen, University of Turku  
Saara Lehto, University of Vaasa  
Laszlo Major, University of Turku  
Aida Ohtonen Piuva, Åbo Akademi University  
Tuula Pesonen, University of Eastern Finland  
Riikka Qvintus, University of Helsinki  
Ann-Sofi Røj-Lindberg, Åbo Akademi University  
Juho Tiainen, University of Eastern Finland  
Nina Ågren, University of Lapland

### **Aalto University Junior**

Veli-Matti Ikävalko, head  
Riikka Keto-Tokoi, coordinator (technology)  
Pilvi Saaristo, planning officer  
Heidi Sillanpää, coordinator (natural sciences and mathematics)  
Heidi Simppala, coordinator (art and entrepreneurship)  
Ilkka Tittonen, representative of LUMA Centre Finland/chair of the steering group  
In addition approx. 35 student assistants

### **University of Helsinki Science Education**

Maija Aksela, professor  
Anne-Maria Ernvall-Hytönen, associate professor  
Outi Haatainen, postdoctoral researcher  
Topias Ikävalko, specialist  
Kaneli Kalliokoski, coordinator  
Joonatan Kölhi, research assistant  
Antti Laaksonen, university lecturer  
Veera Lupunen, coordinator  
Maija Nousiainen, university lecturer  
Reija Pesonen, coordinator  
Noora Pyyry, assistant professor  
William Smolander, doctoral researcher  
Heli Virtanen, doctoral researcher  
Karoliina Vuola, doctoral researcher  
Emmi Vuorio, doctoral researcher

In addition, other research assistants and instructors of the science labs actively contributed to the operations.

### **LUMA Centre of the University of Eastern Finland**

Mervi Asikainen, director

Justus Kinnunen, university teacher

Saana Kinnunen, university teacher, LUMA coordinator

Juho Tiainen, project planning officer

### **Junior University**

Nina Herttuainen, planning officer

Leena Ikonen, LUMA coordinator

Laura Jouhkimo, coordinator until 31 August

Päivi Kuosmanen, deputy member of the board and supervisor of the school collaboration team

Annamaria Mustonen, coordinator, 14 August–14 December

Johanna Naukkarinen, member of the board and chair of the LUMA coordination group

Maiju Rintakumpu, planning officer (Lahti)

In addition approx. 20 hourly paid LUMA assistants

### **LUMA Centre of Central Ostrobothnia**

Ismo Hakala, director

Pentti Impiö, senior planning officer

Mikko Myllymäki, research coordinator

Tommi Nurmi, university teacher until 31 August

Anna Polso, university teacher from 1 June

### **Central Finland LUMA Centre**

Anni Aroluoma, coordinator

Anniina Koliseva, coordinator

Jan Lundell, director

Asmo Roponen, assessment

### **LUMA Centre of Southwestern Finland**

Jussi Heinonen, LUMAn lumoa project

Reetta Kyynäräinen, LUMA coordinator from 1 September

Sanna Launiainen, LUMA coordinator

Laszlo Major, centre director  
Pasi Nurmi, unit director  
Matleena Tuomisto, LUMA coordinator until 31 October  
Additional student instructors

### **LUMA Centre Lapland**

Partow Izadi, LUMA specialist  
Anniina Jokitalo, LUMA coordinator, 1 May–31 December  
Ulla Kemi, LUMA specialist  
Saara Krook, LUMA coordinator until 7 August  
Pekka Muotka, LUMA operator  
Pietti Tolvanen, director  
Nina Ågren, LUMATIKKA+ specialist from 9 October

### **LUMA Centre of Ostrobothnia**

Hanna Hankaniemi, LUMA coordinator  
Outi Kaarela, LUMA instructor until 31 May, specialist (science education) from 1 June  
Kukka-Maaria Kallio, LUMA instructor until 31 July  
Janne Koljonen, director  
Outi Kurri, specialist (science education) from 9 October  
Saara Lehto, LUMA instructor until 31 May, specialist (science education) from 1 June  
Saana Söderlund, LUMA instructor until 31 May, specialist (science education) from 1 June  
Aleksi Välisuo, non-military service until 6 July

### **LUMA Centre of the University of Oulu**

Sari Harmoinen, director from 1 August  
Kati Kyllönen, planning officer  
Jouni Pursiainen, director until 30 June

### **LUMA Centre Päijänne Tavastia**

Olga-Sofia Alitalo, specialist, on parental leave 1 January–6 December  
Tarja Kariola, director  
Noora Kivikko, specialist, doctoral researcher  
Veera Pukkila, specialist

Suvi Simpanen, specialist  
Moona Vilen, specialist until 31 December

### **Skolresurs at Åbo Akademi University**

Christian Ahläng, operations coordinator  
Katarina Drugg, financial affairs  
Linda Karvonen, administrative coordinator  
Elin Kjellberg – continuing educator in the LUMA Ulos luokasta project  
Niklas Ollila, translator  
Bengt-Johan Skrifvars, director of operations  
Kim Virta, continuing education planning officer  
Ronald Österbacka, chair of the Skolresurs steering group

### **Tampere University Juniversity**

Anniina Halonen, coordinator from 4 January  
Tuulikki Harsia, specialist  
Susanna Kaitera, specialist  
Laura Salkonen, senior specialist  
Pekka Verho, board representative, chair of the LUMATE committee  
Vikke Vuorenpää, LUMA project coordinator  
Additional 15 part-time science education instructors