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BrightnESS²

Bringing Together a Neutron Ecosystem for Sustainable Science with ESS

H2020-INFRADEV-3-2018-1

Grant Agreement Number: 823867

Deliverable Report
D5.3: Stakeholder Engagement and Enlargement Activities II

BrightnESS² is funded by the European Union Framework Programme for Research and Innovation Horizon 2020, under grant agreement 823867

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1. Project Deliverable Information Sheet

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3. List of Abbreviations and Acronyms

ARIE	Analytical Research Infrastructures in Europe
BNS	Bilbao Neutron School
BSBF	Big Science Business Forum
CERN	European Organisation for Nuclear Research
CETS	Central European Training School in Neutron Scattering
CIFAR	Canadian Institute for Advanced Research
CNI	Canadian Neutron Initiative
EMBL	European Molecular Biology Laboratory
ENSA	European Neutron Scattering Association
ESO	European Southern Observatory
ESS	European Spallation Source ERIC
FEL	Free Electron Laser
F4E	Fusion for Energy
ICO	Industry Contact Officer (ICO)
ICRI	International Conference on Research Infrastructures
ILL	Institut Laue-Langevin
ILO	Industry Liaison Officer
ITER	International Thermonuclear Experimental Reactor
i2ns	Innovative Inelastic Neutron Scattering
LEAPS	League of European Accelerator-based Photon Sources
LENS	League of advanced European Neutron Sources
NRU	National Research Universal
NWO	Netherlands Organisation for Scientific Research
RID	Reactor Institute Delft
SILS	Italian Synchrotron Radiation Society
SIOS	Svalbard Integrated Arctic Earth Observing System
SISN	Italian Society for Spectroscopy
TU Delft	Delft University of Technology
UNIVPM	Università Politecnica delle Marche
WP	Work Package
2FDN	Fédération Française de Diffusion Neutronique

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4. List of Pictures and Figures

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5. Executive Summary

During the second year of the BrightnESS² project, Work Package 5 in collaboration with the consortium implemented strategic activities that facilitated bottom-up as well as top-down outreach and engagement of scientific communities and stakeholder groups in and outside Europe. The activities of the Work Package were impacted by the COVID-19 pandemic and the relating restrictions on physical meetings and international travel. However, the decisions made by the project partners during the early days of the pandemic allowed the consortium to move forward despite the changing circumstances. Some of the events planned to take place in 2020 were implemented, albeit in a different format than originally intended. Some were postponed to 2021, anticipating that physical meetings will eventually become possible.

The enlargement activities during the year of 2020 focused on Canada. The neutron user community there is developing a strategy to rebuild the national capacity for materials research and development with neutron beams. The BrightnESS² project also helped the European Spallation Source ERIC to strengthen its relations with research groups in South Africa, the Netherlands, and Israel, and reach out to the young generation of European scientists through a dedicated school in Italy that promoted the benefits of neutron technique in biophysics. A Science and Policy Colloquium organised in Brussels helped to demonstrate to policy makers how neutrons contribute to mission-based research and reviewed research results in the area of health, energy and food production. In addition, the European Spallation Source ERIC together with facilities of the League of advanced European Neutron Sources (LENS) established good working relations with other pan-European organisations, such as the League of European Accelerator-based Photon Sources (LEAPS) or the Analytical Research Infrastructures of Europe (ARIE), and started discussions on collaboration opportunities in future Horizon Europe calls. Lastly, the project identified logistics as a new strategic area of interest and started implemented activities with the aim to improve delivery services to Research Infrastructures in Europe.

Despite the disruptive impacts of the COVID-19 pandemic, BrightnESS² activities progressed well during 2020 and Work Package 5 continued to deliver results in line with the project goals.

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6. Introduction

The aim of Work Package 5 (WP5) is to establish the European Spallation Source ERIC (ESS) as a truly global research infrastructure that generates impact in and outside Europe. Activities of Task 5.1 and 5.2 have been designed to help ESS to gain support in countries which are not yet represented in the ESS member base and raise awareness about the benefits of neutron research among scientific communities and policy makers.

Figure 1: Aerial view of the ESS facility and campus in November 2020

During the first year of the BrightnESS² project, it proved to be effective to work towards these goals by organising various types of international and national events, including conferences, workshops, seminars, and trainings, to mention just a few. However, the second project year was impacted by the effects of the COVID-19 pandemic. The world-wide restrictions on travel and physical meetings have prevented the consortium from organising events as before. Since physical meetings have been in the core focus of Tasks 5.1 and 5.2, it can be concluded that WP5 has been the most affected Work Package of the BrightnESS² project.

The 16 project partners of BrightnESS² come from 11 different countries. In addition, WP5 implements activities, which involve communities and stakeholders from countries which are not represented in the consortium, thus making the geographical reach of the Work Package very broad. The pandemic was evolving at different speed in each of these countries in 2020. During the first months of the year, it was difficult to predict when and how some of the planned international activities could take place because of the ongoing uncertainty, changing national policies, and also prevailing hope that the restrictions will soon be lifted. At that point, many meetings were merely postponed to a later date. However, as the time progressed, it became more obvious that physical events would eventually have to be replaced by virtual ones if they were to take place in 2020. Because of this, most of the activities scheduled to take place in 2020 could not be effectively implemented as originally planned. Some were

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rescheduled, some were put on hold and the format of some was changed to accommodate for their execution in 2020.

This report gives a thorough overview of WP5-supported activities which took place in 2020 with the aim to enlarge the ESS member base or raise awareness about neutron research and support the long-term sustainability of the user community in Europe.

7. Enlargement Activities

The ESS currently has 13 Member Countries, which together govern the Organisation and build the facility in Lund, Sweden. The Members include: Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Norway, Poland, Spain, Sweden, Switzerland, and the United Kingdom. They contribute to the construction budget with cash and In-kind Contributions, such as for example equipment or technical components developed by their competent home institutes. The ESS aspires to enlarge its member base and gain further political and financial support for the project from governments in and outside Europe. Countries with essentially large user communities are the primary target group.

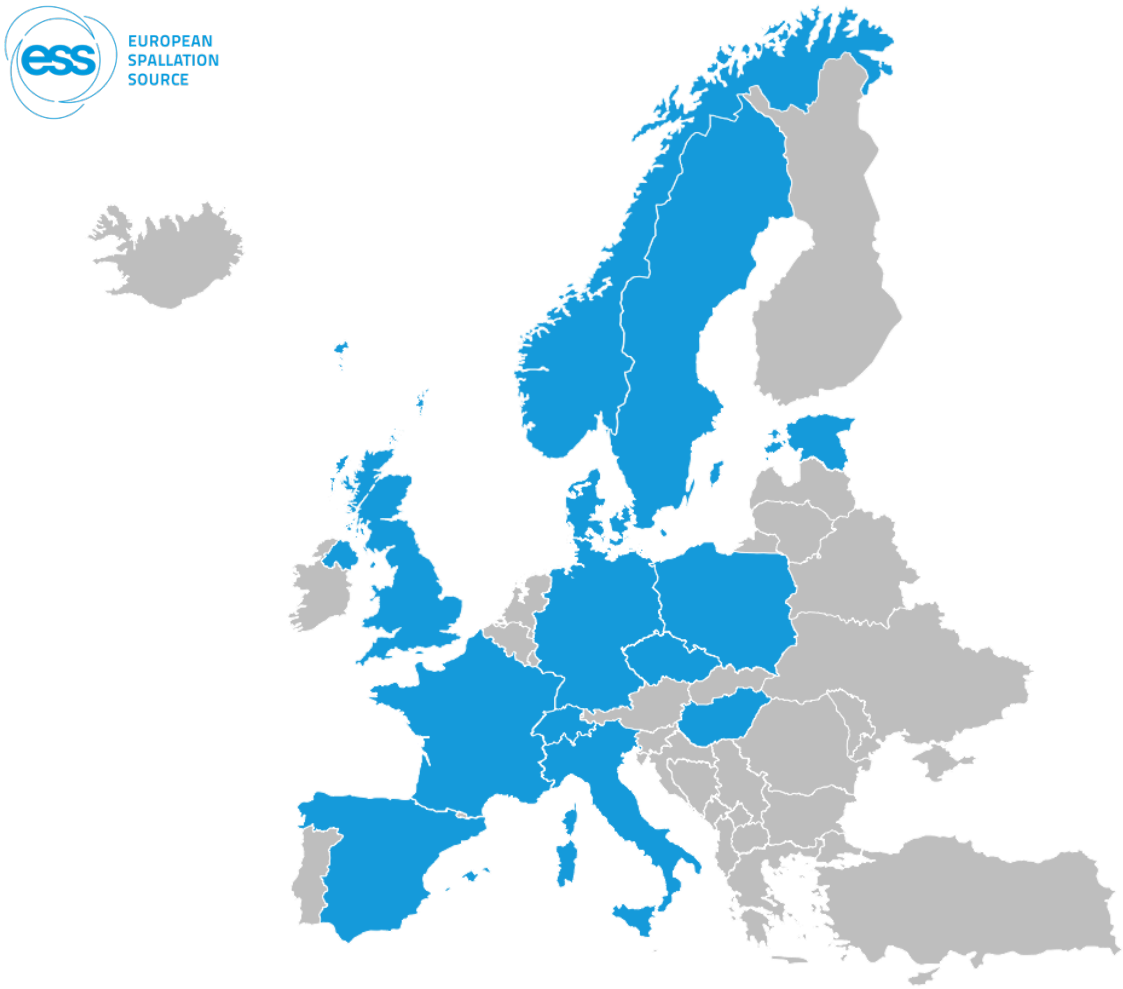

Figure 2: Member base of ESS

Engagement with the Canadian scientific community, which is in the process of defining its national neutron strategy, and interactions with the South African partners of the BrightnESS² project, were the key focus of enlargement activities in 2020. The collaboration with the Netherlands progressed as planned as it does not require any physical meetings and a major activity with Israel had to be

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postponed. The last report on Stakeholder Engagement and Enlargement Activities from February 2019 also listed ESS' interactions with Singapore, China, and Japan. However, these have been temporarily put on hold because of the impacts of the COVID-19 pandemic.

7.1. Canada

In May 2020, the Canadian Neutron Initiative published their vision for Neutrons Canada resulting from January's roundtable event in the Canadian capitol, which included European perspectives from ESS, ILL and LENS. The report[1] outlines the Canadian neutron strategy, while considering participation in the European neutron ecosystem through memberships at ESS and ILL.

Picture 1: Front cover of a comprehensive report from January 2020 roundtable meeting in Canada

BrightnESS², along with the FILL2030 project at ILL, helped to sponsor the January Roundtable Meeting in Ottawa, which produced the report. LENS Chair and ILL Director Helmut Schober, ESS Director General John Womersley, and ESS Director for Science Andreas Schreyer all participated in the historic meeting, which included Canada's chief science advisor and high-level representation from 17 Canadian institutions.

According to the report, "the university executive participants formed a consensus around three propositions:

1. Canada should maintain its leadership role in materials research with neutron beams;
2. Canadian universities need to establish a pan-Canadian, university-led framework to govern, manage, and represent Canada's program for materials research with neutron beams; and
3. Canadian university Vice-Presidents of Research should devote their own time and attention to help shape this new framework and to ensure ongoing engagement of their universities as Institutional Members."[2]

During the year of 2020, the Canadian neutron beam community continued to align around an emerging strategy to rebuild Canadian capacity for materials research and development with neutron beams.

[1] Canadian Leadership in Materials Research with Neutron Beams: Report on a Roundtable Meeting towards the Establishment of "Neutrons Canada", available at: https://fedorukcentre.ca/documents/resources/cni/neutrons-canada-roundtable-2020-jan-29---full-report.pdf
[2] Ibid., p. 5.

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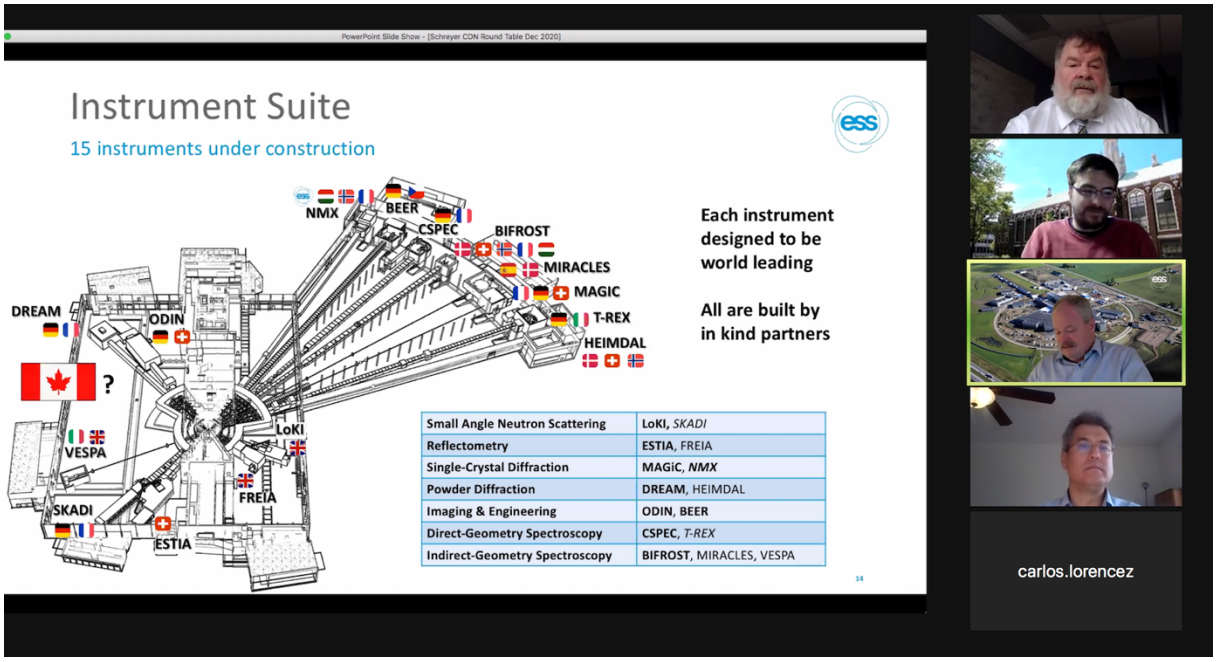
On 15-16 December 2020, leading scientists from across Canada gathered virtually to shape this "national neutron strategy" at a roundtable organized by the Canadian Neutron Initiative (CNI) and Canadian Institute for Advanced Research (CIFAR), with support from BrightnESS² and the Fedoruk Centre.

The roundtable was a culmination of extensive consultation since 2015, when it became clear that Canada's only neutron source, the National Research Universal (NRU) reactor, would close permanently in 2018, jeopardizing the future for research with neutron beams by Canadians. Ideas and feedback were invited on key elements of the strategy, including the needed infrastructure and associated programs, domestic and foreign, spanning the near-term to the long-term.



Picture 2: ESS presentation during roundtable meeting on Canadian national neutron strategy

Neutron beams are irreplaceable tools to generate knowledge and advance materials for 21st century challenges such as ensuring a clean and sustainable environment, and protecting the health and safety of our communities.

The national neutron strategy encompasses infrastructure and a governance framework enabling Canadians to address these challenges with world-class tools. Roundtable participants were optimistic about prospects for partnership with foreign neutron facilities, for developing the neutron beam lab at the McMaster Nuclear Reactor, and for exploring our options for neutron sources, each of which are elements of the strategy.

The meeting confirmed that there is broad support for the proposed national neutron strategy and specifically for the creation of a national coordinating organization, Neutrons Canada, which would be charged with governing and managing the strategy's major activities as a coherent program. At the end of January 2021, CNI published a concise report summarising the discussions of the roundtable. The document is titled "Report on Outcomes of the CNI-CIFAR Roundtable on a National Neutron Strategy"[3] and lists key areas of agreement. It acknowledges, among other things, that "Access to

[3] Report on Outcomes of the CNI-CIFAR Roundtable on a National Neutron Strategy (January 2021). Available at: https://fedorukcentre.ca/documents/resources/cni/rountable-report-on-national-neutron-strategy---2021-01-28.pdf

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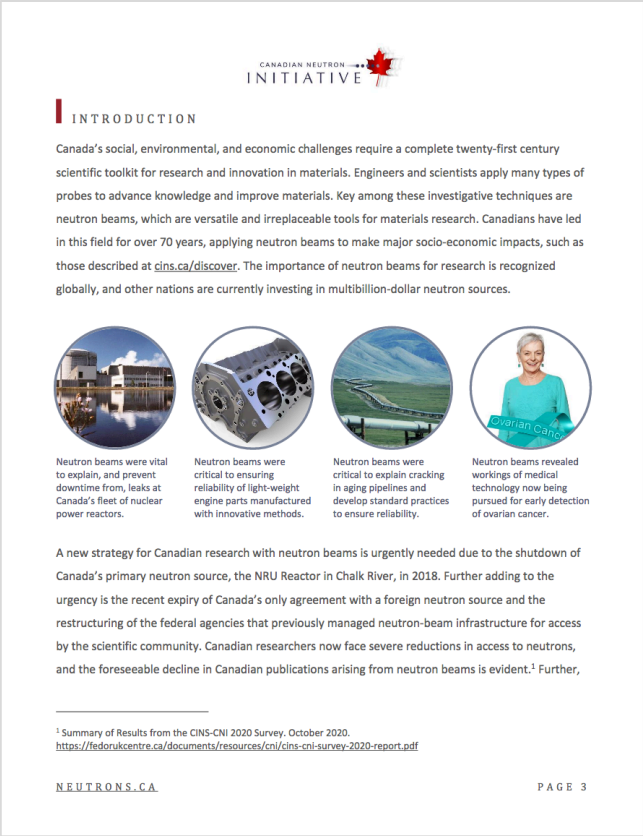
foreign neutron facilities is an urgent priority to address the present neutron beam shortage, and will continue to be essential even after the McMaster nuclear Reactor is fully optimised".[4] It also emphasises that "domestic capabilities are essential for Canada's effective participation in [this] global arena".

BrightnESS² and the Fedoruk Centre have agreed to actively use their networks to reach out to the Organising Committee of the International Conference on Research Infrastructures (ICRI) with the aim of introducing a session that would raise awareness about the benefits of neutron research among the event participants and highlight internationalisation of research infrastructures and the positive impacts of this phenomena. ICRI, originally scheduled to take place in Ottawa in the summer of 2020, was postponed to June 2021 and will take place virtually. BrightnESS² and the Fedoruk Centre aim to use the time leading to ICRI to strategically strengthen collaboration between ESS and Canada.



CANADIAN NEUTRON INITIATIVE

INTRODUCTION

Canada's social, environmental, and economic challenges require a complete twenty-first century scientific toolkit for research and innovation in materials. Engineers and scientists apply many types of probes to advance knowledge and improve materials. Key among these investigative techniques are neutron beams, which are versatile and irreplaceable tools for materials research. Canadians have led in this field for over 70 years, applying neutron beams to make major socio-economic impacts, such as those described at cins.ca/discover. The importance of neutron beams for research is recognized globally, and other nations are currently investing in multibillion-dollar neutron sources.

Neutron beams were vital to explain, and prevent downtime from, leaks at Canada's fleet of nuclear power reactors.

Neutron beams were critical to ensuring reliability of light-weight engine parts manufactured with innovative methods.

Neutron beams were critical to explain cracking in aging pipelines and develop standard practices to ensure reliability.

Neutron beams revealed workings of medical technology now being pursued for early detection of ovarian cancer.

A new strategy for Canadian research with neutron beams is urgently needed due to the shutdown of Canada's primary neutron source, the NRU Reactor in Chalk River, in 2018. Further adding to the urgency is the recent expiry of Canada's only agreement with a foreign neutron source and the restructuring of the federal agencies that previously managed neutron-beam infrastructure for access by the scientific community. Canadian researchers now face severe reductions in access to neutrons, and the foreseeable decline in Canadian publications arising from neutron beams is evident.[1] Further,

[1] Summary of Results from the CINS-CNI 2020 Survey. October 2020. https://fedorukcentre.ca/documents/resources/cni/cins-cni-survey-2020-report.pdf

NEUTRONS.CA PAGE 3

Picture 3: Preview of a page from a comprehensive report of the December 2020 roundtable meeting in Canada

7.2. Israel

During the first year of the BrightnESS² project, a consortium of Israeli and European institutes, including BrightnESS² partners ESS and ILL, started the preparatory work to organise a seminar in Israel to raise awareness about neutron science. The event was scheduled to take place between 15-18 March 2020 at El Geid in Israel, but had to be postponed due to the COVID-19 pandemic. The partners are evaluating the possibilities of organising the event in 2021 either as a physical or virtual seminar.

Figure 3: Banner of The Science of Neutrons event

The main goal of the seminar is to increase the knowledge, visibility and opportunities of neutrons to the Israeli academic community, and promote innovative multidisciplinary research with neutrons. While Israeli researchers have an excellent reputation for their use of x-ray scattering (a technique highly complementary to neutron scattering) in synchrotron facilities worldwide, the use of neutrons is far more limited. The seminar is an opportunity for younger scientists and students to learn how neutrons can be used to investigate the structure and dynamics of a broad range of materials.

[4] Ibid, p. 4.

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BrightnESS² plans to support the participation of ESS staff in the seminar, should it take place as a physical meeting, in order to present future opportunities for research using neutrons at the novel instrumentation at ESS and identify the main points of interest for the Israeli community.

7.3. The Netherlands

In 2019, ESS worked in close collaboration with the Delft University of Technology (TU Delft), a member of the BrightnESS² consortium, to prepare an update for the research infrastructure landscape analysis to be performed by the Netherlands Organisation for Scientific Research (NWO). In autumn 2020, TU Delft was informed about the outcomes. ESS together with the Reactor Institute Delft (RID) at TU Delft are both included in the list of officially recognised large-scale research infrastructure of the landscape analysis, which will be used to define the new National Roadmap of the Netherlands. The new Roadmap will put research infrastructures form the same research field into clusters. It is expected that around 10-15 thematic clusters will be created and approximately half of them will succeed in the competition for national funding. ESS will be a part of the cluster on materials. RID is engaging in discussions with other facilities within the materials cluster in order to share lessons learned from previous applications, and discuss possibilities for collaboration within the cluster. The announcement of the new National Roadmap is expected in the first quarter of 2021 and the first roadmap call will follow afterwards.

7.4. South Africa

ESS continues to engage the research community in South Africa though the activities of WP2 implemented by South African partners of the BrightnESS² consortium, Necsa and iThemba LABS. WP5 intended to support the organisation of the second South African Workshop in 2020, focusing on neutron science capacity building. However, due to the COVID-19 pandemic and restrictions on travel, the workshop was replaced with a series of virtual mini-symposia events. Each of the symposia was focused on a specific topic related to neutron research. An overview is presented below.

Number	Date	Topic
1	05 August 2020	Neutrons for Engineers
2	25 August 2020	Crystallography: Organic Chemistry
3	07 September 2020	Magnetism
4	10 September 2020	Geosciences
5	15 September 2020	Energy Storage and Conversion Materials
6	18 September 2020	Palaeontology and Heritage Conservation
7	22 September 2020	Catalysis
8	23 September 2020	Crystallography: Inorganic Chemistry
9	28 September 2020	Nanomaterials
10	19 January 2021	Life Sciences Research

Figure 4: Overview of seminars in the South African thrust mini-symposia series

The meetings were arranged as 2.5 hour-long virtual sessions and comprised talks by international as well as South African experts. The series provided a discussion platform for experienced and inexperienced neutron users. BrightnESS² partners ESS, TUM, and STFC contributed with expert presentations. The discussions at the end of each session were engaging and allowed all participants

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to ask questions. By opening the seminars to participants with diverse backgrounds, the series secured a wide scientific community participation. The seminars helped to raise awareness among the scientific community in South Africa about the research possibilities of neutron techniques.

Picture 4: Participants of South African mini-symposia series

8. Community Building

Shortly before the COVID-19 pandemic hit Europe, a community building activity focusing on the young generation of scientists was organised with the support of BrightnESS² in Italy. BrightnESS² also facilitated the establishment of contacts and strengthening of relations between the neutron sources and photon sources of Europe during 2020 both through in-person and online meetings. This section provides further details on both activity areas.

8.1. XXIV School of Pure and Applied Biophysics

Scattering techniques based on X-rays and neutrons have proven to be two of the most powerful techniques for studying biological structures. This is why the fourteenth edition of the School of Pure and Applied Biophysics focused on applications of X-ray and neutron scattering in biology, combining theoretical and practical lectures. The participants also had the opportunity to visit the Elettra synchrotron in Trieste and conduct experiments.

The school took place in Venice, Italy between 27-31 January 2020. Organised by Università Politecnica delle Marche (UNIVPM), the Italian Society for Spectroscopy (SISN), and the Italian Synchrotron Radiation Society (SILS), the school was co-funded by BrightnESS², UNIVPM, and Elettra Sincrotrone in Trieste.

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Participants Profile

The school was attended by 15 students of 7 different nationalities. Five of them were females, giving a gender ratio 1:2. The students were affiliated with institutes from 5 different countries: Italy (10 students), France (2 students), Spain (1 student), Turkey (1 student), and Russia (1 student). The vast majority of the participants were PhD students. Only one of the participants was a Master student, and one was a Postdoc. The students had a wide range of scientific backgrounds, including biology, chemistry, engineering, materials science, medicine, environmental science, and physics.

Picture 5: Participants of the XXIV School of Pure and Applied Biophysics organised in Venice, Italy in January 2020

School Programme

The first two days of the school focused on principles of X-ray and neutron scattering, including presentation of experimental techniques available at synchrotrons, Free Electron Lasers (FELs) and neutron sources in Europe, and an overview of techniques relevant for biophysics.

A visit to Elettra Synchrotron in Trieste was organized on the third day. The tour included the synchrotron hall and all beamlines to help the students familiarise themselves with the layout of the instruments. They also had the opportunity to visit the FERMI FEL facility and learn about its set-up. In the afternoon, the students were divided into 2 groups and performed two experiments: protein crystallography at XRD1 beamline, and X-ray absorption at XAFS beamline. Each experiment lasted one hour.

Lectures on other techniques relevant for biological research followed on the last two days of the school. All students received a certificate confirming their participation.

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Immediate Results and Long-term Impact

The school was very successful as reflected in the positive feedback shared by the participants in a questionnaire at the end of the programme. According to all participants, the programme adequately covered the field of the school and as many as 87% (see Figure 5) of them considered the quality of the lectures to be good. The participants not only deepened their knowledge, but also received new information that is relevant for their respective research activities and have now a good overview of current research trends (see Figure 6). The impact of the school is expected to be long-term as students reported that the programme resulted in new collaborations, new perspectives on their research and even new projects or placements at a new institute (see Figure 7).

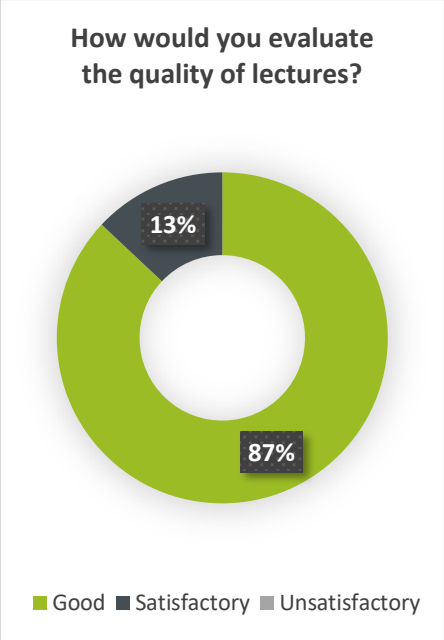

Figure 6: Quality of lectures

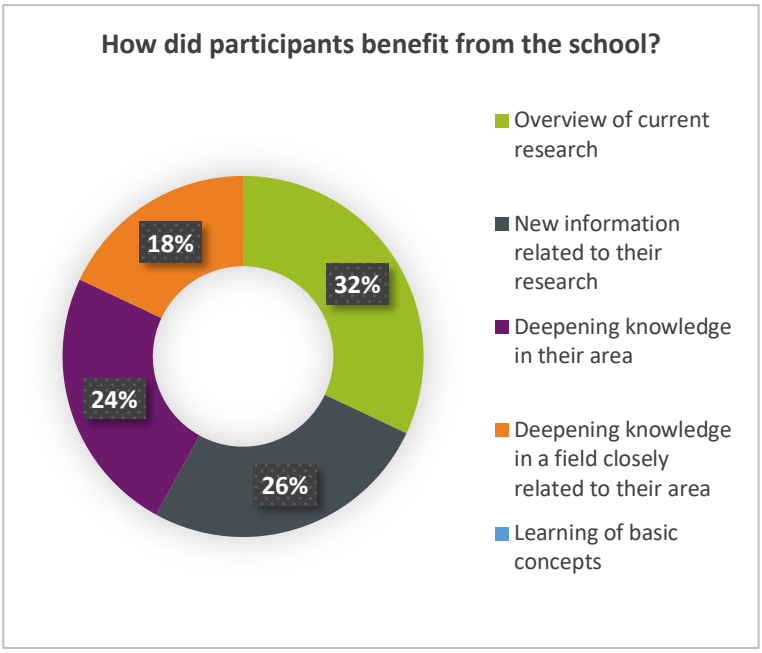

Figure 5: School benefits

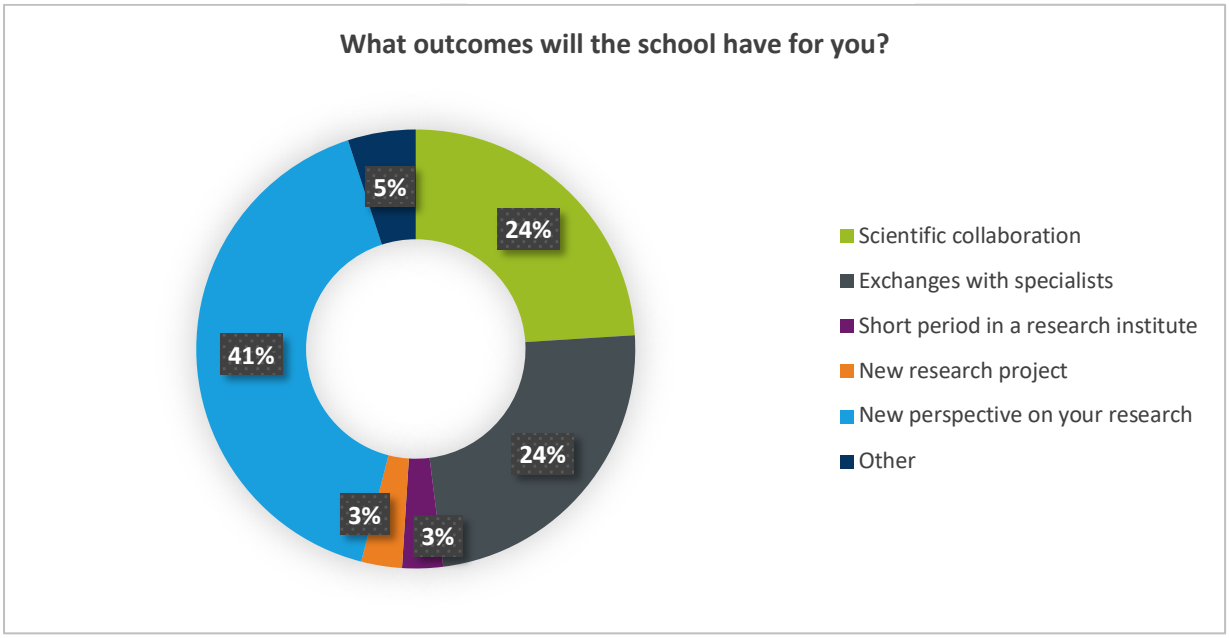

Figure 7: School outcomes

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8.2. Collaboration with LEAPS and ARIE

WP5 has supported the community of neutrons sources in the BrightnESS² consortium and LENS in establishing strategic partnerships with other prominent pan-European umbrella organisations that bring together research infrastructures from scientific areas other than neutron research. This section describes in further detail the interactions that BrightnESS² and LENS partners have had with the photon sources and analytical research infrastructures of Europe. The discussions help the communities to openly brainstorm about prospective collaborations in the future Horizon Europe calls, focusing specifically on new scientific user groups, data management, battery storage, and life sciences.

League of European Accelerator-based Photon Sources

The League of European Accelerator-based Photon Sources (LEAPS) is a consortium of synchrotron radiation and free electron laser user facilities in Europe established with the aim to ensure and promote the quality and impact of the fundamental, applied and industrial research carried out at these facilities. LEAPS inspired the establishment of the League of advanced European Neutron Sources (LENS), which was officially launched in March 2019. LENS places emphasis on the relationship between user communities and funding organisations, continuous improvement of source facilities, optimising resources between and aligning policies among partners – all to ensure excellence to the communities they serve.

The first strategic coordination meeting between LENS and LEAPS took place on 11 February 2020 in Brussels before the LENS Science and Policy Colloquium. The two umbrella organisations collectively represent 25 facilities serving some 35,000 scientific users. Two areas of potential collaboration include strategic contributions to societal challenges, and data management and analysis. The two league organisations are in touch on regular basis and continue to explore possibilities for collaboration.

Picture 6: First strategic meeting of LENS and LEAPS in Brussels in February 2020

Analytical Research Infrastructures in Europe (ARIE)

The Analytical Research Infrastructures in Europe (ARIE) represent more than 100 European research infrastructures that collectively provide services to tens of thousands of users from academia and

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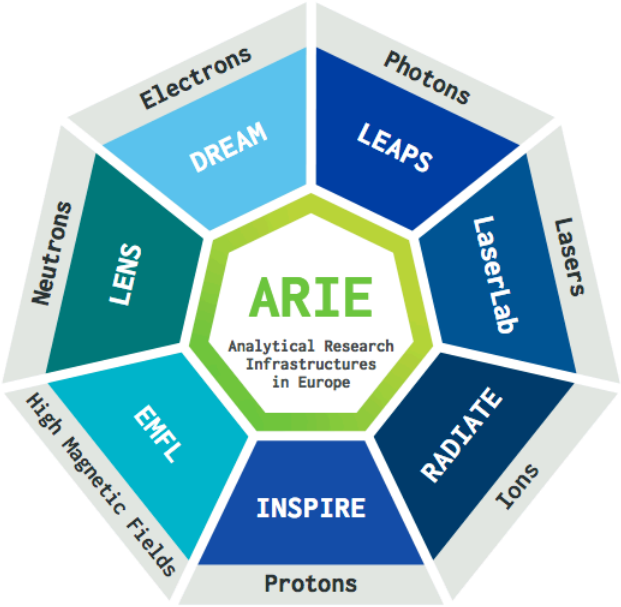
industry. The ARIE networks perform research using electrons, magnetic fields, protons, lasers, neutrons, photon sources and ion beams. LENS is a member of ARIE, representing the neutron sources of Europe.



Picture 7: The seven networks in the ARIE family

In July, ARIE published a position paper on Horizon Europe.[5] Moon-shot missions, such as those of Horizon Europe, require exceptional solutions, and the world-leading ARIEs are one of the key places those solutions can be sought. The ARIE Joint Position Paper highlights how the common, complementary approach will help address the societal challenges of the Horizon Europe Missions framework programme was presented today. To address the Missions, the transversal platforms of ARIEs will collaborate amongst themselves and with the Mission specialists at unprecedented levels. They will build and exploit open networks to share knowledge and skills, to coordinate access, to prepare samples, and to create the sample environments required for experiments under real conditions; in doing so, they will use the new European Open Science Cloud. Within the Horizon Europe Missions, there is an unprecedented opportunity to deploy the analytical techniques, skills and know-how of the ARIEs on a large scale, targeting the Missions' individual research needs. Thanks to the nature of Europe and the ease of multi-disciplinary, cross-border partnerships, the many varied and complementary analytical techniques of the ARIEs can be brought together in coordination with the Horizon Europe Mission specialists. As a result, the unique value of the ARIEs can be added to the Missions, accelerating research and driving solutions for Europe's citizens.

In September 2020, ARIE published another position paper, this time addressing viral and microbial threats.[6] The paper describes how the ARIEs have responded rapidly to Covid-19, as well as how they will address the scientific and operational challenges posed by the pandemic and future viral or microbial threats. The impact of the ARIEs results from the complementarity of their unique individual analytical techniques, which, in combination, provide unmatched analytical capabilities to study infectious diseases. It ranges from investigations at near atomic level (required for understanding the molecular mechanisms of infection and the structure-based design of antimicrobial and antiviral therapeutics) to developments in detection, treatment and prevention. The combination of high-end infrastructure and expertise at the different ARIEs is unmatched in the world and forms an ideal base to develop new and existing multi-disciplinary approaches to tackle infectious agents. For this to be successful, however, there must be funding and networking possibilities to enable international teams of experts from the medical and biomedical-research communities to collaborate more closely, and sustainably, with ARIE scientists and engineers. Bolstered by the health cluster of Horizon Europe, it presents an unprecedented opportunity to deploy the ARIEs' unique combination of analytical

[5] Joint Position Paper on Horizon Europe Missions, available at: https://www.lens-initiative.org/2020/07/09/joint-position-paper-on-horizon-europe-missions-issued-by-europes-analytical-research-infrastructures/

[6] Joint Position Paper on Viral and Microbial Threats, available at https://www.lens-initiative.org/2020/09/28/analytical-research-infrastructures-of-europe-arie-join-forces-to-face-covid-19-and-other-viral-and-microbial-threats/

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techniques, skills and know-how to efficiently target viral and microbial threats. The result will be an acceleration both in research that combats viral and microbial threats, and in the development of fast in-field testing capacities and other solutions to protect the health of Europe's citizens.

Picture 8: Joint Position Papers of ARIE

8.3. Support of Innovation Activities and Collaboration with Industry

As a part of its objective to establish ESS as a research infrastructure with impact in and outside Europe, WP5 supports the activities of ESS staff in charge of WP4: Innovation and Industry. WP4 builds on the elemental innovation framework developed under BrightnESS between 2015-2018 and carries out activities to implement the recommendations of ESS Innovation Strategy, introduce an innovation culture at ESS, and evaluate the potential of the Industrial Liaison Officers (ILO) Network nodes. To this end, BrightnESS² collaborates with the EU-funded project ENRIITC,[7] which aims to enable industry to become a full partner of research infrastructures whether it is as a user, a supplier, or a co-creator, and build a permanent pan-European network of ILOs and Industry Contact Officers (ICOs).

For example, WP4 with the support of WP5 of BrightnESS² was involved in the first ENRIITC Networking Meeting, which was held virtually on 15-16 October 2020 with the aim to facilitate collaboration among the ENRIITC community. During the first day, participants were split into groups to discuss specific topics organised in virtual table discussions. Leader of Work Package 4 of the BrightnESS² project, was one of the two moderators of the topic related to "Unblocking the Innovation Potential of Research Infrastructures to the Benefit of Industry". He participated in the preparation of the table discussions, moderated a table discussion during the event, and supported the topic leader wrapping-up the take-aways and preparing the topic conclusions that were presented to the participants on 16 October 2020.

[7] For more information visit: www.enriitc.eu

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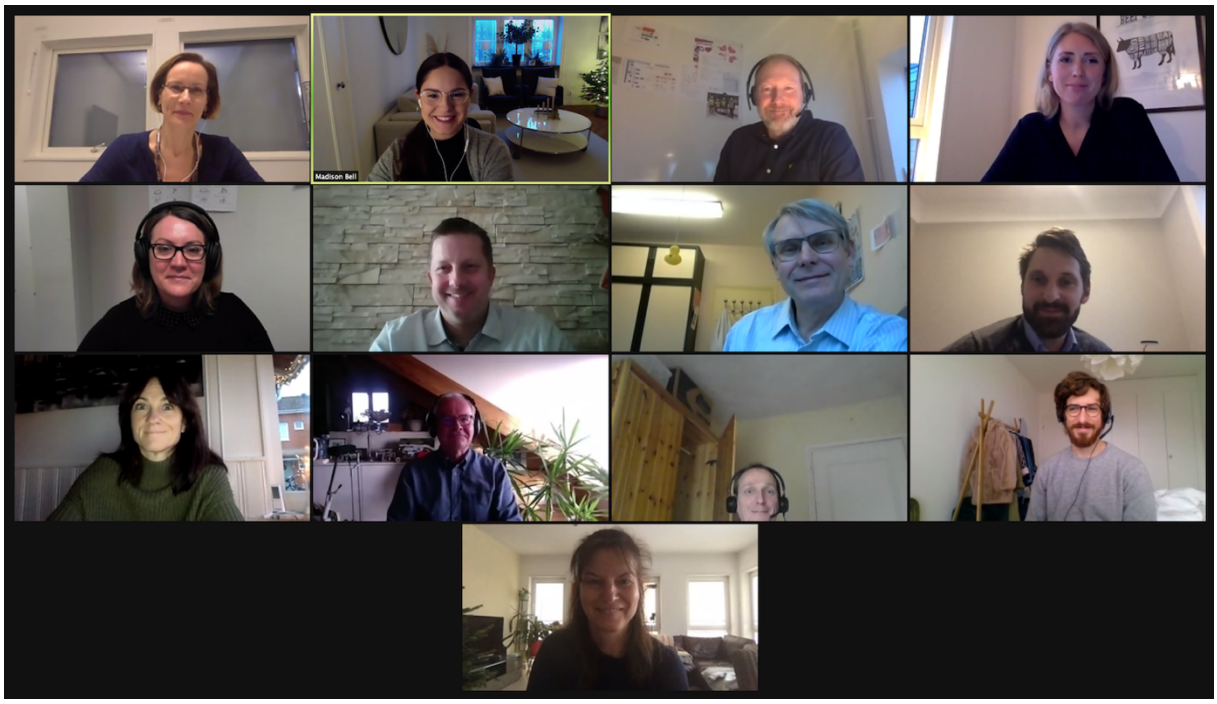
8.4. RI Logistica

Around a third of the construction budget of ESS is realised by means of In-Kind Contributions. With the ESS In-Kind model, Partners, on behalf of their national governments, supply equipment, design documentation, personnel or other services to support the construction of ESS. ESS is currently in the peak of the Construction Phase, which started in 2013. As of January 2021, the facility has been 76% complete. Equipment from In-Kind Partners and suppliers has been arriving to the ESS construction site from all over Europe. Deliveries include:

1. Large-sized, unique items like e.g. the Target Wheel Vessel, and
2. Items in high quantities like e.g. 6 lorries of port beam blocks.

The type of deliveries arriving to ESS will change once the Construction Phase is successfully finished. The circumstances created by the COVID-19 pandemic during the year of 2020 have pointed out that users of research infrastructures might require remote access to facilities more often in the near future. This will require more frequent receiving, shipping, and handling of samples.

There is currently no Forum in Europe which would allow for the exchange of knowledge between research infrastructures on issues related to logistics and the development of common strategies towards suppliers, authorities and logistical companies. Considering the importance of logistics, WP5 of the BrightnESS² project initiated the established of the RI Logistica Programme Committee.



Picture 9: Kick-off meeting of the RI Logistica Programme Committee

The kick-off meeting of the Committee took place on 14 December 2020. The Committee brings together representatives of large-scale research infrastructures and users with the aim to identify common challenges of supply- and user-related logistics at research infrastructures and facilitate mutual learning. The Committee also held a meeting focused on user logistics on 11 January 2021 and another one focusing on suppliers on 19 January 2021. The members are planning to organise an online event in May 2021.

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The aim of the event is to explore the opportunities for establishing a permanent RI Logistica Forum for the development of standard and exchange of best practices. The expected benefits of such forum include cost-efficient, safe and timely handling of equipment and samples, mitigation of transportation risks, and harmonising customs handling.

RI Logistica Programme Committee members
• European Spallation Source ERIC (ESS) • European Molecular Biology Laboratory (EMBL) • European Organisation for Nuclear Research (CERN) • European Southern Observatory (ESO) • European XFEL • Fédération Française de Diffusion Neutronique (2FDN) • Fusion for Energy (F4E, ITER) • Svalbard Integrated Arctic Earth Observing System (SIOS)

Figure 8: RI Logistical Programme Committee members

9. Stakeholder Engagement

LENS held a Science and Policy Colloquium on 11 February 2020, focused on how neutrons contribute to mission-based research. Sponsored by BrightnESS², the meeting was held in Brussels and brought together members of Europe's neutron science community, several European Commission representatives, and representatives from LENS' sister consortium, LEAPS.

BrightnESS² also supported the participation of representatives of the European Neutron Scattering Association (ENSA) in the Colloquium to further strengthen the dialogue between user groups, facilities and policy makers. The ENSA representatives included Jörg Pieper, Research Professor of Biological Physics at the University of Tartu, Livia Bove from UMPC in Paris, and Maria Paula Marques, Professor at the University of Coimbra.

ESS Director General John Womersley opened the proceedings by highlighting the historical significance of the location – the magnificent surroundings of the Bibliothèque Solvay. The momentous 5th Solvay Conference on Electrons and Photons was held in a nearby building in the park some 94 years ago, and it is remembered as one of the most famous meetings in the history of physics. Gathered to establish the foundations of quantum physics, 17 of the 29 attendees went on to win Nobel Prizes for their work. "There is a significant evolutionary change underway for both neutron science in Europe as well as in how the European Union views the role of research infrastructures," said Womersley.

Research Infrastructures and Horizon Europe

How Europe's research infrastructures can best position themselves to contribute to the missions of the Commission's 9th Framework Programme, Horizon Europe, was the underlying motivation for the colloquium, which served to highlight the ways in which this was already being done and those areas where adaptation would be necessary. The head of the research and industrial infrastructures unit in the European Commission's directorate-general for research and innovation at the time of the conference, Adam Tyson, followed Womersley with a direct message to the leadership of both LENS and LEAPS. He encouraged scientists and research infrastructure managers to provide integrated services that focus on missions and the shortening of the lag between new knowledge and its application.

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The chair of LENS, Helmut Schober, who is director of the Institut Laue-Langevin (ILL), and Caterina Biscari, the chair of LEAPS and director of Spain's ALBA Synchrotron, followed Tyson on the programme and made it clear that an important alliance between the two organisations was taking shape. Biscari gave a thorough introduction to LEAPS and highlighted where LENS and LEAPS facilities had long been cooperating both scientifically and otherwise, including in the increasingly critical area of data processing and analysis. Schober then set the stage for the remainder of the colloquium by moving quickly into the science of neutrons, highlighting recent research results from ILL that herald great benefits for society.

Picture 10: Panel discussion on mission-based research during LENS Science and Policy Colloquium in Brussels in February 2020

Societal Impact of Neutron and Photon Research

What followed into the early evening was a convincing display of the fulfilment of the "science for society" mantra that is central to the mission of many of Europe's major science infrastructures. Schober reviewed recent advances that will impact quantum computing ("the neutron can watch the quantum computer computing!") and health research with neutrons that has advanced the understanding and treatment of Alzheimer's, diabetes, AIDS and cancer. He then yielded the floor to Kristina Edström, a chemist from Uppsala University who has been making waves recently as project coordinator for the BATTERY 2030+ consortium, which aims to revolutionise the role batteries will play in our society over the next decade and beyond.

The most recent Nobel in chemistry recognised some of Edström's predecessors and colleagues for the discoveries that led to lithium-ion battery technology, and that spotlight has settled on what is next for batteries. It is clear that both the EU and European industry intend to invest heavily in developing new science to advance the sustainability and impact of battery technology. Both LENS and LEAPS have recently published their input[8] to the BATTERY 2030+ roadmap, which in its earliest stages relies on the capabilities of photon and neutron sources.

[8] LENS Position Paper on "BATTERY 2030+ Roadmap (Second Draft)", available at: https://www.lens-initiative.org/wp-content/uploads/2020/01/LENS-BATTERY-2030-roadmap-position-paper.pdf

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Following Edström were Maria Paula M. Marques and Wim Bouwman, two neutron science specialists who are engaged in mission-based research on cancer drugs and food production, respectively. Marques is a researcher from Portugal's University of Coimbra and recipient of last year's ISIS Neutron & Muon Source Society Impact Award for research with neutrons. Her talk featured the fundamental research that has led to the discovery of new metal-based anti-cancer agents based on experiments she performed at the UK's ISIS in 2017. The research provides the basis for new treatments that can reduce the toxicity of cancer therapy while enhancing the immune system's ability to fight the disease. Bouwman, who works out of the Technical University of Delft, is a neutron scientist who has long been studying the optimisation of food processing, including the development of sustainable ingredients for food production. Noting that food production accounts for 20% of the carbon dioxide contributing to climate change, Bouwman underscored the importance of establishing a scientific basis for new processes and ingredients, including viable meat substitutes.

Picture 11: Handover of LENS Green Deal Position Paper to the European Commission

The colloquium closed with a short panel discussion that featured the addition of Sweden's former finance minister, Allan Larsson. Larsson played an instrumental role in locating ESS in southern Sweden and served on the EU's mission board for Climate-Neutral and Smart Cities. The discussion broadened to the EU's proposed European Green Deal, and Schober and LENS Vice-Chair Robert McGreevy, director of ISIS, took the opportunity to formally hand over the LENS Green Deal Position Paper[9] to the Commission.

10. Activity Plan 2021

The BrightnESS² partners have jointly developed activities to take place in 2021 in support of the achievement of the project goals. These activities will primarily target scientific communities and stakeholders from nine countries, namely Canada, Estonia, France, Hungary, Ireland, Israel, South Africa, Spain, and Sweden. However, since many of the events will be implemented virtually, the potential geographical reach is much bigger. The dates of the majority of the events have not been decided yet due to the uncertainties related to the ongoing pandemic, but the overview below indicates in which quarter of 2021 are they most likely to take place. It is possible that some of them will be implemented within a different timeframe. The events which are planned in the last quarter of the year are intended to take place as physical meetings, but this depends on how travel restrictions will evolve.

[9] Making it happen: Placing Analytical Research Infrastructures at the Heart of the Green Deal, available at: https://www.lens-initiative.org/wp-content/uploads/2020/02/LENS-Green-Deal-position-paper.pdf

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Categories

Community building	Knowledge-sharing	External conference or event	Public engagement	Outreach	Education

Activities

Year	Quarter and/or month	Activity	Place
2021	Q1-Q4	Strategic Community Building Activities for Sustainability Developing a networking collaboration to identify and act upon opportunities of funding, bridging ARIE and Life Science Research Infrastructures, to provide a coherent service to the broadest life science user community.	Online (Lund, Sweden)
2021	Q2	Seminar on the Science of Neutrons	Online (Ein Gedi, Israel)
2021	Q2	RI Logistica Conference	Online (Lund, Sweden)
2021	Q2 – June	Workshop on Polyelectrolytes	Online (Sorbonne, France)
2021	Q2 – June	International Conference on Research Infrastructures (ICRI)	Online (Ottawa, Canada)
2021	Q3	Workshop on Elastic Neutron Scattering for Dynamic	Online (Dublin, Ireland)
2021	Q3	Informational Event about Neutrons for Scientists in Other Fields	Tartu, Estonia
2021	Q3 – Sep	Big Science Business Forum (BSBF)	Granada, Spain
2021	Q4	Central European Training School in Neutron Scattering (CETS)	Online (Budapest, Hungary)
2021	Q4	Workshop on Innovative Inelastic Neutron Scattering (i2ns)	Autrans, France
2021	Q4	Community Event in South African	Pretoria, South Africa
2021	Q4	Bilbao Neutron School (BNS)	Bilbao, Spain
2021	Q4	Press trip for Spanish media	Lund, Sweden
2021	Q4	Visit of Spanish and Basque Delegations	Lund, Sweden

Figure 9: Activity Plan 2021

11. Conclusion

The outreach and enlargement activities planned to take place in 2020 were affected by global developments and the restrictions on travel and physical meetings resulting from the COVID-19 pandemic. The consortium was presented with a unique challenge of deciding how to best change the format of scheduled activities in order to implement them without unnecessary delays. All this while trying not to limit the events' prospective impact. Informed decisions were made that helped the project to move forward during the year and achieve the desired goals. While some events had to be postponed and some international collaborations put temporarily on hold, the events that were implemented during 2020 were impactful and their online aspect allowed the partners to reach larger and more diverse audiences. The BrightnESS² partners are now used to organising virtual events and plan to continue to do so during 2021, gradually adding hybrid and physical meetings.

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