

Annual Review **2016**



CERN & Society



EMPOWERING THROUGH SCIENCE, TECHNOLOGY AND IT

WORD FROM ANNE RICHARDS, CERN & SOCIETY FOUNDATION CHAIRPERSON

2016 was a successful year for the CERN & Society Foundation, reaching a growing number of people in our mission to spread the CERN spirit of scientific curiosity, for the inspiration and benefit of society.

With its grants, CERN & Society enabled young people from all corners of the globe to nurture their passion for science, technology and IT, facilitated innovation and knowledge exchange, and build creative bridges across communities. Through the Beamline for Schools Competition, CERN & Society engaged more than 1 500 high school students worldwide. To our great delight, also in 2016, the first research paper resulting from this unique competition was published by one of the 2014 winning teams, demonstrating the value and direct impact of the project.

The Foundation granted scholarships to 11 summer students from around the world for in-depth study of particle physics, engineering and IT at CERN, and to three PhD students to carry out their research within the ATLAS Collaboration. Through the Digital Libraries School, 30 librarians and IT specialists from eight African countries were introduced to digital libraries management concepts and software by CERN experts in Ghana, building critical capacity for scientific research and exchange in the region. The Foundation also funded over 60 teachers to take part in CERN training for secondary-level teachers, equipping them to bring modern physics into their classrooms.

In the area of innovation and knowledge exchange, CERN & Society supported the continued development of the free and open-source software KiCad, and the Foundation contributed to enriching the cultural landscape by stimulating creative exchanges between science and the arts with four residencies for artists at CERN. None of this would have been possible without the extraordinary support of our donors. We thank you for your generosity and for your commitment to our mission.

As we move forward, we welcome a new project under the CERN & Society aegis: the CERN Entrepreneurship Student Programme (CESP), a five-week residency at CERN, during which graduate-level students in entrepreneurship will learn about CERN technologies, explore their commercial potential and identify those that could be taken to market. This project recognises the value of entrepreneurial development and responds to a clear need for high-quality hands-on training in high-tech entrepreneurship, which can complement and reinforce the theoretical education basis offered during university studies.

You can find more details on the pages of this review. I hope that the impact of the programmes will inspire and convince you of the important role all of us can play in support of science, technology and IT for the benefit of people everywhere.

OUR MISSION

CERN & Society is a programme of projects funded primarily by the CERN & Society Foundation, a charitable foundation established by CERN whose purpose is to support and promote the dissemination, to the widest possible public, of the benefits of CERN's mission, through education & outreach, innovation & knowledge exchange, and culture & creativity.



SCIENTIFIC CURIOSITY

We aim to raise people's interest in scientific endeavours and get young people excited about the understanding and pursuit of science.



INSPIRATION

We believe in innovative learning opportunities and creative synergies across very different fields such as science and the arts.



SOCIETY

We aspire to further the development of practical applications from fundamental research for the improvement of people's lives.

"SPREADING THE CERN SPIRIT OF SCIENTIFIC CURIOSITY, FOR THE INSPIRATION AND BENEFIT OF SOCIETY."

HEAR FROM OUR BENEFICIARIES



SOCRATES FOTIADIS (40), Greece
Teacher Programme

*"THIS WAS A UNIQUE EXPERIENCE FOR ME.
I'M PLANNING TO TRANSMIT AS MUCH
KNOWLEDGE AS POSSIBLE TO MY STUDENTS."*



CHILUFYA MWEZA (28), Zambia
ATLAS PhD Grant Scheme

*"I'M REALLY THANKFUL FOR THE OPPORTUNITY
THIS GRANT HAS GIVEN ME."*



TEK KAN CHUNG (17), United Kingdom
Beamline for Schools Competition

"IT'S JUST AWESOME TO SEE SCIENCE IN THE MAKING."



ALOYSIUS MWANJE SSENONO (31), Uganda
CERN-UNESCO Schools for Digital Libraries

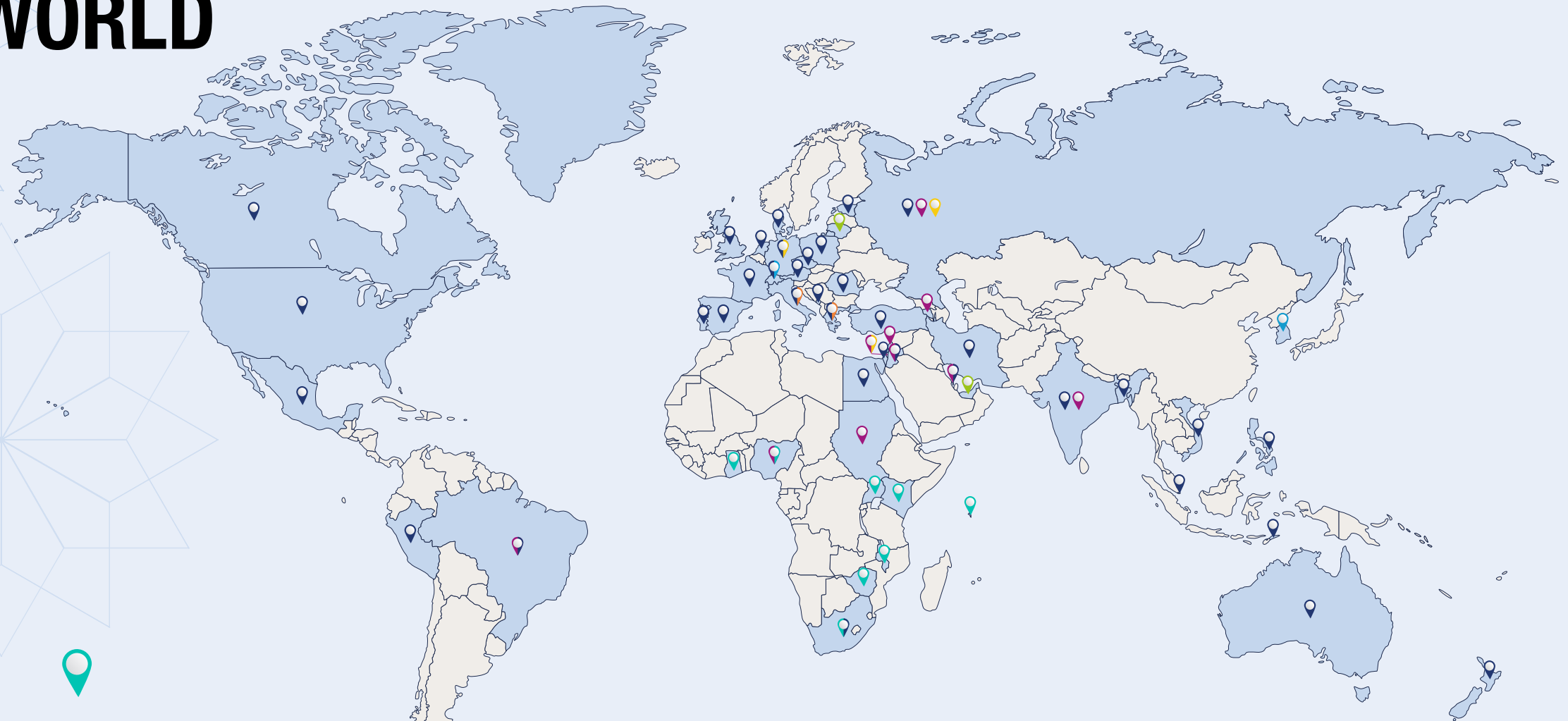
*"THE OPPORTUNITY NOT ONLY BENEFITED MY
INTELLECT BUT IT ALSO SOCIALLY ENRICHED
MY BEING."*



TALYTHA BARBOSA (24), Brazil
Non-Member State
Summer Student Programme

*"WORKING AS A SUMMER STUDENT AT CERN
WAS ONE OF THE BEST AND MOST EXCITING
EXPERIENCES I HAVE EVER HAD."*

OUR REACH ACROSS THE WORLD

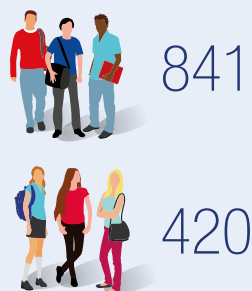


BEAMLINE FOR SCHOOLS COMPETITION

Engaging high-school students in real experimental particle physics research at CERN.

151 experimental proposals submitted by **1261** students

Gender distribution:



NON-MEMBER STATE SUMMER STUDENTS

Giving the next generation of scientists the skills to contribute to the development of their communities.

11 students fully supported for 8 weeks

Gender distribution:



CERN-UNESCO SCHOOLS FOR DIGITAL LIBRARIES

Enabling African researchers to join the global network of digital libraries and build capacity in their own countries.

30 librarians and IT specialists trained

Gender distribution:



ATLAS PHD GRANT SCHEME

Unique education for outstanding PhD students in particle physics research.

3 grants awarded

Gender distribution:

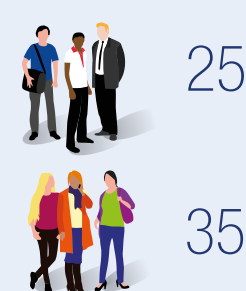


CERN NATIONAL TEACHER PROGRAMMES

Equipping teachers to empower through scientific education.

60 teachers supported

Gender distribution:



COLLIDE

Artist residency programme developing expert knowledge in the arts through a connection with fundamental science.

2 residencies granted

Gender distribution:



ACCELERATE

Country-specific, one-month artist residency award facilitating creative collisions between culture and science.

2 residencies granted

Gender distribution:



BUILDING THE FUTURE

To meet the critical challenges of the 21st century, we need greater public engagement in science, evidence-based decision- and policy-making, and more talented young people from every country pursuing careers in STEM (science, technology, engineering and mathematics) subjects. These skills and knowledge will be fundamental for building the infrastructure for a sustainable planet and for the well-being of people across the globe.

Since its establishment in 2014, the CERN & Society Foundation has contributed to enhancing CERN's impact on society, especially by bringing young talent skills and competencies needed to flourish in the future. CERN & Society projects are inspired or enabled by CERN, but go beyond of the Organization's specific research mandate.

"I BELIEVE THAT THE FUTURE IS SHAPED BY PEOPLE WHO CARE ABOUT OUR CIVILISATION REGARDLESS OF THE ODDS AND CONDITIONS."

SAMI OZDEMIR, DONOR

CERN-UNESCO SCHOOLS FOR DIGITAL LIBRARIES

At CERN & Society, we believe in the value of equal opportunities, we have a passion for open science and open data and, most importantly, we want to improve people's lives by means of innovative technologies. Established with these values in mind are the CERN-UNESCO Schools for Digital Libraries: week-long training sessions for African librarians and IT specialists, designed to increase the impact of African researchers' work and to improve their access to research resources from around the world.



2016 GHANA SCHOOL

In 2016, the fourth edition of the CERN-UNESCO Schools for Digital Libraries took place in Kumasi, Ghana. For one week, 30 librarians and IT specialists, coming from eight different African countries, attended an intensive training course on digital libraries, learning how to replace expensive and quickly outdated hard copies of publications with digital versions. In particular, they were taught how to use the Invenio digital library software, a free and open-source tool for digital library management developed at CERN. The second part of the School will consist of an advanced training course at CERN for selected participants during the summer of 2017.

Olufunmilayo Fati is a Nigerian System Librarian who attended the 2016 School in Ghana. She was interested in knowing more about the introduction and application of emerging technologies to library operations in Africa and, in particular, in her country.

During the School, Olufunmilayo had the opportunity to discuss ideas and solutions on digital library issues with fellow participants, and thanks to these new connections, she was able to get actively involved with the African Digital Library Support Network, of which she is now the Nigerian Contact Person and Representative.



Olufunmilayo Fati, 2016 CERN-UNESCO School for Digital Libraries

"[THE SCHOOL] GAVE ME THE FRAMEWORK AND CONCRETE TOOLS TO TAKE BACK TO MY COUNTRY TO MAKE A POSITIVE IMPACT, AND ALSO TO ENHANCE MY FUTURE WORK IN DIGITAL LIBRARIANSHIP."



“BEFORE OUR ADVENTURE IN GENEVA, I WAS HESITATING ABOUT MY FUTURE. AFTER THE COMPETITION, I FINALLY DECIDED TO STUDY ENGINEERING, BECAUSE AFTER THESE STUDIES I THINK I WILL BE ABLE TO WORK IN A GREAT PLACE LIKE CERN.”

“PYRAMIDS HUNTERS” STUDENT, BL4S 2016

CERN BEAMLINE FOR SCHOOLS COMPETITION

As a scientific competition for high-school students, the CERN Beamline for Schools Competition (BL4S) promotes science and engineering education for young students globally, encouraging them to delve into STEM subjects through hands-on engagement with scientific and technological activities.

Working in teams, students develop experimental proposals under the supervision of their teachers. The two winning teams have the opportunity to come to CERN and conduct their experiments using a fully equipped particle beam line that is allocated to them as for other CERN experiments.

2016 BL4S COMPETITION

In September, the winning teams of the 2016 edition (“Pyramid Hunters” from Poland, and “Relatively Special” from the UK) were welcomed to CERN to perform their experiments on a fully equipped beam line, just like real scientists conduct research at CERN: a unique opportunity.

GREAT NEWS CAME THIS YEAR ALSO FOR BL4S ALUMNI.

One of the winning teams of BL4S 2014, “Dominicuscollege”, from the Netherlands, published a paper in *Physics Education* (the international journal of the Institute of Physics) in collaboration with the Dutch National Institute for Subatomic Physics (Nikhef) and Radboud University. Their paper, “Building and testing a high school calorimeter at CERN”, describes their experiment at CERN, its results and their overall experience of being the first winners of the Beamline for Schools Competition together with the “Odysseus’ Comrades” team, from Greece.



Hear from our donors: Jasper van Zon, Arconic Foundation

“We are proud to partner with CERN and the CERN & Society Foundation. Their capacity to drive young people’s interest in science and advanced STEM education, and to inspire tomorrow’s science and engineering graduates, complements our Arconic Foundation mission of building a talent pipeline that will contribute to scientific progress and support the global economy.

Arconic Foundation supports programmes that help prepare the 21st century’s engineering and advanced manufacturing workforce. Through collaboration with our non-profit partners, our initiatives make high-quality STEM education opportunities available to students; support engineering and technical skills training through community colleges, vocational technical schools and universities around the world; and help to create access for under-represented individuals to the STEM fields. Working with CERN and in particular being actively involved in the Beamline for Schools programme ticks all of our boxes. It’s great to see the impressive engagement and enthusiasm of so many students across the globe on their way to becoming the scientists, engineers, disruptors and leaders of the future.”



CERN NATIONAL TEACHER PROGRAMMES

A well-trained and inspiring teacher can play a key role in the future academic and professional development of young students. With the growing demand for skilled workforce in STEM (science, technology, engineering and mathematics), stimulating and passionate teachers are needed to engage more students in scientific studies.

Every year, professional development programmes are organised at CERN for teachers to keep up to date with the latest developments in particle physics and related fields, enrich their skillset and provide, in turn, high-level education to their students.

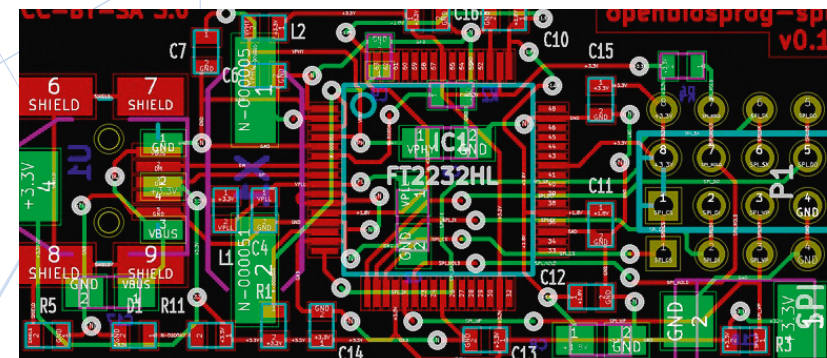


Maria Fotopoulou,
2016 Greek Teacher
Programme

2016 GREEK TEACHER PROGRAMME

In 2016, the CERN & Society Foundation proudly contributed to the Greek Teacher Programme. Forty high-school science teachers participated in a four-day intensive training course, which consisted of a series of lectures and workshops. According to the teachers, "one of the most instructive and amusing moments" was the S'Cool Lab workshop, where the teachers had the opportunity to build their own particle detector as part of an experiment that would be easy to replicate in the classroom with the appropriate basic equipment.

"WATCHING LECTURES OF RESEARCHERS HAS ALWAYS BEEN VERY INTERESTING FOR US, THE SCIENTISTS. HOWEVER, SHARING KNOWLEDGE SO CLOSE TO ITS CONCEPTION AND IMPLEMENTATION WAS FASCINATING. MY EXPERIENCE WAS MORE THAN INSPIRING, NOT ONLY FOR MY FUTURE LESSONS IN THE CLASSROOM BUT ALSO IN THE LAB."



Bob S. Stricklin, Jr., donor

"WHEN I STARTED TO WORK WITH KICAD, I REALISED THAT IT WAS A VERY FINE TOOL WITH LOTS OF THOUGHT AND EFFORT INVESTED. I CONTRIBUTED TO GIVE MY SUPPORT FOR THE EFFORT AND ENCOURAGE THE DEVELOPERS TO KEEP WORKING BECAUSE SOFTWARE IS NEVER FINISHED. I TRULY DO APPRECIATE HAVING SUCH A FINE TOOL TO DEVELOP MY OWN PROJECTS."

"WE ARE A SMALL COMPANY (AROUND 20 EMPLOYEES). WE USE FREE SOFTWARE BECAUSE THE OPEN SOURCE GUARANTEES THAT OUR DESIGNS WILL REMAIN USABLE, INDEPENDENTLY OF WHAT HAPPENS TO THE ENTITY MAINTAINING THE SOFTWARE. WE DONATE TO KICAD BECAUSE DEVELOPING QUALITY SOFTWARE COSTS MONEY AND WE LIKE THE ENHANCEMENTS THAT HAVE BEEN MADE AND ARE BEING DISCUSSED FOR FUTURE RELEASES."



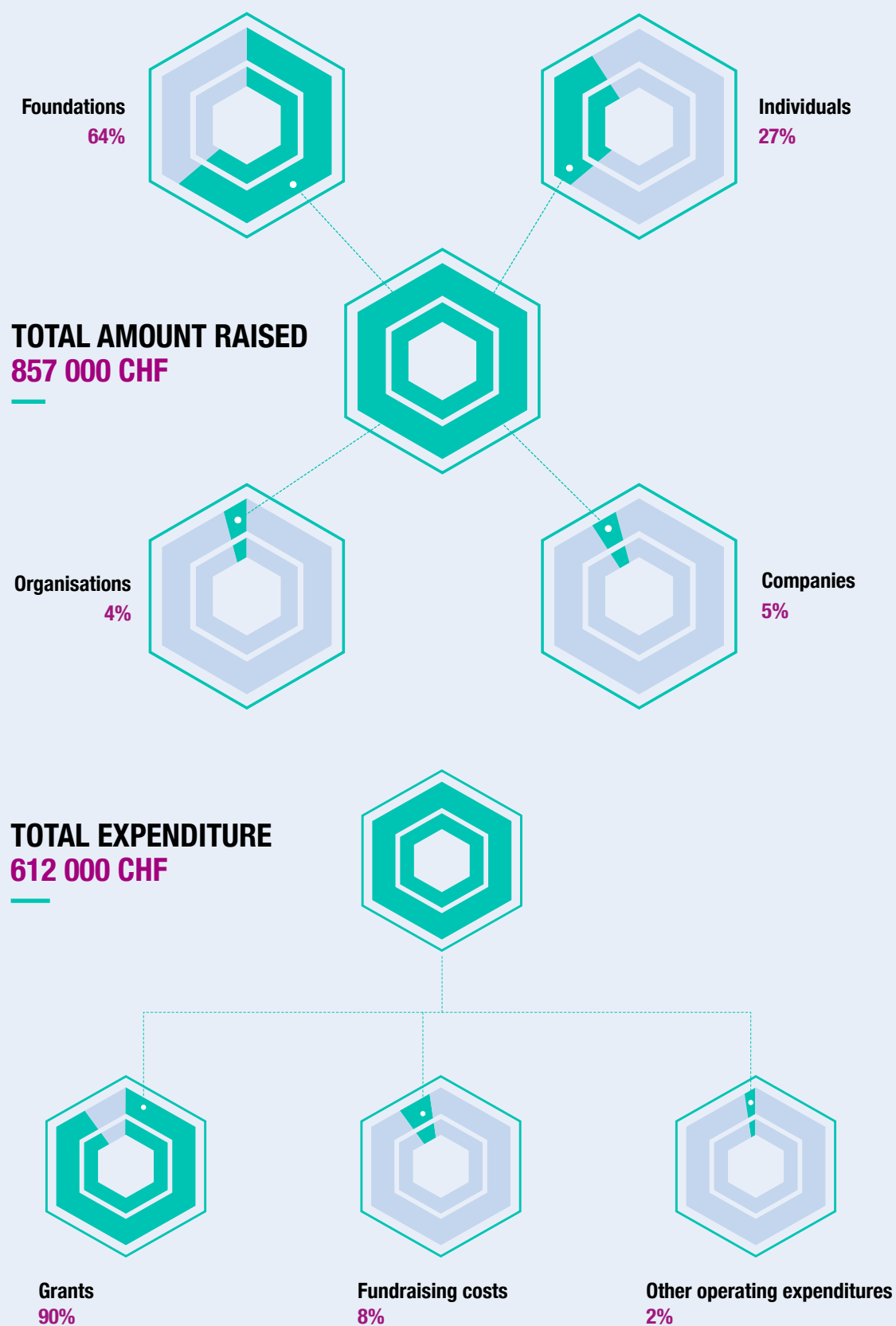
David Mosberger, donor

KICAD DEVELOPMENT

KiCad is a dynamic and innovative free and open-source software (FOSS) suite for electronic design automation. Its scope is to help people create and share electronic design information with no artificial barriers and without compromising productivity, so that design and development knowledge can flow more freely. It is also a valuable and free tool to teach electronic design to students.

KiCad benefits from a wide community of users that actively contributes time and money to its development. In 2016 alone, more than 130 hours of development were made possible thanks to individual online donations to the CERN & Society Foundation, coming mainly from KiCad users. This is proof of the huge impact this technology has on people's professional lives, and an encouragement for its further improvement for the benefit of society.

FINANCES



CERN & SOCIETY FOUNDATION BOARD

The governing document of the CERN & Society Foundation allows for a maximum of nine and a minimum of three trustees, including the Director-General of CERN as an ex officio member, and one member designated by CERN.



STRUCTURE & GOVERNANCE

As of 31 December 2016, the board members are Ms Anne Richards, Chief Executive Officer of M&G Investments, serving as Chairperson; Professor Peter Jenni, former ATLAS Spokesperson, serving as Deputy Chairperson (designated by CERN); Professor Rolf-Dieter Heuer, President of the German Physical Society (DPG) and former Director-General of CERN; and the CERN Director-General, Dr Fabiola Gianotti as ex officio member.

The trustees hold regular board meetings throughout the year. The Foundation board is responsible for the overall direction, management and administration of the Foundation and its assets and takes decisions according to the provisions set out in the articles of association on all matters concerning the Foundation. The board also makes decisions on strategy and policies.

HOW YOU CAN HELP

There are many ways to support the CERN & Society initiatives. No matter how - or how much - you give, your gift can make a difference!

TRUSTS, FOUNDATIONS AND COMPANIES

Place science's benefit for society under the spotlight. We have taken important steps forward so far thanks to our partners, but we can do so much more with additional help!

For information about partnership opportunities with CERN & Society, please write to the Partnerships & Fundraising Section at partnerships.fundraising@cern.ch



ONLINE DONATIONS

Boost CERN & Society's reach easily and quickly! You can make a secure online donation at www.cern.ch/donate



AT THE CERN SHOP

If you happen to be around CERN, pay a visit to the gift shop in the Reception area. There, you will find authentic LHC Data Tapes available as souvenirs for a contribution of 10 CHF or more. 100% of your donation will directly support CERN & Society projects.

OUR DONORS

THANK YOU TO ALL THE SUPPORTERS OF THE CERN & SOCIETY FOUNDATION!

INDIVIDUALS

- Anne Richards
- Constantine Fantanas
- Margarita Louis-Dreyfus
- Matthew Eyton-Jones
- Yasemin Arik & Akhil Monappa

COMPANIES

- ACEA SpA
- National Instruments Switzerland
- Uniqa Assurances SA

FOUNDATIONS

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- Curators Foundation
- Fondation CIE Gilles Jobin
- Fondazione Silvio Tronchetti Provera
- Foundation for Art and Creative Technology (FACT)
- Fund Ernest Solvay, managed by the King Baudouin Foundation
- Generation Foundation
- John S. Latsis Public Benefit Foundation

- Motorola Solutions Foundation
- Simons Foundation International, Ltd.
- Pro Helvetia

ORGANISATIONS

- ARKO (Arts Council Korea)
- République et Canton de Genève
- Rupert (Arts and Education Centre)
- Ville de Genève

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Additional supporters of the CERN & Society Foundation in 2016:

- | | | |
|--------------------------|------------------------------------|----------------------------------|
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| - Jay Damkoehler | | |

Our heartfelt gratitude also goes to the many donors who supported CERN & Society in 2016 but who wish to remain anonymous.

Finally, we express our thanks to all CERN colleagues, without whose curiosity, creativity, hard work and social conscience, CERN & Society projects would not be possible.



CREDITS

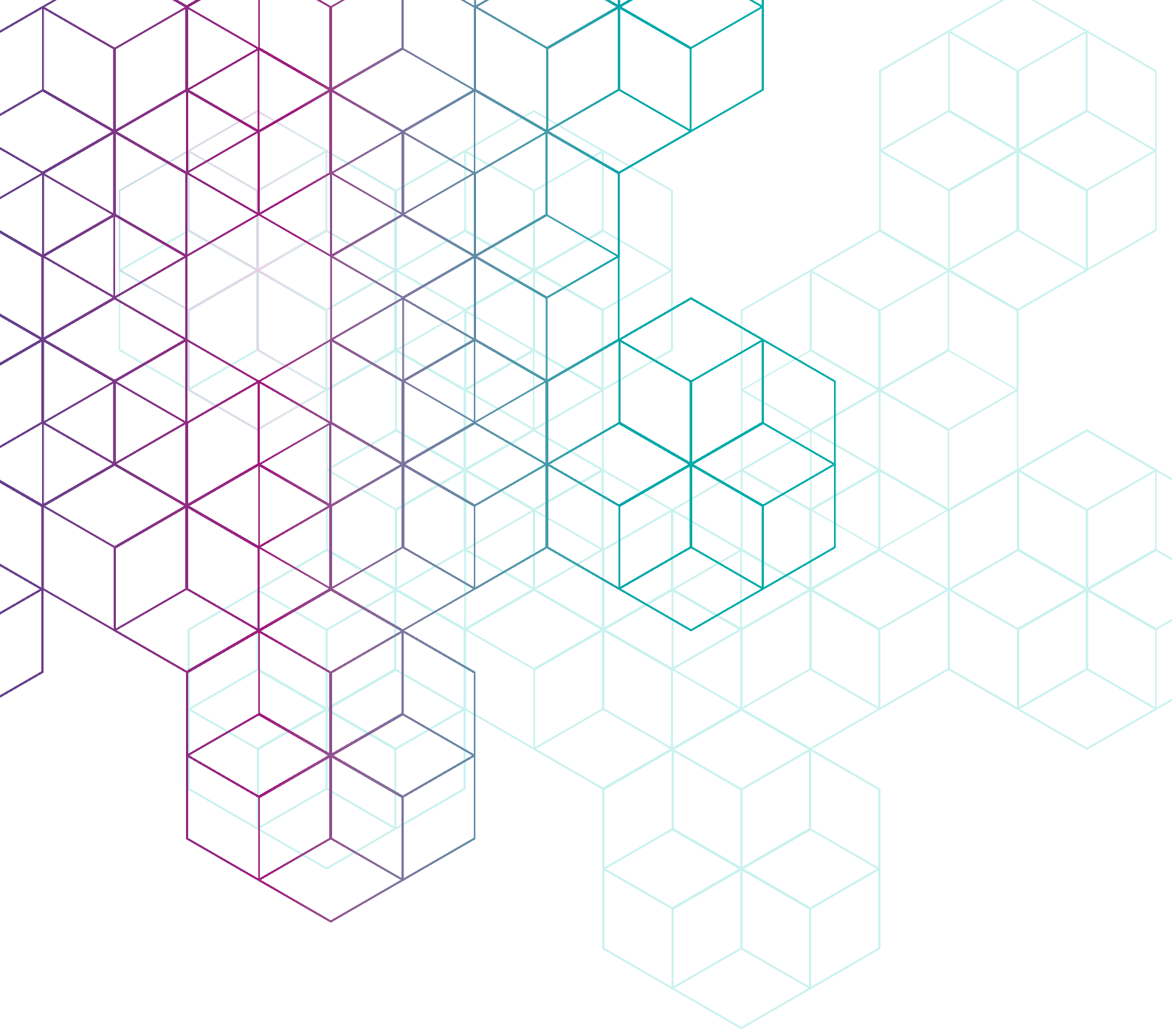
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