TIMEPIX@school

From CERN's Large Hadron Collider to schools, a chip to revolutionize STEM Education.

CERN & Society Foundation

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“For many high school students, especially those from low income or minority backgrounds, it’s often difficult to see the value of studying STEM subjects.

This project provides them with leading edge hardware they can use in their classrooms, the same device used in space, in hospitals and in museums.”

- Michael Campbell, MediPix and TimePix project leader.

_SMALL SIZE, HUGE IMPACT

Imagine giving students access in their classrooms to the same equipment that keeps astronauts safe in space.

_the problem

85.000.000

THE ESTIMATED GAP OF SKILLED PROFESSIONALS IN STEM BY 2030

One of the reasons behind this is the lack of diversity and inclusivity in many STEM (science, technology, engineering and mathematics) workplaces and programmes.

Women, rural populations, minority ethnic groups, people from lower socio-economic classes, and other marginalised groups are underrepresented in STEM fields in most developed and developing countries.

The TimePix project is looking towards helping students connect with STEM subjects, creating the spark for scientific curiosity and bridging the gap to fairer access to education.

_our solution

A study by Accenture revealed that **for every dollar invested in learning, a company reaps a remarkable $3.53 in measurable value to its bottom line – a staggering 353% return on learning.** With the TimePix project, we are not just investing in hardware; we are investing in the future of STEM education and workforce diversity.

How we will do it: through a network of regional hubs spread across CERN Member States, Associate Member States, and beyond, serving as epicenters of innovation and empowerment.

These hubs will be instrumental in distributing TimePix hardware and teaching materials to local schools, ensuring that every student has the opportunity to delve into the wonders of science firsthand.

Equal Access, Equal Opportunity: Through an open call process, local hubs will be carefully selected to serve at least three schools, providing up to 10 detectors per hub. This ensures equitable access to education and the scalability of the project, with promotional materials disseminated through teachers’ networks, empowering educators to inspire the next generation of scientists.

_Testimonies of our students

The voices of who experienced the TimePix chip firsthand

From radiation to Data Analysis

To have access to such exciting technology that **enabled us to be part of genuinely impactful experiments was so empowering**. Aside from the excitement of learning concepts that went well beyond the curriculum, **it also gave me and others confidence in our ability to learn, research, and share ideas** that I would certainly not have otherwise had.

To have that confidence built at that age stood me in great stead as I was making decisions about my future. Not only was **I inspired by all of the fascinating science** that I learned through the experiments that we were able to conduct with TimePix, but **I felt as though my peers and I could really, meaningfully contribute.** It was a completely unique experience and I am very grateful.

- Anna Evans, participant in the first pilot, Data Analyst, UK.

Radiation in Biomedical Engineering

I had the opportunity to use a TimePix detector for my research project, about the **effect of radiation on the growth of living organisms, in this case, plants**.

The two things I liked the most are its simplicity and versatility: it's very easy to handle and it can be used for countless things. **It has been a very interesting and instructive experience.**

- Efran García, 19. Biomedical Engineering. Pompeu Fabra University, Spain

The spark of curiosity

I'm Claudia Santaella Payà, I am eighteen years old and in September I will start the first year of the Physics degree at the University of Barcelona.

Thanks to the TimePix chip, **I was able to discover how experimental physics works in a very accessible way** for any sixth-form student.

I think that **bringing these tools to educational centres is necessary** to create curiosity about STEM subjects amongst the youngest and make known the great world of particle physics, just as it happened to me.

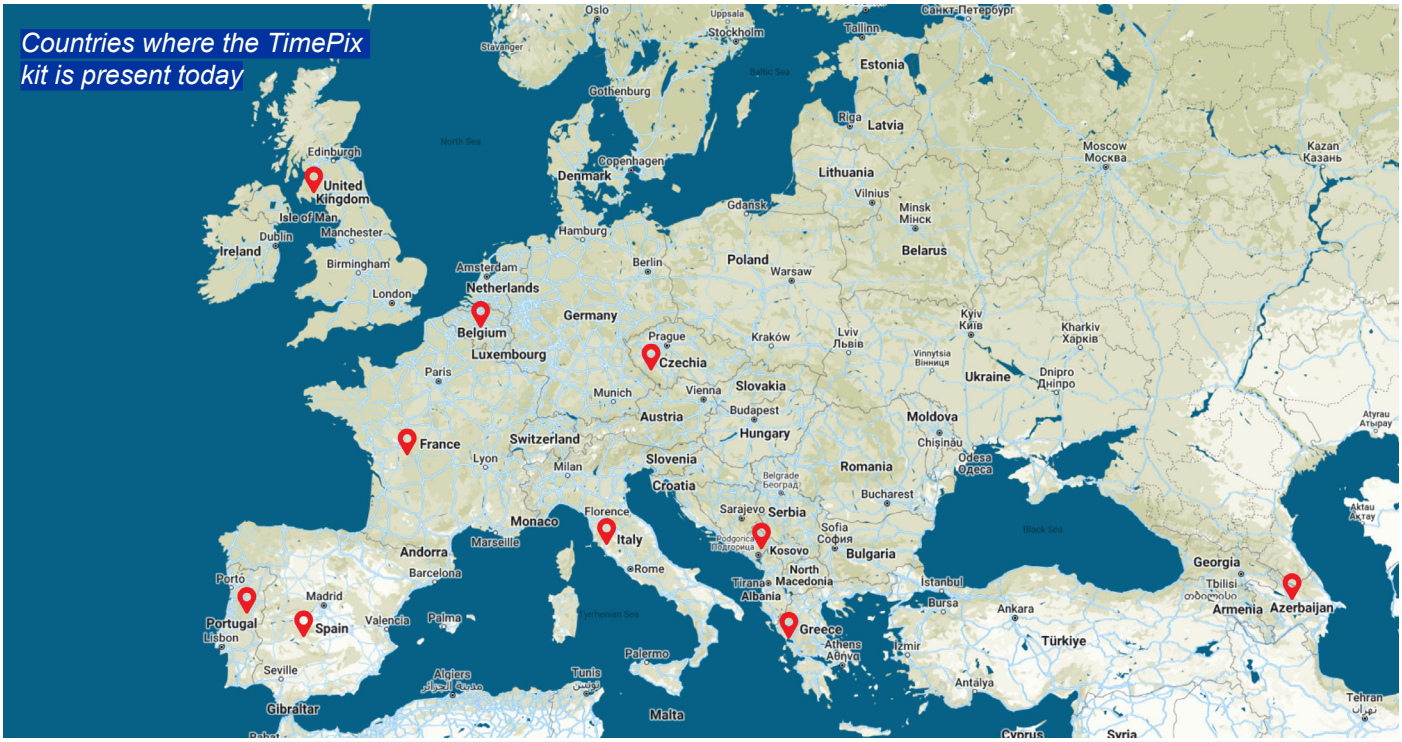
- Claudia Santaella, 18. Physics student. University of Barcelona, Spain.

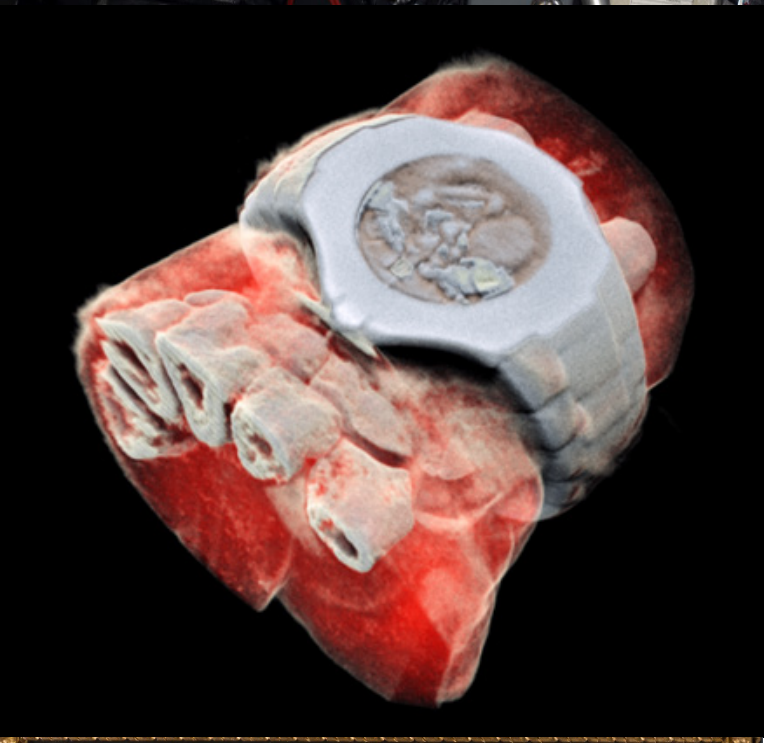
From Physics to Aerospace Engineering

I am Marc López Alonso, I am 21 years old and I am studying the second year of the Aerospace Engineering degree at UPC.

I am sure that doing a practical activity with the TimePix detector can lead, as it did with me, some undecided students to choose a more technological and scientific path when they see that what they study in class has a real application and is not just theory.

- Marc López Alonso, 21. Aerospace Engineering, Polytechnic University of Catalonia, Spain.





_TimePix Impact

Space

it monitors radiation levels of astronauts on the International Space Station

Medicine

Enabled doctors to have the first colored 3D X-ray scan

Art

Thanks to TimePix chip we can now trace art back to its origin

Close up of a TimePix3 chip

From CERN experiments to society and education

TimePix is a tiny particle detector, that fits in your pocket

_what is TimePix?

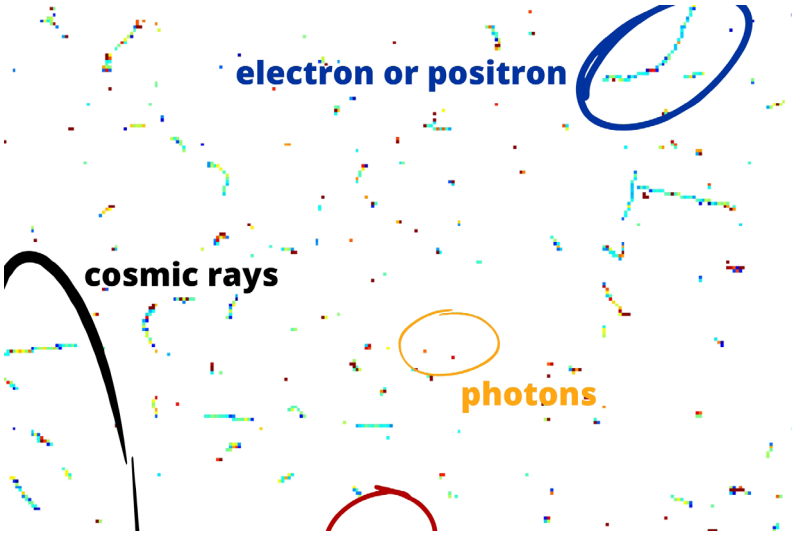
TimePix is one of the chips developed by the Medipix Collaboration. **After 30 years of project impact on different societal applications, we are now ready to make TimePix available in high schools.**

When combined with semiconductor sensors, it provides images of ionising radiation. The chip comprises an array of 256x256 pixels on a pitch of 55 µm.

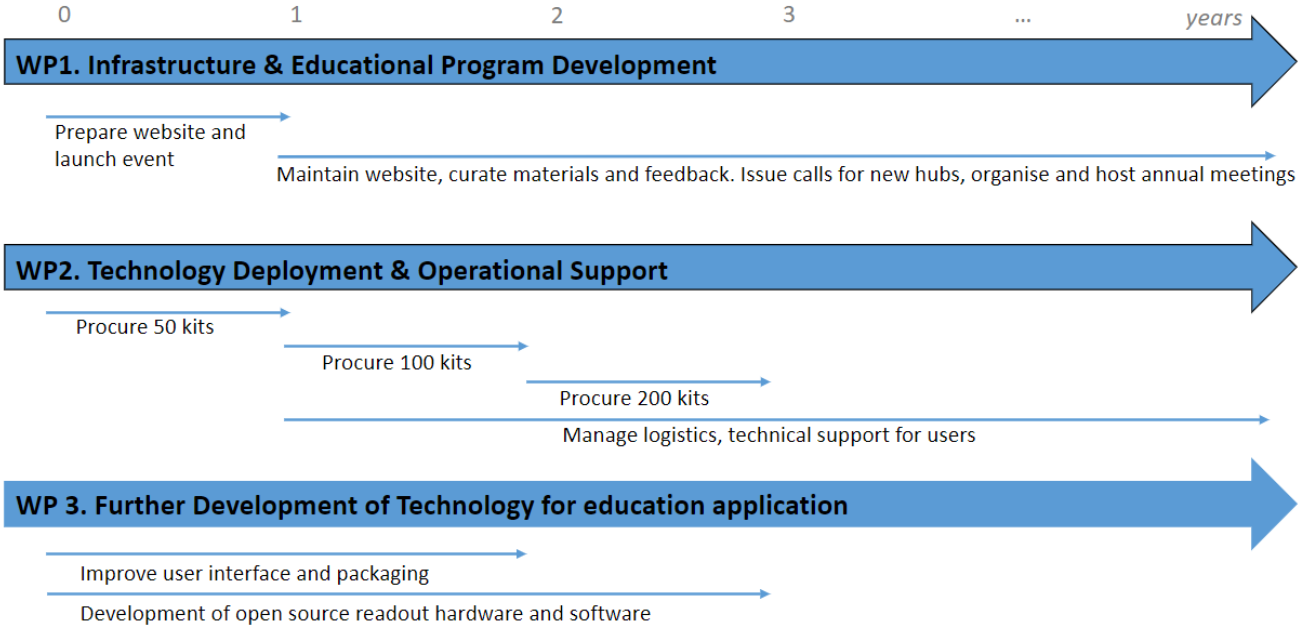
If the frame time is adjusted such that individual clusters in an image are well separated, **it is possible to measure how much charge is deposited in each pixel by a given particle. Looking at the shape of the clusters, one can distinguish heavy-charged particles from light-charged particles, photons, alphas, and beta particles. TimePix is a game-changer** in the world of STEM education. With its high-resolution images of ionising radiation and intuitive interface, TimePix enables students to analyse and differentiate various particles, sparking curiosity and engagement.

_how does it work?

In the image below, you can witness the transformative impact of TimePix in action – a testament to its power to inspire and educate.



_development timeline



_your support

Your contribution isn't just a donation – it's an investment in the future of STEM education and workforce diversity. Together, we can achieve remarkable milestones:

_Infrastructure & education program development: creation of a website and curated repository of teaching materials. Videos of role models and applications available, annual teacher's network gathering.

_technology deployment and operational support: distribution of TimePix kits to the selected HUBS.

_development of technology for educational applications: improvement of the existing technology using the feedback of teachers and students.

You can either choose to support part of it or become the main partner for more than 20.000 students all over the globe.

Forbes

Workplaces Do It, So Can Schools: Real-World Relevance Keeps Girls In STEM

_your impact

Kickstart the project and create the international central Hub for thousands of students. - 400.000 CHF

Support the realisation and improvement of the central hub that will connect students and teachers internationally.

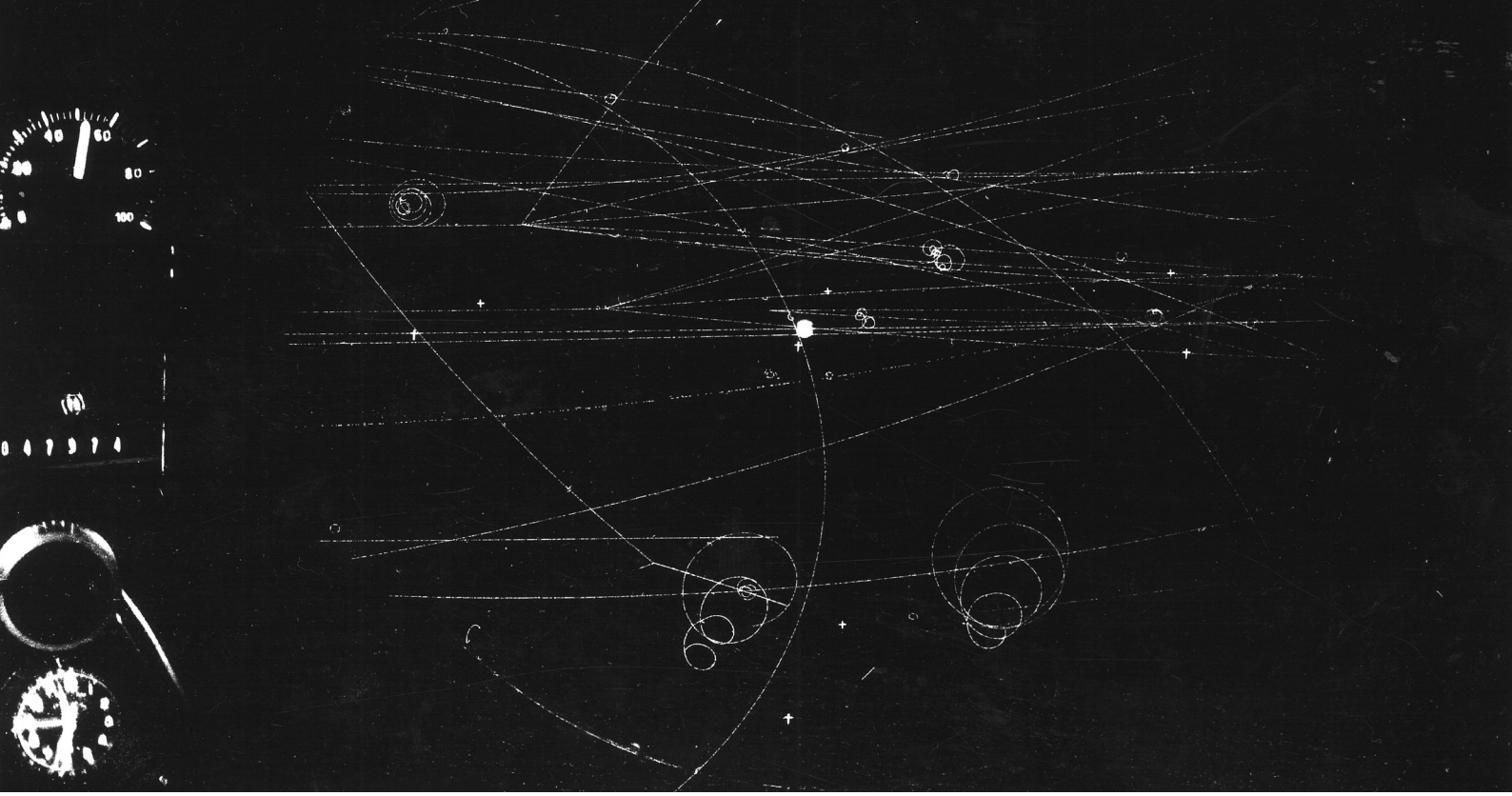
Launch the firsts regional hubs and distribute TimePix hardware to schools in CERN Member States and Associate Member States.

Distribute the first 150 kits, support two years of the programme - 700.000 CHF

Expand our reach to additional schools and communities. Ensure that more than 7.500 students have access to hands-on quality education. Connect them to role models that will inspire them to become the scientists of tomorrow.

Support the whole programme for 4 years and help shape the society of the future - 1.600.000 CHF

Empower more than 20.000 students to get closer to STEM. Scale up our efforts globally, create a network of more than 400 TimePix kits.



_CERN

At CERN, physicists and engineers are **probing the fundamental structure of the universe**. They use the world's largest and most complex scientific instruments to study the basic constituents of matter – the fundamental particles. These particles are made to collide together at close to the speed of light. The process and resulting collisions give physicists clues about how the particles interact, and provides insights into the fundamental laws of nature.

The instruments used at CERN are **purpose built particle accelerators and detectors**. Accelerators boost beams of particles to high energies before the beams are made to collide with each other or with stationary targets. Detectors observe and record the results of these collisions.

Founded in 1954, the CERN laboratory sits astride the Franco-Swiss border near Geneva. It was one of Europe's first joint ventures and now has 23 member states and 10 associate member states.

Cooperation between nations, universities and scientists is the driving force behind CERN's research.

More than 18 000 people from around the world work together to push the limits of knowledge. CERN's staff members, numbering around 2600, take part in the design, construction and operation of the research infrastructure. They also contribute to the preparation and operation of the experiments, as well as to the analysis of the data gathered for a vast community of users, comprising over 13 600 scientists of 110 nationalities, from institutes in more than 100 countries.

_CERN & Society Foundation

CERN has a long tradition of scientific excellence, generated by a culture of openness and knowledge sharing across borders and nurtured through education and training. In addition to its core research work into fundamental physics, **CERN organises activities that stimulate people's engagement with science and innovation for thriving communities**.

In 2014, CERN established the **CERN & Society Foundation, a non-profit charitable foundation that enables private support for a variety of projects** in the fields of scientific education & outreach, innovation and knowledge exchange and culture and creativity.

The CERN & Society Foundation strives to:

- **Highlight the importance of STEM education** (Sciences, Technology, Engineering and Maths) for society;
- **Inspire, engage and support young students in STEM** in countries all over the world, including underprivileged communities;
- **Promote quality scientific teaching** and bring the latest developments in physics and related technologies into the classroom;
- **Foster creative and unconventional synergies** between science and culture, enriching the cultural landscape;
- **Share scientific knowledge and find innovative solutions for a better world.**

EDUCATION & OUTREACH

INNOVATION & KNOWLEDGE EXCHANGE

CULTURE & CREATIVITY