IdeaSquare

The innovation space at CERN

Progress Report 2024

10th Anniversary Special Edition

$$\mathcal{L} = -\frac{1}{4} F_{\mu\nu} F^{\mu\nu} + i\not{D}\psi + h.c + \chi_i y_{ij} \chi_j \phi + h.c. + |D_\mu \phi|^2 - V(\phi)$$

CERN

IdeaSquare

IdeaSquare passed an amazing milestone in 2024. We celebrated our 10th anniversary, and it was a moment to look back – at our origins, our development and, most crucially, our impact. With this report, we invite you to be part of our project, share in this occasion and discover everything we have done, do and aim to do. While we have covered much ground in the past decade, we have remained faithful to the key tenets of our mission and those of CERN: exploring different methods of tackling complex problems, linking science, technology and society; advancing research for innovation knowledge; generating and expanding multidisciplinary collaboration; and inspiring people towards new ways of thinking. Looking forward, we're considering all the ways we want to shine in the future, to ensure we continue building on what we've achieved so far while consistently seeking new avenues of innovation that can create a meaningful impact for CERN and for society.

Throughout this Progress Report, you will find examples of the impact IdeaSquare has had during the past 10 years. You can also read testimonies from those who have experienced and appreciate at first hand the significance of IdeaSquare for their work and lives.

CERN

IdeaSquare

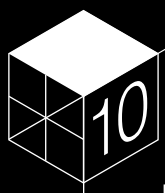
Contents:

Get ready for the past impact and future plans of IdeaSquare to unfold before you. When you reach the yellow pages, expand those sections and discover all...

Science and everyday life cannot and should not be separated.”

— Rosalind Franklin, British chemist who made key contributions to the discovery of the structure of DNA

10-year highlights! Look for this sign to discover achievements from our first decade.



IdeaSquare:

10 years connecting science and societal challenges

Starting points

Welcome to the 4th edition of the IdeaSquare Progress Report. It covers 2024, but also shares some thoughts about the future while considering the past decade. That's because 2024 was a special year for IdeaSquare as it marked its 10th anniversary, and the community, past and present, came together to commemorate the occasion. It's important to take time to celebrate achievements and this was indeed a celebration!

The energy, fun and enthusiasm of youth was nicely juxtaposed with the experience and wisdom of the senior CERN staff (some now enjoying a well-earned retirement) who were so instrumental in the creation of IdeaSquare. When reflecting on its foundation, it was interesting to consider the leap of faith that was required, the ability to challenge conventional ways of thinking and structures.

In my mind, these concepts are central to the spirit of IdeaSquare, the notion of thinking differently, looking for possible solutions and ways forward, as well as believing in young people and in a brighter future.

Today, IdeaSquare is a space for prototyping activities across the whole of CERN, including key experiments. It is the nerve centre of, among others, the highly successful ATTRACT project, which in itself is an important cornerstone of CERN's relationship with the EU.

CERN is not an academic institution that awards degrees, but the innovative training delivered to so many young people is of crucial importance and is notably different from formal university or company-driven training schemes. IdeaSquare plays a significant role in that training.

As CERN looks to select its next major project, be it the Future Circular Collider or similar, our stakeholders look to understand what we do – not only in science but in our impact on society. IdeaSquare will be a key player in providing that understanding as we continue to empower bright minds and help with the challenging evolution from ideas to businesses – squaring the circle, one might say.

Christopher Hartley
Head of Industry, Procurement and Knowledge Transfer at CERN

ISAB members

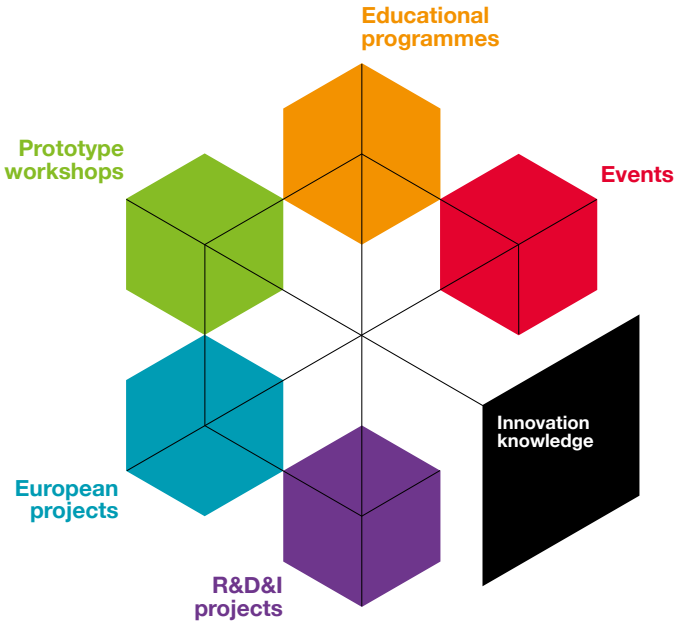
CURRENT
_Mar Capeáns
(CERN)
_Prof. Sijbrand de Jong
(Radboud University, Chair)
_Prof. Kalevi Ekman
(Aalto University)
_Prof. Erika Garutti
(Hamburg University)
_Michela Magas
(Industry Commons Foundation)
_Prof. Ezri Tarazi
(Technion)

PREVIOUS
_Prof. Julian Birkinshaw
(LBS) 2019-2022
_Prof. Matteo Cavalli-Sforza
(IFAE) 2017-2022
_Mr. Thierry Lagrange
(CERN) 2017-2021
_Frank Linde
(TH Köln) 2017-2018
_Joachim Mnich
(CERN) 2020-2021
_Roberto Verganti
(Polimi) 2017-2018

What is IdeaSquare?

IdeaSquare (I2) is the innovation space at CERN. It's a place that encourages collaboration, experimentation and learning, bringing together people from multiple disciplines and backgrounds with members of the CERN community. I2 combines diverse perspectives and extensive scientific knowledge in a hub where anything goes when it comes to seeking solutions for the future of humanity. IdeaSquare – where people are given a licence to dream.

What does all this mean in real life? It means IdeaSquare is an -ing place. Under the umbrella of our six interlinked areas, shown in the graphic below, I2 is a facility where doing is done. We provide a practical, accessible space, welcoming and inspiring, essential tools, and the opportunity to give anything a go. Because at I2 the process is key. Labs, 3D printers, a double decker bus, a kitchen, four walls and a roof! A dynamic hub where people come together to freely generate disruptive ideas, testing is done, prototypes are produced – and they all take these experiences away with them to share with others and apply in their institutions, departments and professional circles, amplifying the learnings even further. **I2 is an ongoing experiment in how to accelerate the impact of science on society, as we explore in the following pages.** We've done that for 10 years already. We're going to keep doing it.



Without experimentation, no real innovation is possible. The process of innovation can be as important as its products…"
—Saku Mäkinen, Martin Steinert, Matteo Vignoli, Julian Birkinshaw, Markus Nordberg

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Our impact

In a world full of uncertain challenges, at IdeaSquare we aim to support CERN in producing new ways to bridge science and society through collaborative experimentation and research, and expand the perspective of what innovation is. I2 is not a place for traditional science or outreach, but rather it exists for fundamentally rethinking and innovating beyond the conventional framework.
After 10 years, I2 has proved to be a unique collaborative space within CERN, fostering innovation by offering an open, interactive hub where people from different disciplines can intersect for experimentation and the generation of new ideas.

“What we’re trying to do at IdeaSquare is to innovate, to get people to think in a completely different way and to do something fundamentally different than what everybody else is trying to do.”

—Christopher Hartley, Head of the Industry, Procurement and Knowledge Transfer Department at CERN

A snapshot of how we began

IdeaSquare started with a dream – to create a place for seeking to make the impossible possible within the surroundings and aligned with the work of CERN. Marzio Nessi and Markus Nordberg had worked for 12 years on the management of CERN's ATLAS experiment, the largest general-purpose particle detector experiment at the Large Hadron Collider. Science often moves slowly, but they wanted to find a way to harness all the ideas and learning that had been gathered during the work on ATLAS and leverage it in a more fluid way for the future.

Something that I was concerned about while in ATLAS, was that we had so much knowledge that could be projected 25-30 years into the future, but it wasn't happening fast enough in real life. There was too much of a gap between knowledge and technology. So, I began to think that maybe we should try to encourage the idea of open innovation."

—Marzio Nessi, Deputy Project Director of LBNF/DUNE. He served ATLAS as Project Manager from 2001 to 2013 and currently he's involved as a Science Consultant on the ATTRACT project

And so the concept of IdeaSquare was born, drawing on the philosophy of the Design Factory Global Network (an international community of innovation hubs on a mission to create change in the world of teaching, learning and research), with the aim of having a positive impact on the world and based on CERN's mission to engage citizens in research and the values of science.

We thought that we would set up a lab that would allow our engineers and scientists to tinker. That means pre-R&D. So very early stage, where you still don't have a clear idea or a clear collaboration, just a couple of ideas.
On our part, we had the idea of launching ATTRACT, and there was also the concept of harnessing all this student energy… Somehow both were pushing in the same direction towards finding new ways to improve basic research by incorporating a human-centric perspective. Our primary goal was to see whether our scientific knowledge could inspire new ideas that can create value for society."

—Markus Nordberg, Head of Resources Development (IPT-DI), Co-Coordinator for the ATTRACT project, and CERN IdeaSquare Manager. Resources Coordinator of the ATLAS Experiment from 2001 to 2013

2008 – Following completion of the LHC, a community existed that wanted to harness all the knowledge accumulated by scientists, engineers and technicians

2013 – Marzio Nessi and Markus Nordberg have the vision for IdeaSquare

2013 – The concept of the ATTRACT programme is born, to create an entirely new European model of open innovation, an engine for jobs and prosperity. IdeaSquare becomes, among many other endeavours, a test-bed for ATTRACT for new innovation concepts and methodologies.

August 2013 – First IdeaLab pilot is created to test the basic concepts of IdeaSquare

October 2013-March 2014 – The first Challenge Based Innovation (CBI-1) pilot course started, enabling **17** multidisciplinary students in **2** teams to collaborate with CERN researchers

2014 – Building revamped to house IdeaSquare HQ

September 2014 – London bus arrives

2014 – Second iteration of CBI with **45** students in **6** teams

December 2014 – IdeaSquare officially launched

10

years in a nutshell

2014-2024 facts & figures

The first 10 years of IdeaSquare saw growth in all areas of our work, from participating students and institutions to CERN projects prototyped using our facilities and research articles published. (And that was despite a lengthy global pandemic during this period.) Here we have gathered some of our most pertinent numbers, summing up the achievements of I2 to date.

A space where ideas thrive

3,000 students

20 R&D&I collaboration projects with CERN

+500 teachers participating in student programmes

7 European projects

136 student programmes

+700 events regarding innovation and collaboration

300 participants in executive programmes

80 governmental delegations have visited I2 since 2014

+80 activities together with the KT group

12 CERN departments/ groups utilising our prototyping facilities

388 authors published in the CERN IdeaSquare Journal of Experimental Innovation (CIJ)

+150 CERN personnel making use of these facilities

117 different affiliations from **25** countries

10 CERN experiments benefited

130 original articles

IdeaSquare has built up an extensive network of multidisciplinary collaboration

66 partner institutions from **18 countries**

+24% increase in 2024

6 are European international organisations

Participants at IdeaSquare have come from **5** continents

Fun facts

225,883 total cups of hot beverages consumed since 2014

57% black coffee

14% coffee with milk

13% hot milk

16% hot water

Unexpected outcomes
In 2024, two IdeaSquare alumni got engaged!

We have extended our engagement in the virtual realm

5 social media platforms

9,719 followers
18% growth in 2024

1 YouTube channel with 77 videos

Providing an innovation hub for CERN researchers

IdeaSquare offers everyone in the CERN community an accessible place for unconventional thinking and testing.

Giulio Aielli

Physics Researcher and Detector Expert at CERN. Associate Professor at Università di Roma Tor Vergata. Has done R&D&I at IdeaSquare since it was created, including for the EDUSAFE (completed) and ATLAS Upgrade (ongoing) projects.

How did you come to be working at IdeaSquare at its start?
The interaction between the multidisciplinary spirit of IdeaSquare and our project, EDUSAFE, was quite natural. They were both shaped at the same time by the same people, and that's why they look very similar to each other.

How did IdeaSquare influence the development of EDUSAFE?
EDUSAFE was about finding new solutions by exploiting science and new knowledge created by ATLAS. The idea was to take a piece of the ATLAS trigger and say, "Why don't we use it for another purpose?". As a result, the project integrated different technologies to create a wearable personnel safety system based on augmented reality. We quickly saw the value of interacting at IdeaSquare with CBI-1 students from other disciplines who were working on our technologies to find alternative applications: one group focused on helping autistic children, and others developed more algorithms for artificial vision. These interactions led to mutual enrichment. On our side, we further developed the concept and then tried to use it in another physics experiment, the DUNE neutrino experiment.

It's been 10 years, and you're still developing R&D&I at IdeaSquare.
Yes, I'm developing R&D&I for phase 2 of the ATLAS Upgrade experiment. We're making a new generation of particle detectors for the fast detection of muons. And we're thinking about what comes beyond LHC, so blue-sky R&D. In parallel, I'm now doing a project to equip IdeaSquare with a visualisation of muon cosmic rays for the public, and to create a simple interaction between a person and their cosmic ray radiation, to visualise and possibly play with it.

What is the value of working at IdeaSquare for your research?
IdeaSquare is a hub where people from our team who are scattered around Europe, or even further, can periodically come together to share their developments and work on very intensive integration and testing campaigns. This would be difficult to achieve without a hub. It's the pulsating heart of the project. We use the facilities and their precious instruments, like the 3D printers and cutters. We've used IdeaSquare a few times for the early phase of the Upgrade project. I think we under-exploit it, we need to involve this type of process more at IdeaSquare. For example, if you want to make a prototype of a new type of detector, which maybe isn't the one that we install in ATLAS but the next one, the facilities in IdeaSquare can streamline the process. ⬢

"IdeaSquare is about training, communication and invention."
—Giulio Aielli

"IdeaSquare is a vital bridge in building long-term trust and accessibility between CERN and society. It generates future demand for the technologies and interaction/ collaboration that, for example, CERN KT is able to serve. In return, that builds commitment from the member states to continue funding CERN."
—Jan Visser

Forging a bridge between CERN and its member states

IdeaSquare facilitates the sharing of knowledge between CERN and its 24 member states, providing the means for collaboration, idea exchange and education.

Jan Visser

CERN Industry Liaison Officer for the Netherlands. PhD in Physics. Part of events at IdeaSquare for 7 years. Focused on making connections between Big Science, industry and educational organisations and people and institutions in the Netherlands.

What have you worked on with IdeaSquare?
This year we will organise the seventh TU Delft summer school at IdeaSquare. We started with ATTRACT technologies and gave the students the challenge of coming up with applications outside the field of development, to come up with something new, to validate ideas, build a prototype, do a pitch, and then present it to a jury.

Since then you've brought 175 Dutch students to IdeaSquare, and around 500 international students do projects here each year. What is the value of this for CERN?
The training of students who are not connected to the research done at CERN, and who are doing studies in other fields, is critically important to CERN and its long-term survival. Why? Because over time CERN cannot rely just on its, relatively small, community of particle physicists to maintain the interest and commitment of member states and companies to pay for ever more expensive physics research and experiments.
CERN needs support from the general public that actually pays for it. So it's great to leave a positive impression on hundreds of students every year, who are all smart people, and while they won't work at CERN, they might find themselves in roles either in industry or government where support for CERN will be questioned. Based on their own positive experience at CERN, they can defend the funds that flow into the organisation for fundamental research and activities with societal impact, like those at IdeaSquare and knowledge transfer.

But this happens only if there is a mechanism, i.e. IdeaSquare, where these students can first interact with CERN, and get an understanding about CERN, learn about its technologies and novel application areas, and talk to physicists, so that they are not 'afraid' of CERN or think that CERN is only relevant for particle physics applications and not anybody else. ⬢

Robert Aare

CERN Industry Liaison Officer for Estonia. MSc in Physics. Delegate of Estonia on the CERN Finance Committee. Advisor to the Estonian delegation in the CERN Council.

How does IdeaSquare contribute to CERN's mission?
One of CERN's goals is to educate, not only to research, but also to give something back to society and I think IdeaSquare is a good way to do this. It goes in tandem with the Science Gateway, which shows what CERN does, while IdeaSquare shows how CERN thinks, at least when it comes to research.

What would you say is the fundamental role of IdeaSquare?
CERN has a very big emphasis on engineering machines that are built to work. However, IdeaSquare is about playing around with concepts. There are other places where you can learn about building a very reliable machine, for example, on technical student programmes, but in my opinion, what's important is the ability to play around with concepts.

What is the significance of IdeaSquare for students?
First is its programmes, and secondly the fact that IdeaSquare is located in CERN. So the students don't only go through the prepared programme, they also get to visit CERN and see how physics is researched. I think it's a huge cultural influence. There are people from a lot of different countries and lots of cultures in CERN, and they're researching something together. I had this experience as a summer student in 2015, although I didn't realise the significance of that experience until many years later. Additionally, I think STEM as a field has a problem in that the general impression is that it's very dry, and a subject that it's very difficult to be excited about. But IdeaSquare tries to counter that by introducing an element of creativity.

Where would you like to see IdeaSquare in the next 10 years?
There is something about IdeaSquare that emphasises having a way of free thinking. So I don't think it would be a good idea to put IdeaSquare in a box regarding, "This is what you do in the next 10 years". ⬢

Widening opportunities for education

IdeaSquare promotes innovation, learning and awareness regarding societal challenges and transformations that impact CERN scientists, and academic institutions and their students.

Chrysoula Manoli

Mechanical Engineer working at CERN, primarily on R&D&I projects like AHEAD, focusing on advanced cooling applications for inner tracking detectors at CERN and beyond. Expert in advanced 3D-printing technologies.

Tell us about your experience with the ATTRACT programme.
I was involved in the ATTRACT programme from Phase 1, and our project successfully advanced to Phase 2. With the ATTRACT funding for AHEAD, we developed breakthrough technology for monitoring fluidic parameters in direct contact with the fluid, addressing current system limitations. Notably, we developed technology for two key use cases: thermal management systems for both space and Earth applications. This support has pushed the boundaries of innovation and brought our research closer to practical applications.

What was it like to collaborate with the students involved in IdeaSquare's programmes?
It was a dynamic and enriching experience. I found it particularly valuable that the students came from diverse academic backgrounds and ethnicities, bringing fresh perspectives and ideas from different angles. I fully support these student programmes because they add value to technology by emphasising application-oriented innovation.

How has your involvement with IdeaSquare influenced your research or your approach to innovation?
Being part of IdeaSquare has broadened my perspective on innovation. The interdisciplinary environment has encouraged me to think beyond conventional research methods, and explore applications focused on the societal impact of technology and identifying target markets. Even just a conversation with the IdeaSquare team provides valuable guidance on how to advance technology. I've been fortunate to attend several events focused on the intersection of technology and society, which expanded my thinking beyond AHEAD. Additionally, I've had the opportunity to use their equipment to create prototypes and functional parts for AHEAD's test purposes. ⬢

Ramón Bragós

Deputy Director of Academic Innovation and Research at the Institute of Educational Sciences at Universitat Politècnica de Catalunya (UPC), Spain. Professor of Electronic Engineering. Involved in IdeaSquare CBI since 2014.

What impact has participating in CBI had on engineering students from UPC?
The experience of immersion at IdeaSquare and contact with CERN's world of physics and particle research has been truly transformative for our students. It inspires them to elevate their ambitions, think big and explore beyond conventional engineering challenges. For many, this experience serves as a launchpad for future opportunities in top institutions and broadens their academic and professional horizons.

How has CBI influenced the university itself?
The impact on UPC has been gradual but steady. A few years before CBI, we had already started introducing project-based subjects into the curriculum, moving away from purely traditional, structured engineering education. However, CBI has played a key role in reinforcing and accelerating this shift, demonstrating the value of interdisciplinary, experiential learning, and leading us to incorporate challenge-based subjects. While change at an institutional level takes time, we have seen growing recognition of the benefits of this approach, and it's influencing how engineering education evolves at UPC.

And on a personal level, how has this experience changed your perspective as a professor and a researcher?
Participating in CBI has been a turning point for me, both as a professor and a researcher. It has completely reshaped my perspective on education and innovation. Before this, I was deeply involved in biomedical research, a field in which I was well-established. However, after experiencing CBI's collaborative, interdisciplinary approach, I found myself drawn to this way of working. It led me to shift my focus toward research and education that emphasises impact and real-world problem-solving. This transition has been both challenging and deeply rewarding, opening new doors in my career and redefining my role within the academic community. ⬢

Encouraging business professionals to work differently

Having the chance to engage with CERN via IdeaSquare can prove revolutionary for business executives.

Diego Pacheco

Sales Director for Europe, Novameat. Industrial Engineer. Participant in CBI at IdeaSquare in 2017, when he was doing his MBA at Esade.

How did CBI and IdeaSquare influence your career path?

I think IdeaSquare and CBI gave me more freedom than ever to think really big. For me and my career, it was a catalyst for change, a turning point. Before CBI and even after my MBA at Esade, I was on a conventional career path, with a job offer in a multinational tech company, which was great news at the time. But once I started working there, I realised something was missing. The company had innovation and other typical aspects of big corporations, but it lacked purpose. In CBI, working with multidisciplinary teams, CERN experts and tutors, we always had a sense of purpose. Afterwards, I felt that absence. It was something I had never experienced before, and I couldn't ignore it. CBI played a big role in choosing my next step, a career that combined innovation and purpose in food tech, and was aligned with several UN Sustainable Development Goals.

I understand that reality doesn't always allow for ideal choices, but when I do have that choice, I will always seek projects that create real impact. CBI showed me what it means to work with purpose, and once you've experienced that, it becomes a guiding principle in every step forward. ⬢

Osmar Polo

CEO of T-Systems Iberia. President of the German Chamber of Commerce for Spain. Strategic Vice-President of 22@Network Barcelona. Participant in the 'Thinking the Unthinkable' executive workshop, October 2024.

What connections do you see between business and science?

Business and science share the same challenge: how to manage uncertainty. In both worlds, moving forward means facing the unknown with a large capacity for adaptation. While science seeks answers to questions not yet formed, companies have to anticipate future economic scenarios, minimising risks as much as possible. And that's how both spheres work to convert challenges into opportunities, through innovation and collaboration.

What did you personally take away from your time at IdeaSquare?

Being at the epicentre of science and innovation in Europe made me understand more deeply how collaboration is essential to resolve the most complex challenges, both in the science and business worlds. CERN represents a model of open and global innovation that is very inspiring for anyone who has transformation and collaboration as their goal. ⬢

"Being able to live this experience with leaders from different sectors highlighted the importance of strengthening the union between science and business to face the challenges of the future."

—Osmar Polo

10 years of robust connections

IdeaSquare relies on the synergies created with committed collaborators and our dynamic team.
Strong, meaningful and long-lasting relationships with 66 institutions from 18 countries have been established and nourished throughout these first 10 years of IdeaSquare. From prestigious universities to art and design schools, specialised scientific and technology centres, and 6 European intergovernmental research organisations, these are supportive, multidisciplinary collaborations that have enabled the impact of I2 to go further, geographically, conceptually and creatively.

Notably, in 2024, the number of collaborating institutions grew even further, with an additional 12 organisations, representing a 24% rise – this highlights the ongoing expansion of the affiliations.

_Aalto University
_ACS - Anglo-Chinese School
_ARC - Centre of Excellence for Dark Matter Particle Physics
_BIC Araba
_CDI - Collège des Ingénieurs München
_CDI - Collège des Ingénieurs Paris
_CDI - Collège des Ingénieurs Torino
_CREA Genève
_CSIC - Spanish National Research Council
_Delft University of Technology
_EIRMA - European Industrial Research Management Association
_EMBL - European Molecular Biology Laboratory
_EMU - Eastern Mennonite University
_Erasmus University Rotterdam
_Esade Business School
_ESO - European Southern Observatory
_ESRF - European Synchrotron Radiation Facility
_European XFEL
_Haaga-Helia University
_HAMK - Häme University of Applied Sciences
_HIP - Helsinki Institute of Physics; University of Helsinki
_HVL Skape
_HWZ - Hochschule für Wirtschaft Zürich
_IAAC - Institute for Advanced Architecture of Catalonia
_IED Barcelona Design School
_ILL - The Institut Laue-Langevin
_Inno.space
_IQS - Instituto Químico de Sarriá
_Kaunas University of Technology
_LAB University of Applied Sciences
_Laurea University of Applied Sciences
_Metropolia University of Applied Sciences
_Nandin ANSTO's Innovation Centre
_NHL Stenden University
_NIKHEF - Dutch National Institute for Subatomic Physics
_NorCC - Norwegian Centre for CERN-related research
_NTNU - Norwegian University of Science and Technology
_NTUA - University of Athens
_NY Pace University
_NY Seidenberg School of CSIS
_Ohio State University
_Polimi - Politecnico di Milano
_Politechnika Warszawska
_Polito - Politecnico di Torino
_Porto Design Factory
_Pratt Institute of Design
_RCA - Royal College of Art
_Scuola Holden
_St. John's University
_Swinburne University
_Tampere University
_Unibo - Università di Bologna
_UNIGE - Università degli Studi di Genova
_Unimore - Università degli Studi di Modena e Reggio Emilia
_UNITAR - UN Institute for Training and Research
_Università degli Studi di Ferrara
_Universität St. Gallen
_Université Paris Cité
_Universiteit van Amsterdam
_UPC - Universitat Politècnica de Catalunya
_UPV/EHU - Universidad del País Vasco
_Vilnius Universitetas
_ZHdK - Zürcher Hochschule der Künste

Get to know our team

Nowhere is the multidisciplinary nature of IdeaSquare better highlighted than in our team, both past and present, an accomplished group of international scientists, engineers and professionals from a multitude of fields. For the first IdeaLab pilot in 2013, the team had 4 people, and now we are 15 at IdeaSquare! Since its inauguration, the IdeaSquare team has had 29 members in total from 17 countries across 3 continents and the following 19 disciplines: Anthropology, Business administration, Computer science, Design thinking, English literature, Fine arts, Industrial engineering and management, Management, Mechanical engineering, Nuclear engineering, Organisation science, Physics, Political science, Psychology, Science communication, Social innovation, Sociology, Structural engineering and Theatre arts.

Current team (as at the end of 2024)

_Catarina Batista
(aka Mindset Accelerator), Project Associate at CERN IdeaSquare

_Mirabelle Breidvik
(aka Dispatch Druid), Science Communicator and Event Organiser

_Robert Cailliau
(aka Provocateur in Residence) Co-Author of the first hypertext system for CERN, Innovator in Residence

_Giulia Gaddi
(aka Nerd Watcher), PhD candidate in anthropology

_Pablo García Tello
(aka Kumamon), Section Head of the Development of EU Projects and Initiatives at CERN, and Co-Coordinator of the ATTRACT project

_Markus Nordberg
(aka Cosmic Janitor), Head of Resources Development (IPT-DI), Co-Coordinator of the ATTRACT project, and CERN IdeaSquare Manager

_Laëtitia Pedroso
(aka Happiness Manager), Admin, Logistics and Events

_Roy Pennings
(aka Running Motivator), Senior EU Projects Manager

_Jimmy Poulaillon
(aka Science Communication Wizard), Science Communication Officer

_Yuri Tanaka
(aka Cosmic Gardener), Innovator in Residence

_Tuuli Utriainen
(aka Cosmic Collaboration Enabler), Project Associate at CERN IdeaSquare

_Lauri Valtonen
(aka Artificial Intellectual), Project Associate at CERN IdeaSquare

_Ole Werner
(aka Cosmic Firefighter), Project Associate at CERN IdeaSquare

_Laura Wirtavuori
(aka Idea Shepherd), Project Associate at CERN IdeaSquare

_Dina Zimmermann
(aka Prototyping Troll), Project Associate at CERN IdeaSquare

Previous team members

_Faezeh Abbasi
(aka Sustainability Facilitator), Senior Fellow

_Oday Darwich
(aka Serial Learner), Innovator in Residence

_Hans Hagenes Bøe
(aka Prototroll), Project Associate at CERN IdeaSquare

_Jani Kalasniemi
Project Associate at CERN IdeaSquare

_Youlia Krasteva
Executive Assistant and Office Manager

_Joona Kurikka
Project Associate at CERN IdeaSquare

_Oscar Lillelokken
(aka Prototyping Troll), Project Associate at CERN IdeaSquare

_Lila Mabiala
(aka Communications Litterateur), Science Communication Officer

_Claudia Marcelloni
(aka Ideas Connector), Global Curator and Head of the Sparks! Forum at CERN, Communications Officer at CERN IdeaSquare

_Romain Muller
(aka Embodimentor), EU Projects Officer at CERN IdeaSquare

_Santeri Palomaki
Project Associate at CERN IdeaSquare

_Sandy Petitfrere
Executive Assistant and Office Manager

_Jami Sarnikorpi
(aka Prototyping Voyager), Project Associate at CERN IdeaSquare

_Harri Toivonen
(aka Idea Shepherd), Consultant at CERN IdeaSquare

_Alexia Yiannouli
(aka Tea Enjoyer), Science Communication Officer

R&D&I projects

Stimulating instrumentation in research

At IdeaSquare, we host and support CERN-linked R&D&I projects and Knowledge Transfer activities. Over the past decade, this collaboration has fostered groundbreaking projects, events and programmes connecting scientists with non-scientists, both students and professionals from other disciplines, as well as CERN personnel. Together they have sought to apply detecting and imaging technologies developed for high-energy physics in fields such as healthcare, entrepreneurship and art, among others, embodying CERN's mission to advance knowledge and benefit humanity.

11 R&D&I projects

4 ongoing projects

7 completed projects

CERN experiments and R&D&I projects
Completed projects*
GRADE Research Programme (Generic pre-R&D&I at IdeaSquare)
GR01 - SIMPLE
GR02 - TT-PET
GR03 - AUGMENT
GR04 - HEALTH
EDUSAFE
TALENT
STREAM
Ongoing projects
ATLAS Upgrade
CERN Neutrino Platform (CENF)
Transient–Cloud Chamber
Social research on innovation

Knowledge Transfer group main entrepreneurship activities
CERN NTNU Technology Screening Week
INSEAD Deep Tech Key Management Challenge (KMC)
CESP (CERN Entrepreneurship Student Programme)
Entrepreneurship Meet-ups
BIC Screening Week
CERN Global Health Workshop
CERN Medical Technology Hackathon

*You can read in detail about each project's scope in our previous reports.

20 collaborations with CERN, including ATLAS, CMS, FASER, ICARUS, ISOLDE, Neutrino Platform, LHCb, and GEMpix

9 researchers working at IdeaSquare in 2024

Knowledge Transfer group activities

+80 activities hosted

+2,550 participants in KT related activities at IdeaSquare

Umut Kose

Senior Scientist and Researcher, ETH Zurich. Works on the Hyper-Kamiokande and FASER projects at CERN. Worked for 8 years on the Neutrino Platform. Has used the facilities at IdeaSquare extensively for his R&D&I.

"IdeaSquare serves as a hub where people from diverse disciplines, backgrounds and cultures come together. Engaging with such a dynamic community not only allows for the exchange of experiences but also fosters the development of new ideas through the collision of different perspectives."

What role has IdeaSquare played in the R&D&I you've undertaken?
IdeaSquare has been instrumental in early-stage detector R&D&I, providing an exceptional environment where innovative ideas could be tested, refined and validated before full-scale implementation. From my early involvement in CERN Neutrino Platform projects to the ones I'm currently involved with, IdeaSquare's darkroom and lightroom have supported a wide range of experiments, some of which have directly influenced the development of neutrino detectors, including ICARUS and the ProtoDUNEs. With the availability of a monochromatic light source, IdeaSquare has played a crucial role in supporting photon detection systems and their qualification tests. I have been the primary contact person for these measurements, ensuring that the facility meets the needs of various research projects. One of the key strengths of IdeaSquare is allowing researchers to create custom experimental setups, quickly adapt to new challenges, and push the concepts forward.
It's so easy to develop your ideas at IdeaSquare, since everything is readily available, and the people are also open to helping. For prototyping, for example, you have access to 3D printing, an electric shop and a machine workshop, as well as a laser cutter. If you need to solder something, you don't have to search for a soldering station, it's right there. That accessibility is a huge advantage.

What else does IdeaSquare mean for you in your specific physics research?
Interacting with people from diverse backgrounds leads to discussions that inspire new ways of thinking. These conversations often introduce fresh perspectives, particularly in my research, and I thoroughly enjoy engaging with students from other disciplines.

Are there any other advantages you've benefited from through IdeaSquare?
Being part of IdeaSquare has provided me with the opportunity to collaborate on art-science projects with Yuri Tanaka and Agnes Chavez, exploring the intersection of particle physics and creative expression. For example, Fluidic Data, a large-scale art installation spanning the four levels of the CERN Data Center stairwell. This piece visually represents data throughput from the four major LHC experiments, and I contributed to integrating the technology into the artwork.

"For me, the atmosphere is very conducive to a productive work environment. The lab itself is full of equipment and detector components, I feel very connected to the more experimental sides of my work, and the frequent visitors (scientists and non-physicists from a wide range of disciplines) lead to interesting and useful discussions. I think the access to other opinions supplements my own approach to physics and problem-solving."
—Charlotte Cavanagh, Postdoctoral Research Associate in Umut's group

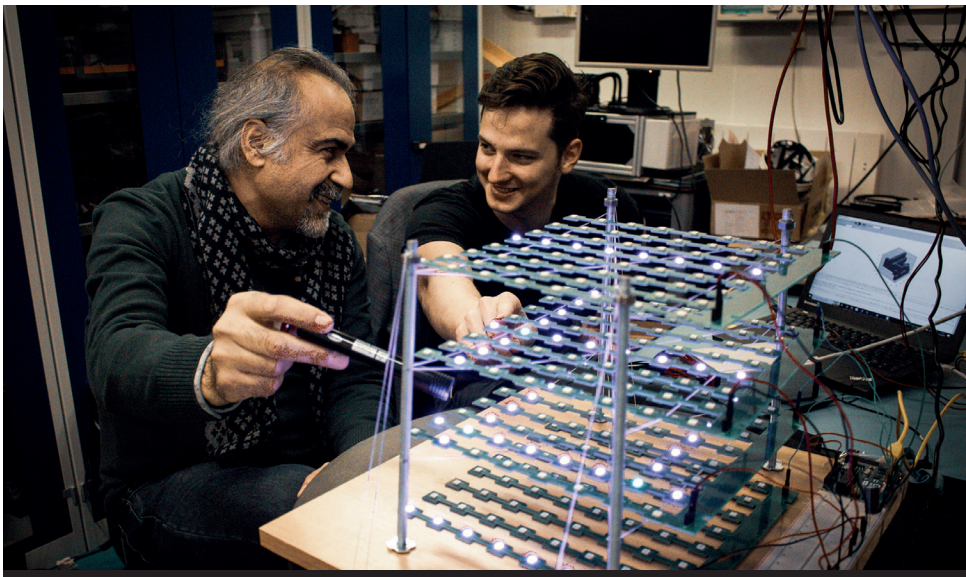
The impact of detection & imaging technologies

Detection & imaging technologies used in the R&D&I projects hosted at IdeaSquare impact the following areas:

- Advanced manufacturing
- Medical devices & imaging
- Life sciences & biotechnology
- Clean & green technology
- Sensors & automation
- Materials & coatings
- Intelligent transport & cities
- Information & communication
- Microelectronics
- Artificial vision
- Neuromorphic computing
- Homeland security & large infrastructure surveying

CERN experiments and R&D&I projects

From the outset, IdeaSquare has sought to facilitate the fundamental research being done at CERN through practical means, whether by providing an alternative space for collaboration, offering opportunities to meet exceptional students and young innovators, or enabling more flexible prototyping or instrumentation resources. Of particular interest are early-stage concepts that could turn into EU-funded projects or lead to technology development initiatives – essentially ensuring that as much research, development and innovation happening at IdeaSquare as possible could turn into a positive, value-added result for CERN and the world beyond it.



Our in-house physicists, Umut Kose and Carsten Jaeschke, created this cube detector prototype to help visualise particles going through a matrix scintillator detector at IdeaSquare.

GRADE Research Programme (Generic pre-R&D&I at IdeaSquare)

Grade is a CERN research programme for very early-stage R&D&I in particle physics. From 2016 to 2020 the projects developed under GRADE looked at the potential use of new, promising detector concepts and technologies for upcoming experiments, while also seeking to expand the knowledge among other institutions, such as technical universities and business schools. Its first four initiatives have been completed, but the GRADE framework remains open for new related projects in the future.

CERN Neutrino Platform (CENF)

This extensive experiment is CERN's contribution to fundamental research in neutrino physics taking place at different particle accelerators around the world, such as the DUNE project. For various years, IdeaSquare housed the location of CENF's central design and engineering office, and provided dedicated spaces (darkroom, clean room, etc.) and tools (prototyping machines, 3D printers, etc.) to a group of designers, engineers and physicists, as well as input from CBI students.
In July 2021 this team moved to CERN's Prévessin site, where the ProtoDUNE detectors are located, but related CENF activities remained active at IdeaSquare. Currently, 5 researchers conduct R&D&I studies connected to CENF at IdeaSquare, working specifically on 3 main neutrino experiments:

Hyper-Kamiokande experiment (Hyper-K)
At IdeaSquare, researchers are working on crucial low-voltage (LV) and high-voltage (HV) power supply boards, protective underwater vessels for the electronics, and the complex assembly of the electronic units. In our labs, they're testing the initial prototypes and pre-production versions of the front-end electronics, and doing physics analysis to guarantee their seamless integration into the complete Hyper-K system.

FASER experiment
FASER is designed to search for light, weakly interacting, long-lived particles beyond the Standard Model, and to study high-energy neutrino interactions at the CERN LHC. At IdeaSquare, the group develops analysis tools that analyse FASER/FASERNu data and contribute to detector maintenance.

ICARUS detector
From 2014 to 2019, a group of researchers designed, developed and prototyped the Cosmic Ray Tagger (CRT) system for the ICARUS detector at IdeaSquare. Once finalised, 125 CRT modules were produced in Italy and then transported to Fermilab in the USA, where they were installed and commissioned at the end of 2021, and integrated into the ICARUS detector. Scientists at CERN continue to work on the ICARUS detector at IdeaSquare today.

ATLAS Upgrade

The ATLAS experiment at CERN has embarked on a new stage with this phase 2 Upgrade project. It focuses in particular on the muon system and involves the creation of a new generation of particle detectors to be able to detect muons faster than before, by exploring the use of novel

Completed projects

GRADE Research Programme (Generic pre-R&D&I at IdeaSquare)

GR01 (SIMPLE) 2016-2019
Silicon photo multipliers for generic R&D detector

GR02 (TT-PET) 2016-2020
Pre-clinical TOF-PET scanner with precise 3D spatial recognition for MRIs

GR03 (AUGMENT) 2016-2020 Generic R&D and augmented reality techniques

GR04 (HEALTH) 2016-2020
Multi-project initiative regarding health and safety detectors

EDUSAFE 2012-2016
Virtual and augmented reality during planned and emergency maintenance in extreme environments. EU funded

TALENT 2012-2015
Affordable high-performance detector modules to answer the forthcoming needs of research infrastructures and industry application demand. EU funded

STREAM 2016-2019
Developing smart sensor technologies and training in the area of radiation enhanced applications and measurements. EU funded

technologies to improve performance and detection capabilities. The prototyping facilities and collaborative working environment at IdeaSquare are supporting this advanced R&D undertaking – part of the detector structure was developed at I2 and some CERN scientists working on the project are hosted there.

Transient–Cloud Chamber

This art installation features a particle detector that turns cosmic muons into real-time trails of light and sound, and was created by 3 CERN scientists, Yuri Tanaka, Akitaka Ariga and Umut Kose, in collaboration with a trio of external experts: Chris Bruckmayr (art design), Pavle Dinulović (sound design) and Rohan Sachdeva (industrial design). It was showcased at the Ars Electronica Art & Science exhibition in Linz, Austria, in early September 2024. Going forward, this blend of art and science project could develop recognition and sound systems into three spatial dimensions with immersive soundscapes.

Knowledge Transfer group activities

CERN's Knowledge Transfer (KT) group engages with experts in science, business and industry to share know-how and technology in fields such as ecology, healthcare, aerospace and entrepreneurship.

For the KT team, the IdeaSquare environment is invaluable when it comes to running workshops and student events that explore the industry potential of CERN innovations. By bringing together diverse minds from both within and outside CERN, I2 helps nurture a culture of open ideation and problem-solving, strengthening its mission of connecting fundamental research with real-world needs. I2 provides a dynamic setting where researchers, students and industry experts can experiment, learn and co-create.

A selection of KT initiatives at IdeaSquare from 2024

CERN Global Health Workshop
The workshop brought together global health professionals, policymakers and technical experts from various disciplines to explore solutions to key health issues.

RD-NMR – KT Co-creation Workshop
The purpose of this workshop was to engage relevant stakeholders and potential end users early on in the R&D&I process of Radiation-detected Nuclear Magnetic Resonance (RD-NMR) to tailor forthcoming developments towards validated needs ('adapt to adopt' strategy).

Main KT undertakings

Entrepreneurship Meet-ups 2018-2020
60 activities
1,891 participants

CESP (CERN Entrepreneurship Student Programme)
3 editions: 2018-2020
29 participants

CERN NTNU Technology Screening Week
10 editions: 2015-2024
392 participants

INSEAD Deep Tech
4 editions: 2021-2024
134 participants

BIC Screening Week
1 edition: 2020
18 participants

CERN Medical Technology Hackathon
1 edition: 2018
25 participants

CERN Global Health Workshop 2024
50 participants

RD-NMR – KT Co-creation Workshop 2024
30 participants

Not just physics

A research group has been created at IdeaSquare to focus on improvements for I2's educational programmes, and study emerging student practices. In this research, the group applies I2's holistic, multidisciplinary approach to innovation, and is now sharing its findings by publishing papers and attending conferences.

To date, we've worked on three studies:
_Futures' educational needs: Meeting Futures' Educational Needs: A Case Study of the CERN IdeaSquare Planet Student Programme

_Students' use of generative AI during the programmes: Exploring Students' Use of Generative AI in Transformative Futures' Innovation Education.

_Students' relationship to the future: Trade-offs in Increased Futures' Consciousness in Transformative Futures' Innovation Education: A Case Study of CERN IdeaSquare Planet

"In IdeaSquare, the space has been made so that we can really meet, have conversations together and solve problems. So it's like this butterfly effect in which the simple fact of how the space is put together to promote certain interactions among the people who are here, will, in the end, just make physics work better."
—Giulia Gaddi, PhD candidate in Anthropology. Université Paris Nanterre

European projects

Linking science innovation and the UN SDGs

IdeaSquare is at the forefront of creating cutting-edge innovation frameworks in Europe. It is a key partner on EU projects, like ATTRACT and Crowd4SDG, and the newcomer, TECH2X*. It also co-manages the CERN Green Village initiative with CERN's Site and Civil Engineering department, which serves as a sustainable technology testbed and demonstration partner for Horizon Europe consortium projects. The ATTRACT project has been named one of the Top 5 initiatives with a significant impact for the New European Innovation Agenda.

10

+1,450
students from
75 disciplines

5 continents

7 EU projects

ATTRACT
(Phase 1, Phase 2)
ATTRACT Earth
(previously
ATTRACT Phase 1B)
6 participating labs
CERN
EMBL - European Molecular Biology Laboratory
ESO - European Southern Observatory
ESRF - European Synchrotron Radiation Facility
European XFEL
ILL - The Institut Laue-Langevin

3 collaborating partners
Aalto University
EIRMA - European Industrial Research Management Association
Esade Business School

CROWD4SDG
6 participating institutions
CERN
CSIC - Spanish National Research Council
Polimi - Politecnico di Milano
UNIGE - Università degli Studi di Genova
UNITAR - UN Institute for Training and Research
Université Paris Cité

4 associated research labs
Citizen Cyberlab
Citizen Science Center Zurich
Learning Planet Institute
IIIA CSIC Institut d'Investigació en Intel·ligència Artificial

GREEN VILLAGE
CERN Site and Civil Engineering (SCE)
CERN IdeaSquare
3 projects

1 testbed platform for early-stage sustainable solutions and technologies

+195
R&D&I participating projects

18
partner institutions and research labs

*TECH2X was presented to the EC in 2024, and will start in 2025. More details in the What's next? section, page 43.

Jonathan Wareham

Professor of Information Systems at Esade Business & Law Schools. Member of the ATTRACT Consortium Board. Co-Editor of CIJ. Coordinator of the ATTRACT Socio-economic studies.

Incremental innovation will not be sufficient for addressing societal challenges in the coming decades. The ATTRACT project and methodology aim to accelerate market uptake of breakthrough innovation."
—Pablo Garcia Tello, ATTRACT Project Coordinator and Leader of the Development of EU Projects and Initiatives section at CERN

What is the concept that led to the creation of the ATTRACT EU project?
The idea behind ATTRACT is that, in Europe, we have several well-known, prestigious scientific research infrastructures, such as CERN, the European Southern Observatory, the European Synchrotron Radiation Facility, and the European Molecular Biology Laboratory, among others. To perform the basic scientific research they are known for, these institutions have to develop extremely sophisticated instrumentation, detection and computational technologies, and taxpayers have paid for this. ATTRACT provides a mechanism to take these technologies – already built and operating at scale – and find alternative uses for them in industry. These could include fields like healthcare and medicine, agriculture, security and other areas we might not have considered yet.

How does ATTRACT facilitate putting these technologies into action to the benefit of citizens and society at large?
ATTRACT aims to provide support and resources to entrepreneurs and engineers to help them develop these technologies into new products or services. With our research we focus on how scientific tools and technologies trickle down into the world of business. ATTRACT is a perfect mechanism to explore the levers we can develop and employ, essentially experimenting with what works well, and what doesn't, in bringing tools from basic science into the business world.

200
innovation projects

18
scaled-up deep-tech projects

3
projects on sustainability tested at CERN campus

ATTRACT

ATTRACT is a Horizon 2020 initiative supported by the European Union and orchestrated by CERN, along with 6 prominent scientific institutions and 3 collaborating partners across Europe. The primary objective of ATTRACT is to establish a co-innovation ecosystem in the field of detection and imaging technologies, bridging the gap between fundamental research and the industrial sector, while integrating contributions from multidisciplinary young innovators. The participating entities partner with industry professionals and experts in business and entrepreneurship to advance cutting-edge scientific instruments, foster economic value creation and employment opportunities, and stimulate overall growth. The project seeks to transform pivotal scientific advancements in imaging, detection and computational technologies into market-ready products and services, catering to industrial markets. At CERN, IdeaSquare plays a central role as the coordinator of this programme, and its prototyping facilities have been used in several ATTRACT projects since the beginning of the initiative.

The ATTRACT Academy Facilitation team brought together teachers and trainers during the Pre-Final Conference at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France, in June 2024.

ATTRACT project highlights

2018: Phase 1 call opens with 1,211 proposals

+40 countries

2019-2020: Phase 1

170 projects each awarded **€100,000** – **19** of them involved the participation of CERN

23% of the projects gathered venture capital funding in Phase 1

Several innovative studies and reports produced

Phase 1 Final Conference (online)

2021-2025: Phase 2

18 R&D&I projects based on the most promising opportunities from Phase 1

10 ATTRACT Academy training programmes

8 socio-economic studies

Next steps

ATTRACT Final Conference
Brussels, July 2025

Phase ATTRACT Earth
Starting Summer 2025

Massimo Caccia

Professor of Experimental Physics, Università Insubria, Italy. Research Associate at INFN and CERN. Project leader of 'Random Power', one of the 170 Phase 1 projects awarded a grant which also went on to be included in Phase 2.

What was it like working with the students from the ATTRACT Academy?
I'm a university person, so I'm used to working with students and young people, but these teams were very specific and peculiar, because they immediately got the point that the major asset of today is being able to 'connect the dots'. These were highly interdisciplinary teams, made up of different personalities, and they merged their attitudes, their skills, their knowledge, their passion into a unique project.

How did this benefit your ATTRACT project?
Whenever you're explaining what you do to somebody new, you learn by teaching. This is the essence of what we do. In this particular case, even during the final presentation, I took a lot of notes, because there were hints, suggestions, further thoughts that could come back to unpredicted applications of our technology.

Within the ATTRACT ecosystem, how do you see the pieces coming together? Do you think this holds a key for the future?
It certainly does, because the future will be built by pieces that are currently on the floor, split, and they have to become the elements of a puzzle. ATTRACT is really contributing to picking up the pieces and putting them together. So you are connecting young and experienced generations, people who can run fast and people, because of their experience, who can think fast. And you're connecting fundamental research, which is curiosity-driven, and the market, and you're building up new personalities and critical thinking. This is what you dream of when you are designing a project, and ATTRACT is making this dream real.

Awards and recognitions

2020_Falling Walls award for breaking down the wall around scaling up breakthroughs in European innovation

2020_European Commission Research & Innovation Policy review: IdeaSquare recognised as an example for international best practices by the Hitachi and University of Tokyo Joint Research Laboratory in Japan, and the Industry-University Cooperative Research Centers Program of the National Science Foundation in the US

2023_ATTRACT project named among the Top 5 initiatives that are significantly relevant to the New European Innovation Agenda (NEIA)

ATTRACT Phase 2 R&D&I projects

AHEAD Advanced heat exchange devices

Glass2Mass High-performance, high-resolution optical components in fused silica for the mass market

H3D-VISIOnAiR Head-worn 3D-visualisation of invisible elements for surgical intra-operative augmented reality

h-cube Micromechanical bolometer arrays for THz hyperspectral imaging

HipMed Hyperspectral imaging to support precision medicine in cancer diagnostics

HYGER Highly efficient IR detection unit based on high-purity black germanium technology

HYLIGHT Prototyping a light-sheet microscope for the diagnostic of embryo implantation based on hyperspectral phasor analysis

IALL Integrated adaptive liquid crystal lenses

MEGAMORPH Market-entry of graphene-based large-area modulators with a radical production of holographic displays

MetaHiLight Adaptive metamaterials for smart, standalone histopathology with polarised light

MicroQuaD-Material science Microscopy with multielement quantum detectors

PiPe4.0 Innovative nano and laser pipe sensors for in situ gas monitoring

POSICS-2 Position-sensitive SiPM compact and scalable beta-camera (Phase 2)

Random Power In-silico quantum generation of random bit streams

SNIFFIRDRONE Drone-based air pollution mapping for environmental monitoring and improvement of quality of life

ULTRARAM Ultralow-power, non-volatile, random access memory arrays for data centres and space applications

UNICORN Dx Universal electrochemical nanosensors for next-generation diagnostics

VISIR2 Novel visible-infrared imaging system in two-dimensional arrays

ATTRACT Academy

The ATTRACT Academy was based on the Young Innovators and Entrepreneurs pilot scheme run during Phase 1 of the project, which received overwhelmingly positive feedback from the students taking part. Multidisciplinary Master's-level students in the Academy had to work on societal applications for the technologies being developed under the ATTRACT initiative. It had a strong focus on using technology to benefit society, with the UN Sustainable Development Goals (SDGs) as a guide to innovation, and its aim was to bring a fresh perspective to research and innovation through its participants.

ATTRACT Socio-economic studies: Evaluating the benefits of deep tech for Europe's economy

The ATTRACT initiative has funded 8 impact studies conducted by business and innovation experts. They provide an in-depth quantitative and qualitative analysis of key aspects of the ATTRACT model, offering valuable insights for policymakers on how its approach can be effectively scaled up at both national and pan-European levels.

The studies focused on:

_Investigating and identifying critical factors for vibrant innovation ecosystems

_Identifying best practices to embed the ATTRACT paradigm across the detection and imaging landscape, and to reduce its reliance on public sector funding

_Detecting Europe-wide conditions and requirements that will turn the upscaling of breakthrough technologies into drivers of social inclusiveness, gender equality, skills development and the reduction of geographical disparities

Learn more about the R&D&I projects funded in Phase 2 at https://attract-eu.com/

Discover the 170 ATTRACT R&D projects of Phase 1 at https://phase1.attract-eu.com/showroom/

The ATTRACT projects received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements No. 101004462 and No. 777222.

ATTRACT Academy facts and figures

10 programmes, total of **26** editions/rounds

17 institutions represented within ATTRACT Academy consortia

149 completed student projects

1,307 students from **75** different disciplines

+50% of the student projects offered new ideas to researchers

105 teachers

"As far as the socio-economic impact is concerned, it's very difficult to convince politicians and policymakers that there is a direct link between funding basic research and economic output. These studies are critically important to demonstrate that connection in a tangible way. While there is already a lot of evidence to support this idea, having something concrete and strong to present to policymakers and funding bodies will make a significant difference."

—John Wood, Chair of the ATTRACT Project Advisory Committee

ATTRACT Socio-economic studies' facts and figures

8 studies

9 countries

20 partner institutions

Joshua Ichor

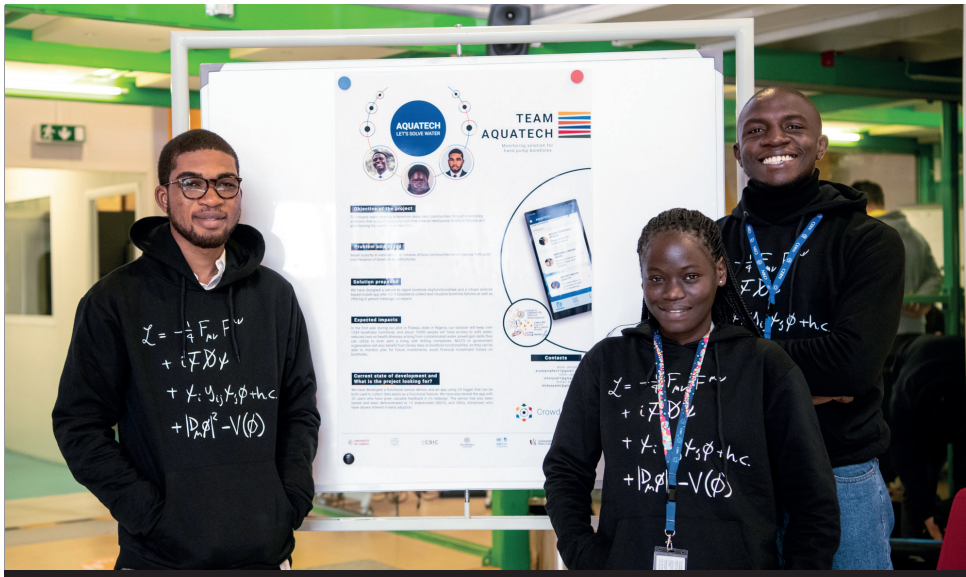
Co-Founder and CTO of AquaTech. Hydrogeologist. Climate fellow of the 776 Foundation. Member of award-winning team of Crowd4SDG project.

Tell us about AquaTech, why you founded it and what it does.
AquaTech was born out of the urgent need to improve water monitoring, reduce non-revenue water losses, and provide safe, sustainable water access for underserved communities. During the Crowd4SDG programme, we developed an IoT-powered water monitoring system that can help utility companies and governments detect leaks, track water quality and optimise distribution.

How was your experience as a student on Crowd4SDG?
Being part of the Crowd4SDG programme was a transformational journey for me, both personally and professionally. It provided access to world-class research facilities at CERN, where we developed and tested our technology. The programme shaped my entrepreneurial mindset, enhancing my ability to scale solutions from concept to impact. Additionally, mentorship from global experts helped refine our project, positioning AquaTech for success in securing funding and partnerships. Crowd4SDG connected me to a network of global innovators, investors and policy experts, opening doors to collaborations that are now accelerating our expansion in Africa.

How did IdeaSquare play a role in your experience?
IdeaSquare was the perfect ecosystem for turning innovative ideas into practical, scalable solutions. It provided access to cutting-edge research, prototyping labs and expert mentorship. More importantly, it fostered a culture of collaboration, bringing together scientists, engineers and entrepreneurs to co-create impactful solutions. My time at IdeaSquare strengthened my ability to combine scientific research with real-world application, a skill that continues to drive my work at AquaTech.

The CROWD4SDG project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 872944.



Members of the AquaTech award-winning team, Joshua Ichor, Jenipher Alum and Dickson Simali (L-R), showcased their project during the Final Crowd4SDG Conference.

Crowd4SDG

Crowd4SDG was a three-year EU-funded project under Horizon 2020, which focuses on harnessing citizen science and artificial intelligence to monitor and address challenges related to the UN SDGs. The goal was to research the extent to which citizen science could provide an essential source of non-traditional data for tracking progress towards achieving the SDGs. The initiatives organised by Crowd4SDG, which had 6 participating institutions and 4 associated labs, followed a novel innovation cycle called GEAR (Gather, Evaluate, Accelerate, Refine), which started with the online selection and coaching of citizen-generated ideas for climate action. These were subsequently accelerated by our Challenge-Based Innovation (CBI) workshop at IdeaSquare. Key focus areas included climate resilience, water and flood management, and disaster response.

At I2, our role was twofold: to provide a testbed where students, researchers and the public could collaborate to develop innovative solutions; and support the rapid prototyping of climate resilience tools through hackathons and workshops.
Impact on society:
_Increased public engagement in scientific research
_Development of scalable, low-cost technologies for environmental monitoring
_Strengthening the role of citizen science in policymaking and crisis response

Learn more about the Crowd4SDG projects at https://crowd4sdg.eu/

Crowd4SDG facts and figures

+40 students aged 16-26
5 teams selected for the Accelerate workshop for each cycle
28 training and workshop sessions
22 publications in international journals
18 publications in conferences and books
+40 participants in workshops
9 projects selected for insertion in an SDG Accelerator programme at the University of Geneva
2 selected for support by local social incubators
2 supported by a follow-on project called Yoma led by UNICEF and supported by the Fondation Botnar, Switzerland

Final Conference (March 2023)

100 conference participants
60 hackathon participants
3 hackathons

CERN Green Village

CERN Green Village is a hub for innovation and sustainability, offering its extensive campus as a testbed and demonstration site for sustainable solutions developed by external companies, startups and Horizon Europe consortium projects (even though Green Village itself is not an EU project). Partners gain access to CERN's infrastructure, expert personnel and international network while benefiting from its independent regulations that streamline permits and decisions. IdeaSquare is involved with the management of Green Village, and all undertakings done as part of the initiative have to include its participation.

The Green Village initiative aims to foster breakthroughs in energy efficiency, waste reduction, sustainable transportation and environmental quality while leveraging cutting-edge technologies like AI, microcomputing and advanced sensors.

Three of the individual projects proposed using Green Village are:

_Passive Reflectors for 6G Data Transmission
ELEDIA@UniTN group
Energy-efficient alternatives to address the high infrastructure demands of 6G networks. Using static passive electromagnetic skins (SP-EMS). These solutions optimise wireless signal reflection, reduce active network devices and lower energy costs.
Impact: SP-EMS offer cost savings, sustainability and enhanced wireless performance, with potential applications in challenging locations like motorways and CERN tunnels.

_Air Quality Nodes & Dashboard
University of Witwatersrand
Addresses air quality monitoring gaps in the Global South by deploying low-cost sensors and IoT technology integrated with machine learning. It processes and displays real-time data via a web-based dashboard.
Impact: This project informs decisions in public health, mining and urban development, aiming to significantly enhance understanding and interventions regarding air quality.

_Technology Demonstration in CERN Service Tunnels
ELEDIA@UniTN group
Focused on testing SP-EMS in CERN's underground service tunnels. These long, curved tunnels provide a challenging environment to showcase the technology's potential to eliminate data dead spots without extensive infrastructure, and reduce maintenance and power needs.
Impact: Through the design, installation and performance benchmarking of these demonstrations, this project aligns with CERN's goal of enhancing connectivity while reducing environmental and operational costs.

Ryan Peter Mckenzie

Research Fellow at the Institute of Collider Particle Physics, University of the Witwatersrand. ATLAS Hadronic Tile Calorimeter Run Coordinator. Manager and System Designer of the Air Quality Nodes & Dashboard project.

How did the Green Village initiative support your project?
Our Air Quality Nodes & Dashboard project joined CERN Green Village while it was still in its infancy, which is a particularly challenging period. We were able to deploy our air quality nodes at CERN (Meyrin site) for an extended period of time, which allowed the team, including myself, to receive hands-on training and support from CERN staff. An additional benefit of being a member of Green Village was the added exposure which the project received as a consequence. This was particularly apparent when engaging with our funding agencies.

How has your project progressed since then?
Thanks to the points mentioned, the project has gained significant momentum in the past few years. We've begun to expand the system's deployment within Johannesburg, South Africa. This expansion is ramping up, to the point that South Africa will have the highest concentration of air quality monitoring devices on the continent in the coming months.

Green Village is a service to the European scientific community."
—Roy Pennings, Senior EU Projects Manager at IdeaSquare

2024 highlights

9 proposals submitted by partners

3 applications on testing

Focus areas:

_Sustainable construction and pollution prevention
_Biodiversity conservation
_Big data for carbon footprint reduction
_Environmental monitoring
_Light and noise pollution abatement
_Smart energy solutions
_Urban analytics and green mobility

Prototype workshops

Fast forward through prototyping

Since its creation, IdeaSquare has offered prototyping spaces to the CERN community. All its members are welcome to visit us to learn about design-driven methodologies, take part in prototyping workshops and use our instrumentation as part of their experiments. What's more, I2 delivers flexibility and accessibility, a singular place to work and innovate for both CERN members and students. The chance to interact with each other, which can inspire reflection and different ways of thinking as well as practical learning, encourages many within CERN to appreciate the depth of I2's potential, returning to carry out other work.

Experiments
- ALPHA Antiproton Decelerator (AD)
- ATLAS
- CLEAR
- CMS
- FASER
- ICARUS
- ISOLDE VITO
- Neutrino Platform
- ProtoDUNE
- TERAPET

Research programmes
- GRADE

Groups & Units
- ATS - Accelerator and Technology Sector
- EL - Electrical Engineering Group
- HSE-RP - Occupational Health & Safety and Environmental Protection Unit
- IR - International Relations

Departments
- BE - Beams
- EN - Engineering
- EP - Experimental Physics
- IT - Information Technology
- SY - Accelerator Systems
- TE - Technology

CERN users
- EPFL (CERN Green card)

10 years of boosting CERN experiments through prototyping

12

CERN departments/ groups utilising our prototyping facilities

+140

CERN personnel have received training in prototyping since March 2022
+87% increase in 2024

10 **CERN experiments benefited**

For a detailed description of the equipment found in each of the IdeaSquare prototyping labs, scan the code.

Nikolay Azaryan

Applied Physicist at CERN working on the VITO experiment, a dedicated beamline, as part of ISOLDE, the oldest experiment at CERN. PhD in Engineering and Technologies for Particle Accelerators.

IdeaSquare is integral to our research endeavours, from developing innovative systems to optimising the use of advanced materials. We can efficiently produce different components for our experimental setups, perform quick prototyping and share the experience with other users of IdeaSquare. We look forward to continuing our collaboration and tackling new challenges with their support."
—Nikolay Azaryan

How has IdeaSquare supported your work on the VITO project?
IdeaSquare's facilities have played a pivotal role in the prototyping and production of various components for our experimental setups. We often use the 3D printers, the laser-cutting and 3D-cutting machines in the Mechanical Workshop, do some soldering in the Electro Shop, and of course, we start the day at IdeaSquare in the kitchen, having a coffee with our nice colleagues who work there.

Do you have future plans to make use of the facilities at IdeaSquare?
Looking ahead, we've identified several challenges that will leverage the capabilities of IdeaSquare's facilities. One of our upcoming experiments requires an RF transmission device with complex geometry. Before committing to expensive CNC machining, we intend to create 3D-printed prototypes and explore the application of conductive paint for their coating.

Robert Garbrecht Larsen

PhD candidate at CERN, researching radiation-hard fibers and developing new instrumentation for use in CERN's North Area, especially for lines with high radiation.

How does IdeaSquare contribute to your doctoral research?
IdeaSquare enables a large degree of flexibility and fast prototyping in my work, which has greatly sped up and reduced the cost of my research. Specifically, the access to resin printers and laser-cutting tools, which are not commonly found in the labs at CERN, makes otherwise impossible prototyping into a fast and easy project.

For instance, I have been able to iteratively design, print and modify endcap pieces for a prototype straw detector. This would not have been possible without IdeaSquare. Access to its informal workspaces is also greatly appreciated. It means that time supervising a long print can be used productively. And the staff at IdeaSquare deserve a warm thank you for always being available and helpful.

Prototyping at IdeaSquare – giving a boost to innovation

Prototyping at IdeaSquare has achieved various advances in the past 10 years. Significantly, prototyping has become a core component of various educational programmes at CERN. In addition, training programmes in FPGA, Arduino and other technical domains have been successfully executed with participation from multiple CERN departments. And the range of training on offer has been expanded to meet the evolving needs of the CERN community.

Use of our prototyping facilities in 2024

Although CERN departments are starting to get 3D printers, the prototyping facilities at IdeaSquare remained popular for CERN personnel in 2024:
_**3D Studio:** 156 days occupied, 134 bookings
_**Machine Shop:** 67 days occupied, 83 bookings

The rest of the time, student programmes and our in-house R&D&I scientists make good use of the labs.

Hex-a-thons

In 2024, IdeaSquare hosted Hex-a-thons within the TeSi and CBI4Ai programmes, providing students with a unique, hands-on experience that directly connects to the collaborative spirit and scientific mission of CERN's LHC. By building and testing their own 'particle detectors' using a range of materials, multidisciplinary students gained practical insights into the complex processes of particle identification and sorting, mirroring the challenges faced by CERN scientists and highlighting the development of hard and soft skills. The exercise included curated sessions on coding, 3D printing and laser cutting, to demonstrate the capability of I2's resources, while also fostering creativity, teamwork and playful imagination.

IdeaSquare is high on the list in terms of the places where we spent hours to reach the success we can now claim for the new calorimeter modules. This workshop/lab/open-space provided high-tech machines and training open to any CERN user, allowing us to prototype our ideas without the additional step of asking someone else to design and produce what we had in mind."
—Matteo Salomoni, Physicist and CERN Research Fellow, and Kacper Jama, Mechatronics Technician. They're working together on the LHCb calorimeter, an important detector for the identification of electromagnetically charged particles

What impact does prototyping at I2 have?

_Enable experimentation and innovation in an interdisciplinary setting

_Support exploratory and technical prototyping for CERN members

_Teach students a tangible methodology for problem-solving and exploration

_Provide a rapid prototyping facility to scientists, researchers, students and external collaborators, offering access to state-of-the-art equipment such as 3D printers and laser cutters, along with training on how to use them

_Offer hands-on workshops to share knowledge inside CERN

_Enhance educational programmes and research projects, by creating a collaborative space where interdisciplinary teams work on practical applications

A community of innovative people from different parts of CERN gathered during the Prototyping at CERN micro-conference at IdeaSquare on November 2023 (top).

Students teams and their instructors from the TeSI programme during the building and testing of their own ‘particle detectors’ during the Hex-a-thon hands-on experience (bottom).

2024 highlights

Trained 68 CERN personnel in 3D printing and laser cutting

Collaborated with experiments such as CMS, ALICE, LHCb, ISOLDE, ATLAS and ProtoDUNE

Prototyping became a core component of various educational programmes

Successful execution of training programmes in FPGA, Arduino and other technical domains with participation from multiple CERN departments

Expansion of the range of training offerings to meet the evolving needs of the CERN community

FPGA Courses

2 editions: 2024
20 participants

MediPix Workshop

1 edition: 2024
18 participants

Award at Design Factory Global Network UnBoxed 2024 conference

‘Hex-a-Thon: Collaborative and Creative Learning Experience for interdisciplinary students based on hands-on innovation’. Presented to Rohan Sachdeva and Mireia Sierra

Educational programmes

Training and experimenting with the innovators of the future

Education is one of the principal methods by which we can have an impact both within CERN and among the wider society. Sharing know-how brings tangible results, with the opportunity to reach people from multiple backgrounds and specialisations, bringing them together for collaborative learning using a spectrum of teaching formats that have sustainability at their core. Whether it's early-stage tinkering, encouraging the use of science in other fields or advancing open innovation in unexpected places, the facilities at IdeaSquare empower every kind of student, young or experienced, scientific or not, that comes our way.

13
IdeaSquare Planet pilots

Our decade of educational programmes would not have been possible without **50 collaborating institutions from 15 countries:**

Australia
Finland
Germany
Greece
Italy
Lithuania
Netherlands
Norway
Poland
Portugal
Singapore
Spain
Switzerland
Thailand
USA

3,000
students

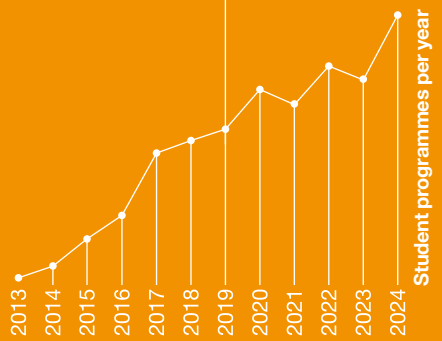
+500
teachers participating in student programmes

136
student programmes

16 KT-run student programmes

300
participants in executive programmes

+1,150
RCA students



Tuuli Utriainen

CERN Fellow and Project Associate at IdeaSquare. Student Programme Associate since the opening of I2.

What makes IdeaSquare different from other educational environments?
IdeaSquare is a unique space that pioneers collaboration. It combines the magic of CERN, its relentless quest to uncover the secrets of Mother Nature, with a deeply human dimension. Here, people come together in the same physical space to share methodologies, exchange ideas, and engage in projects with the potential to transform society. Collaboration is at the heart of the experience: it's how we learn to bring out the best in ourselves and others, navigate challenges, imagine unconventional futures – and take the first steps toward making them real.

What do you think is the main impact of IdeaSquare's programmes on the students?
That really depends on the programme, the edition, and the students' backgrounds. Each participant brings their own strengths and areas for growth. For example, designers may feel more at ease with open-ended exploration, while business students often have a strong sense of feasibility and viability. The richness comes from this mix and students learn not only from the process, but also from one another. The collaborative nature of the experience creates space for students to stretch beyond their familiar ways of thinking. Ideally, it's through this shared exploration that possibility thinking expands and creative confidence grows so that by the end, students feel both inspired to imagine bold ideas and supported in learning how to bring them to life, together.

"We want to present this holistic picture of what it means to solve a problem, what it means to solve a big problem, what it means to think big, and what is radical in the way we're thinking."
—Andreea Cotoranu, Clinical Professor in the Information Technology Department of Pace University, and Director of the New York City Design Factory initiative at the university. Part of CBI A3 since 2019

Christine Thong

Academic Director of Design Factory Melbourne and Professor at Swinburne University. ANSTO Principal Innovation Fellow. Involved in IdeaSquare student programmes since 2014.

Which aspects make the IdeaSquare experience unique for your students?
Curiosity and a collaborative culture surrounding open science that propels students forward. They are inspired and motivated to give things a go – they feel the agency to think big and the licence to dream is not just a nice plastic card. The proximity to CERN, the experiments, corridor conversations with scientists that always seem to happen, and students are blown away by the openness to listen, share ideas and encourage deep thinking.

How does IdeaSquare affect how professionals approach future challenges?
When students graduate to professionals, I think they bring with them a greater resilience, confidence in creative problem-solving and self-efficacy to work on projects that include deep technology.

A decade of continuous experimentation in educational programmes

The student programmes at IdeaSquare have evolved significantly over the past 10 years, transitioning from experimental initiatives to well-structured programmes implemented with different universities worldwide. The I2 team plays a critical role in fostering innovation by equipping students with problem-solving skills, teamwork and systems thinking, all in alignment with CERN's mission. Naturally, with each year that passes, we have a growing international community of IdeaSquare alumni, who are employing their experience with us to drive change across diverse industries, careers and institutions.

Experiential learning such as we offer at IdeaSquare in collaboration with CERN fosters analytical and creative thinking, curiosity, self-awareness, resilience and flexibility. In addition, we co-design the programmes embedded in the curricula of several universities worldwide, with the following building blocks:
_Empowering students with a new mindset for addressing complex, systemic global challenges
_Enhanced collaboration, critical thinking and resource management skills
_Focused on the UN SDGs, linking futuristic problem-solving to contemporary global issues
_Encouraging students to transition ideas from imaginative narratives to practical, scalable solutions – actionable real-world outcomes

As CERN approaches uncertainty and unknown challenges through multidisciplinary collaboration, the student programmes at IdeaSquare embed this approach with young learners: multidisciplinary work, international collaboration and the application of tech and science for the benefit of society.

Challenge-Based Innovation (CBI)
Our first educational format
2013–2024
_Launched in the very early days of IdeaSquare, CBI was designed as a pilot course where multidisciplinary student teams and their instructors could work with CERN researchers on the search for novel solutions for the future of humankind. Focused on open innovation and embracing the concept of rapid prototyping, CBI is woven into the very essence of I2.

ATTRACT Academy
Using technology to benefit society
2022–2024
_Once CBI had been tested and iterated over several years, in 2022 we consolidated it into the ATTRACT Academy, an initiative where Master's-level students in the Academy had to work on societal applications for the technologies being developed under the EU-funded ATTRACT project (see page 21).

IdeaSquare Planet
Far-off experiences for close-to-home answers
2023–Future
_In early 2023, an exciting new 2-week pilot titled IdeaSquare Planet was run. The concept was simple but challenging: What if humanity were compelled to start anew on an entirely different planet? How could we make choices that prioritise sustainability? Could the knowledge gained during this cosmic journey be effectively applied to real-world situations on Earth? After testing I2 Planet 13 times in total, from 2025, it will become the platform for our student programmes. Discover more in What's next? (see page 44).

Continuous experimentation on educational programmes
Looking for new approaches to tackle complex problems since 2013
+10 years
_At IdeaSquare we never stop experimenting with the key goal of training young minds to become thought leaders, not just those in science but also professionals from other disciplines beyond particle physics and engineering. During these more than 10 years we've experimented with programmes for different educational levels, from Master's-level students to executives. The focus of our approach has varied, going from societal challenges to technological demands, linking science with industry and speculations about the future, and even disruptive fashion solutions. And we're still going!

Participating in a student programme with ATTRACT helped me ease my way into this extensive environment that involves these intimidating technologies. Taking deep technology and introducing it at the student level makes it so much easier to transition into industry or research, whichever students choose to go into."
—Lauren Demaio, a student on CBIA3

The trip to CERN really demonstrated how much business and engineering depend on each other. As we were developing our solution, we realised that changing one aspect of our prototype required changing our entire business model, and vice versa."
—Andrew Topinka, a finance student who participated in OSU@ Transatlantic, 2016

Alumni from the TeSI and CBI4AI programmes, from Barcelona, Valencia and Bologna, share their learnings and conclusions during an IdeaSquare Planet pilot workshop.

EMBA Digital Leadership Workshop

5 editions: since 2020
~100 students

2024 highlights

5 executive programmes
22 student programmes
35 institutions
56 teachers
488 students
43% engineering
18% business
17% design
22% other
40% female
60% male

Aaro Packalén

Finishing Master's in ideation practices in the health technology industry, Aalto University, Finland. Works in the prototyping labs and as Product Development Project (PDP) Course Coordinator and Coach at Aalto Design Factory. ATTRACT BASE 2022/23.

How would you describe the value of the ATTRACT Academy?
Product development and interdisciplinary learning can be done without the ATTRACT Academy. But what the ATTRACT Academy brings is something very valuable. It showed us how we can actually bring change to the world, how to search for the biggest societal impact, and how important it is to understand the bigger picture to be able to change the world. In short, doing an ATTRACT project showed my teammates and I that we can change people's lives for the better and create groundbreaking innovation in Europe.

What impact did your time at IdeaSquare have on your personal and professional development and your project?
IdeaSquare is one of the most inspiring places I've had the pleasure to visit. Every time I leave, my mind is bubbling with ideas and possibilities. And at IdeaSquare I learned about exponential thinking and the importance of dreaming and understanding your goals, since they drive all your decisions. IdeaSquare has transformed the way I see the world and future possibilities, and it's now a much more exciting place.

Sunnie J. Groeneveld

Director of the Institute for Digital Business and Dean of EMBA Digital Leadership, HWZ Hochschule für Wirtschaft Zürich, Switzerland. Founder & Managing Partner, Inspire 925 GmbH.

What are the aims of your EMBA in Digital Leadership?
Our primary goal is to equip students with a robust set of tools, methods and leadership approaches to successfully navigate and drive change. As a business school programme, our mission is to broaden perspectives and challenge conventional ways of thinking. Many executives naturally focus on short-term, incremental improvements. However, by exposing them to exponential thinking, such as the kind fostered at CERN, we help them step beyond their established frameworks and embrace transformative ideas.

What are the main outcomes and learnings for participants from the IdeaSquare experience?
The visit to IdeaSquare is intentionally immersive and thought-provoking. Participants gain firsthand insights into how fundamental research fuels innovation, encouraging them to think beyond traditional corporate structures and adopt a more exploratory mindset. A key takeaway is not only how to find answers but also how to reframe challenges in a way that leads to more groundbreaking solutions, and replicate these conditions within companies. This shift in perspective is essential for business leaders seeking to foster innovation in their organisations.

A significant portion of the learning that happens there is unstructured, which is its real power, along with the intangible aspects like openness, respect and trust."
—Sunnie J. Groeneveld

While at IdeaSquare, students from St. John's University in New York developed a board game that simulates the challenges of travelling to and settling on an exoplanet, inspired by I2 Planet. It emphasises quick decision-making and thought experiments, prompting reflections on real-world applications.

Events

10

Connecting curious minds

Multidisciplinary collaboration in all its forms has always been fundamental to IdeaSquare's day-to-day operations and achieving our goals. As such, each year since our launch we've hosted a full and eclectic programme of events, creating forums where science, innovation and knowledge transfer merge to encourage the curious and enterprising to come together. Wide-ranging topics related to CERN's research and its potential social value are showcased through initiatives such as hackathons, scientific writing clinics, open-source programming, cultural breakfasts, tours for high school students, cinema and art events, game simulations, sustainable fashion concepts, networking drinks and coffee mornings.

Supporting the CERN community

- CMS Patatrack Hackathon
- LHCreate
- CMS Darts Hackathons
- LHCb Hackathon
- CERN Global Health Workshop
- CERN Medical Technology Hackathon
- ROOT Hackathons
- Mini Hackathon for the Women in Technology community at CERN
- Thinking 'inside' the box workshops
- Prototyping at CERN networking sessions
- Science Communication Hackathon at CERN

Multidisciplinary events

- Sparks! Serendipity Forum at CERN
- Cineglobe Science Fiction and the Future of Detection and Imaging workshop
- New European Bauhaus @ CERN IdeaSquare
- Open Science Summit: 'Accelerating the Adoption of Open Science', in partnership with NASA
- Probono Green Village workshop
- EIROForum workshop
- ENOLL OpenLivingLab workshop
- The Port Hackathon
- Humanitarian Designers Meet-Up Lab
- Embodiment workshop
- Futures workshop with SDG Lab (now Beyond Lab)

Conferences

- Crowd4SDG Final Conference
- Open Innovation in Science (OIS) Research Conference
- Geneva Science and Diplomacy Anticipation Summit (GESDA) workshops

Educational events

- World Economic Forum Global Leadership Sessions
- Django Girls
- UN Data Innovation Lab
- UNIGE Open Science Day
- UniGen workshop: Innovation, Human Development and Sustainability
- Training on Python and Data Science for Girls and Women
- Innovation 4 Change

+700

events regarding innovation and collaboration

80

governmental delegations have visited I2 since 2014

10th anniversary celebration: Reflections from a unique event

Marking 3,653 days since we started

As part of the auspicious occasion, reminiscences were shared, part confessions were made and praise given. Here's a sample of the emotions, thoughts and nostalgia revealed during the gathering.

It was an incredible learning path, seeing how true innovation is done when you work with people who have different expertise, who come from different domains. You manage to have this incredible balance between improvisation, good planning, coordination and unstructured things. But above all, you create an energy that everyone who passes through really takes to heart.

—Mar Capéans, CERN Senior Scientist and Head of the Site and Civil Engineering (SCE) department

We developed the communication and the collaboration within IdeaLab and IdeaSquare for young people to have a threshold for coming into a space where there is a possibility to do something differently. To make a mess. To understand that mess. To look for beauty within the mess. And make something that really could help in progressing humanity or sustainability in some way.

—Harri Toivonen, Project Associate at IdeaSquare from 2013 to 2020. Responsible for IdeaSquare's building design. Service Manager, Disec Oy

Time works in a really funny way here; a clock may or may not tell you what time it is, but it will tell you what time it is for. Unexpected things happen at IdeaSquare and even simple, constant things like time cannot be taken for granted here. One minute the students are immersed in thinking about the beginnings of the universe and the next they are ideating about what kind of a society they will be building on a future planet. Days turn into nights in the blink of an eye and when leaving, students are often left wondering how they have achieved so much in the little time that they spent here.

—Shreyasi Kar, Deputy Member, ATTRACT Project Consortium Board. In charge of ATTRACT Academy. Head of Operations, Aalto Design Factory

IdeaSquare is about change. I saw problems that were going to be solved at IdeaSquare. I saw solutions that were going to find a problem at IdeaSquare. And then just when I think I've got the picture at IdeaSquare, everything changes again. And this is a continuous process. IdeaSquare is about change. So every time I think I've got it, they change again. So now I think I've got it. Because they're going to change again. And I think that's the spirit there. And it's a spirit that I value very much.

—Sijbrand de Jong, Chair of ISAB. Professor of Experimental Physics, Radboud University Nijmegen

Generating value for Europe

From the beginning, IdeaSquare has supported and arranged events in collaboration with or for international organisations such as the UN, European Commission, and international NGOs in Geneva and beyond.

In 2024, we held a wide range of multidisciplinary events aimed at fortifying our commitment to connecting curious minds. Here is a spotlight on some events:

_Humanitarian Designers Meet-up Lab
48 participants
Humanitarian Designers (HD) is an NGO dedicated to building bridges between the design community and those working in humanitarian aid. It's a community of learners, practitioners and allies with the mission to raise awareness, educate and have an impact. This gathering at IdeaSquare in September 2024 gave the HD community and its allies the chance to come together and seek out ways to move their undertaking forward, through adding bricks of knowledge, drawing up new blueprints for future collaborations and the creation of tangible projects.

_CMS Patatrack Hackathon
2 editions
33 participants
These hackathons are open to all members of the CMS (Compact Muon Solenoid) team. The goal is to brainstorm, debug, develop and improve well-defined algorithms or pieces of code, sharing ideas and knowledge. An alternative but effective way to advance understanding and knowledge related to this huge, long-running project.

_CMS DARTS Hackathon
2 editions
45 participants
The CMS is a general-purpose detector built around a huge solenoid magnet at the LHC in CERN, and the experiment involves over 6,000 participants. For these DARTS (data acquisition, run control and trigger interfaces) hackathons, the (non-exclusive) focus was on (future) users of the Level-1 scouting system. Ideas for novel analyses or other use cases for scouting could be developed and prototyped with the help of core members of the Level-1 Data Scouting effort.

_2nd ROOT Hackathon
30 participants
ROOT is a software framework that was created at CERN, and every day thousands of physicists use ROOT applications to analyse their data or perform simulations. Taking place in the inspirational venue of IdeaSquare, this three-day hackathon was designed as a coding marathon with a focus on:
_Pythonic interface extensions
_Python documentation enhancement
_Tutorial modernisation campaign

Any level of experience and programming skills were welcome, and 15 external participants joined the fun, some from CERN and a few who came specially for the event from Europe and Qatar.

_LHCb Hackathon
30 participants
Focused on preparing the High Level Trigger 2 software of the Rare Decays working group (LHCb experiment) for the upcoming 2025 data-taking period. It brought together developers to collaboratively work on the LHCb software, following a structure that combined introductory tutorials and hands-on development sessions with in-house experts.

_Learn to use satellite data to understand climate change
26 girls aged 14 and older
Aimed at women and girls, this training session is run in collaboration with the organisations RightsTech Women and Women in Technology, and is made up of two parts: getting more women into STEM careers and technical training.

_SDG Community Coffee
Futures foresight activity with the SDG Community Lab (now Beyond Lab).

_Burglar Alarm workshop
Prototyping activity for people working in different NGOs and international organisations in the region.

_WFUNA seminar (World Federation of United Nations Associations)
6 seminars
180 students from Chinese universities

_Design for Policy Workshop at the European Commission
25 participants working within policy, diplomacy, innovation and education shared best practices and connected as a community.

2024 highlights

125 total events
1,949 total participants

15 tours of the space, including visits from governmental delegations
4 events for CERN clubs: CERN Alumni, Women in Tech and Ski Club
5 events in collaboration with the Science Gateway
16 events for KT, CERN members and external participants
1 super birthday party: our 10th anniversary celebration
16 hackathons

Innovation thrives where disciplines collide. The square inside the innovation space at CERN offers a unique arena for people across sectors to meet, exchange and let their imagination soar – exploring how today's scientific and technological advances can serve society. The ideas born in these gatherings feed the fertile soil of CERN's collaborative ground."
—Claudia Marcelloni, former Head of Public Events Programming at CERN. Curator of 6 editions of TEDxCERN, and 3 editions of Sparks, the Serendipity Forum at CERN

On 8 November 2024, IdeaSquare marked its 10th anniversary with a series of engaging discussions exploring the journey of IdeaSquare over the past decade and giving us a glimpse into the exciting future ahead. With almost 150 attendees, the special celebration was dedicated to creativity, innovation and social impact, and featured many of those who have contributed to the development and success of IdeaSquare during its first 10 years.

Dante Larini

Public Event Curator at CERN. Participated in a programme at IdeaSquare as a Master's student in 2015.

As a graduate student, you attended an initiative called 'C4SI Collaborate for Social Impact' at IdeaSquare. What were your main learnings from that first experience?
IdeaSquare brings down barriers, because you have different people from different horizons, and the environment is really quite informal, full of stimulating colours and stimulating people who tend to be creative. It would be very different, for example, if you were doing a brainstorming exercise in a corporate office or an office block!

Did being at IdeaSquare influence how you did things afterwards?
It was the first time I had done an ideation process, and I participated in prototyping and brainstorming. I am still using some prototyping in my work, having joined CERN a few months ago. I did a workshop in November, for example, with dancers for young kids. I didn't know whether it would work or not, so it was kind of a test. So, indirectly, yes, that's associated with the prototyping process, but I also do brainstorming and use ideation at the start of a new process.

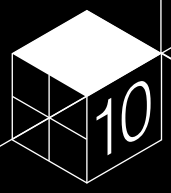
In your new role of organising outreach activities for CERN, do you see IdeaSquare as part of the mission to bring CERN closer to a bigger audience?
I would like to include IdeaSquare in future projects. I'll give you an example. In April, one of our events for kids will be looking at quantum science through the lens of comics and superheroes. We're going to have a workshop at the labs in the Science Gateway. And in the future, I would love to do such an activity with IdeaSquare.

Innovation knowledge

Collecting and sharing experiences and findings

Since its launch in 2017, the CERN IdeaSquare Journal of Experimental Innovation (CIJ) has filled a gap that previously existed in the publication of innovation research. Today, CIJ is an essential tool for the sharing of evidence-based results related to interdisciplinary experimental innovation, including process methodologies, educational approaches, knowledge exchange, management and policy. It seeks to broaden horizons regarding this field of research, and open the door for both those at IdeaSquare, including its students, and external contributors to make their ideas and insights more widely known.

In 2023, CIJ added an extra issue per year, moving from 2 to 3.



388 authors have contributed so far from 25 countries and 117 affiliations

8 volumes

18 issues

18 editorials

95 original articles

9 Coffee Papers

4 **Methodological Notes**

4 **ATTRACT** Socio-economic studies

2 **editors-in-chief**
Prof. Saku Makinen (2016-2023)
Matteo Vignoli (2023-)

Matteo Vignoli

Editor-in-Chief of CIJ. Associate Professor at the University of Bologna. PhD in Management Engineering.

CIJ's goal is not only to collect information and knowledge. It is a platform for education, but also for creating community and sharing knowledge."
—Lauri Valtonen, Co-Managing Editor for CIJ, and Research Team Lead

What was the thinking behind the creation of CIJ?
IdeaSquare as a Design Factory was the first to think that we not only needed to create impact with programmes and by connecting people, technology and society. We also needed to experiment with novel methodologies in the spirit of CERN, document what has been done, reflect on it, develop it using a scientific method. So, we needed to promote research on what was happening and publish it. But we found there was a hole, there was no outlet that would publish those kinds of articles. Not a physics journal, and management literature was not ready for these methodologies. So we said, "You know, when something isn't there, somebody has to create it." And we decided that IdeaSquare needed to create a journal that would document these developments, programmes, ideas and achievements that were really interesting, not only for the people involved, but also for the wider community.

Was it difficult to get it established?
People said that it was a crazy project, because establishing a new journal is really rare and hard and courageous. But IdeaSquare is the bridge between innovation, science and society, so the journal is a natural extension, it's part of the cultural project that is behind IdeaSquare. Many other research institutions and universities were really interested in what work IdeaSquare was doing and having knowledge that is actually formalised is one of the best ways to disseminate results. It was the first journal to publish this kind of innovation experiment at the intersection of management, design, engineering, science, art and humanities and education.

How would you describe CIJ?
It's for misfits, for people who think "I am a designer involved in innovation management and entrepreneurship. I don't fit into a single category because I am creating something new by combining education with science and blending innovation with technology and society." You know, if you try to publish something like that in a design journal, they'll say, "No, that's not design." And if you go to an entrepreneurial journal, they say, "That's not entrepreneurship, that's not innovation," because you're mixing things in new experiments and new understanding of what those things are worth, and that's what CIJ stands for, forward-thinking pieces. A lot of people told us at the beginning, "What are you doing? There's no space for this." It's not meat or fish. It's a paella. It's something that cuts across categories, it's crossing disciplines promoting experimentation in the true spirit of CERN.

Content 2024

1 volume
3 issues
3 editorials
2 Methodological Notes
2 ATTRACT Socio-economic studies
3 Coffee Papers
17 original articles
Special Issue on 'Innovations in Career and Life Design'
+15% increase in new authors
+25% increase in affiliations
+40% submissions received compared with 2023
+60% of articles published compared with 2023
We reached a record of 3,134 article views in June 2024

What is happening with CIJ today?

People are increasingly submitting to the journal, viewing it as an interesting publication and outlet for their research. Significantly, CIJ doesn't only innovate in terms of its content, but also in the formats used to publish articles. For example, in 2024, it started publishing Methodological Notes to educate authors on different methodologies – discover more about the varied formats on the right. CIJ also has a project to educate younger communities through Summer Schools. In the journey of a startup journal, it's necessary to show that it's part of a system where everybody is measured, where everybody is recognisable, where everybody stands on the shoulders of each other. In addition, it's a learning device, encouraging people who read it to take new directions or seek alternative solutions in their own research.

In addition to CIJ, members of the IdeaSquare team have contributed to disseminating and expanding the boundaries of innovation knowledge through their work on 2 books published in 2024:

New Frontiers in Science in the Era of AI (Springer)
An interdisciplinary book that enables scientists and non-scientists from different fields to explore fascinating historical and recent advances in physics, astrophysics, genetic evolution, neuroscience and artificial intelligence. Marilena Streit-Bianchi, a former member of CERN, was co-editor, while from IdeaSquare, Markus Nordberg, Pablo Garcia Tello, Jimmy Poulaillon, Laura Wirtavuori and Lauri Valtonen collectively wrote a chapter titled 'Addressing Societal Challenges with the Help of AI from Student Teams at IdeaSquare, CERN'.

Big Science, Innovation, and Societal Contributions: The Organisations and Collaborations in Big Science Experiments (Oxford University Press)
Edited by Shantha Liyanage, Marilena Streit-Bianchi and Markus Nordberg, and with two chapters written by Pablo Garcia Tello, this book examines how Big Science projects evolve to solve complex scientific problems, consequently addressing critical social challenges.

Our special content formats

_IdeaSquare Coffee Papers
In parallel to the main journal, since 2017 CIJ has published 'IdeaSquare Coffee Papers', which are lighter, food-for-thought pieces. These collaborative articles, written by anonymous researchers from different fields, visiting or staying at I2, intend to provoke and inspire as much as those in the main journal.

_Methodological Notes
This is a special chapter dedicated to methodological papers aimed at inspiring innovation researchers to explore and embrace diverse applied methodologies in their work.

_Special Issues
From its launch, CIJ has produced Special Issues focused on specific themes. Since 2021, one volume a year has been reserved for these concepts, such as 'Experimenting with Challenge Based Innovation' and 'Using Science for Greater Good'.

_ATTRACT Socio-economic studies
In 2022, CIJ became a central platform for supporting the socio-economic research component embedded in ATTRACT Phase 2.

"The purpose… of CIJ is to provide an open platform and a data depository for socio-economic innovation research. CIJ is interested in the social dimensions of experimentation in innovation."
—Saku Mäkinen, Martin Steinert, Matteo Vignoli, Julian Birkinshaw, Markus Nordberg

Vol 1, No. 1 (2017) CERN IdeaSquare Journal of Experimental Innovation

Valeria Brancolini

Managing Editor of CIJ. Freelance Publishing Consultant, Science Editor and Writer. Former CERN Publisher (2013-2018)

What challenges are you facing in moving CIJ forward?
For example, the first time that we applied for the Web of Science, they asked straight away which category we belong to. It's true that CIJ doesn't really belong to the categories it's in, and I think we should stress this in our new application to the Web of Science. Once you want to play the game of other people, there are some rules you have to follow. And, the journal game is made up of a lot of rules. But this aligns very much with the CERN spirit of experimentation, of serendipity and not being willing to fall into the constraints of society's schemes. We're facing the challenge of needing to follow the mainstream and needing to be in a category, and at the same time bringing forward something different, a new attitude. CIJ is rare in the world of journals, which is still very conservative. So we need to communicate more about the specific characteristics of CIJ.

IdeaSquare is filled with people whose dreams and determination fuel new possibilities, creating a place where dreaming and doing go hand in hand. Looking to the future, we aim to keep building a space where we use what's known to find what's new. And, if things go our way, we hope this creative spirit will ripple through CERN and beyond, spreading curiosity, collaboration and change from a youthful perspective.
After all, we are still young – only 10 years old. There's a whole world left to discover, and you have a licence to dream.

What's next?

Our ongoing experimentation in innovation knowledge

"IdeaSquare can help us comprehend how society is evolving and the problems it's facing, and what may be done while there's still time. It's an exciting place where we can try things out and feel comfortable looking at problems from all sides."

—Robert Cailliau, Co-Author of the first hypertext system for CERN.
IdeaSquare's Innovator in Residence

Our pillars for the next 10 years

What's next for IdeaSquare? As an innovation hub, I2 wants to keep supporting both CERN and multidisciplinary young innovators, become a global reference in collaborations between science and society, and ensure that our innovation knowledge reaches as far as possible, all in the name of seeking solutions to real-world issues.
Each of IdeaSquare's endeavours has a vision for the future. In the following pages, we provide a brief exploration of what the next 10 years at I2 could look like.

Advance CERN's mission by bringing science and society ever closer
Continue developing innovation knowledge for the collaboration between science and society, to find answers to global problems

Expand I2's position within the European and global innovation landscape
Add value to Europe by creating new models for and contributing to the continent's innovation

Promote an innovative education ecosystem
Train the change-makers of the future and facilitate transformation

Guadalupe de Córdoba

Head of Area of the Deputy Directorate-General for International Consortia, Organisations and Scientific Infrastructures at the Spanish Ministry of Science, Innovation and Universities. Head of the Spanish Delegation on the CERN Finance Committee.

What do you think is the most important impact of IdeaSquare on students and education?
One of the key aspects for me is the importance of free thinking and how it translates into education systems. Current educational programmes are well-structured, but I believe they lack that spark of freedom to explore ideas outside the rigid frameworks we often impose. In Spain, and perhaps elsewhere, students are still placed on structured paths, rather than being encouraged to generate and develop their own ideas. IdeaSquare offers an environment where students can break away from these limitations and truly innovate.

How do you see the role of IdeaSquare in the future?
I believe IdeaSquare has the potential to be an even bigger driver of change. The ability to expose students to multidisciplinary environments and allow them to work on real challenges fosters creativity and independent thinking. However, I also think it is essential to increase awareness of IdeaSquare's work. There needs to be more visibility, so more students and institutions can benefit from this model. It's a powerful approach that should be more widely adopted across Europe.

A vision grounded in a set of core values.

Openness and collaboration to encourage free communication, thinking and cooperation, strengthen connections and facilitate new ways of collective working.

Embracing diversity by welcoming individuals from all social, cultural and geographic backgrounds, as well as from all educational disciplines and levels of experience.

Integrating different cultures to promote cultural understanding and synergy, recognising that global challenges require a diversity of perspectives.

Generating transformative innovation that is driven by a shared commitment to creating impactful change.

Dedication to excellence, which is not only innovative, but also sustainable and effective in addressing societal challenges.

In 2024:

+2,400
people passed through IdeaSquare

83.3%
occupancy rate and growing!

IdeaSquare is almost at full capacity. To keep expanding our impact and be able to benefit more people and institutions, I2 needs to grow in both space and team members.
At the time of writing, the expected occupancy at IdeaSquare for 2025 is 93.5%, representing a 10% rise compared to 2024. Although this is extremely gratifying, it also means we need to carefully consider our next steps. Because another 10% rise means…

Continuing to support CERN

Advance CERN's mission by bringing science and society ever closer

IdeaSquare is committed to training new generations of innovators in scientific approaches and CERN expertise, pushing the boundaries of science and technology to address societal issues. We have seen that providing unique prototyping facilities for researchers and fostering interactions with students, but also between people from different parts of CERN, creates a knowledge exchange that can lead to innovative ideas, hypotheses and applications.

A hub to boost R&D&I

The outlook for R&D&I at IdeaSquare is intricately entwined with the ongoing projects at CERN – such as ATLAS Upgrade and CENF – and the numerous activities undertaken by its Knowledge Transfer group. As CERN continues its mission to undertake world-class fundamental research in particle physics, and the KT group seeks to create opportunities to transfer CERN's technology and know-how, I2 will remain at their side for hosting and facilitating their innovative work.

Advance experimentation through prototyping

With demand growing, facilities will be upgraded and expanded as and when it's possible to provide a state-of-the-art experience, and its technical training and advisory services on prototyping will be supplemented.

Communicating CERN's value to the general public, member states and decision-makers

A primary objective in this area is the strengthening of ties with CERN Science Gateway. This collaboration is already underway, with guided tours of IdeaSquare available to visitors and this service has seen significant demand. Additionally, starting in August 2025, a new initiative will be introduced: hands-on mini-workshops for the general public, focusing on specific scientific aspects of CERN's activities. Ideas have also been presented regarding making the path from the Science Gateway to IdeaSquare more inviting, e.g. putting in little games along the path or an eye-catching installation in front of IdeaSquare.

IdeaSquare constantly welcomes visits from several CERN Council delegates and from governmental delegations in which it highlights the links between science and society. And the collaboration with CERN ILOs is growing, to identify links that add value to member states.

I think the Science Gateway is really interesting and insightful in many ways for a lot of people. But it only takes you so far. IdeaSquare is about coming to CERN, seeing how it really functions and how the people there work together. IdeaSquare's activities include a visit to see some of the experiments, so you get insights into what CERN is. When you get involved in a programme at IdeaSquare, you reach a deeper level of understanding of what CERN is, and what CERN can mean to you."
—Jan Visser, Industry Liaison Officer for the Netherlands

I believe IdeaSquare has the potential to continue being a hub for innovators and curious minds, fostering groundbreaking collaborations. Its unique environment will undoubtedly continue to inspire scientific and technological advancements in ways we may not even foresee today."
—Umut Kose, Scientist, Researcher on the Hyper-Kamiokande and FASER projects at CERN

Our next endeavours

Support to nascent R&D&I initiatives inside the CERN community

Photonics for HEP

Superconductivity Global Alliance

Hub for the young community at CERN by establishing a network of Science Diplomacy specifically run by and oriented to young scientists, and supporting the process of writing and (if funded) coordinating their first EU grant application.

Host activities linked to the development of high-performance electronics and detectors with applications to large-area fast-tracking systems, and linked to testing Hyper-Kamiokande detectors and electronics and the developments for CMS Inspection Robots.

Contributing further to Europe's innovation frameworks

Expand I2's position within the European and global innovation landscape

A key objective is to continue adding value to Europe, by creating new models for and contributing to the continent's innovation and education ecosystem, and participating in EU projects as much as possible, harnessing the expertise we've gathered to date in this area.

European projects

IdeaSquare has built up extensive experience in coordinating and managing large-scale EU projects, and a primary goal for the future is to progress even further in this field. As well as hosting, IdeaSquare could also offer expertise on the management of potential EU projects. As the current phase of ATTRACT comes to a conclusion, I2 is in a strong position to bid for new contracts. Through strategic funding and collaboration, with initiatives like ATTRACT, we can contribute to the transformation of scientific excellence into tangible societal and economic benefits, and help secure Europe's long-term prosperity.
As well as this, I2 will continue to be an essential participant in CERN's Green Village, facilitating the testing and prototyping that is so essential to innovative sustainability projects.

Expanding beyond the field of detection and imaging technologies

ATTRACT has provided a model to enhance Europe's innovation capacity and competitiveness, to create a more integrated and well-funded European innovation ecosystem that can transform scientific breakthroughs into economic growth and global leadership. European policymakers have acknowledged this, and a dialogue has been established for its potential scalability in the next EU Framework Programme FP10.

ATTRACT Final Conference
Brussels, 2-3 July 2025
The conference will showcase how an R&D&I ecosystem could be implemented under the European values of 'Open Science, Open Innovation and Open to the World'. ATTRACT has delivered a blueprint for this concept. Participants will have a unique opportunity to gain firsthand insights into the ATTRACT model's key components, including co-innovation mechanisms, collaboration frameworks and innovation pathways.

ATTRACT Earth
Starting 4Q 2025
With a similar structure and implementation to ATTRACT Phase 1, the objective of ATTRACT Earth incorporates a significant novelty: it will be dedicated to the identification and initial development of breakthrough detection and imaging technologies to improve the models of climate change. Those technologies must be suitable for future integration in pervasive devices of everyday use such as mobile phones, portable devices and the Internet of Things.

CERN Green Village

IdeaSquare's key role in the Green Village initiative is based on the belief that sustainable innovation is only possible if next-generation entrepreneurial capacity is continuously increased.
As a result, Green Village projects can tap into the innovative minds of multidisciplinary students taking part in I2 project-based courses. These students analyse the technology being tested and generate creative solutions or services, often leading to new applications.

CERN's Green Village transforms the CERN campus into a village-scale open lab, leveraging CERN's infrastructure to test and advance sustainable technologies for urban challenges. It demonstrates solutions for net-zero cities – smart energy, mobility, waste, biodiversity and sustainable construction –, preparing them for large-scale deployment. Uniquely, its link with IdeaSquare engages students in reimagining these innovations, fostering fresh ideas and accelerating their impact within the European innovation ecosystem."
—Mar Capéans, CERN Senior Scientist and Head of the Site and Civil Engineering (SCE) department

New EU project!

TECH2X exemplifies IdeaSquare's continued dedication to fostering innovation and entrepreneurial ecosystems, connecting students, researchers and industry partners, and enhancing Europe's capacity to cultivate transformative technological solutions for societal impact. The project also promotes gender equality and inclusivity by offering dedicated mentorship and support to women entrepreneurs.

EIT HEI Initiative TECH2X project: Accelerating Deep-Tech Entrepreneurship in Higher Education

IdeaSquare is playing an essential role in the new TECH2X project. TECH2X is a pioneering initiative funded under the European Institute of Technology's Higher Education Initiative (EIT HEI), aimed at boosting innovation and entrepreneurship capacity in HEIs for the enhancement of deep tech. Between 2025 and 2027, TECH2X will address the growing need for universities to transition into 4th-generation institutions by fostering collaborative and transformative mindsets essential for addressing complex societal challenges.

Central to IdeaSquare's involvement is the provision of training and methodologies for innovative tech-driven courses at partner universities, using IdeaSquare's proven methodologies that combine design thinking and challenge-based innovation to foster student creativity, collaborative skill sets and entrepreneurial confidence. By the project's end, TECH2X will have directly trained over 800 students and advanced competencies in deep-tech innovation and entrepreneurship among researchers, academics and KTOs.

TECH2X consortium

- CERN IdeaSquare
- Esade (project coordinator)
- UNIBO - University of Bologna
- METU - Middle East Technical University
- HSMA - Hochschule Mannheim
- Almacube business incubator
- plus 6 associated European universities

Alise Pika-Ozola

Industry Liaison Officer for Latvia. Former Economic Policy Advisor to the President of Latvia. Advises companies, startups, academia and investment partners on growing through impactful R&D collaborations.

How is IdeaSquare contributing to connecting science with industry?

As a public institution supported by member states, CERN plays a unique role in Europe. IdeaSquare provides a platform where people can engage freely, explore ideas and rethink how they approach innovation, whether by improving a product or shaping new ways of thinking. These kinds of platforms are essential, and IdeaSquare's open environment is a major part of its appeal.

What is the value for students of having these experiences at IdeaSquare?

CERN is a world-renowned physics lab, and for students, regardless of their field, coming here is a unique experience. While CERN can only host a limited number of students, initiatives like IdeaSquare make it more accessible to those from multidisciplinary fields. I've heard feedback from Latvian students who have been here, and it completely changed their perspective. Reading about CERN or watching videos of it is one thing, but speaking to scientists, visiting the labs and interacting with the IdeaSquare team brings a whole new level of understanding.

What have you got planned with IdeaSquare for the coming months?

Recently, I introduced the two main institutions in the country engaged with CERN – the University of Latvia and Riga Technical University – to IdeaSquare to raise awareness of its work. In August 2025, decision-makers and administrative staff working in the field of innovation at the University of Latvia will come to IdeaSquare to take part in the education mission programme. It will be the first time a Latvian university has participated in it. Recently, the University of Latvia has gone through a reorganisation, and is shifting its focus much more towards creating relationships with industry and business to help knowledge transfer and innovation come out of universities more efficiently and faster. I think the collaboration with IdeaSquare will be a great opportunity to address this challenge. ⬢

Preparing the next generations of change-makers

Promote an innovative education ecosystem

Our educational initiatives stretch ever further, and we will keep seeking diverse methodologies for challenging and inspiring our students in new and meaningful ways.

IdeaSquare Planet, our new innovative flagship programme

Following a successful pilot phase, the IdeaSquare Planet (I2P) courses are a central facet of our plans going forward. Students first engage in a speculative science-fiction scenario where they address the challenges arising from the settlement of an exoplanet. This immersive experience fosters creativity, collaboration and openness to alternative futures. In a second phase, students 'return' to Earth, applying their newfound skills to real-world challenges, such as sustainability and social issues. I2P equips students with future thinking, systems thinking and strategic problem-solving skills to tackle complex global challenges with resilience and adaptability.

We keep striving for innovation knowledge

CIJ will continue providing a platform for established and younger researchers across the different fields embraced by IdeaSquare, including the creation of a PhD summer school, articles and notes regarding methodology, and attendance at established conferences, while also creating our own workshops or colloquia. Educating young people about documenting their results is also important, and we want to involve students' perspectives in what we do. Another area we're interested in is training less experienced researchers on potential methodologies for experimenting in innovation, management, design and entrepreneurship. Together, all these endeavours will strengthen our relevance and leadership.

Estonian High School at IdeaSquare Planet

High school students visited IdeaSquare for a one-week I2 Planet programme in early 2025. This was an exceptional event; usually students taking part in I2 programmes are university-level, but occasionally, younger participants are offered the chance to visit – for example, this group from Püha Johannese Kooli in Estonia.

Oleg Shvaikovsky
Teacher at Püha Johannese Kooli (St John's School) in Estonia.

As an educator, what do you particularly value about IdeaSquare ?
What I love most about the approach is its interdisciplinarity – there are no strictly defined physics or chemistry tasks, but rather a focus on thinking outside the box and building a vision based on a holistic view. I constantly emphasise the importance of open-minded and unbiased curiosity.

How do you think exposure to CERN and IdeaSquare can influence your students' academic interests?
On our way back I was hearing conversations about how to become a particle physicist. In fact the students were already showing this curiosity during our visit. There's no doubt that CERN and IdeaSquare have sparked a deeper interest in STEM. ⬢

This free thinking that IdeaSquare is promoting is needed for moving forward in the future. I think that's a critical element in innovation."
—Robert Aare, Industrial Liaison Officer for Estonia

Next steps for taking education into the future

_Manage increasing demand: New partners keep coming in, we will have to start saying "No" for the first time if we cannot expand our facilities

_New collaborations with NASA and Klang Games

_Exploring new formats to expand outreach, and tackle space and budget limitations: More programmes are taught online because some institutions cannot afford to travel, and it allows us to do programmes in parallel (Melbourne, DOMUS, Singapore)

_Investigate I2Planet as an avenue for new consortiums for funding proposals

_I2P already has a first spin-off: a 12-week Master's-level course at the Space Science Unit at Swinburne University of Technology. Cool fact: the unit leader is a real-life astronaut, Kim G Ellis Hayes.

It's also crucial to consider that IdeaSquare is an ongoing experiment, a place of constant transformation, that needs new and increasing resources to ensure its continuity, growth and impact for the next 10 years and beyond.

"IdeaSquare is the people who commit and collaborate with excellence every day to deliver something unique. Take away such people and IdeaSquare becomes an empty building without a purpose."

—Pablo Garcia Tello, ATTRACT Project Coordinator and Leader of the Development of EU Projects and Initiatives section at CERN

Contact

We would love to hear from you!
Contact us with any questions or for more information:
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