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This Physics Professor Credits Collaboration for Her Success

She has helped advance sustainable energy research

BY LIZ WEGERER 17 HOURS AGO

IEEE Senior Member Cinzia DaVià [second row, seventh person from left] at the 2025 Nuclear and Plasma Opportunities for Energy and Society workshop. CINZIA DAVIÀ

For Cinzia DaVià, *collaboration* isn't just a buzzword. It's the approach she applies to all her professional endeavors.

From her contributions to the development of a silicon sensor used in CERN (European Organization for Nuclear Research) particle accelerator experiments to her current research on portable energy generation solutions, there's a common thread.

As a professor of physics at the University of Manchester, in England, and a research professor at Stony Brook University, in New York, she has built strong connections across academic disciplines. Her continued involvement at CERN connects her with a broad array of professionals.

DaVià, an IEEE senior member, says she leverages her expertise and her network of collaborators to solve problems and build solutions. Her efforts include advancing high-energy particle experiments, improving cancer treatments, and mitigating the effects of climate change.

Collaboration is the foundation for any project's success,

she says. She credits IEEE for making many of her professional connections possible.

Even though she is the driving force behind building her alliances, she prefers to shine the spotlight on others, she says. For her, focusing on teamwork is more important than identifying individual contributions.

“The people involved in any project are really the ones to be celebrated,” she says. “The focus should be on them, not me.”

A career influenced by Italian television

As a young child growing up in the Italian Dolomites, her passion for physics was sparked by a popular documentary series, “Astronomia,” an Italian version of Carl Sagan’s renowned “Cosmos” series. The show was DaVià’s introduction to the world of astrophysics. She enrolled at Italy’s Alma Mater Studiorum/University of Bologna, confident she would pursue a degree in astronomy and astrophysics.

A summer internship at CERN in Geneva changed her career trajectory. She helped construct experiments for the Large Electron-Positron collider there. The LEP remains the largest electron-positron accelerator ever. An underground tunnel wide enough to accommodate the LEP's 27-kilometer circumference was built on the CERN campus. It was Europe's biggest civil engineering project at the time.

The LEP was designed to validate the standard model of physics, which until then was a theoretical framework that attempted to explain the universe's building blocks. The experiments—which performed precision measurements of W and Z bosons, the positive and neutral bits central to particle physics—confirmed the standard model.

The LEP also paved the way, figuratively and literally, for CERN's Large Hadron Collider. Following the LEP's decommissioning in 2000, it was dismantled to make way for the LHC in the same underground testing tunnel.

As DaVià's summer internship work on LEP experiments

progressed, her professional focus shifted. Her plans to work in astrophysics gradually transitioned to a focus on radiation instrumentation.

After graduating in 1989 with a physics degree, she returned to CERN for a one-year assignment. As she got more involved in research and development for the large collider experiments, her one year turned into 10.

She received a CERN fellowship to help her finish her Ph.D. in physics at the University of Glasgow—which she received in 1997. Her work focused on radiation detectors and their applications in medicine.

“Nothing was programmed,” she says of her career trajectory. “It was always an opportunity that came after another opportunity, and things evolved along the way.”

A fusion of research and results

During her decade at CERN from 1989 to 1999, she contributed to several groundbreaking discoveries. One involved the radiation hardness of silicon sensors at

cryogenic temperatures, referred to in physics as the *Lazarus effect*.

In the world of collider experiments, the silicon sensors function as eyes that capture the first moments of particle creation. The sensors are part of a larger detector unit that takes millions of images per second, helping scientists better understand particle creation.

In large collider experiments, the silicon sensors suffer significant damage from the radiation generated. After repeated exposure, the sensors eventually become nonfunctional.

DaVià's contributions helped develop the process of reviving the dead detectors by cooling them down to temperatures below -143° C.

Her proudest professional accomplishment, she says, was a different discovery at CERN: Her research helped usher in a new era of large collider experiments.

For many years, researchers there used planar silicon sensors in collider experiments. But as the large colliders

grew more sophisticated and capable, the traditional planar silicon design couldn't withstand the extreme radiation present at the epicenter of collider collisions.

DaVià's research contributed to the development, together with inventor Sherwood Parker, of 3D silicon sensors that could withstand extreme radiation.

The new sensors are radiation-resistant and exceptionally fast, she says.

Scientists began replacing planar sensors in the detectors deployed closest to the center of each collision. Planar detectors are still widely used in collider experiments but farther from direct impacts.

The development of the 3D silicon sensor was groundbreaking, but DaVià says she is proud of it for a different reason. The collaborative approach of the cross-functional R&D team she built is the most noteworthy outcome, she says.

Initially, people with conservative scientific views resisted the idea of creating a new sensor technology, she says. She was able to bring together a broad coalition of scientists

was able to bring together a broad coalition of scientists, researchers, and industry leaders to work together, despite the initial skepticism and competing interests. The team included two companies that were direct competitors.

That type of industry collaboration was unheard of at the time, she says.

“I was able to convince them,” she says, “that working together would be the best and fastest way forward.”

Her approach succeeded. The two companies not only worked side by side but also exchanged proprietary information. They went so far as to agree that if something halted progress for one of them, it would ship everything to the other so production could continue.

DaVià coauthored a book about the project, *Radiation Sensors With 3D Electrodes*.

A focus on sustainable entrepreneurship

DaVià has long been concerned about the impact of

extreme weather events, especially on underserved populations. Her interest transformed into action after she attended the American Institute of Architects International and AIA Japan Osaka World Expo last year.

During the symposium, held in June, panelists shared insights about natural disasters in their regions and identified steps that could help mitigate damage and protect lives.

The topics that particularly interested DaVià, she says, were excessive glacial melt in the Himalayas and the lack of tsunami warnings on remote Indonesian islands.

One of the ideas that surfaced during a brainstorming session was that of “smart shelters” that could be deployed in remote areas to assist in recovery efforts. The shelters would provide power and a means of communication during outages.

The concept was inspired by MOVE, an IEEE-USA initiative. The MOVE program provides communities affected by natural disasters with power and communications capabilities. The services are contained

within MOVE vehicles and are powered by generators. A single MOVE vehicle can charge up to 100 phones, bolstering communication capabilities for relief agencies and disaster survivors.

DaVià's knowledge of MOVE guided the evolution of the smart shelter concept. She recognized, however, that the challenge of powering portable shelters needed to be solved. She took the lead and formed a cross-disciplinary team of IEEE members and other professionals to make headway. One result is a planned two-day conference on sustainable entrepreneurship to be held at CERN in October.

"IEEE helps bring people together who might not otherwise connect."

The goal of the conference, she says, is to "join the dots across different disciplines by involving as many IEEE societies and external experts as possible to work toward deployable solutions that help improve life for people around the world."

The two-day event will include a competition focusing on solutions for sustainable energy generation and storage systems, she says, adding that entrepreneurs will share their ideas on the second day.

Her commitment to developing solutions to mitigate destruction caused by extreme weather led to her involvement with the IEEE Online Forum on Climate Change Technologies. She led the way in creating the Climate Change Initiative within the IEEE Nuclear and Plasma Sciences Society (NPSS).

She was the driving force behind securing funding for two of the society's climate-related events. One was the 2024 Climate Workshop on Nuclear and Plasma Solutions for Energy and Society. The second event, building on the success of the first, was last year's workshop: Nuclear and Plasma Opportunities for Energy and Society, held in conjunction with the Osaka World Expo.

New paths to guide others

DaVià reduced her involvement at CERN, when she joined the faculty at the University of Manchester as a physics professor. In 2016 she joined Stony Brook University as a research professor in the physics and astronomy department. She divides her time between the two schools.

She still maintains an office at CERN, where she works with students involved with particle physics. She is also an advisory board member of its IdeaSquare, an innovation space where science, technology, and entrepreneurial minds gather to brainstorm and test ideas. The goal is to identify ways to apply innovations generated by high-energy physics experiments to solve global challenges.

DaVià is the radiation detectors and imaging editor of *Frontiers in Physics* and a cochair of the European Union's ATTRACT initiative, which promotes radiation imaging research across the continent. She is an active member of the European Physical Society, and she is an IEEE liaison officer for the physics and industry working group of the International Union of Pure and Applied Physics.

She has coauthored more than 900 publications.

IEEE as the connector

DaVià's involvement with IEEE dates back to her undergraduate years, when she was introduced to the organization at a conference sponsored by the IEEE NPSS.

As her career grew, so did her involvement with IEEE.

She remains active with the society as a distinguished lecturer. She is a member of the IEEE Society of Social Implications of Technology, the IEEE Power & Energy Society, and the IEEE Women in Engineering group. She received the 2022 WIE Outstanding Volunteer of the Year Award.

She stays involved in IEEE to help her understand the work being done within each society and identify opportunities for cross-collaboration, she says. She sees such synergies as a key benefit of membership.

"IEEE helps bring people together who have similar

"IEEE helps bring people together who might not otherwise connect," she says. "We are stronger together with IEEE."