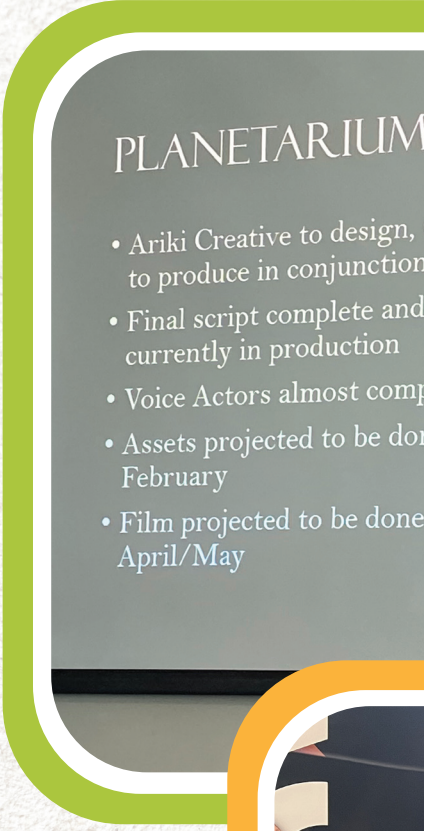
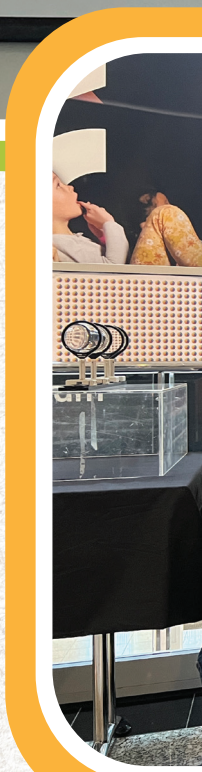
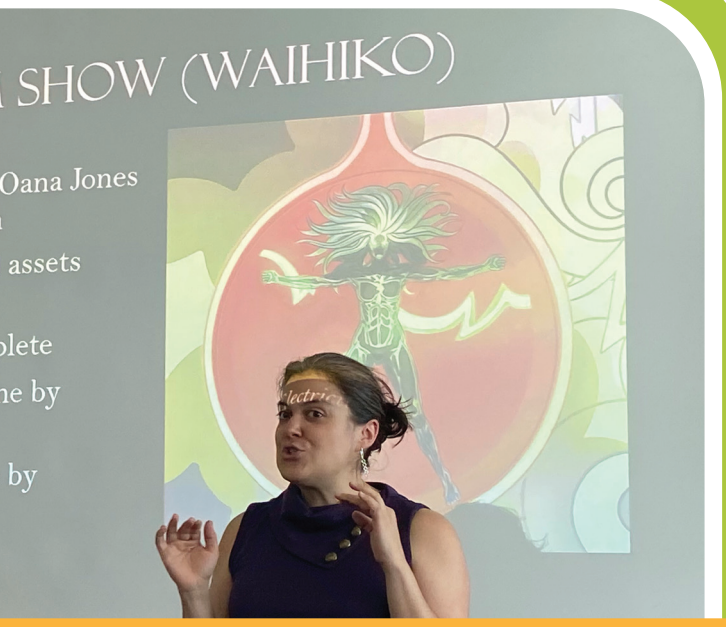




WHEN IT COMES TO SCIENCE ENGAGEMENT, HIRE A PROFESSIONAL

JESSA BARDER

Researchers don't need to do science engagement alone. Working with professionals makes the job easier and more effective and can lead to better science.



Clockwise from top left: The author delivers a science-engagement presentation at a planetarium show. Kids participate in a kaleidoscope workshop. Actors perform during the *Quantum Voyages* theater piece. The author poses for a photo with the optics chapter at the University of Otago. (Top left photo courtesy of Solar Tsunamis research programme; top right photo courtesy of Roberta Parlavecchia; bottom right photo courtesy of James Gross; bottom left photo courtesy of Museum of Transport and Technology. Design by Masie Chong with artwork adapted from iStock.com artists RilakkuMaxx and oatawa.)

"Everything is so delicious. You should be a chef!" Have you been at that dinner party? The table setting is artful, the multicourse meal is beautifully prepared, and a guest offers that heartfelt compliment to the host.

Although I understand the sentiment behind the compliment, I also know from about a decade of cooking in restaurant and catering kitchens that any guest with professional kitchen experience would probably cringe at the remark. Cooking professionally bears little resemblance to hosting a dinner party. They require different, though related, expertise and experience.

Now that I have spent seven years in my second career as a professional science engagement coordinator, that dinner party scenario flashes in my head frequently. Although many articles advocate for scientists to undertake communication and engagement activities, few of those resources recommend that research groups or departments contract with science engagement professionals. That shocks me because as important as it is for scientists to undertake science engagement activities, their main area of expertise is, in fact, doing science.

Therein lies the science engagement equivalent of the dinner party scenario: Could a skilled home cook who excels at intimate dinner parties as a hobby (but has a day job) work a Saturday night dinner service at a restaurant that will feed 200 patrons? Of course. Would they enjoy it? Probably not. Having a professional cook work the line would almost definitely yield a better result. Similarly, researchers could undertake their own science engagement activities, but hiring a professional can bring valuable coordination and communications expertise to such activities.

What science engagement provides

Even though this article focuses on the role of professional science engagement coordinators, I support the treatment of science communication as an essential skill for scientists to develop and then practice regularly throughout their careers. (Scientists looking for advice can see physicist Don Lincoln's 2025 *PT* article "A brief guide to science outreach.") I try to avoid the term "outreach" because, for me, it suggests that the science is isolated from the communities in which the research is being done.

The value of science communication to society and to science itself is something that has been studied and written about at length, both in opinion pieces and in research literature. In 2010, for example, Research Councils UK published a report that grouped the benefits of public engagement into four categories: career inspiration, raising your profile, developing skills, and enhancing your research.[1] In a 2025 *PT* commentary, Lincoln wrote about how scientists' "lackadaisical view of science outreach" can end up harming them because of the disconnect that develops between them and the public.

Researchers may also want to do science engagement because it helps them get funding. NSF evaluates funding proposals according to not only their "intellectual merit" but also their "broader impacts."

Science engagement has other benefits, including opening career pathways to students from historically marginalized communities.[2] It can lead to increased diversity in research groups and institutions, and that brings different perspectives and approaches to problem-solving and can drive greater innovation and creativity.[3]

More broadly, the efforts of scientists to connect with communities of all ages

The first installment in a series of graphic novels, codeveloped and cowritten by the author of this feature and Māui Studios, integrates Māori culture and knowledge with quantum physics. It's available to download for free at www.doddwalls.ac.nz/our-impact/community-engagement.

and backgrounds can build and strengthen trust and understanding in the rigorous processes by which science builds knowledge.[4] When carried out effectively, science engagement is a powerful tool against the spread of dis- and misinformation in communities and can even generate public support for taxpayer-funded research.[5] Furthermore, science engagement can contribute to culture by inspiring works of art, music, theater, and dance.[6]

What is a science engagement coordinator?

Coordinating science engagement activities requires a lot of effort and time. When asked about the barriers to participating in or undertaking science engagement, researchers most often identify time constraints, a factor that is usually correlated with a lack of institutional support and a lack of skills.[7] One respondent in a study by researchers from the University of Tasmania emphasized that scientists "cannot be experts in everything."[8]

Researchers, therefore, may benefit from experts in science engagement. I am employed by the physics department at the University of Otago–Ōtākou Whakaihu Waka in Dunedin, Aotearoa New Zealand. (Aotearoa is the Māori name of the country.) In addition to supporting the department, I coordinate community engagement for Te Whai Ao—Dodd-Walls Centre, which is the country's national center of research excellence in photonics and quantum physics. Similarly to most academic researchers, I conduct much of my work with the support of external funding, and part of my job is to help bring in more funding.

My job as a science engagement coordinator represents a superposition between a project coordinator and a science communicator.

At ASB Polyfest, the largest Pasifika cultural festival for secondary schoolers in the world, a volunteer demonstrates how eddy currents will slow a magnet's drop through conductive materials.

The first part of my job is development. I specialize in hands-on, informal science engagement activities. I spend time with the academic and technical staff members of my department to develop activities that connect to their work, including demonstrations, games, craft-based activities, engineering or design challenges, puzzles, and experiments. I've developed rocket workshops to get people thinking about Newton's first law and about the importance of payload weight. I've built an ice variation of the game Jenga for a team that studies ice dynamics.

I've developed a series of puzzle challenges that explores the evolution of cryptography, from ancient scytale ciphers to the modern RSA encryption that secures the internet. Accompanying resources include a basic introduction and model of quantum key distribution, a protocol that uses entangled photons as encryption keys. In the model, two people can attempt to encrypt and decrypt messages sent to each other while a third person tries to measure the key that they need for decryption. The exercise reveals that the measurement process alters the keys that the two communicating parties are working with, and so they know immediately that someone is eavesdropping.[9]

Currently, I am codeveloping storylines for a series of graphic novels with Māui Studios, a Māori creative agency based in Christchurch. Each novel's storyline features a quantum concept portrayed as accurately as possible—kind of an antithesis to *Ant-Man*, you might say. The work is possible because I have access to my university department of physicists who not only believe that the activities are valuable but also are willing to help.

After developing the engagement activities,I deliver

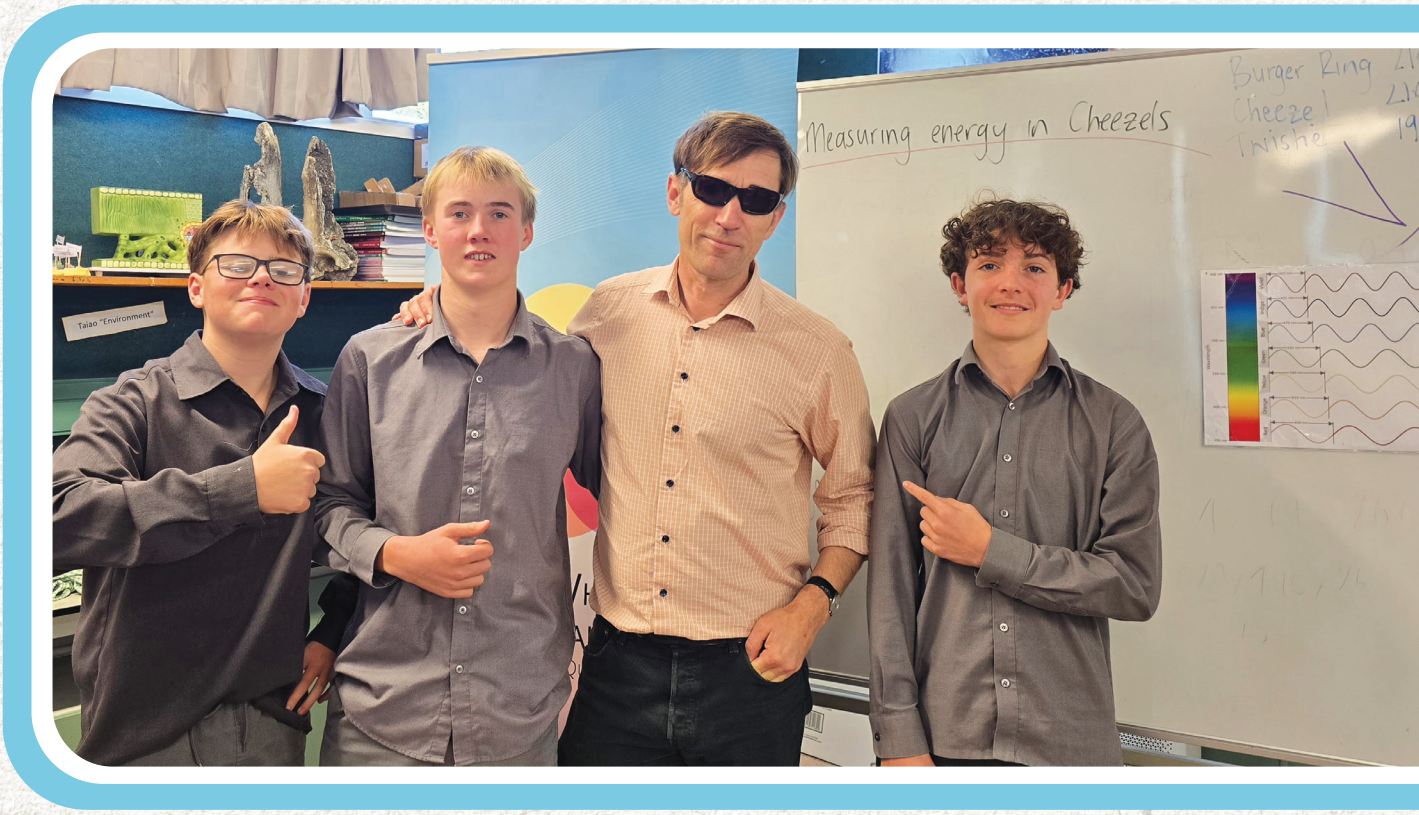
them with department members or research teams at community festivals, family fun days, class visits, pub talks, and school-holiday programs. I adjust content according to time frames, audiences, and locations: Is the event for 5-year-olds outside on a rugby field? A group of 70-year-olds in an auditorium? A class of 13-year-olds right after lunch? (Yes, the time of day absolutely matters.) Will teachers or caregivers be around?

I handle the back-and-forth with the event organizer and school or community contact, complete the health and safety paperwork, wrangle volunteers from my university's academic and technical staff, sort travel bookings, get all the equipment and gear to the site, and coordinate everything else associated with the event. My work takes me all over Aotearoa New Zealand.

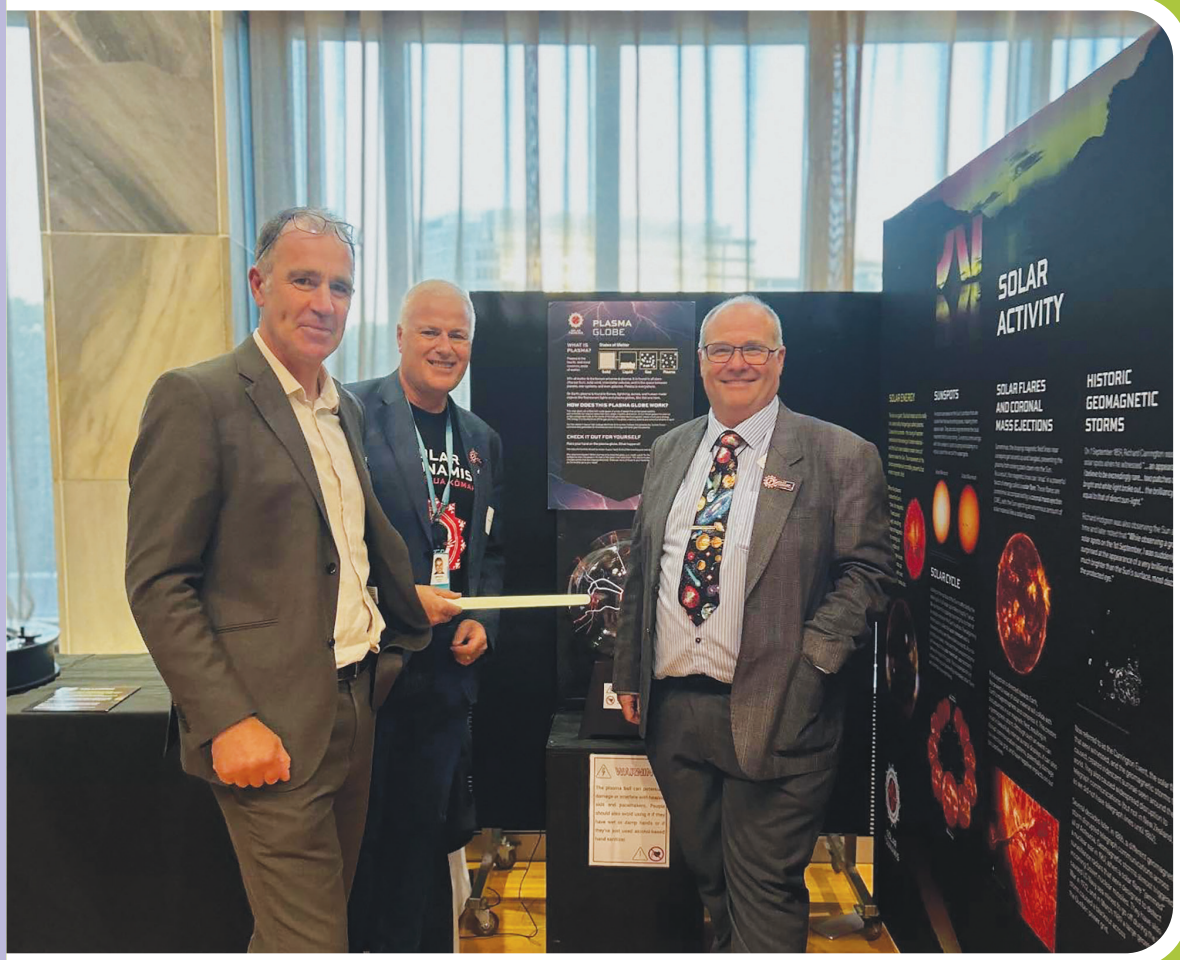
Studies show it is essential not only to work with students and teachers in a formal learning setting but also to deliver informal science engagement activities that include students' wider support network, particularly their families.[10]

That approach extends the life of any positive impact the activities have by empowering the students' grown-ups, as I call them, to reinforce and recall the activity at home. Incorporating the students' grown-ups into the activity also helps the grown-ups overcome any anxiety or insecurity they might be feeling about their own ability to engage with STEM subjects. The approach is particularly effective in families where the grown-ups may not have attended a university. Broadening the grown-ups' horizons helps broaden the children's.

Then I conduct a debriefing with department staff and teachers that I've been coordinating with to evaluate the programs and activities. Are they having the desired impact? What needs to change? I



Niels Kjærgaard of the University of Otago and Te Whai Ao—Dodd-Walls Centre and year-nine students at a school in the Southland region of Aotearoa New Zealand participated in a 2025 science department tour. When the author returned to the school this year without Kjærgaard, the same three boys asked after him. (Photo courtesy of Kowhai Charlton.)



Aotearoa New Zealand member of parliament Scott Willis (left), Transpower senior principal engineer Andrew Renton (center), and Craig Rodger of the University of Otago's physics department (right) stand by an installation explaining a plan they developed to protect the national grid from major space-weather events. The temporary installation was on display at the interactive science showcase *Solar Tsunamis–Parawhenua Kōmaru* at the Tūhura Otago Museum.

liaise and maintain connections with teachers, community organizers, artists, cultural leaders, libraries, and museums around the country. I'm always open to building new relationships to see what is going on or if there is a new community to work with. I also try to stay up-to-date on research coming out of the science communication field.

Bringing in a professional

If you're a researcher who's interested in getting you and your department involved with science engagement activities, you should consider working with a professional. But how can you persuade your department head or principal investigator to invest even a bit in someone like me?

There are three primary areas in which science engagement professionals deliver the most value.

Time. I went into some detail about my job because I wanted to illustrate how much development, organization, and evaluation are required for effective science engage-

ment activities, especially for groups doing them for the first time.

Working with a professional reduces the amount of time that a scientist or researcher is required to do things that aren't lecturing or research. Plus the experience of science engagement professionals provides the scientist or researcher with insights to handle projects more efficiently. We know when the design of a demonstration isn't going to work because it's too easy to break or that a sugared-up preteen can unintentionally weaponize it. We know which questions will likely get asked by different demographics or, if we ask a question, which answers will likely be given. We also have a solid feel for how many activities will fill up a 45-, 60-, or 90-minute program for different demographics and venues.

We are more than happy to work independently or share our methods, whichever would be most beneficial for you. Time and effort shouldn't be a barrier to your participation in quality science engagement activities.

Impact. Achieving a desired impact sometimes requires thinking outside the box. Professional science engagement coordinators are particularly adept at that because a major part of the job is building and maintaining a diverse network of personal connections. Sometimes, people fall into the trap of thinking that only scientists can communicate science—but excellent science communicators can, and often do, come from the humanities and social sciences, precisely because so much of the communication work is about humans.[11]

Once an activity is finished, then an engagement coordinator needs to measure or evaluate its impact. Articles recommending that scientists participate in communicating their science will often mention evaluation and assessment of the engagement activities as an important part of the process. Guidance on how to do that beyond "counting audience members" or "counting likes and shares" is harder to come by outside of science communication research.[12] That's because tracing outcomes is not a straightforward process. Being able to draw a direct line of causality from someone participating in an event to them choosing a STEM pathway is highly unlikely because that's not how humans work.

How many people participated in the activity is only one of several factors that a coordinator considers when evaluating impact. If you want more rigorous, ongoing evaluation, outsourcing the analysis to a professional science engagement coordinator can prove immensely valuable to any informal science engagement activities your research team or department chooses to invest in.

Better science. The science engagement activities that professional coordinators organize can lead researchers to do better science. One postdoctoral fellow commented that he appreciates the new perspective he has for his research in spectroscopy after hearing me describe it to a four-year-old as "reading rainbow code." Now, when he starts to feel frustrated, he opens the thank-you card we got from the preschool after our visit and remembers some of the magic and wonder that science can bring.

Another research fellow I've worked closely with for over a year learned communication skills from public events that I facilitated. She's now taking those skills and designing her own interactive demonstration to add to her overseas invited guest lecture to undergraduates at a summer school.

Two PhD students in the physics department at the University of Otago shared their appreciation for two engagement programs I developed for them that required travel to different cities. They reflected not only that they appreciated the value of engaging the communities we visited but also that the trips presented opportunities to build new collaborations across universities in Aotearoa New Zealand. One of them emailed the director of Te Whai Ao—Dodd-Walls Centre to say, "I have found outreach to be more than just community engagement, but also a great opportunity to visit other places and meet others in the field."

Where can I get a coordinator?

We're probably a lot closer than you think. I, along with a lot of other professional science coordinators who I know, came from jobs at museum engagement programs and often with a postgraduate degree in social science. Partnering with museums and science centers can provide access to great venues for talks, and those places will often already have networks in the community.

I have also met some incredible science communicators who have backgrounds in theater. Actor Alan Alda, for example, started a second career in science engagement and founded a science communication

center. Programs that offer degrees in science communication can point you toward their alums—who may well be working in a nearby museum.

As the professional practice of science engagement continues to grow, researchers are starting to see that working with a professional has significant value.[13] That's not to say that scientists can just check out because we've got this handled. You're not escaping my shoulder tapping that easily—my work depends on a close relationship with experts. But the responsibility doesn't need to rest exclusively on your shoulders, and you don't need to be experts in everything, including engagement. PT

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▲ The author ran an after-school science engagement program at Aotearoa New Zealand's Tūhura Otago Museum in 2022. (Photo courtesy of Tūhura Otago Museum.)

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