Quantum Science Careers

Developed by APS Public Engagement

modeled after the STEP UP Careers in Physics Online Matching Tool

This tool can be used for any level. It matches students to relevant quantum scientists' profiles based on their interests and values. They can then research, create their own profiles, and discuss with the class. Encourage your students to take this interactive Career Matching Survey to see what Quantum careers fit them best.

STEP 1: Provide students with the following survey. Have them think about what career types excite them and what they think they will value in their job.

Quantum Career Goals Pre-Survey

Q1. Mark the **three** most important factors for your future career satisfaction:

- ❏ a. Making money
- ❏ b. Helping other people
- ❏ c. Having job security
- ❏ d. Working with people
- ❏ e. Having lots of family time
- ❏ f. Having an exciting job
- ❏ g. Making use of my talents/abilities
- ❏ h. Impact sustainability and society

Q2. Mark **two** areas you are most interested in:

- ❏ a. Administration/Management
- ❏ b. Arts/Media
- ❏ c. Astronomy
- ❏ d. Biology
- ❏ e. Chemistry
- ❏ f. Computer Science
- ❏ g. Education/Academia
- ❏ h. Engineering
- ❏ i. Quantum Science
- ❏ j. English/Writing
- ❏ k. Medicine/Health
- ❏ l. Physics
- ❏ m. Technology
- ❏ n. Sociology

Profile Matching Matrix

How to use the table:

1: Have students look at their responses to Question 2 (Q2, left-most column) and mark (highlight, star, circle) the rows that match their responses.

Example: *Sally chooses **e** (Astronomy) and **j** (Arts/Media) for **Q2**. She goes to the table and sees three people listed for **Q2e** and two for **Q2j**. Once she highlights/circles the responses she moves on to the next step.*

Q2	PROFILES	Q1						
		a	b	c	d	e	f	g
e	Kelle Cruz - Astrophysicist	-	-	-	✔	✔	✔	✔
e	Gabriela Gonzalez - Astrophysicist	✔	-	✔	✔	-	✔	-
e	Sara Seager - Astronomer and Planetary Scientist	✔	-	✔	-	-	-	✔
j	Dianna Cowern - YouTuber	✔	✔	-	✔	-	✔	✔
j	Laura Kasian - Production Technician/Software Engineer	✔	-	✔	-	-	✔	✔

2: From the groups marked in Step One, mark the columns she chose for Question 1 (Q1, columns on the right) noting that ✔ indicates recommended profiles to read and " - " denotes a less relevant profile to read.

Example: *For **Q1**, Sally picks **b** (helping other people), **d** (working with people), and **e** (having lots of family time). She goes to the table and highlights or circles columns matching her responses, taking note of every one that has a ✔.*

Q2	PROFILES	Q1						
		a	b	c	d	e	f	g
e	Kelle Cruz - Astrophysicist	-	-	-	✔	✔	✔	✔
e	Gabriela Gonzalez - Astrophysicist	✔	-	✔	✔	-	✔	-
e	Sara Seager - Astronomer and Planetary Scientist	✔	-	✔	-	-	-	✔
j	Dianna Cowern - YouTuber	✔	✔	-	✔	-	✔	✔
j	Laura Kasian - Production Technician/Software Engineer	✔	-	✔	-	-	✔	✔

3: Once all the responses have been marked, find the people selected that have the most ✔ marks that match the student's responses.

Example: *Sally highlights/circles her choices in yellow and sees that two profiles have the same number of ✔ marks. She then reads the job title of the profiles that have tied with the highest number of ✔ marks and chooses the one she finds most interesting.*

Q2	PROFILES	Q1						
		a	b	c	d	e	f	g
e	Kelle Cruz - Astrophysicist	-	-	-	✔	✔	✔	✔
e	Gabriela Gonzalez - Astrophysicist	✔	-	✔	✔	-	✔	-
e	Sara Seager - Astronomer and Planetary Scientist	✔	-	✔	-	-	-	✔
j	Dianna Cowern - YouTuber	✔	✔	-	✔	-	✔	✔
j	Laura Kasian - Production Technician/Software Engineer	✔	-	✔	-	-	✔	✔

STEP 2: Have the student follow the direction above to find profiles of quantum scientists that match their interests and values. Have the students read the profiles for one or two of their matches.

Profile Matching Matrix

After completing the **Career Goals Pre-Survey**, find which career profiles best fit your response using the table below. See next page for instructions.

Q2↓	**Q1 Responses →** **Profiles↓**	**Q1a**	**Q1b**	**Q1c**	**Q1d**	**Q1e**	**Q1f**	**Q1g**	**Q1h**
Q2a	Michael Bennett		✔				✔	✔	
Q2b	Inès Montaño						✔	✔	
Q2b	Joan Étude Arrow		✔		✔	✔		✔	
Q2b	Alex Tingle	✔	✔	✔	✔		✔	✔	
Q2b	Philip Chrostoski				✔		✔	✔	
Q2c	Michael Bennett		✔				✔	✔	
Q2c	Inès Montaño						✔	✔	
Q2c	Joan Étude Arrow		✔		✔	✔		✔	
Q2c	Philip Chrostoski				✔		✔	✔	
Q2c	Randy K. Dumas	✔	✔				✔	✔	
Q2c	Soyoung Shin						✔	✔	✔
Q2d	Yorick Andeweg	✔					✔	✔	
Q2d	Inès Montaño						✔	✔	
Q2d	Travis Humble		✔	✔			✔		
Q2e	Inès Montaño						✔	✔	
Q2e	Joan Étude Arrow		✔		✔	✔		✔	
Q2e	Travis Humble		✔	✔			✔		
Q2f	Yorick Andeweg	✔					✔	✔	
Q2f	Mariia Mykhailova	✔					✔	✔	
Q2f	Shavindra Premaratne				✔		✔	✔	
Q2f	Joan Étude Arrow		✔		✔	✔		✔	

Q2f	Diana Franklin	✔	✔					✔	
Q2f	Marina Radulaski	✔	✔	✔	✔		✔	✔	
Q2f	Philip Chrostoski				✔		✔	✔	
Q2f	Itay Hen				✔	✔	✔	✔	
Q2f	Travis Humble		✔	✔			✔		
Q2f	Alexander Radnaev		✔				✔	✔	
Q2f	Soyoung Shin						✔	✔	✔
Q2g	Yorick Andeweg	✔					✔	✔	
Q2g	Michael Bennett		✔				✔	✔	
Q2g	Mariia Mykhailova	✔					✔	✔	
Q2g	Kiera Peltz		✔				✔	✔	
Q2g	Inès Montaño						✔	✔	
Q2g	Joan Étude Arrow		✔		✔	✔		✔	
Q2g	Diana Franklin	✔	✔					✔	
Q2g	Julius de Rojas				✔		✔	✔	
Q2g	Marina Radulaski	✔	✔	✔	✔		✔	✔	
Q2g	Peter Brereton		✔				✔	✔	
Q2g	Philip Chrostoski				✔		✔	✔	
Q2g	Itay Hen				✔	✔	✔	✔	
Q2g	Soyoung Shin						✔	✔	✔
Q2h	Yorick Andeweg	✔					✔	✔	
Q2h	Michael Bennett		✔				✔	✔	
Q2h	Shavindra Premaratne				✔		✔	✔	
Q2h	Inès Montaño						✔	✔	
Q2h	Anjul Loiacono	✔	✔			✔		✔	
Q2h	Diana Franklin	✔	✔					✔	
Q2h	Julius de Rojas				✔		✔	✔	
Q2h	Marina Radulaski	✔	✔	✔	✔		✔	✔	
Q2h	Peter Brereton		✔				✔	✔	

Q2h	Alexander Radnaev		✔				✔	✔	
Q2h	Randy K. Dumas	✔	✔				✔	✔	
Q2h	Soyoung Shin						✔	✔	✔
Q2i	Mariia Mykhailova	✔					✔	✔	
Q2i	Shavindra Premaratne				✔		✔	✔	
Q2j	Yorick Andeweg	✔					✔	✔	
Q2j	Mariia Mykhailova	✔					✔	✔	
Q2j	Julius de Rojas				✔		✔	✔	
Q2j	Peter Brereton		✔				✔	✔	
Q2k	Anjul Loiacono	✔	✔			✔		✔	
Q2k	Travis Humble		✔	✔			✔		
Q2l	Yorick Andeweg	✔					✔	✔	
Q2l	Michael Bennett		✔				✔	✔	
Q2l	Shavindra Premaratne				✔		✔	✔	
Q2l	Joan Étude Arrow		✔		✔	✔		✔	
Q2l	Alex Tingle	✔	✔	✔	✔		✔	✔	
Q2l	Julius de Rojas				✔		✔	✔	
Q2l	Marina Radulaski	✔	✔	✔	✔		✔	✔	
Q2l	Peter Brereton		✔				✔	✔	
Q2l	Philip Chrostoski				✔		✔	✔	
Q2l	Itay Hen				✔	✔	✔	✔	
Q2l	Travis Humble		✔	✔			✔		
Q2l	Alexander Radnaev		✔				✔	✔	
Q2l	Randy K. Dumas	✔	✔				✔	✔	
Q2l	Soyoung Shin						✔	✔	✔
Q2m	Yorick Andeweg	✔					✔	✔	
Q2m	Mariia Mykhailova	✔					✔	✔	
Q2m	Shavindra Premaratne				✔		✔	✔	
Q2m	Joan Étude Arrow		✔		✔	✔		✔	

Q2m	Marina Radulaski	✔	✔	✔	✔		✔	✔	
Q2m	Philip Chrostoski				✔		✔	✔	
Q2m	Alexander Radnaev		✔				✔	✔	
Q2m	Randy K. Dumas	✔	✔				✔	✔	
Q2n	Kiera Peltz		✔				✔	✔	

STEP 3: Read 1-2 Matched Physicist Career Profiles

Yorick Andeweg - Graduate student / research assistant

I do physics research to improve atomic clocks at the National Institute of Standards and Technology (NIST)! Atomic clocks are the most accurate clocks in the world, and quantum mechanics plays a key role in how they work. Atomic clocks can be used for things like GPS, communication, and even studying Earth from space.

Growing up, I always liked to play with construction toys, such as LEGO and K'Nex. In a way, the equipment in my lab is not so different from these toys! In addition to physics, my work involves skills like electrical engineering, coding, and analyzing data.

Outside of the lab, I enjoy reading, backpacking, and playing video games.

https://www.nist.gov/pml/time-and-frequency-division/atomic-devices-and-instrumentation

Michael Bennett - Director of Education and Workforce Development

I didn't take any physics classes in high school because I thought it was just for "smart people!" But in college, I was lucky enough to be able to do research in astronomy and gave physics a try. After I graduated, I worked at a natural history museum for two years which really showed me the importance of making science something everyone can participate in and feel a part of.

Later, I went to graduate school for nuclear astrophysics (which is a mix of physics and astronomy), and after I got my PhD, I switched into working in physics education research. That means I study how people learn and teach physics. Now, I make decisions about quantum education for one of the National Science Foundation's five Quantum Leap Challenge Institutes. I get to design programs and courses that help students figure out what they want to do in the world of quantum and find careers in this exciting field.

Even though my current job looks very different from the job I thought I'd have as a high school and college student, I use a lot of skills that I built during that time: problem-solving, writing, communication, etc. This makes my job really exciting and varied – I might get to create learning materials, meet with scientists and companies, and do some research all in a single week! I really enjoy my job because it gives me an opportunity to help folks who might not think they are "smart enough" for science realize that they can develop all the skills they need to be successful. Outside of work, I really enjoy climbing and hiking, as well as doing karaoke and playing Dungeons & Dragons.

Mariia Mykhailova - Principal Quantum Software Engineer

As a kid, I knew I wanted to be a software engineer pretty early on - I had great role models in both my mother and my grandmother, one of the first software engineers in Ukraine. I started coding in year 7 in school. Later, I got my Master's degree in applied math with a fair bit of physics thrown in, and spent a couple years working as a software developer in the banking world. Then I moved to the USA to work for Microsoft - still in classical software roles.

However, I eventually realized that I wanted to work on something more challenging, something that would make use of my interest in math AND science. Luckily, that was when I learned about Microsoft's quantum program, and joined it as one of the first few software engineers working on what eventually became the Microsoft Quantum Development Kit.

Soon after the first version of the Quantum Development Kit was released in 2017, I came up with an idea of a project that would help learners master the basics of quantum computing and quantum programming - the Quantum Katas. The work on this project reminded me of my passion for education and writing, helping people learn and making it exciting for them, which I did by hosting small workshops and hackathons on quantum computing. Eventually, I took that to the next level, taking on teaching a quantum computing course at Northeastern University and writing a book, *Q# Pocket Guide*, explaining Q# (a coding language) and the Quantum Development Kit.

These days, I work on making quantum computers more reliable and spreading quantum education. In my spare time, I help young people get into the field of quantum computing, and am working on my second book, about the basics of quantum computing and creating quantum software projects. I enjoy hiking, birdwatching, and playing board games, as well as writing small fiction stories.

https://devblogs.microsoft.com/qsharp/author/mamykhai/

Kiera Peltz - CEO / Executive Director

I did not grow up knowing what quantum computing was; in fact, I learned about quantum computing for the first time in my 20s. Now I run one of the largest quantum education programs in the world and have introduced quantum computing to over 25,000 people!

I am the Founder and CEO of The Coding School, a nonprofit which helps students learn the important technical skills for the jobs of the future. Growing up, I wanted to go into politics, but when I got to college, I was discouraged from taking a beginner computer science class because I did not learn how to code in high school. Realizing that schools weren't preparing students like me with the skills needed for future jobs, I started The Coding School from my college dorm room to help change that.

Around six years ago, a volunteer who did research on quantum computing told me about quantum for the first time and encouraged me to create a program to introduce young students to it. I began researching all things quantum and knew that this was an area that young students needed to learn about! So I started Qubit by Qubit, a program focused on bringing quantum education to all students and teachers everywhere.

Even though I do not teach quantum myself, I spend my days working with quantum scientists and researchers on building fun lessons. With degrees in Political Science and Sociology, I took a non-traditional path into quantum, which shows that there is a place for everyone–no matter your background or interests–in the field of quantum.

Shavindra (Shavi) Premaratne - Quantum Systems Engineer

I was born and raised in Sri Lanka and always loved computers and technology. But in high school, I read books on Einstein's theory of relativity and became interested in physics and understanding how the world works. When attending college at University of Peradeniya (Sri Lanka), I studied Physics and took classes in Computer Science. That's when I discovered quantum computing and realized I didn't have to choose between the two– because quantum computing combines both! To learn more, I attended University of Maryland College Park (UMD) and got my PhD in physics focusing on quantum computing.

After graduating, I have been working at Intel to help build a quantum computer. I get to interact with people from a lot of diverse backgrounds including other physicists, chemists, materials scientists, electrical engineers, computer scientists, computer architects, software and hardware engineers. The best part of my job is that building a quantum computer requires a lot of problem solving that will eventually create something to transform the world, just like how normal computers transformed our lives over the past few decades. One day, quantum computers could help discover new medicines, create whole new materials, or make weather forecasts much more accurate– which I find awe-inspiring. It's amazing to use physics to solve real-world problems and help build technology of the future.

I am passionate about spreading the excitement of quantum computing, and have given talks and led workshops to help others learn more. In my free time, I enjoy volunteering, outdoor activities, and driving along scenic roads.
https://scholar.google.com/citations?user=TxvSqzYAAAAJ&hl=en

Inès Montaño - Associate Professor for Applied Physics and Materials Science

I teach quantum physics to both college and PhD students. This semester I am also teaching a new class called Introduction to Quantum Technologies, which teaches students about some of the ways quantum science is being used in the real-world. I also lead a research group called *Quantum Physics and Emerging Phenomena*, that works on a variety of topics such as materials inspired by nature that interact with light (called photonic quantum materials) and quantum tomography which uses measurements to better understand particles. I also started an outreach program called SparCQS - Sparking Curiosity in Quantum Science which helped over 20,000 people in the last year learn about quantum science.

What I love most about my work is that every day is different and that I feel challenged every single day! Quantum Science is a fascinating field! It is fun to wrap your mind around the mind-boggling concepts, introduce others to this exciting world, and to create new technologies.

https://mira.nau.edu/ines-montano/

Joan Étude Arrow - Quantum Society Fellow / Deputy Director of Education and Workforce Development / CEO of the Quantum Ethics Project

I work as a quantum researcher and lead two groups at the Center for Quantum Networks. One group focuses on figuring out how well quantum computers really work—this is called quantum algorithmic benchmarking. The other group explores quantum ethics, which means making sure quantum technology is used in ways that are fair, safe, and helpful for everyone.

I also help run a program called the Quantum Research Exchange (QRX). This program helps students from local community colleges as they look for internships at quantum companies. For this program, I create seminars on quantum technology, as well as organize events such as our quantum hackathon sponsored by Nvidia and Inflection.

As the founder and CEO of the Quantum Ethics Project I am working to ensure quantum technology harms no one and benefits everyone.

https://www.youtube.com/channel/UC44q8XljwJxWys23dnGR2rQ

Anjul Loiacono - Vice President of Quantum Matter Platforms

I lead a team that has built a research lab that studies something called an ultracold atom (also known as a Bose-Einstein condensate). Our lab is also online for people around the world to use via the cloud! That means anyone, anywhere can explore quantum science from their own computer.

For my job, I use a lot of different skills such as: problem solving, working with other people, communicating clearly, negotiating, understanding science topics such as optics and photonics (which deal with the physics of light), connecting concepts or information and being able to summarize it all well.

I've also had to learn new areas of science like atomic, molecular, and optical physics but also learn when to ask the experts for help!

https://spie.org/about-spie/equity-diversity-inclusion/women-in-optics/2018-wio-planner/anjul-loiacono

Alex Tingle - Technical Product Manager

I have called myself a scientist and inventor since I was a kid, and was even a commissioned artist by 4th grade (illustrating the cover of my dad's book). I loved both art and science, but I figured it would be easier to make art without an art degree than it would be to do physics without a physics degree. I went to the University of Colorado and studied physics, with a focus in AMO (atomic, molecular, and optical) physics. Ironically, when I graduated in 2011, two degrees in physics were still not enough to get a job doing physics, and I had to learn new skills - like how to be an engineer.

After eight years of creating products and engineering, I was able to return to physics through quantum. I am now the product manager for a cloud-accessible quantum lab (meaning anyone around the world can access it from their own computer) for research and education, where my physics background, engineering experience, and creativity are critical. My job now involves translating between diverse groups of people, including physicists and engineers, managers, and our users! My artistic eye has been useful along my entire career journey, but is especially important in this role, where I work together with marketing teams and developers to make our lab fun and easy to use.

Diana Franklin - Associate Professor of Computer Science

I lead research on how to teach quantum computing sciences to beginners, from 5th grade to early college students. This requires an understanding of quantum computing basics, learning basics, and skills in creating educational activities for young audiences.

As a child, I loved music and soccer, but I also liked teaching people. I was a tutor in middle school and worked as a teaching assistant in summer programs in high school. I love being social with people as well as the challenge of figuring out what someone does not understand and explaining it in a way that helps them.

I came from a low-income background, so I wanted a career that would provide financial stability. I started in computer architecture (a field within computer science), designing computer chips and memory. I then explored what ideas from classical architecture can be applied to quantum computers. My true passion is education, though, so I switched to computer science education research (researching how people teach and learn computer science). It is only now that I get to combine my two areas of expertise - education and quantum computing - by creating games and activities that teach quantum computing concepts. Switching fields cost me many years in my career, but I really enjoy my work now, so it was worth it. I always advise people to play the long game! Retaking a class costs you three months - but could give you a lifetime of a career!

In my job, I especially love that I am helping students discover quantum computing in a fun way. This allows me to be creative, when I am developing a new game and ideas for artwork. It is also challenging because it requires creating a game that is both fun and conveys quantum science. Finally, I enjoy getting to work with my awesome team, brainstorming ideas together.

https://people.cs.uchicago.edu/~dmfranklin/
https://quander.cs.uchicago.edu
https://canonlab.org/collapsingqubits

Julius de Rojas - Assistant Professor of Physics

I lead a research lab at Oklahoma State University that studies new materials for future computers. When I was younger, I didn't expect to go into physics or quantum science. I was always curious about how things work and how knowledge can make the world better. I also loved subjects like literature, history, art, and sociology. In the end, I think I was drawn to physics because I enjoyed working with lasers and solving challenging math problems.

At first, I thought I wanted to study archaeology or journalism. Switching to physics in college felt like jumping into something completely unfamiliar. It was hard, and I often wondered if I was good enough. What helped me was finding friends to study with and sticking with it. Eventually, I earned my degree in physics from UCLA and went on to get a PhD at UC Davis, where I studied magnetic materials.

After that, I did research in Spain and England, learning about different types of materials and how they behave. Along the way, I also discovered that I really enjoyed teaching. A lot of students think physics is too hard or only for certain people. I liked showing them they could succeed—even if they didn't believe it at first.

Since 2023, I've been building my own lab and working with students on research. I love what I do—coming up with new ideas, solving problems, helping students, and sharing the excitement of physics.

https://experts.okstate.edu/julius.de_rojas
https://cas.okstate.edu/physics/about_us/dr_de_rojas_lab/

Marina Radulaski - Associate Professor of Electrical and Computer Engineering

I was always a curious student who loved getting involved in student organizations and traveling. I went to Mathematical High School in Belgrade, Serbia, where I competed in math, physics, and computer science at national and international levels. I also started a debate club that gave me the chance to attend events all over Europe. At the same time, I joined a local science center and worked on physics projects that helped me get into scientific programs in Germany and Poland.

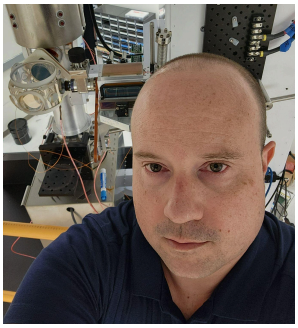
For college, I studied both physics and computer science at two different universities. I wanted to get better at modeling and understanding how nature works. But where I lived, there weren't many chances to do hands-on experiments, so I looked for internships in other countries. I met some professors from Vienna at a quantum information workshop and they invited me for a partially paid internship. Since living costs in Austria were much higher than in Serbia, I had to find extra funding. I emailed every public office and Austrian company I could find that did business in Serbia, and eventually got support from the City of Belgrade. That internship was a big turning point for me—I got to work at a top research institute led by a future Nobel Prize winner, and it sparked my interest in quantum networking and computing.

Since my university didn't offer study abroad programs, I searched on my own and found a student organization that helped me land internships in Oxford and Berlin. These summer research projects deepened my interest in quantum optics and gave me valuable hands-on experience.

Later, I applied for a summer research opportunity at Lawrence Berkeley National Lab—and now, years later, I'm an affiliate faculty member there! That experience inspired me to apply for graduate school in the U.S., and I joined the Applied Physics PhD program at Stanford University. During grad school, I got involved in the optical society, took on leadership roles, and met a lot of people who helped me figure out my path. Being near Silicon Valley, I started to wonder if a tech job might be right for me, so I did a summer internship at Hewlett Packard Labs and really enjoyed it. Still, I realized that my true passion was education and leadership in science, and I stayed focused on my goal of becoming a professor.

https://rlab.engineering.ucdavis.edu
https://www.linkedin.com/in/radulaski/
https://x.com/MarinaRadulaski

Peter Brereton - Quantum Sensing Engineer, Space Instruments



I always knew I wanted to be a physicist. In high school, I got really interested in lasers and even built a simple laser and holography system for a science fair! That curiosity led me to major in physics in college.

After college and graduate school, my first job was actually in the Navy, where I worked on submarines. Later, I went back to school for my PhD. I was older than most of the other students—and I had kids of my own by then! During my Master's program, I did a research project testing quantum mechanics in the lab. That's when I knew I wanted to spend my career studying quantum science and working as a professor.

Today, I work at NASA's Goddard Space Flight Center, where I lead a lab that builds super-sensitive space sensors using the strange but amazing rules of quantum physics. We use things like laser-cooled atoms to measure gravity from space. These tools help us study Earth and other planets.

What's really exciting is that we're not just doing experiments in a lab—we're building real equipment that can go on satellites. Our work helps scientists understand climate change, track sea ice, and study underground water. It's pretty cool to know that quantum science can help solve big problems here on Earth!

https://www.linkedin.com/in/peterbrereton/

Philip Chrostoski - Postdoctoral Researcher

I'm a postdoctoral researcher at Sandia National Laboratories, where I study quantum information science. That means I use math and computers to understand how quantum systems work—especially ones that can help us build super-precise sensors.

But I didn't always plan to become a physicist. At first, I wanted to design video games or work with computer hardware because I loved technology. The big moment that changed my mind came in two parts. First, I read A Short History of Time by Stephen Hawking (which was a big deal because I didn't usually read books for fun). Then I took a physics class where the teacher was so excited about the subject—and everything we learned reminded me of science fiction in video games, movies, and TV shows. I realized I wanted to help turn science fiction into reality!

Still, my first year studying physics in college was tough. I barely passed my intro classes, and the only reason I made it through was because I had great study partners. That teamwork became one of the best parts of doing science for me. Over time, I started to understand the harder topics, and I discovered that quantum physics was my favorite. That's where I decided to focus my career.

Now, I love my job because it's all about solving puzzles with other scientists. Quantum research needs lots of different skills—math, experiments, computer science—and we all work together to make new discoveries. I enjoy using what I've learned to model these complicated systems and answer questions I'm already curious about. It doesn't even feel like work most of the time!

Outside of the lab, I enjoy science fiction and fantasy, building computers, playing tabletop roleplaying games, powerlifting, and of course, video games.

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Itay Hen - Principal scientist and research associate professor of physics

I'm a scientist at the University of Southern California's Information Sciences Institute. I lead a small team of amazing students and researchers, and we work on quantum computing. That means we create smart algorithms—like sets of instructions—to solve really hard problems in physics and math. Some of them use quantum computers, and some use regular ones.

Even though I earned my PhD in particle physics, I've always been fascinated by the strange and exciting ideas in quantum mechanics. The fact that you might be able to use these weird rules to do things like teleport or calculate faster than any regular computer really caught my imagination! Over time, I switched my focus to quantum science—and I've never looked back.

I love coming up with clever ways to solve tricky math and physics problems. Sometimes, we don't even know if a problem can be solved—but the fun is in trying. Every day, I get to learn something new, and sometimes our research leads to unexpected and exciting new ideas.

The best part of working in quantum computing is the people. I get to work with students and colleagues who are just as curious and passionate as I am. And the bonus? Our work might help shape the future of technology and make a real difference in the world one day.
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Travis Humble - Director of Quantum Science Center

I lead the Quantum Science Center, a big research project run by the U.S. Department of Energy. Our team includes scientists from all over the country, and we're based at Oak Ridge National Laboratory. We work together to discover new things about quantum science and build technologies that could change the way we use computers—making them faster, more secure, and better for the environment.

What really inspires me is how science can lead to amazing new inventions. I've always enjoyed solving tough problems that mix different subjects like chemistry, physics, computer science, and math. My own career path has crossed all of these areas, and I know that choosing what you want to do in life isn't always easy.

For me, I followed my curiosity and a strong desire to help make the world a better place. Finding what excites you—and what makes a difference—is a great way to discover your path. That's what helped me, and it might help you too.

https://www.qscience.org/

Alexander Radnaev - Lead Quantum Physicist and Technical Program Manager

I lead the development of quantum computers at a company called Infleqtion in Boulder, Colorado. These computers use tiny particles called atoms to do powerful calculations. Every day, I work on building and improving these machines by using physics, engineering, and teamwork.

My interest in science started when I was about seven years old. I liked playing with electronics, just like my older brother. But a lot of my projects didn't work, and that was frustrating. So my mom took me to the physics department at the local university to get some help. That's how I ended up in advanced physics and engineering classes for kids, and I loved it. By middle school, I had already decided I wanted to study physics.

To reach that goal, I studied every day, even on weekends. I went to special Sunday classes at a university for high school students. All that hard work helped me get into a great physics program, and my teachers noticed my passion. They helped me transfer to an even better school in Moscow, where I discovered how fun atomic physics could be.

A big turning point came when I met a guest speaker from a famous U.S. lab called NIST. We stayed in touch, and I eventually got a research internship in Boulder, Colorado. That's where I learned about graduate school in the U.S., and I ended up studying at Georgia Tech. I worked in a great lab with a wonderful mentor and classmates, doing really exciting experiments.

During grad school, I also discovered swing dancing, which helped me relax—especially when experiments weren't working. I even met my future wife at a dance event.

After I finished school, I worked in Silicon Valley and learned a lot about engineering and business. But I missed working with atoms. With help from old friends and mentors, I found my way back into atomic physics and joined the world of quantum computing. It's a fast-moving field, full of challenges and learning, and I love being part of it.

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Randy K. Dumas - Application Scientist

I've been curious about how the world works since I was a little kid. By the time I started middle school, I knew I wanted to study physics—especially space and stars, which is called astrophysics. I've always been someone who learns best by doing things with my hands, so I wanted to work in experimental physics, which means doing science by building and testing things.

At first, I thought astrophysics was the way to go, but I soon found out it often involves writing computer code and working with huge amounts of data collected by other people. I didn't enjoy programming that much, so I started to think about other options. That's when I joined a program at UC San Diego that let students do real research with professors. I joined a lab that studied something called condensed matter physics. At first, I wasn't sure about it—it felt a little too close to chemistry. But I soon discovered it was a perfect fit for me. In this field, you can actually make something in the lab and then test it right there using different tools. I loved that!

From there, I went on to graduate school at UC Davis, where I was lucky to get a special scholarship that let me start research right away. I was sure I wanted to be a professor and do research forever, so after getting my PhD, I moved to Sweden for a research job. I worked at a university there for seven years, writing papers and applying for research money. But after a while, I realized I missed the more hands-on work that first got me excited about physics.

That's when I found a job back in San Diego at a company called Quantum Design—the same company I first heard about back when I was a student. I was nervous about leaving university life, but it turned out to be one of the best decisions I ever made.

Now, I get to teach, help people with research, and even mentor other scientists. I also helped start a project called Discovery Teaching Labs, which connects colleges and tech companies to create fun, hands-on science classes. In many ways, I feel like I've come full circle—back to being the kind of physicist I dreamed of being when I was your age.

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https://discoveryteachinglabs.com/
https://www.qdusa.com/
https://www.qdusa.com/support/applications_team.html

Soyoung Shin - Development strategist, quantum workforce and education

My job is all about helping young people learn about quantum computers—the computers of the future! I create fun educational events, write technical guides, and give advice to students and professionals. It makes me really happy to see students get excited about quantum science and grow into experts.

One big moment for me was in 2020 when I joined the IBM Quantum Challenge. It was the first time I was part of a big group of people all working together online to learn about quantum computing. Because I had studied atomic physics and electrical engineering, I understood the ideas pretty quickly. That's when I realized I could really help others understand this new technology too, and maybe even make a difference in the world by teaching and building a strong learning community. I dove right in—and I've been doing that ever since.

I've also had to pause my career twice to take care of my kids—once for five years and once for two. At first, that was hard, but it actually helped me grow in other ways. It gave me time to think about what really matters to me and helped me build confidence. Sometimes life surprises you and sends you in a new direction—and that can lead to something even better than you expected. That's what happened to me.

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***STEP 4**: Very effective for students to "see" themselves in these roles. Have students create their own profile for a quantum career they choose. It can be based on the profile they read or they can research additional careers and roles in Quantum Science Information and Technology. Be creative and have fun. Students can share or you can post in the classroom.*

Personal Career Profile (Planning Sheet)

Name: _____ Date: _____

Part 1: Use this sheet to plan your career profile.

I want to pursue a career in _____

In this career I will focus on:

What do you hope to contribute or accomplish through your career choice? (How will you help the world or contribute to society?)

I need the following skills (What skills or traits do you need to pursue this career?):

Based on what you learned from the physicist profiles, what are the ways you could achieve this career with a degree in STEM? (How can a degree in STEM lead you into this career or support your growth in this career?)

Personal Career Profile (Final)

Name: _____ Date: _____

Part 2: Using the information you documented in Part 1, create a profile of your future self that achieves your career goals with a degree in STEM. Imagine that this profile will be read by students like you to illustrate that STEM can help them achieve their goals. Use the template below (2 page maximum).

Name
Career Title

[Insert a picture of YOU that relates to your career]
Who I Am [Describe who you are and aspects of your background that are important to you]. **Why STEM** [Give a brief personal background including how you became interested in STEM, the degree(s) you earned, and the steps you took to reach your career through STEM.] **Using STEM** [Describe the skills and traits from your STEM degree that you use in your career. Describe ways that you have contributed to your field, or ways your work benefits others, or interesting projects/accomplishments that have occurred in your career.] **Advice for Students** [Suggest ways for students to pursue their career goals using a STEM degree, what they may not know about STEM, etc.]