

# The Story Collider

## Imposter Syndrome: Stories about not feeling good enough

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Almost everyone has at one time or another felt inadequate despite their achievements. In this week's episode, both of our storytellers share their struggles with feelings of self-doubt, insecurity and the fear of being exposed as a fraud.

**Part 1:** Sarah Demers has this nagging feeling she's not a real physicist.

*Sarah Demers is a particle physicist and professor at Yale University. She studies the Higgs boson and looks for physics beyond the current "standard model" using CERN's Large Hadron Collider. She's also an interdisciplinary enthusiast, having co-written the book "Physics and Dance" with choreographer and dancer Emily Coates, and regularly teaching a "Physics and Music" course at Yale. When she isn't physics'ing she can be found hiking with her kids, foraging for mushrooms, brewing beer, or blissfully watching certifiably terrible science fiction with her husband.*

**Part 2:** After dropping out of college, Kevin Smiley can't seem to shake his feelings of inadequacy.

*Kevin Smiley is a US Army veteran and senior mechanical engineering undergraduate with a minor in applied mathematics and an interest in thermal-fluid science.*

## Episode Transcript

### Part 1

It is the winter in 2021. I'm in the control room of the ATLAS Experiment in Switzerland. We're getting ready to break a world record. Highest energy collisions ever created in a lab that are going to teach us about the fundamental particles in the universe and forces of nature.

Our detector has essentially been sleeping for the last three years. We've been doing a number of upgrades to it and it's time to wake it up. I'm running a series of tests and the tests are failing terribly.

ATLAS is a complicated detector. It's huge. It's the size of a six story building and it's buried 100 meters under our feet. Our goal is to extract the hundreds of millions of electronic signals coming out of the detector, process them through our software and display them on a great big wall in the front of the control room so that everybody can instantly see the status of the detector.

You may be familiar with the pandemic. We were wearing masks. We had a skeleton crew, because of travel restrictions. And we were each tagged with a Proximitator device. These were bright blue boxes the size of a deck of cards that you had either around your neck or stuffed into a pocket. Sort of like the things you might tag wildlife with if you want to track their migration patterns, but these were tracking the physicists as we walked around CERN. If you got within two meters of another person for more than 30 seconds, your devices would vibrate and remind you that you had to back up and give each other more space. I felt like I was in some kind of dystopian social science experiment.

I had moved my family to Europe for the year so that I could work with these colleagues who I now had to actively avoid.

But our goal was clear: project the status of the ATLAS detector in the front of the control room, and our failure was obvious. There was no projection of the detector.

We were running out of time and I was starting to panic, which tossed me back to my early days in physics, because I was not an obvious physicist. I was a strong student in school and ambitious. But when I got to physics, I really struggled. Trying to map the abstract concepts in math to physical situations was really hard for me. Then the lessons that we were learning about how the forces worked were completely counterintuitive.

I used to think of myself as a really strong student, but my confidence collapsed. From day one, I recognized that physics was a very powerful way to pay attention to the world, and I was hooked.

As an undergraduate at Harvard, I don't remember a lot of my college days, but I do remember my first Physics class, the basement of the Harvard Science Center.

It was like a family reunion. I was sitting there and people were calling across the room, "Hey, I remember you from the Physics Olympics. Oh, yeah, you were in the Physics Olympics."

I was thinking to myself, "There's a Physics Olympics?"

I was one of the few women in the room. I was an athlete and I felt completely out of place. Things did not improve when the lecture started. Waves of unintelligible information coming over me. Equations and lots of Greek letters and arrows on the board.

I told myself, "This is gonna be fine. I'm gonna go back to my dorm room. I'm gonna study my textbooks and it's all gonna make sense," which was a terrible plan that absolutely never worked.

I was not just in some kind of an internal bad negative physics loop. I actually had a professor hand a test back to me and say, "I've never seen anyone fail anything this badly."

I had actually chosen and fallen in love with my worst subject and I didn't know how to get help. I didn't know how to form my confusion into complete sentences that were questions. And I didn't know how to admit just how lost I was.

But somehow, through lots of stubbornness and struggling and going to TA's office hours and doing and redoing the problems, I started to learn some physics. It wasn't in time to impress Harvard. The career counselor told me that grad school probably would not be wise. But it was my senior year and I didn't have a backup plan, so I went.

Dove into graduate school. Did physics every waking second. Fell in love with it, fell in love with a classmate, married him, wedding anniversary, 21st, in two weeks, actually. But this nagging feeling that I wasn't a real physicist was with me everywhere, and it had consequences.

When it came time for people to sign the big beam that went across my detector, my thesis experiment, I couldn't bring myself to sign it. I didn't feel like a real physicist.

I had a real turnaround moment the following summer. I was having lunch with a peer of mine, brilliant. She won a national mathematics award when she was in middle school.

I asked her, "How do you do this?"

And she said, "Actually, I'm a terrible physicist. I just work harder than everyone else to cover it up."

My jaw dropped. It was like the Pope telling you they're not really Catholic.

What was also shocking is that it was exactly the message that had been on replay in my head for the last seven years.

I thought, "She's obviously delusional. She is not measuring her capabilities accurately." And I had to think. I was, by any account, a successful graduate student. Maybe I was actually becoming a physicist, too.

By the time I got my faculty position in 2009, the things I didn't understand in physics were no longer terrifying. They were exciting and they were opportunities.

But in that ATLAS control room, I was terrified. We were stressed, we were tired, our code wasn't working, our colleagues were counting on us. Collisions were coming and I was

coordinating. It's one thing to be lost and confused when you're a student and it's another thing altogether when you're in charge.

I remember thinking to myself, "I'm gonna go back to my office. I'm gonna read the documentation. This is all going to make sense." But there was no textbook for the problems that we were having.

I looked around the control room at all of my colleagues as we were actively avoiding each other and I realized there's no one person in this room who can get this detector up and running on their own, and there's no one person who has to.

So I asked for help. We gave regular transparent updates. We Zoomed and emailed people from all over the world. We tried and tried and tried again. Things started to look up to the point where my main concern was, "What if I don't understand enough about the conditions of these collisions to anticipate what could go wrong? What if we haven't been running the right tests?"

But the day of collisions arrived, and so did the press. The room was packed. We had left our Proximitors behind at this point. We were all in masks and we were wearing matching t-shirts. I was terrified, a complete ball of nerves. My family was watching the livestream at home.

We heard the Large Hadron Collider announcer, robotic voice say, "Beam one injected." Then a few moments later, "Beam two injected." And these beams of protons were accelerated around a 27 kilometer ring 100 meters underneath us, crossing the border between France and Switzerland.

We watched on our screens as the energy climbed until they hit world record breaking energy and the LHC operator steered the beams in to create collisions in our detector.

I look around the room and I see my colleagues holding up their cellphones, their cameras pointing at a blank wall where my team's code is supposed to project an image of these record breaking collisions.

30 seconds felt like 30 minutes, and then the image appeared. The detector lit up like a Christmas tree and everybody cheered. I felt an immense sense of relief and very much not alone.

## Part 2

One thing that many people don't know about me is that I'm a college dropout. In 2013, when I graduated high school, I was going to a community college back home in Washington State, and I was not the best student, I need to say. I thought I could just get by on just mediocre effort. I quickly learned that wasn't the case, because coupled with all my friends leaving to go off to their universities and having the time of their lives, I felt forgotten, I felt abandoned, and I felt alone. And I quickly became depressed.

And with this depression, it really affected my grades and attendance. I didn't see the point of going to school anymore. So, I decided that this isn't for me, and I dropped out.

I felt like a loser at the time. I was a failure. I didn't know what I wanted to do. I couldn't imagine what I could do. And so, like many others that don't really have any direction in their life, I've decided maybe the army's the right choice.

Now, when you're enlisting in the army, you have to take what's called the ASVAB. It's just a vocational test that pretty much just assesses what jobs are you best suited for in the military.

Now, I didn't know anything about this and so when I asked my recruiter about it, he told me, "Don't stress about it. The minimum scoring you need is a 31, and anyone with a pulse can get that."

So, when I went to take a test, I didn't really think anything of it. It was just another test that had a couple math questions, some reading comprehension, some things about science, some things about mechanical and electrical components, and then that was it.

When I got back to the recruiting station, I remember my recruiter running up to me with a giant smile on his face and just staring at me. It was really unnerving. And he asked me how I think I did.

I just told him, "Sorry, I think I did all right," and he laughed at me. He told me I didn't just do all right. I killed it. I had scored in the 92nd percentile of all scores. It was one of the highest scores that he has ever seen as a recruiter. It was a score that qualified me for any job in the army and high enough that, if I did have a degree, I could have gone into officer candidate school.

I was blown away by this and that's kind of what started my career in the army.

So, fast forward a couple years later. I'm doing better. I can do my job well. I'm making plenty of friends. I'm earning awards and commendations, and I'm definitely happier now. But I also felt guilty because the only reason I was there was because I was a college dropout. I had failed at what I was initially trying to do, and the army was only there to pick me up. I struggled with this guilt for a while.

In 2017, my company received orders for a defense in chemical, biological, radiological, nuclear response force, DSERF. Part of the training for that mission requires everyone to pass the

hazardous materials operator's course. This course is known for its difficulty, with nearly a third of all participants failing the written exam. So, needless to say, I'm very much stressed.

So, I do something that I haven't done in years. I study. And I passed. I got certified and it was all great.

But the magnitude of passing that didn't really occur to me until a couple of weeks later. When I was standing in Friday Formation, I hear my committee commander yell, "Special Smiley, post!"

I'm confused. Why am I being called up?

So, I relatively go up there and I'm freaked out. I think I'm in trouble with everything that I had, but what surprised me is that he presented me with a certificate of achievement. Out of the 120 personnel in our company, I had the highest score of 98%. I had set an example for our battalion. He even joked that he was going to recommend to the battalion commander I'd be the designated instructor for training up the other companies when they take over this mission.

I was blown away by this. And frankly, I finally started to think maybe the army is where I belong.

Fast forward next year in 2018. I'm in Korea. I'm a sergeant now. And I knew this was going to be a difficult experience. I'd be on the other side of the world away from my family in a land where I didn't speak the language, I didn't look like everybody else, and frankly, I didn't understand the culture.

At this time, it was also my 18-month mark before my contract was up, and so I had to make a decision. Am I going to re-enlist for another five years, possibly make this a career, or am I going to get out? I didn't have any other options that I was considering, so initially, I was thinking, yeah, we can probably make this a career.

But my decision came December 25th, 2018. My platoon had taken over the night shift and I was glad about this because at midnight in Korea, it's 2:00 in Seattle where I'm from. So, on that shift, I was able to FaceTime my parents, FaceTime my family, to wish them all a Merry Christmas, listen to them freaking cry at how much they miss me.

I was generally happy because I knew they were where they all belonged, with each other. And I carried this happiness for the rest of that night, until I got back to my barracks room.

When I walked in, there was no one to greet me. I didn't smell my dad's pot roast cooking. I didn't hear my younger cousins singing 'Jingle Bells' for the 37th time in a row. I walked into a dark room that smelled like wet soggy boots, with nothing but a couple of instant ramen packets to eat.

That room had never felt any larger, more empty and colder than that day, and I never wanted to experience that again. I hated that feeling. So, on Christmas day, 2018, I decided I'm going to get out of the army.

But, now, what do I do? I didn't have any interest in doing my job on the civilian side. I didn't have skills in plumbing or carpentry or electrical work, so the trades weren't an option. And all my interests and hobbies really only led to deadend jobs. I felt like I was doomed to live a life where I was never going to live at my full potential. I didn't have any options.

At the time, the only thing I wanted to do was just go back to being a kid where I didn't have to worry about that stuff. I just wished I could go back to being a kid, play with my LEGOs, designing and building these crazy spaceships and cars.

Then I thought, "Wait a second, I can do that. I could be an engineer."

But to be an engineer, I'd have to confront something that I was trying to avoid, something that I ran from. I'd have to go back to school. I'd have to confront being a college dropout, going back to school, and try to overcome that.

But I justified that. I knew this was going to be a risky thing. I was leaving the army, something that I was good at, something that I didn't have to worry about living expenses, and something that I had the aptitude to rise up the ranks, and I was going into a profession where 60% of the people that enrolled in engineering either dropped out or transferred majors. I couldn't afford to mess up. I can't. This felt like this was my last chance.

But I justified this risk because of two numbers. My 92nd percentile ASVAB score, one of the highest scores that my recruiter had ever seen, and the 98% on that hazmat test, a score that set an example for a battalion. These two numbers were all I had to tell myself that I am smart, that I have the capabilities of doing this.

I wasn't a kid anymore. I didn't have those bad habits I had. I had grown up. I knew I'd at least have a better chance at college than before I joined the army. That's when I decided I wanted to be a mechanical engineer.

Now, mechanical engineering is not an easy undertaking. Engineering is you're plagued to fail, fail after fail. You take monumental problems and you have to develop a solution, and there is no guarantee for success.

And one of those failures came to me last spring during my Thermofluids 2 midterm exam. See, I was working through the problem and I got to the final answer and it didn't look right. And so when I went back through my work, I realized that I made a critical mistake at the very start of the problem and I didn't have time to fix it. Reluctantly, I just had to take my exam, turn it in and accept whatever grade I got.

I was pissed at myself. How could I be so stupid? But I wasn't going to leave it at that. I knew what I had to do. I knew I could get the right answer. And I respected [Dr. Cole? 00:09:54], my instructor too much to let him think that he failed me as my teacher.

So, when I left that class, I sat down, I reworked the problem and I emailed it to him. I told him, "Hey, I'm not looking for points back. I simply just want to tell you that I made a mistake, I know what I did wrong, and I can do this."

And then I realized that because I, instead of shying away at failure, instead of ignoring it, pretending it didn't exist, and then instead embracing it and accepting it, it made me a better engineer.

Then it all clicked in me. I wasn't running from my failures as a college dropout. Being a college dropout is what's led to where I am. I realized that if I wasn't a college dropout, I probably wouldn't have tried as hard as I have to get to where I am today. By accepting and embracing my failures, I have gone from a college dropout to graduating next May with a Bachelor's in Science in Mechanical Engineering, Magna Cum Laude.

Thank you.