“As Spiders Do” – UR Alumni Podcast

Creating Joyful Chemists w/ Colleen Kelley, W’88

Episode 6

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[intro music plays]

Maggie Johnson:

Welcome to “As Spiders Do,” the University of Richmond podcast where we share stories about our amazing alumni. I'm your host, Maggie Johnson, from the class of 2018. Today I'm talking with Colleen Kelley from the class of 1988. Colleen is the founder of Kids Chemical Solutions, a company that teaches anyone chemistry through comic books. We talk about the joy of discovery, coming to college as a first-generation student, and staying true to your dreams as an entrepreneur. So, join us, as we journey into Ray and Poppy's comical, chemical world.

[intro music fades]

Maggie Johnson:

First off, would love if you could just tell us a little bit about your background and what you're doing now.

Colleen Kelley:

Well, I'm a Spider, so that's the genesis of my story as a chemist. And so, I arrived at University of Richmond in 1984 and became a chemist very shortly after that, under the guidance of some great faculty. Emma Goldman, in particular, and her husband Raymond Dominey really just took me under their wings and showed me all the joys of being a chemist. They are joyful chemists, I would say, and they exude that. And I just kind of sucked that up. I had a career in chemistry and in academia as well. So currently I'm at the University of Arizona where I teach organic chemistry and the labs and some nursing chemistry. But along the way, the burning question for me always has been, I'm a first-generation college student, how did I understand chemistry and find so much love and joy? And I never for a second thought it was anything but challenging and fun, not impossible. And so, I wanted to uncover the answer to why students are really struggling in chemistry, and over my 30-year career, that's really the question I've been trying to answer and then that's where the comic books came from.

Maggie Johnson:

Did you always know you wanted to be a chemist?

Colleen Kelley:

I think so. It's a weird thing.

Maggie Johnson:

No, I love that. That's awesome. Chemistry is always something I struggled with, so I think I really would have benefited from your books growing up. So how did you end up at UR? You said your first generation, kind of, what was that process like, both deciding where to go to college and how you picked UR?

Colleen Kelley:

Well, I grew up in central Pennsylvania and it snowed there, so I wanted to go south. And I didn't have parents to guide me in the process. So, I just kind of looked at the map and went to visit UR and it was a beautiful campus. And there I was. I didn't, you know, it was before the internet. They had a pretty brochure. So, it looked good and I was a serious student and had been studying basically the minute I could read on. So, it wasn't a long shot that I would end up at a place like UR with rigorous academics.

Maggie Johnson:

You mentioned your parents maybe weren't as able to guide you through that process as much. So, what was that transition like coming to UR?

Colleen Kelley:

Oh, it was hard. I mean, socially it was great. I had tons of friends. I was in Lora Robins Court. I think that's still around.

Maggie Johnson:

It is.

Colleen Kelley:

I was a freshman in Lora Robins. Yeah. And, uh, had immediate friends and just fell in love with the campus and the community. The academics were harder than I expected. And I got a C on my first chemistry exam that just about devastated me. But then I fought back harder than ever and, you know, came out with an A, but that first semester learning how to study and how to balance everything and all of that was, maybe typical of freshmen, but I think in particular, I just wasn't aware of what the academic rigor really was going to be.

Maggie Johnson:

You mentioned Emma and Ray, you mentioned they were joyful chemists. I love that. What about that with them really connected you with them?

Colleen Kelley:

Well, I had my best friend from Lora Robins Court, is still my friend today. And her name is Kelly. So, it's very confusing Colleen Kelly and Kelly Kirkpatrick. Kelly was also a chemistry major, so there's a lot of alliteration going on in here. But Kelly said to me, she said, you know, you should do undergraduate research. And we were freshmen and I didn't even know what that was. And I just said, okay. So, I had seen Emma Goldman driving around in this cool Mustang and she was about 29, 30 years old. She just seemed awesome. So, I just followed her around until I could corner her and ask her if I could do research with her. And she said, yes. So really the inspiration came outside of the classroom. Every day in lab, and her husband was in a different research lab, but they're very excited about discovery and about the process of watching their students discover. And, you know, there's this mentorship, but also, we were also colleagues in the lab and trying to figure things out. So, it was that excitement and joy of discovery and doing something nobody had ever done before. I do remember thinking, "wow, I can't believe she's letting me do an experiment that nobody in the world has ever done before." And because I didn't understand that that's actually what research is, you have to do something new. So yeah, that was just so exciting to me. And then the classroom work came after that. I understood then what I needed to learn to support that discovery.

Maggie Johnson:

That's really cool. Do you remember what your first research project or question was?

Colleen Kelley:

I do. So, Emma was in the area of chemistry that I eventually pursued myself called Organo-metallic chemistry. We had an iron atom bonded to a silicon atom and there was a dangling hydrogen and we were trying to get tweezers to pluck that hydrogen off. And it sounds very simplistic, but it was never been done before. So, we wanted to see what would happen when we plucked that off.

Maggie Johnson:

I love the imagery. And I think that really comes across in your comic books too, just how you're describing it, like plucking the hydrogen off. I can see it in my mind. That's really cool. So, after graduating, you went straight into chemistry work. Did you know you always

wanted to teach or did you go into research first? What was your journey right after graduating?

Colleen Kelley:

I did, I went into research first. I finished my PhD at Penn State and then did a post-doc in Strasbourg, France. So, lived there for a while and then came back to Washington, DC to do some more research. And when I was in DC, I was asked to teach a class in medicinal chemistry at the National Institutes of Health, just at night to physicians who need continuing medical education. And that's where I...I started a love for teaching and began applying for jobs in an academic setting so I could continue teaching.

Maggie Johnson:

What was researching in France like? Was it really different from working in America?

Colleen Kelley:

The language was really difficult. Again, this is before cell phones and computers. So, I was really dependent on no Google Translate. So, I had a difficult time with the language, but again, the community, the people, the support were great. A lot of the words are the same, but I do remember...it's very classic in chemistry, they have those containers that have a long thin neck and then a round bottom. And we call them round bottom flasks in the United States. And they call them balloons. And I always thought that was the funniest thing because they look like balloons.

Maggie Johnson:

Oh, I love that. It's so funny.

Colleen Kelley:

They would say, "Colleen, you can have no more balloons."

Maggie Johnson:

That's amazing. And how did you come across wanting to write the comic books? That's such an interesting transition. So, from teaching to using the comic books as a teaching tool, what was that transition like?

Colleen Kelley:

Well, my journey in teaching was always to make chemistry accessible and understandable with a basic promise that, if I could learn it, anyone could learn it. So, I started telling stories

kind of using Winnie the Pooh characters and realizing that my organic chem students were loving that. They loved that Piglet is like fluorine, like little and scared. And Winnie the Pooh is more like bromine, kind of puffy and happy, and when I would give those analogies and put them into stories. Over the years, I would have students come back to me and say, you know, I, when I was studying for the MCAT, I remembered your stories or, you know, now that I'm in pharmacy school, I'm remembering your stories. I just had enough students tell me that the stories were sticking and that I should write them. So, I began writing them and it was difficult because there's so much dialogue, because in my mind they were character speaking. And so, I thought, what is a dialogue rich medium? And comic books are a dialogue rich medium. So, enter me as a comic book script writer. I've never done that before. I had a crash course on YouTube on writing comic book scripts and found a comic book artist and took it from there with some tutoring from the team at the comic book artists place where they explained to me how they wanted the scripts written.

Maggie Johnson:

That's such an interesting world that I feel like I know nothing about. So, you have the stories, you have an idea in your head, kind of what was your process in terms of like finding those next steps?

Colleen Kelley:

So, I have two generations of artists. I have concept artists, which is Mackenzie Reagan, one of my former students who's now at Savannah College of Art Design, but ready to graduate. She's my friend, and my son's friend. So, Mack was in my class and she helps me to develop the initial character designs. And then from there, then I've got a team led by Jonathan Hallett who created Stitch of Lilo and Stitch. He's one of the Disney Stitch of Lilo and Stitch. So, Jonathan has really been in the industry for about 30 years and has mentored me through the process of taking my stories, Mack's characters that we develop and then getting that into a script format so that he can then develop the comic books from there. So, it's been just a great team of people that have been helping me. But the actual script writing has come, I should knock on wood, has come pretty easily because I've had the stories in my head for so many years that you just sit down and they just start coming out.

Maggie Johnson:

You've mentioned that you've had these stories in your head for a while. What's your process when you're thinking of a story or thinking of those analogies? Where do you find that inspiration?

Colleen Kelley:

So, the storylines are... there's 10 comic books that are scaffolded to mirror the first 10 chapters of a freshman chemistry textbook. So, if you are taking chemistry at the University of Richmond, these first 10 comic books could replace that textbook. So, I just take chapter one, periodic table, chapter two, the structure of the atom. So, I take those learning objectives and then remember the stories I tell about those subjects. So, the sequence of the comic books is critical because they are carefully thought out so that when someone finishes all 10, they have finished the equivalent of a college chemistry course. So, and that could be an eight-year-old, which I'm finding they're glamping on, or a 108-year-old if they just wanted to learn chemistry. So, the process is much more organized than it may appear, that it's based on 30 years of my teaching chemistry, so I know the sequence. Then the characters evolve from my inspiration of what a molecule looks like. For example, cyanide has a carbon bonded to a nitrogen with a triple bond, which makes it linear. So, the character cyanide looks like an arrow. So, the characters are designed to reinforce what a molecule would look like in three dimensions.

Maggie Johnson:

Is your main target audience is kids, correct?

Colleen Kelley:

You know, that's a difficult question. The comic books make this level of chemistry accessible to nine, 10-year-olds. However, I've got plenty of high school students who are using it, who are already behind in chemistry for whatever reason, so they're using the comic books to catch up. I also have seniors using it to study for their MCAT. So, it really is for everyone at this point. At some point when chemistry becomes normal and more accessible, entry group will be third, fourth, and fifth grade. But for now, we've got a nation of people who have not had equitable access or their portal to understanding chemistry has been closed to them. So, this opens it up for just about everybody.

Maggie Johnson:

That's really wonderful. I think that's so important. And there's no stigma around like no matter how old you are, where you are in life, you can start and it's never too late to learn. It's really beautiful. What's your ultimate goal for your series? What's the impact you're looking for them to have?

Colleen Kelley:

Well, living in Southern Arizona, we're really close to Mexico. So, trailing only slightly behind is the Spanish version of this whole comic book series. So, one of my staff members, a former grad student of mine, José Veleta grew up in Mexico and now he's a PhD chemist. And so, he's translating the comic books into Spanish. And he alerted me to the fact that in the United States, Spanish chemistry curriculum in Spanish is non-existent. So, we wanna pioneer that. It's really important that students who have Spanish as their native language are able to learn in their native language. My experience living in France allowed me to understand how important learning in your native language really is and how impactful that is. And to be out of that and to have to learn a new topic in a different language for me was a struggle. And if I can remember that all these years later, I want to make sure that elementary school students who have Spanish as their native language can learn chemistry that way. So, it really, my vision is, you know, this is going to be an animated series someday. This is going to be on...you're going to see; my favorite character probably is Big Ox. He's just so cute. He's this big blue ox that's just smiling all the time for oxygen. But you'll see him on t-shirts in Target. Kids will dress up as Poppy and Ray for Halloween. It will become very, very normal and not, "ugh, I have to take chemistry." But I wanna erase that stigma and make sure that, "oh yeah, I learned chemistry with Poppy and Ray" - those are my two main characters. And then I can do the same with, the way I frame it is any subject that causes meltdowns at home. I'm a mom as well, so. Luckily my son's 22, so we're past a lot of that, but algebra was a meltdown situation. Physics can be a meltdown situation. So, if this platform is accepted, all the things where people think they just can't do it, I'm gonna make sure that they can.

Maggie Johnson:

it's almost like the Schoolhouse Rock of chemistry and science, I love that.

Colleen Kelley:

Yeah, that's my vision.

Maggie Johnson:

That's so fun. Do you think your former self would be surprised by where you are now?

Colleen Kelley:

Yes and no. I mean, I think I've always been a little bit quirky. If I look back to my time at either at UR or at Penn State, I mean, we were always making up stories about molecules just for fun, just to pass the time, you know, if you're in the lab. So yeah, I think I would be a little surprised, but I would be probably surprised that I would be so excited to go to see the

fourth graders again today because they're awesome, because I think I was more a "serious chemist" and really wanted to be a serious chemist. And I still am a very serious chemist. My passion just lies in creating robust, accessible curriculum materials, as opposed to designing new drugs for malaria, which was my former self.

Maggie Johnson:

Yeah, I think there's such an interesting connection there where it's like, you're still doing serious chemistry. It's just, it's a different form than maybe we think of. What's a big challenge that you're facing right now and kind of how are you tackling it?

Colleen Kelley:

Really just juggling everything that I have to juggle, so that there's...I think there'll be a shift in that, whether I am able to hire more staff to help me, whether I adjust my... I've been, I'm old Maggie. Well you've heard. I entered UR in 1984. So, I could retire soon. So that's a question I'm, I'm mulling over so that I could do this full time, that kind of thing. So, it's, you know, I'm an empty nester. It's all these midlife–kind of really cool opportunities ahead of me with retirement, emptiness, and then this exciting opportunity to follow my dream. So, I don't know what that landscape looks like, but that is the challenge. And then, unfortunately or fortunately, I have got a great team of artists and each comic book costs me $20,000 to produce.

Maggie Johnson:

Oh my gosh.

Colleen Kelley:

I funded that entirely myself. And right now, I need to find donors or I'm looking for fundraising mechanisms to complete the series because without that, it's going to be challenging. We have revenue already. We have the first two comic books for sale on our website. We're going to have the next two, so four of six for sale. So, revenue will help, but I definitely am looking to make this business sustainable.

Maggie Johnson:

Yeah. What's that process been like in terms of going from concept to now it's a full-fledged business. What's that process been like to build that up and create that space where you're bringing in this revenue?

Colleen Kelley:

The University of Arizona, probably much like UR, has a great entrepreneurial program for faculty, staff, and students. And in conjunction with, we have, it's called the University of Arizona Center for Innovation. So, they have all kinds of mentors and courses and so I've been through so many incubators. I've been through five incubators on startups. Startup Tucson has some resources. So, I find myself a member of a lot of these cohorts and I've been learning and really enjoying it. And the cohorts are inspiring. You know, you have anyone from making blocks for kids to curing cancer because we have a lot of science here in Tucson. The process has been surprisingly great. I just finished a pitch competition. I never thought I'd be part of a pitch competition. So, I was on stage as a finalist. It's been great, but also that has been exhausting as well, trying to always have my entrepreneur hat on. What does it look like to be a founder of a startup, and how you get that moving forward as well.

Maggie Johnson:

Yeah, you mentioned that balancing, to like all the pieces of being an entrepreneur and you always have that hat on. Do you feel like it takes away at all from the passion of creating the books or do they fuel each other?

Colleen Kelley:

It does take away. I'm craving time to sit down and write scripts again. I want to write some more. I want to create some more. We also have activity workbooks. I've got reading guides. I've got games. We have card games. We have periodic table Twister. So, it's a whole suite of just juicy fun for each comic book and I long for the days being in my jammies and writing and doing that instead of being on stage pitching. So, it's a necessity, the entrepreneur side, because without that my dream doesn't come true. So, I'm happy to do so, but it does take away from the creative side for sure.

Maggie Johnson:

What would you consider your greatest achievement so far?

Colleen Kelley:

Oh, for sure raising my son. Let's just take all the chemistry out of that. He's the awesomest thing I've ever done. I'll own that. Yeah. Shout out to Ian.

Maggie Johnson:

I love that. Is he a chemist too, or at least in the sciences?

Colleen Kelley:

Oh, no. So my son is also an entrepreneur, but he has his own fashion brand. So, he's a fashion designer. He'll be showing at New York Fashion Week for the first time with the runway show. And he started his brand of clothing when he was 17 in high school and has grown it. So, I'm just so proud of his vision, innovation. So, he's really making history happen too. So, I think we inspire each other.

Maggie Johnson:

That's really, really cool. Well, congratulations to Ian. That's amazing.

Colleen Kelley:

Thank you.

Maggie Johnson:

Any advice for people who are looking to kind of strike out on their own and make their own dreams a reality?

Colleen Kelley:

I think because I was coerced strongly into joining these entrepreneurial communities and going through these cohorts where, there's one called National Science Foundation Innovation Corps. I went through that program three times learning about Lean Canvas. So, I would say hold your passion. I think if you have a design and an idea, either-whether it's fashion for my son or comic books or really making chemistry accessible for me, hold your "why" very strongly, but allow the support from these communities. I think most communities have some kind of startup support and allow yourself to learn from these people. If you haven't already, like if you were a business major at UR, you probably know all this stuff, but if you weren't, make sure that you learn it. It's really important so that you have slow and steady growth, so that you minimize your risk and that you learn the landscape of investment, what that all means, so that you can sustain your dream.

Maggie Johnson:

How has your why evolved over time?

Colleen Kelley:

It has not changed very much. My "why" is I want to create a nation of joyful chemists. But when opportunities come at me that might seem flashy, I can evaluate them against that

vision. And if there is an opportunity that seems great, but is really diluting that vision or maybe diverting that vision, at this point, because I'm the CEO, founder, everything, typist, secretary, I have the ability to say no to those opportunities as great as they may seem if they're misaligned, the vision helps you keep on track.

Maggie Johnson:

Is that challenging to say no to someone who's approaching you with an offer, a deal? Like, what's that like to have to say no?

Colleen Kelley:

It's easier because I'm old and I know I can trust my gut. You know, it really is something that I have developed over time. I think as a young, my younger self, I would have seen opportunity as, you know, go, go, go. But you can take a step back and realize now with a lot of different life experiences that what is your gut saying and that other things will come along. Patience is the word I would say. I have patience and wisdom. And for me that had to develop over a lifetime. I didn't have patience and wisdom at 22.

Maggie Johnson:

I feel like that's totally fair. Not a lot of us do. Awesome. Well, thank you so much. One last question that I've been asking everyone. What does it mean to be a Spider?

Colleen Kelley:

It means in part, for me, a very special community of just excitement for learning. I found so much excitement for learning. And I mentioned my friend Kelly, who I just saw in June, our families get together. And we still look back fondly at, she was an RA eventually at Lora Robins. And I remember laying on the floor in her dorm room as freshmen women would come in and out while we were studying physical chemistry and helping them. So, it's a diverse community of learners that continue to learn and support each other regardless. And it's just, it's a really magical place and that's the only thing I can say and to have experienced that magic, it stays with you forever.

[outro music plays]

Maggie Johnson:

Thanks for listening to "As Spiders Do" from the University of Richmond Office of Alumni Relations. We hope you enjoyed hearing from today's alumni guests and learned a little bit more about what it means to be a Richmond Spider. This episode was edited by Maggie Johnson and Charlotte Pfamatter. Our episode music is by FAS Sounds from Pixabay. You

can subscribe to “As Spiders Do” wherever you get your podcasts. Rate our show and leave us a review to let us know what you think. We're always looking for new stories to share. So, let us know who else we should feature by emailing us at alumni@richmond.edu. That's all for this episode. Talk to you soon. And remember, there are spiders everywhere and that's a good thing.

[music fades out]