

American Chemical Society AMA: I am Elaine Seward, a Producer with ACS Reactions with a background is in digital media and film. Ask me anything about communicating chemistry using animations and/or social media!

AmerChemSocietyAMA¹ and r/Science AMAs¹

¹Affiliation not available

April 17, 2023

Abstract

Hey Reddit—I'm Elaine. I'm a producer for the American Chemical Society's Reactions YouTube series, where we discuss everyday chemistry. We've covered topics ranging from "Is It OK To Pee In The Ocean" to "How Protein Helps To Build Muscle", with a little cookie science in between. As a member of the Reactions team, I write, animate, narrate, edit, and come up with ideas for our videos. I also manage our Twitter and Facebook pages, which you should go and follow right now. Seriously—you know you want to. I feel compelled to note that I have zero scientific background—my background is entirely in digital media and film. This has definitely created some interesting challenges along the way, but I do consider myself to be a science communicator. One of my favorite parts in the process is taking a scientific concept, breaking it down, and re-structuring it so even middle schoolers can understand how chemistry affects their lives. So ask me anything about animating science – including the production process, how it works, my lack of a science background, and how we develop our topics. You can even ask about our social media efforts or what it's like living in Brooklyn while our team is based in DC (hint: I might be addicted to slack). I will be back at 12 pm ET (9 am PT) to answer your questions, so ask me anything about animating science—including the production process, how it works, my lack of a science background, how we come up with topics and you can even ask about our social media. Taking a quick break—will be back around 1:30!

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AMERCHEMSOCIETYAMA [R/SCIENCE](#)

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Where did you learn how to animate?

[Clythoris](#)

I went to American University in DC for grad school majoring in film--I took two classes in After Effects and fell in love with it. Ironically, those two classes were my lowest grades in grad school. I got a job as an assistant motion graphics designer at Rich Harrington's company in Virginia and at night I would animate and do online tutorials. I learned a lot by just messing around and doing projects for myself.

I would love to do something like this for concepts in physics! I'm in the opposite boat from you, though - I have the science background, but no animation experience at all.

Where can I start? What technology or software would you recommend that an absolute beginner learn

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in order to do what you do?

[jjcollier](#)

After Effects all the way! Once you get a good grasp on that you can move on to something like Cinema 4D. Online tutorials are absolutely great. I recommend [this by VideoCopilot](#). Other great beginner sites are [AE TutsPlus](#), [Grey Scale Gorilla](#), and [Creative Cow](#)

I use videos and animations to teach middle school science. There seems to be a big gap- lots of science videos for elementary students and lots for high school, but fewer for middle school. The same thing happens with educational games. Why is this age group less targeted?

[bovfem](#)

Good question. I think it's because it's the most challenging age group--it's that age where you still have some childish interests, and some more grown up interests--you're figuring out how to grow up. To get that right in content is challenging. For us, we try to get a broad range of people interested in science and I like to think that most of our videos would be enjoyed by middle school students.

Hey Elaine, thanks for the AMA.

I love the idea of online education substituting the 200 year old school systems that we have in the majority of western countries. How do you see this market panning out and what does the future hold in regards to educational conservatism fighting back the 'digital teachers' like you?

[Z3R0C001](#)

Great question! I believe YouTube has no business replacing teachers, but I do think of our videos more like the new textbook. Since everything is becoming more and more digital, it makes sense to have students watch educational videos to spur their learning and interests. The great part is that we can interact with them via Youtube and social media, opposed to a textbook which--no matter how hard you try--will remain unresponsive. Videos also bring a sense of personality and intimacy that a dry textbook will always lack.

I would love for more attention to be paid to YouTube educational channels in the future. The worrisome part is accuracy. We do our best to ensure our videos are as accurate as possible (all of our research is from credited studies and research, we pay attention to the visual representation, the wording, etc) and if we--heaven forbid--make a mistake we immediately issue a correction. But there's a lot of videos out there that are pretty shaky with accuracy and spreading pseudoscience or information that's just wrong. I would love to see Google start up an education YouTube spin-off to really help teachers to know which channels and videos they can trust. I think it'd be a fantastic service.

Hi Elaine! Thanks for doing the AMA, I was wondering how you go about (the process) of making a new video, and how long they take?

[willwork4peanuts](#)

Sometimes they feel like they take forever to make. But in a more realistic sense--we have a 4 week schedule for them.

It starts with the idea--we have meetings every few months where we pitch ideas, work on them, sort them out, then the producers usually pick what they want to work on and it's placed on a master

schedule of when our videos will be released (currently we're scheduled up to Sept 20). Someone will write the script (we have several script writers, some of the producers and scientific consultants will write scripts as well). Once the script is written, there's a few days allotted for the producer, our executive producer, and two scientific consultants to look over it and make changes. After this, we have a table read to make sure everything is as accurate as possible, it's comprehensible, and it's fun.

Next we find an expert in the field to vet the script. Once that's done, production begins. Producers have about 5 days to make the first draft of the video. That is sent around to our two internal scientific experts, the EP, and an art director of sorts who checks fonts, colors, designs and so on to make sure we have a consistent feel to our videos. After everyone comments on the first draft, a pretty finalized second draft usually comes out about three days later. This version goes to the external scientific consultant, and to our management for review. The third and final version usually comes out about two days later. We like to have our videos finalized the Friday before the Tuesday it will come out, but sometimes videos won't be finalized until that Monday and occasionally the day it comes out.

Hi Elaine,

You say in the AMA's description that having no scientific background created some interesting challenges. What was the the hardest challenge to beat because of this?

[iamdigidude](#)

Haha definitely creating the molecules in our videos! We recently switched from [this style](#) to [this](#). I had the tendency to make the molecules wrong in the previous method. Our scientific consultants would tell me "Change the bond on the nitrogen to bond with the hydrogen" and I was have absolutely no idea what she was talking about. We would usually end up going through multiple versions of molecules until I got them right--we would easily spend 30 minutes talking about them when they're on the screen for three seconds so we changed the presentation of the molecules and it's been so, so much easier (though I do prefer the look of the old style)

Hello! How did you end up working on this particular project? Did you have a passion for science that led you to wanting to work on something like this?

[theonlycanvas](#)

I actually got my job at ACS the month I graduated from grad school and it was pure luck. I've always gravitated towards science, but never had the desire to be any sort of scientist. It just made sense to start making videos about chemistry and I absolutely love what I do!

Why do I see so many ACS AMAs nowadays?

[uncultured_mamoswine](#)

Because chemistry rocks and we want everyone to love it as much as we do.

Why do textbooks still teach with the outdated orbiting electron model when you'll eventually have to discard that to relearn the hybrid 'cloud' shaped model? I feel as though fluid-like animations showing how resonance 'spreads' it out over a molecule would be far more useful in visualizing bond behavior in the classroom. An animation of electron clouds as 'sticky' droplets would be really interesting to see.

[HumbertHumbertHumber](#)

It looks like [/u/conventionistG](#) answered this way better than I could! And I agree--we use the most accurate and easily comprehensible visuals that we can.

I'm majoring in the same field and it's a relief to see someone working outside of news/advertising. Any advice on someone coming into the workforce in your field?

[thetushqueen](#)

Practice, practice, practice! When I was first starting out, I'd make stupid silly animations for my friends using techniques I had learned--it really helped me to improve as an animator and helped my sense of design. You'll also get frustrated with your work because it's not as good as you want it to be, which can be a good thing. It means you have a good sense of design and want to better yourself. Don't limit yourself to one style of animation--try them all. Animate what you like. I've always gravitated towards science, even though math wasn't my thing so it just made sense to me to animate chemistry. Keep on doing it--keep improving yourself.

Hi Elaine,

As an animation graduate who is extremely demotivated, do you have some tips?

I feel like I have begun to grow to dislike the medium. To me, it was a realization how egocentric people in the film industry are, and most of the times, people practice and hone their skills so they're able to brag how awesome they are or "make it in the industry". That isn't what I want, but I realize that's one of the only ways to get a job.

I would appreciate it if you would reply with your personal beliefs / experience.

[rethardus](#)

Haha oh I totally understand that. Our team isn't egotistical, and we all get along well, so it is possible--granted we're not in the film industry. We're more in the science industry with a few creatives. We're also in the YouTube world, which is different than the film industry. After being to VidCon several years, I really like the YouTube sphere. People don't seem to be as egotistical and aren't as concerned about getting ahead or bragging about how awesome we are. We just want to make good, accurate, and engaging content that people like, which is how the attitude should be. To be honest though, a lot of my friends here in NYC work in the film industry but they don't brag about how they're making it, or who they "bumped into on set" last week. So those people do exist!

I literally fell into my job--I applied for my job the month I graduated from grad school and got it. That was in 2011 then in 2014 we started Reactions. In 2011 there was 5 of us--in 2016 those 5 members are still part of the team, though we've expanded. We were all pretty new in 2011 and by the time 2014 rolled around we were ready to grow, so we did and now we have this awesome channel. So don't be afraid to start something yourself and see how it grows. Find something you're passionate about and animate it. If you like beer make a series about the different types of it, or how it's made or whatever you want. It's the internet--there's a home for literally everything.

With that being said--I'd recommend searching for jobs in companies opposed to in the film industry. Some companies will give you so much room to create what you want and to grow in that space.

How necessary is a degree when it comes to the digital media industry?

[hxcroger](#)

I agree with [/u/vvash](#). It's not necessary as long as you know how to use the programs. If you have a killer reel, a company isn't going to care if your degree is in history. Actually, a different degree can be an advantage. We're constantly in search of someone who knows their chemistry and can whip out an awesome video. So if you have a degree outside of digital media, use it to your advantage!

What software/hardware do you use?

[MrGuttFeeling](#)

Hardware: 2015 MacBook Pro, two 22" monitors, Audio-Technica AT2020 mic, 2 4TB external drives

Software: After Effects, Photoshop, Premiere, Illustrator

Hi Elaine,. You say in the opposite boat from you, though - I have begun to grow to dislike the medium.

[rautila](#)

GASP why?

With "gameification" of education, how feasible would it be to have a game that teaches/uses chemistry as a core mechanic of the game?

[ne0_ge0](#)

Oh boy. That's a different beast than what I do--that involves a massive amount of coding. I would need to find a coder who could make my designs and animations interactive. I gave up on coding my first semester of undergrad ;-). But it won't be that difficult since there are so many people who are good at coding.

I had a really hard time finding mental landmarks or mnemonic devices to understand the numbers like mole. How can these concepts be better explained or communicated?

[RagnaBrock](#)

Excellent question. People process visuals quicker than they do audio, though audio reinforces the visual. For me personally to remember something like mole, it helps for me to understand it. So explain what the mole number represents, and why it's important that the mole number itself is a thing, and show a visual representation of it. So you have why it's a thing reinforced with what it is, being both shown and told. That's your best best.

Hi Elaine, thanks for doing an ama.

I'm curious about roles in a science communication team like yours for PhDs. Specifically how does the team tackle new scientific stories you want to tell?

Do you rely on colleagues with science backgrounds to help select and then breakdown the ideas, or do you interact directly with researchers?

[conventionistG](#)

Awesome question--Our writers (who vary from people with BS degrees in chemistry, to people with PhDs, to people who have film degrees) gather research using credited studies and research, using meta data when possible. The script is then written and passed along to two scientific experts on our team, which is where the PhD holders usually come in. Our experts vet the script line by line ensuring accuracy and that the sources are valid. After their viewing, a group of us hold a table read of the script (our executive producer, the producer of the video, the script writer, and always an expert). Once we're content with the script, it's passed along to an expert in the field, preferably with a PhD. We ask the expert to go over the script to ensure accuracy for language, concepts and molecules.

From there the producer makes the video. I often badger our internal experts about "is this an accurate representation?" "Is this molecule right?" "Is there a specific color individual amino acids are usually represented as?" Experts check every version of the video and sign off that it is as accurate as possible before we release it.

One topic I've noticed recently is 3D printing meat. Have you considered animating this process?

[SchoolLeader](#)

Oh boy. That hasn't come up yet but perhaps in the future because that's a crazy topic--and only if I can eat it!

Hi! What do you find the hardest part about translating a complex idea to a simple mode? Do you have any advice for professional scientists attempting to pose as professional animators or designers?

[thiosk](#)

Ahhh this. The hardest part for me is taking hardcore research and fully digesting it. I just wrote our video on [how protein builds muscle](#). There's a section where we talk about satellite cells and amino acids repairing microtears.

Now since I have no background in science (I took AP Bio in high school--that counts, right, RIGHT?!), I have no idea what a satellite cell is and I have no idea what amino acids do. But this paper is telling me they both repair the micotears. Well great. But I want to know how this happens, why it happens, and why are they both needed? Why can't the amino acids just take care of it? What are these satellite cells doing here?

I can't effectively communicate (via script and visuals) how microtears are repaired unless I completely and totally understand what exactly is going on. If it doesn't make sense to me, then it's not going to make sense to anyone else. That's how I look at it and that's my advice.

Once I completely understand it for the script, I write it down. Then I look at what I've written and think "Is this imperative to know or can it be scrapped?" I don't want to overwhelm a viewer with scientific terms that aren't necessary or go into the weeds about what's happening.

For scientists attempting to animate, you need to find someone who has no idea about the concept you're trying to convey. Show them your animation and if they get it, then you've done an awesome job.