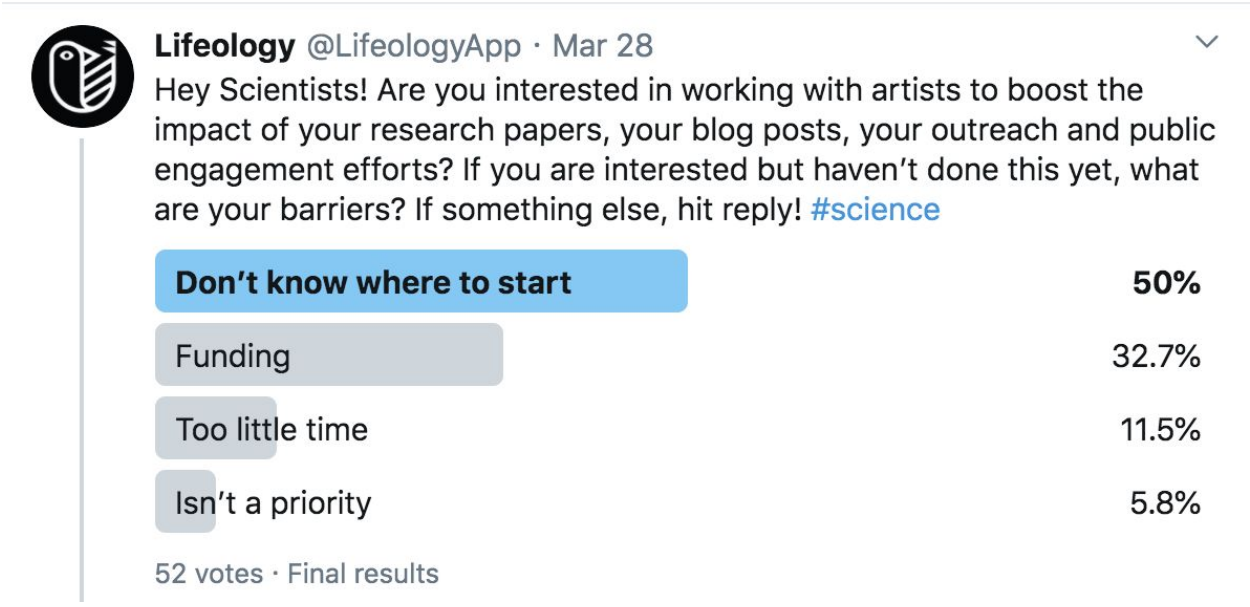
LIFEOLOGY

Advice for Scientists: How to get started working with Artists

Scientists want to work with artists. But the biggest barrier standing in their way is that they *don't know where to start*.



In the Q&A below, 15 artists have answered Q&A questions to help scientists get started!

The artists: Kirsten Carlson, Echo Rivera, Abrian Curington, Gaius Augustus, Ipsa Jain, Molly Patton, Melody Serra, Miriam Rivera, Pooja Gupta, Jordan Collver, Sofie Shen, Karen Romano, Amy Hill, Madison Mayfield, Julie Johnson.

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Q&A

Q: How do you usually meet scientists that you end up working with? What channels online or otherwise do you "monitor" for opportunities to work with scientists?

Kirsten Carlson: Most of my connections come through my science background and referrals. But, regardless of the communication medium (conferences, online, presentations), if I'm inspired by a scientist's work (ie. they are getting their work out there), I introduce myself. Sometimes a project blossoms, sometimes not. I still get to let them know what I think they are researching is awesome. Here are two resources I know about that can help scientists connect with artists: Guild of Natural Science Illustrators (gnsi.org), seaHarmony (seaharmony.org)

Echo Rivera: Networking through conferences or Twitter. I do a lot of blogging and have a YouTube channel as well. So, I often have people reach out to me who have seen my blog or video. Most of the time, it's people who I have started to cultivate a relationship with -- we have had conversations on Twitter or have chatted through email.

Abrian Curington: Typically I meet scientists through other scientists that I've met during conferences or through residencies that I've applied for. I also keep an eye out for anyone looking for an artist on Twitter. Of course, I will occasionally receive a cold email from a scientist who has gotten my information via my residency artwork.

Gaius Augustus: I don't typically monitor for opportunities, and most of my clients have found me through social media or my workshops.

Ipsa Jain: Owing to my training, I have an existing network of scientists that know of my work and interests. This network grows as I get the opportunity to do more work by word of mouth. I also give a lot of workshops for visibility.

Molly Patton: I already have a tight network of contacts from my research days and often gain new business through referrals. I occasionally receive DM's on Twitter or Facebook but LinkedIn is the platform I monitor the most in search of new opportunities.

Melody Serra: As someone who loves science and wants to break into illustrating for scientists, Lifeology as a platform has been a huge help. I also have found some scientists asking for help via my art channel on instagram.

Miriam Rivera: Social media, especially Twitter, have contributed a lot to my visibility. Sometimes I have received commissions directly through direct messages on social media, but usually the requests for quotations come by email. On the other hand, it has also been very useful for me to talk directly to scientists in scientific communication and dissemination events that I have attended as a speaker or participant. Through these events I have created contacts in addition to those I already had due to my scientific background.

Pooja Gupta: Through networking via past project experiences. I sometimes actively share my portfolio site on various channels through social media and clients often reach out through those postings. I try to also keep my clients updated about recent work to spark off new ideas within them and stay on their radar should they require artwork in the future.

Jordan Collver: I follow a fantastic array of like minded scientists and fellow artists on Twitter, where I have connected with almost all the people I've worked with on sci-comm projects. Other opportunities have come through recommendations by friends or past clients.

Sofie Shen: I'm lucky to be in Pasadena, so there are tons of opportunities with Caltech and JPL where they have lectures, Astronomy on Tap, and other events where I'm very likely to meet scientists and engineers. I also do volunteer work for the Planetary Society, so I'd say if you have any public outreach opportunities around, there are bound to be some artists there. As well, I follow a lot of people on Twitter, I tag my work and scientists find me through those tags, I've even connected with a scientist on Tumblr who found me through my tagged work. Recently I participated in a NASASocial, which was excellent for meeting like minded people as well as being able to connect with the scientists behind the Perseverance rover.

Karen Romano: I am a writer and illustrator, the author of books and articles for middle-grade through young adult children, and the creator of science comics based on scientific research. In addition, I work as an independent science communications consultant. At times I am in touch with scientists in order to interview them, visit their labs, or gather images for articles, books, or comics. At other times I go into the field with them to do their public outreach and education, or to work as an artist at sea. My work appears in publications (books and magazines) as well as on the internet. I boost my work through Facebook, Instagram, Twitter, and my own website, and this is a frequent point of contact with scientists. I present my work and speak at science and science education conferences, and am often approached by scientists there to consider working with them and/or covering their work.

Amy Hill: I should do a better job of reaching out to scientists on my end but most of the time scientists find me on Twitter. It seems that is where the highest population of scientists hang out as far as social media is concerned, so I definitely keep my eyes peeled there.

Twitter/Instagram/Etsy: @amyraehill

Madison Mayfield: I have mostly met scientists through personal connections. I have a background in Biology and some of my first commissions were from TAs or PhD students that I had met while in undergrad and then I get referrals from them. I've also done a lot of work showing up at my local natural history museum and advertising myself as a potential illustrator for anyone who works in that space. And occasionally I do get people contacting me via social media.

Q: What are some common basic questions that scientists have for you when the collaboration first gets going? What are some common misconceptions or lack of knowledge that they have?

Kirsten Carlson: My answer overlaps with everyone's and especially with Echo's. How much will it cost? How long will it take? Are the primary Qs I get. Most of the time, I'm as much an educator in sharing the process of creating, as much as I am the creator making the work. I also often ask what the budget is up front because then I can tailor details like size, timeline, usage rights, medium to the project. I learned that it's incredibly helpful to provide a project contract that the scientist and I both sign which includes timeline, deliverables, payment, sketches etc. I believe in long term collaborations (lifetime even) and I usually get involved because I'm passionate about the subject and excited about the science and interpreting it visually. The biggest misconception I would like to dispel is that we can/want to do the work for free, or for exposure, or [fill in the blank]. I do pro bono work but that circles back to wanting to build long term relationships.

Echo Rivera: The biggest question and first question people ask is cost, followed by how the process works. For example: Do they create the first draft or do I? Who crafts the story? The answer is usually: it depends! The biggest misconception of all is that there is only one approach and one cost for a given task. For example, people will send me a draft of their idea, say they want it illustrated, and ask "how much will it cost?" Well, it could cost $500 or $5,000! Cost depends on a lot of things like timeframe, how involved the client will be, and who does the heavy lifting on which tasks, how many revisions there will be, how many people will need to review/approve the final product, etc. So, instead of asking the artist how much something will cost, it's best to tell the artist upfront what the budget is. Then, the artist will tell you what they can do for that cost. A lot of people are hesitant to do that because they want an opportunity to haggle, but I encourage people to move away from that mindset when working with an artist or designer because you want to approach like a relationship where both are building trust. This isn't a car dealership where you're normally at odds with the salesperson.

Gaius Augustus: Clients I work with often feel lost when thinking about how the process works from start to finish. The first thing I typically do is give a brief outline of the process and what is

expected from each of us at each milestone. I give this in writing and also go over it through a video chat.

Abrian Curington: Oftentimes, I have to ask leading questions, as the client has no idea what to ask for! Or they think that their concept may not be translatable into a visual medium. I will often ask them: What kind of research they're doing, what sort of outreach they're interested in, what the deadline is, then I pitch a few ideas to lead them to what they'd like me to create. Once we have a direction, I propose the price that direction would take.

Ipsa Jain: They express the concepts and wonder how it can be visualized. Particularly when it is about editorial illustrations they come with ideas around graphic summary. I end up asking about for what purposes they need this and which format they plan to use it in (print, media, presentation and so on) . It takes time to explain the differences in kinds of visualizations and the audience and qualities. They also sometimes expect hyperrealism or 3D modelling, which is a fair expectation. But they have no idea that if someone does 2D illustrations, 3D illustrations might not be their skillset. They also believe that the work can be done quickly, and come with short deadlines.

Molly Patton: Aside from "how much will it cost?" I find researchers are often unsure of the right questions to ask - which is completely fine and I tend to have a list of questions prepared for them to answer and where possible arrange a meeting or phone call to discuss any details that I might have in return. The most common misconception though, is how long an artwork or a design takes. I have a process I need to adhere to, to ensure a project goes smoothly and there's a limit to how much that can be compressed without compromising the quality of the work.

Melody Serra: I think a common misconception is that because I am the artist I could just be told a topic and "boom!", I know exactly what to draw or illustrate. This is not really how it works, at least not for me, and at least not always. I need to ask questions about the look and feel the scientist is looking for, I need to know what the objective of the project is. I also love when I am given creative flexibility, in other words I know what I am aiming for and what my goal is, but the way I get there and how I choose to express that is something I could figure out alongside the scientist.

Miriam Rivera: The most frequent questions are about the cost, how long can I take to make the order, how is my work process, what would be their role during the process and other specific requirements, such as adapting the cartoons to suitable formats for social media or delivering the elements of the comic book illustrations separately to be used in other materials, such as slides, brochures, etc. One thing to avoid is asking directly for the price, because it will depend a lot on what that project involves. It is not the same as a 1 page comic as a 10 page one, and it is not the same that you have to look for the scientific information or they already give it to you synthesized. That's why it's always better to talk first about what the clients need

with as much detail as possible, and once that's done propose different budget options so they can choose the one that best suits their needs and budget.

Pooja Gupta: Scientists have often come to me when they have already identified the need for some sort of art/visual work for their project. In such instances, they usually have an idea of what they want to achieve but tend to not know how to get there or what medium / tool / style might work best in this scenario.

Case 2: Scientists share their work with me and ask what can be done in terms of communicating their studies. As a multimedia artist I tend to also consult on a medium / tool that is best suited for the topic in concern or depending on the goal and audience. This is less common and tends to come from people who have already worked with me or know of my work. Many don't realise that they can simply share their work with artists and the ideas can be built together in terms of communication. I find this to be restrictive in terms of moving opportunities for communication forward. It'd be great to break that notion of 'having to already have an idea in place.'

Case 3: I look at the work of scientists and reach out to them with an idea saying this can be possible! This is even less common but absolutely possible. Often scientists get more excited than not about such ideas and are very open to exploring possibilities of collaboration.

Showing examples almost never fails in terms of getting scientists on board with ideas. As far as mediums, tools, formats are concerned. This is where I think a portfolio of existing work is most useful.

They usually ask me what I think, feasibilities, budgets and reasons behind each of these decisions. I feel that often there is a lack of understanding within scientists in the design/art process and what it takes to create a complete piece of work. For this, over time, I have built a creative process document based on my experience in design thinking and if necessary share it with them to really show the different pieces of the puzzle.

Jordan Collver: I've been fortunate to work with a great group of people who have lots of experience collaborating with artists or who think creatively themselves, but when this is not the case I am usually the one who has to ask practical questions based on their initial brief - e.g. budget, timeline. I think the most common misconception I encounter is about how quickly the finished art takes, and they can be surprised that a one-week turnaround (or less!) isn't always feasible. I'm not the fastest when it comes to drawing at the best of times, but comics in particular take a long time considering there are on average 5 panels - i.e. what would otherwise be separate illustrations - per page, not to mention developing the script.

Julie Johnson: The main questions I get from scientists are "what do you charge?" and "how does this whole thing work?" They want to know how I charge and I think they are often afraid

that I will charge more than they can afford. They also want to know how we will be exchanging ideas. I think they are worried that they will be unable to effectively communicate what they want or they don't know exactly what they want in the end. I send them information about my pricing and an outline of the back and forth process of coming up with a concept and making edits and adjustments along the way.

Sofie Shen: Scientists aren't art directors, so they don't know what the usual process of drawing is, and don't know what to expect. As an illustrator, I work like this: 1. We talk and I take notes and ask for as much reference (photos, information, etc) as humanly possible. 2. I do several sketches without color and then we meet again and talk about what's working and what's not. 3. I flesh out the concepts that are working, adding color, and then check again to see what's going as the scientist expected. This may go back and forth a bit, and then the final piece comes out of it. Personally, I want all the information I can get, even if we're making an abstract work. I also want to know if the scientist has any opinions of how they imagine the art to be in their head or if they have stylistic preferences.

Amy Hill: First of all, I want scientists to know that they shouldn't feel nervous if they don't know a lot about the art process before approaching artists! I know what relevant questions to ask so we both end up with clear expectations of where the project is headed. The main question scientists will ask is if I could translate what they study into my art form, which is a great place to start. I always do my best to accommodate but one thing to keep in mind is that every art medium has different limitations. For example, I paint with pottery glaze -- some colors have trouble mixing together, I can only create so much detail, and I can only layer colors a certain way. However these are things I bring up at the start if they seem like potential challenges for a given project, and pretty much every scientist I've worked with has been very understanding if given clear expectations at the beginning.

Karen Romano: Everyone wants to know how I get paid! They hope that I am independently funded so that they can cover their work or provide outreach materials for free. The answer is that for the most part I am included in people's proposals and budgets, in the part about reaching broader audiences, educating the public, and so on. I would welcome sponsorship or continual support from a science or art concern in order to continue doing my comics without being part of a proposal, as this can be a long and complicated process for both scientists and me.

Many scientists also think they can commission a children's book. Quite a number of presumptions follow from this idea. While I am an expert at writing for children at every level, and would do a good job of writing about most scientific work, scientists overlook the need for a publishing operation that does production, marketing, and distribution. They seem to think that self-publishing a picture book about their work will be a successful avenue for outreach. I disagree.

Madison Mayfield: The biggest question initially is always cost. I think there is a lack of knowledge on what to charge happening on both ends. It's hard for the artist to name a price without scaring a potential client away. I often wish that scientists would begin the conversation by saying what their budget is or working with the artist to apply for funding. I think many scientists forget that artists have to pay themselves a living wage! Another massive misconception is the time frame many scientists come to you with. Illustration or figure work seems to often be an afterthought or something to begin near the end of the project and I often have to turn people down because they need something next week and I simply don't have the time or can't produce what they want in that time frame. It takes work and proper research to create good work and the artist you're trying to work with may already have loads of other commissions lined up (if they're lucky!). Coming to the artist with a budget, a decently formed idea, and a time frame are all very important in starting a relationship together!

Q: What is the best way for a scientist to start a collaboration with you?

Kirsten Carlson: Connect and introduce yourself and your project via email, social media, etc. It's also great to include what specific work of mine inspired the scientist to get in touch and where/how they found out about my work.

Gaius Augustus: Reach out to me via email or social media. It helps if you already have a solid idea of what you want, a budget, and a deadline, but I have worked with scientists who only have one or two of these. It also helps if you have looked over my portfolio, though I have many work-in-progress pieces that I can only show you if you contact me.

Abrian Curington: Email me any time! Contact on social media works as well. I totally understand if you've never worked with an artist before, and I can help you figure out what you'll need to make your ideas come to life. It's helpful to have a deadline and how you want to use the final product in mind.

Ipsa Jain: Email is the best. An idea that needs to be conveyed, time for conversation and feedback, money to pay, and not a short deadline.

Echo Rivera: Email, Twitter, LinkedIn, or Instagram. Email is usually best, but social media can be okay as long as you make sure the person is active on it first. For example, I usually tweet constantly throughout the day so it's a good bet I'll see your DM. I have auto posts on my FB page, but never really use it. I've had people DM me on FB and only noticed months later.

Molly Patton: Just hit send! It doesn't matter if it's an email, a DM on social media, a phone call - or a text message if they have my number - I really don't mind! If they have an idea of what

they need and a few examples of what they like, great! If not, that's ok too. Part of my job is to help them figure out exactly what they need to get the most out of their project and sometimes it's not what they originally contacted me for. The first step is to just start the conversation on whatever platform they feel most comfortable.

I agree with Molly on this one. - **Melody Serra**

Miriam Rivera: In my specific case, I prefer them to fill in the form I have on the web to order commissions or just talk about their projects, because there I will ask them for all the information I need about them and their project to be able to get an idea and arrange an interview to detail the information and resolve all their doubts about my service so that they can be confident. However, it is perfectly valid to write to me by email or social networks (Twitter, Linkedin, Facebook, Instagram...). From there I will direct you to the form or email if necessary.

Pooja Gupta: Email or Instagram. Less active on other channels and would be okay if it's not urgent. Messaging through the contact sheet on my website reaches straight to my inbox and I am quick in replying to those as well.

Jordan Collver: People get in touch with me by email or leaving me a message on Twitter - either are fine by me! I usually prefer to hold ongoing discussions about the project over email, and maybe meet up once or twice to chat things through over the phone or Skype (or equivalent). Sometimes nothing beats a little "face-to-face" to hash out ideas.

Julie Johnson: Sending me an email or message through social media are the best way to start the connection. After that, I really like to have a phone call or video chat if I can't meet in person because it is the fastest way for me to understand what they want to commission and what their goals are for the work.

Sofie Shen: I'm open to connect through anything, Twitter, Tumblr, Instagram, Linkedin, email me, DM me, call me, text me, ask me about it in real life, we can have lunch! I'm always happy to learn about what projects people are thinking about.

Amy Hill: Sending me a message through my sales channel (Etsy, for example) or social media is the best way to go. It's a good idea to come to me as early as possible, since time and materials available can fluctuate. It's also helpful if you have a clear budget, timeline, and photo references! Artists tend to be very visual people, and any photos you can send for project ideas is invaluable.

Karen Romano: Invite me to collaborate: First, find a way/place/time for us to work together so that I can learn about your work; this may be an expedition or a visit to your lab, or even a phone conversation and series of emails. Second, have an idea of the audience you would like to reach and how you want to reach them. I can help you formulate a plan here. Third, have the

support of your institution to broaden outreach and audience by engaging me to create something for and about you. Fourth, be prepared to seek funding to support it. One final thing to consider is that I can help with fieldwork, as well as outreach. I've done CTD casts from a rigid-hulled boat in Antarctica, and lab work filtering water… so employing me can be a combination of jobs, and therefore ways to fund a partnership.

Madison Mayfield: Email! I get a lot of people reaching out to me initially via social media, but I always transition to email so I don't have to type with just my thumbs! And if a project is particularly complicated, I'll often skype or zoom to hash out details. If someone is local and has specimens/references, then I'll also meet up with them in person.

Q: What kinds of projects or work have you done in collaboration with scientists? What kinds of projects would you like scientists to approach you with?

Kirsten Carlson: I often find myself straddling the world of science and informal education creating outreach/educational types of products (children's books, educational posters, informational graphics). My illustration and design work are in scientific papers, books and exhibits. My formal education is in ornithology, marine ecology and scientific illustration and then I worked for 10 years as a graphic designer and exhibit designer at an aquarium in California. I think my favorite work with scientists is being an artist-in-residence. I've done four and love the process of working side-by-side with a scientist and collaborating in a field work environment.

Gaius Augustus: I've worked on a variety of types of projects: graphical abstracts, cover art, comics, animated videos, book illustrations, even a video game. I love innovative and creative projects that challenge me, so as long as you like my style of art, it's worth talking to me.

Ipsa Jain: I have created graphics for web pages, posters, presentations, grant reports, outreach materials, children's books, zines and so on. I like storytelling more than graphic design work. This is where the scientist and artist in me are happy at the same time.

Echo Rivera: Most of what I do is data visualization and presentation design. A lot of people think PowerPoint dooms you to create boring presentations, but I'm trying to debunk that myth and help scientists create engaging, creative, and fun presentations (for both scientific and non-scientific audiences). I also created some custom illustrated models (e.g., theory models) for folks. I've done a science comic and loved it, and would love to do more.

Molly Patton: Literally anything. I run a full spectrum design studio running graphic, web and motion design streams. We cover anything from journal covers and medical illustration thorough

to branding , web development and animation. More recently, we've launched a new consulting service to show scientists how easy it is to incorporate more visual media into their everyday work - saving costs, reducing timelines and even contributing to the research itself! We feel this will really help break through that cost barrier to scientists working with designers and artists.

Melody Serra: I've had the honor especially in the past few months of creating a wide array of illustrations, this has been tons of fun. I'd love to continue to be approached with all kinds of projects.

Miriam Rivera: I'm specialized in dissemination science comics, but this can also be adapted to illustrations of the style you will find on my website or graphical abstracts. Any research or scientific or technological project that a scientist wants to tell to society, other scientists, media, or companies in a pleasant, understandable and visual way through comics and illustration to increase its impact is welcome, and they can use them in many ways: books, publications in social media, support material for media, graphical abstracts, roll ups, presentations, posters, merchandising exhibitions…

Pooja Gupta: I've worked on campaign content design, infographics, films, visual abstract, scientific illustrations, illustrated research stories in multiple formats, designed books and so on. I'm open to all of this and anything in between really. I especially work with issues / topics related to the environment.

Jordan Collver: I've worked on poster art, cover art, comics, editorial illustrations, illustrations for YouTube videos, and artwork for policy documents as an alternative to traditional charts and infographics. I'd love to work with more scientists drawing comics about their research, either for a popular audience or as a "graphic abstract" or figure in a research paper or poster!

Julie Johnson: I mainly do watercolor illustrations of species for ecologists and evolutionary biologists. The majority of my projects have been for people who study a group of species and don't have access to good or consistent photos of the organisms for their journal publications and presentations. I also do digital diagrams to explain experimental design or life cycles. I have also done quite a few logos for scientific collaborations or labs. Additionally, I paint mushrooms and have created a mushroom identification app, playing cards, and I sell the images on T-shirts and other products for people who love mushrooms. Scientists commission work from me mainly because they want their figures to look beautiful and clean, they want their presentations to be eye-catching, or they work on species that can't be photographed or processes that are best explained visually.

Sofie Shen: Lately I've been working on mission patches for upcoming projects at the Astronaut Center in Poland, for their Moon and Mars analogs, as well as STRATOS, a stratospheric balloon mission. I'm also lucky to be helping with mission patch design for Tektite 2020, which is an aquanaut mission. As well, soon I'll be working with Sirina Nabhan, a DSN engineer at JPL,

to make concept art of future communications satellites. I love everything about space, be it astronauts, robots, astrophysics or planetary science. I'm always looking to expand and help with concept art, illustration, or graphic design.

Amy Hill: My scope is pretty limited to hand-painted ceramics. I have painted anything from stars, rovers, planets, moons, nebulae, galaxies, pulsars, as well as more science-fiction themed pieces. Personally, I love any project where scientists have specific subject matter in mind but also trust my experience and judgement on the artistic elements like composition and style of the piece.

Karen Romano: On-camera interactive videos from shipboard

- On-mic emceeing of shipboard operations for telepresence
- Articles/essays/blogging from expeditions
- Science comics from the field or lab
- Photo journaling from the field
- Lab-- water filtering, and sample-gathering work (as a lab assistant)
- Artist in residence, drawing and writing about operations for a variety of uses, including books, posters, and booklets/brochures that tell the story of an expedition, operation, or project.

Madison Mayfield: Most of the work I have done for scientists is species illustrations, life cycles, cover illustrations, and even logo designs. I absolutely love doing species illustrations, especially when it's to describe a new species, but I would absolutely love to move into more involved illustrations like graphics panels illustrating different aspects of research or fieldwork. Creating illustrations for museum displays would also be incredible.

Q: What are some things that you have learned from collaborations with scientists?

Kirsten Carlson: It’s always the same. I fathom some new aspect about the beauty and wonder of Nature through their science.

Gaius Augustus: What I love about creating science art is that I’m constantly learning from scientists! As a scientist, I felt like I had to focus so much that I didn’t get a chance to branch out. But transitioning back to an artist, I get to learn about the amazing work being done around the world.

Ipsa Jain: I learn about a lot of diverse science. In conversations with them, I also learn about the intensity of their passion which is contagious as well.

Echo Rivera: I have learned SO many cool things I never would have before, it's hard to choose what to share.

Molly Patton: I really enjoy learning about frontier research and I always come away knowing more than I did before. Trying to understand the science behind each project, it's a real challenge, and it takes a little longer, but it stretches my mind in different ways and makes me a better director.

Miriam Rivera: For scientists, the fact that you also have a scientific background is reassuring because it allows for more fluid communication and makes them trust you. Although society sometimes perceives them as wise men hiding in their ivory towers, they are very eager to tell about their research and have a great passion for what they do. And, obviously, with each assignment I learn a lot about different fields of science.

Pooja Gupta: I have a background in design and film academically and all the science I've learnt since is by spending time on the field with ecologists, biologists and the like. They've taught me how they conduct research, why certain aspects are more important over others during different projects and have always been there to explain their science to me, teach me and allow me to grow while I figure out the art bit for the project. It's always been a two-way learning and with every project I take on, I learn about new topics, new methods and new investigations which keep it forever exciting!

Jordan Collver: Learning the science directly from the source is a really fun discovery process. Drawing is a great route to understanding and I've learned a lot from having personal first-hand access to a researcher to ask questions to try to work out how I'm going to draw/interpret something. Through the collaboration itself, I've learned that scientists (at least the ones I've worked with) tend to be keen visual thinkers already and, despite their tendency not to think of themselves as artists/creative, they are bursting with ideas. I didn't necessarily expect this when I started.

Julie Johnson: As a former scientist myself, my favorite part of working with scientists is that it allows me to continue learning about biology. I have always loved biology. Every collaboration also helps me learn how better to serve scientists.

Sofie Shen: I always love asking as much as I can and getting the person I'm collaborating with to go on further about their subject. Even if I don't understand it all, I love hearing people talk about what they're passionate about and learning new things and processes. It's always a deep source of inspiration.

Amy Hill: There's just so much! I think learning about how nature functions in their studies and how I can capture that has been very fascinating. For example, one commission involved an M

dwarf and exoplanet, which are lit in completely different ways and that challenged me to find the right painting techniques to capture both of them accurately.

Karen Romano: So much science. How it is done, in terms of concept, process, personnel, technology, vessels, vehicles, equipment. The big picture and how a small project relates to it. How data are used to tell massive stories, too. And also -- how to learn something new and complex (scientists are amazing learners, able to advocate for themselves in a sincere and positive way in order to get the data and procedures they need). It may sound strange, but they have taught me that it's okay to be ignorant -- and how to manage that and succeed.

Madison Mayfield: So many things! I often find myself learning about animals or processes that I had never even heard of before! Working with scientists has also given me the opportunity to get out in the field and tag along on some hands-on research which is always a massive bonus.

Q: What are some things that you've experienced scientists learning from YOU during collaborations?

Kirsten Carlson: The best is during the artist-in-residencies when I carve out time to share some artistic skills/tools with the scientists. In the process of drawing, observing, sketching I have had many scientists tell me it's benefited their scientific 'thinking.' And since I myself was a scientist and then embraced art, I love sharing the concept of combining science and art with scientists.

Abrian Curington: How to communicate their work in a more approachable way! Since the research has to be explained in order for me to visually translate it, I ask all the questions that an average member of the public would ask, and it gets the researcher thinking from a different perspective.

Ipsa Jain: Discussions with scientists during visualization trials always coax them to ask questions that did not come up earlier in their thought process. I became an equal scientific partner of the lab for a short while. On a very different note, when it comes to outreach projects, I try to express the need for simplified language and jargon-free and creative ways of expressing science stories.

Echo Rivera: Although I will design materials for scientists, all projects tend to involve at least some training and education. I'm often sharing design and psychology tips with clients to explain why I did (or didn't do) something. One reason I love working with scientists so much is I can share tips and strategies from psychology (my background) and they're often blown away with the tidbits I share about the human mind.

Molly Patton: Scientists are often surprised about the extent to which design positively influences their work - not just how it looks, but also in other ways; we improve their visual communication, it attracts more opportunities for funding and collaboration, industry engagement and of course more discoveries to be translated into commercialised technologies that make a real difference in people's lives.

Miriam Rivera: Sometimes scientists attach a lot of importance to theory and don't want to leave anything out. Participating in the process of creating the comic through the reviews gives them the opportunity to see why they should choose only one part of the information or another, why they should tell it in this way or another, and when they enter into the dynamic they even make very valid and fun contributions, whether they are visual metaphors or dialogues, which can be integrated into the comic. And when they see the acceptance it has among readers and the impact on social media and media, they are very satisfied.

Pooja Gupta: I think that the most challenging thing for a scientist or any of us to do is to 'edit'! They are so immersed in the details and technicalities that they try to fit it all in while telling their story. But, this doesn't necessarily work in terms of effective communication. And this is the most common takeaway for scientists. Sometimes the only way to convey this is by showing real time examples / experiments.

Jordan Collver: The inverse of my answer to your previous question, sometimes asking questions about how to visualise a concept prompts the scientist to think about something in a new way. I can't say this has led to any profound new revelations in my experience (yet!), usually just a different way to phrase something or how a visual metaphor for one thing then leads them to make connections and draw parallels by plugging other aspects of their work into the same visual framework.

Sofie Shen: I think in a way, they come along with me on the ride that is making art. Sometimes you make things for weeks and it doesn't come out as you imagined, and one day it all comes together and you just know. When collaborating with someone, it's really rewarding to share that feeling, and to be able to tell that they feel it's all falling into place too.

Julie Johnson: Scientists come to me because they want to communicate their research visually. For many researchers, this is really difficult. They struggle with how to create a figure or diagram that is simple and easy to understand without being overly complicated. I have helped them with that process.

Karen Romano: Scientists want to tell their stories, and are engaged by my process of distilling what they tell me into a visual or written story for general audiences.

Madison Mayfield: The more I work with a scientist, the more they realize how important it is to communicate clearly and have an idea of what they want in their heads. It makes it easier for both of us and means less time going back and forth with edits. I also know that so many of them walk away understanding how long art can actually take and knowing that next time they can't wait until the last minute.

Q: What are your top 3 tips for a scientist who wants to get started with a sci-art project, collaboration, communication or outreach product, etc?

Kirsten Carlson: Brainstorm the who, what, when, where, why, how. Who is your audience (age, education level, language, etc); what is the main message you want the project to project; when is the final deadline; where does it fill a gap in the communication needs for your science; why does your science need a sci-art; how will it be used. This should be a creative stage, look up #sciart, get inspired.

Echo Rivera:

1. Have a budget in mind before you email them and tell the artist upfront. Don't low-ball it, be 100% honest! I don't do hourly rates and many artists don't either (we do flat rates), so it's easier just to know what you have in mind.
2. If you can, find a way to sketch out your ideas for them. Do NOT be embarrassed about this! It's really helpful and we know you aren't an artist or designer. Provide us with a rough draft of what you're thinking. It could be hand drawn or put together with shapes in PowerPoint, it doesn't matter.
3. Be prepared for them to propose an alternative way to get your point across or design your idea.

Molly Patton:

1. Ask all the questions: discovering what you need and how we can help is part of our process and no question is too silly.
2. Be 100% honest about budgets and timelines: we can have up to 20 projects on at a time and juggling all of them is a fine art. If clients aren’t 100% up front with us about what they need, when they need it and what budget they have, it can throw multiple projects off track. This puts us under pressure and may also lead to additional costs if I need to expand my team to meet new timelines.
3. Keep an open mind: part of my job is to find the best solution to a problem, and that sometimes means tweaking or suggesting alternative idea to the one a researcher has presented.

Ipsa Jain:

1. Clarity on what you want to explore and communicate.
2. Openness to receive and adapt based on feedback from the visualising partner.
3. Defined time goals.

Miriam Rivera: I think it's all been said :) An additional tip: Thoroughly review the artist's work when asked. That way we can correct mistakes before moving on to later stages where it is much more difficult to do so. Also, think of yourself as the expert in the scientific field. We can make mistakes and no one wants the final project to contain wrong information.

Pooja Gupta:

1. A written brief brings in a great deal of clarity to both the scientist and artist.
2. Knowing budgets and understanding limitations.
3. Bringing in samples of what they like and dislike for their project will help us understand where they are coming from and easier to begin conversation and understand goals.

Julie Johnson:

1. Think about visuals for your research before you write a grant so that you can plan for what you want to include, contact an artist in advance, and include funding to cover illustrations in your planning and grant writing.
2. Look on social media for #sciart, search for artists who do the kind of work that interests you, talk to other scientists who have beautiful publications and ask who they worked with in order to find an artist.
3. Don’t be afraid to reach out to a science illustrator and ask them anything, they want to hear from you!

Amy Hill: Contact the artist (if necessary) as early as possible!

1. Have photo references for ideas!
2. It should be fun! If you’re creating your own sci-art for the first time, don’t work yourself into endless frustration where you’ll never want to do it again.
3. Be very patient, good sci-art can take time.

Karen Romano:

1. Please, don’t ask people to work for nothing, or for the exposure, or for the experience. Value the work and expect to pay for time and expertise. Have an idea how your project will be paid for, even if that means partnering on grant-writing.
2. And, when you’re coming to artists, don’t undervalue someone because they don’t have an advanced degree or institution.
3. Your institution is going to need to support the project, to help distribute or disseminate the work. It will work well if they are on board from the start with your including funding for the project in your proposal.

Sofie Shen:

1. It's always good to have a clear idea of what you want in mind and to be honest about what that is. Sometimes people think giving the artist "freedom" is good, and sometimes it is, but there's such a thing as too much freedom, which becomes nebulous.
2. Make sure we know who the audience is so that we can design the art toward them.
3. If you'd like, making something like a moodboard, which is a collection of images with the right "feeling", is a good way to get on the same page with the artist if you have a hard time communicating how you envision the project. This can include art, photos, writing, colors, textures, etc.

Madison Mayfield:

1. Do your research before you reach out to a potential artist. Know what type of art someone specializes in before putting a project on their plate. For example, if you know you want paleoart, find someone who specializes in that even if it takes a little extra time to do so.
2. Understand that art takes time and money. Be open and upfront with your budget and the artist will work with you.
3. Communicate as clearly as possible and come with an idea in mind! Provide as many references as possible and don't just assume that the artist knows what you're asking them to illustrate.

Q: What are some of the reasons that you think scientists should work with you?

Kirsten Carlson: I've invested my life—finances, education, time and skill development—to understanding Nature through the lens of science (specifically ornithology and marine ecology) and sharing the beauty and wonder of those discoveries/stories as illustrator, artist, designer, photographer and children's book author-illustrator.

Echo Rivera: I have a PhD in Community Psychology, so I come from the research/academic world and understand the needs of people in these fields. I had a side interest in art and design and found ways to incorporate that into my own conference presentations, workshops, reports, course lectures and other academic projects. I've also been drawing comics or dabbling in creative communications since about 2014 (comics for my blog posts, YouTube videos, my own website design etc).

Molly Patton: I have a science degree and spent three years in research working on engineering novel biomimetic materials. I can read and understand research papers, I know

what to look for and can interpret data - something that is crucial when communicating science, regardless of the audience. I've got a dynamic team behind me and we are yet to come across a brief we couldn't fulfil - regardless of timeline, budget or geographical location.

Ipsa Jain: Training in sciences makes it easier for me to understand the language of scientists and scientific material. I am a great believer in the spirit of collaboration, where all the contributors learn and grow. I have interest and experience in telling stories of science for various platforms.

Miriam Rivera: I'm a science communicator specialized in the comic format. I have a degree in Human Biology and a Masters in Scientific, Medical and Environmental Communication. With my Biomiics I help communicators, disseminators, scientists and their entities to let their target audience know about their work and their advances through stories with a visual, eye-catching and understandable but rigorous format: the comic.

Although some clients contact me for the aesthetics of my drawings, my value lies in my scientific background and ability to communicate. Unlike other comic illustrators and cartoonists, or communicators not specialized in the sector, I have scientific background and in science communication, which allows me to understand your research, detect the most important and newsworthy messages, communicate with you more fluently because I know the technical language you use and always maintain scientific rigor without falling into sensationalism.

I explain scientific concepts as I would have liked them to be explained to me, with attractive illustrations, everyday visual metaphors and small stories. My comics have a recognisable, well-finished style and are related to values such as scientific rigour, clarity and humour.
I have participated in projects for institutions such as the Institute of Molecular Science of the University of Valencia, the Vall d'Hebron Institute of Oncology or the King's College London, which have found in my comics attractive material for scientific conferences and a communication tool that has attracted the attention of the media and contributed to increase their visibility.

Pooja Gupta: As a designer and filmmaker who dabbled into science on field and through learning from scientists through the medium of art, I am able to focus on simplifying the message for non-scientific audiences. I believe that if I am able to understand the scientist then most people would give the science a trial run in communications. Which has worked well in the past. I have the ability to switch between many mediums and formats and often am able to adapt to varying needs. I'm able to consult on what different tools and mediums might help achieve in a particular case as well as use design thinking and experience to identify specific stylistic choices and aesthetics where necessary.

Sofie Shen: Personally, I'm extremely passionate about combining art and science to communicate and further our culture. I think that separately, art and science are amazing, but

together, they can be revolutionary. They balance one another out; art (or design) bringing aesthetics to something that would otherwise be pure practical data. They reflect the world and each other. I admire what scientists have that I lack and I think my process complements the scientific process; I always strive for thorough, accurate understanding of my subjects. As well, I know when to simplify and when to let the science shine through.

Julie Johnson: I have the educational background in ecology and evolutionary biology, which means that we can communicate well because I have an understanding of the complexities of this field. I have many years of experience creating science illustrations that have been published in top journals. I love what I do and I do it every day, and the most exciting thing for me is starting a new project.

Karen Romano: I can help make the invisible visible. I can break down complex topics into palatable stories for the general public or for children. I will work cooperatively with you to find words and images that accurately portray your science, and am trustworthy in that regard. (Many scientists seem to fear that they and their work will be misrepresented.)

Madison Mayfield: I have a background in Conservation Biology, so I'm no stranger to science and actually love using my art to help make their science more accessible to others. I think that's the biggest reason scientists should work with me. Having a nice illustration to go with their work means more reach for them. Plus, it just brings the science up a notch!

Q: What kinds of unique expertise or skills do you bring to sci-art collaborations, projects or products with scientists, that the scientists you work with don’t necessarily have?

Abrian Curington: Though it depends from person to person, I find that I typically bring design, both in a visual sense, picking color schemes, and graphics, and in turning research into a captivating narrative that retains accuracy while holding an audience.

Molly Patton: As someone who dabbles in just about everything, I bring an outside perspective to science research. This is particularly useful in the research translation space where I use my scientific background and expensive network to find the best pathway for research to be translated to technologies and solutions that have a positive impact and then how to communicate the value of a discovery or idea to the right people to make it happen.

Echo Rivera: A lot of scientists don't have a background in psychology, so I am able to bring that skillset into the work I do with or for them. This helps me add humor, build narratives, and evoke the type of emotions to help scientists make the type of impact they want. Plus, I am able

to help scientists know when they are using too much jargon or being too "academic", so to speak, and often help scientists simplify their ideas or content to be more appropriate for their audience (whether that audience is peers, scientists in other fields, or the public).

Ipsa Jain: I bring a sense of visualization and knowledge of production towards various mediums (print, media etc). I also bring sense of making the content audience friendly. I also have a network of peers that can collaborate and work together to fulfill goals that are beyond my own skill set.

Julie Johnson: Often the most important thing I bring is experience interpreting limited reference material or poorly-taken photographs and transforming them into scientifically accurate artwork. For diagrams or figures, often scientists have trouble putting very complicated ideas or processes into simple and easy to follow visuals, so I bring the skills and experience to the table to help them do that.

Sofie Shen: I have a BFA in Illustration from ArtCenter College of Design, and am equipped with knowledge of symbolism and storytelling that in itself is a subject to study. I keep up with illustration and graphic design trends so my work stays on the edge of what's new; as well as being accurate I care about what's cool, too. Design school built my drawing and painting skills, and I still draw daily, for work or fun. Additionally, I have extensive experience with digital programs like Adobe Illustrator and Photoshop, as well as unique industry experience in games, animation, advertising, and product design.

Amy Hill: I think most artists have spent years honing their skills in composition, style, color, balance, and form. I would encourage scientists to trust in artists' design skills because you're giving the artist the opportunity to exceed your expectations.

Karen Romano: I have a career in translating high-level science research, concepts, processes, and technology into stories that appeal to and educate newcomers at all levels -- from preschool to post-school. I know what teachers and students are looking for. And I can create materials that are beautiful, humorous, informationally accurate, and approachable to broad audiences. While you will be able to use what I create in your own outreach, I will also be using it in mine. In the presentations I do in schools, at educational conferences, and at science conferences, I will be getting the word out on your science as well as on the adventure and excitement of science in general, and using you as a model for generations to come.

Madison Mayfield: I work in natural history museums and know how to prep both bird and mammal study skins. I also do taxidermy and have lots of experience with fieldwork. This means I have a lot of hands-on experience with specimens and access to references and can even work as a volunteer on many research projects that I then go on to create illustrations for! Being a part of science from start to finish helps tell a story for the scientist and I think that's a pretty special tool.

Q: Are there any pitfalls scientists should know about in getting started working with an artist/designer?

Gaius Augustus: It's important to make sure that the artist is the right fit for your project. Make sure you like their style of art, you feel confident in their timeline, etc. But even after you've started on a project, if you feel uneasy about a project at any time, be honest about that. The earlier a client brings up a problem, the easier it is to come to a solution.

Abrian Curington: Pick an artist whose work you enjoy, rather than picking a random artist and trying to get them to do something out of their expertise. Some artists will just say yes to any opportunity, to be polite, and there will just be stress on both sides.

Echo Rivera: Keep in mind that the nature of self-employment means we have to move from project to project with efficiency. It is important that the agreed upon timeline is followed, otherwise this can throw off the entire project load of the artist. Make sure you have the commitment from everyone who needs to be involved to provide quick feedback and response to drafts and questions from the artist. If not, and the project stalls, the project may need to end and you'll need to compensate the artist for the work they completed thus far. This isn't a pitfall so much as it's one big difference between the design and academic world. It's common in academia to take weeks or months to provide feedback (e.g. peer review), but that probably won't work well when working with a freelancer artist. If that's not possible, be upfront about this to the artist so they can incorporate that into the timeline and scope.

Sofie Shen: The only thing I could imagine is finding a designer whose aesthetic doesn't match the scientist's, but that can be prevented by reviewing their portfolio before you decide to work with them. I suppose, depending on the project, it can feel to the designer like they're doing all the work, so be sure to keep them up to date with your side of the project and everything you're putting into it as well.

Julie Johnson: Have a clear picture in your mind of exactly what kind of artwork you want and how it will be used. Problems arise when the scientist likes a particular shape or dimensions to the artwork, but finds later on that it will not fit properly into their paper or it will be distorted or shrunk on their website. Also, having a clear idea of the final product will streamline the process and save a lot of time going back and forth on designs.

Madison Mayfield: Definitely pick an artist who produces work that you like and enjoy. Don't just use whoever pops up on your twitter feed first. You have to like the work they produce!

Q: How early / when in a science project do you think a scientist could/should start thinking about reaching out to an artist?

Kirsten Carlson: As early as possible, it's great to be involved brainstorming with a scientist while they are working on a grant proposal. And, I've also noticed that the sharing/back and forth typically opens up new paths, new ideas and it benefits both the scientist and artist.

Gaius Augustus: As with any collaboration, I suggest considering an artist as soon as possible. It's best if you have a few things: a budget, a solid idea of the project's scope, and familiarity with the artist's work. The scope can be as simple as "I want an infographic" or can be a rough sketch of what you're looking for. It's important to note that artists need varying amounts of flexibility. Some artists will want full creative control, whereas others will want the scientist to be heavily involved. This should be discussed early on. Because you may want or need to talk to multiple artists to find the right fit, and because art takes time, the earlier you can get started, the better.

Abrian Curington: As soon as you think you might want some graphics, contact me and let me know that you're working on something for the future. That way I can already have you on my radar (and even lend a helping hand!). A lot of times, people leave contacting an artist until the end, and it becomes a rush job. Graphics done in a rush aren't nearly as integrated into the spirit of the project, and you may even be charged more for a rush fee.

Molly Patton: In an ideal world there would be constant dialogue between scientists and creatives and they should be involved from the get go - the earlier we can start thinking about how we can help, the better our ideas will be! But, in reality, we're probably not quite there yet so the next best time is as early as possible. As soon as a researcher knows they have a conference to prepare for, an industry proposal or grant application to submit, a paper to publish and they *know* they're going to need some graphics, that's when they should get in touch with us. Even if we don't start right away, it helps us to know you're looking to work with us in the near future and I can arrange the Studio's workflow to accommodate that.

Echo Rivera: As soon as you have a proiect deadline, project start date, budget range, and a general idea of what you need help with. I always need to be contacted at least 1 week before the deadline, but I prefer to be contacted about 6 weeks before the project start date. I limit how many clients I take at a time so you can be my priority, so it's good to reach out early.

Sofie Shen: It would depend on how involved the project is and what it's for, but as soon as you have your big ideas locked in and it's just small details to change, I think it would be good to start looking for someone to work with.

Julie Johnson: It never hurts to contact an artist as soon as you think you might want a project in the future. If you wait until a month before you need the artwork, you may find that your artist is too busy to complete the work or that you will have to settle for something simpler in order to make the deadline. Give your artist at least a couple of months.

Karen Romano: As early as you need to in order to secure funding, such that if you are preparing an NSF grant, an artist may be specifically included. You will need to agree on plans, schedules, outcomes, and budget.

Madison Mayfield: As soon as it starts! Even if you don't have an idea in mind just yet, creating a connection with an artist is important and being involved from the beginning may even inspire the artist to come up with some unique ideas for illustrations. It also means the artist will have a better understanding of what the scientist is doing, what they're after, and what kind of budget they're working with or could potentially apply for before the project ends.

Q: Where can scientists meet people like you? What is the best way for them to get in touch with you? How might they initiative outreach and what might they say?

Abrian Curington: Where physically? Very occasionally, I am at science conventions, but I'm more often found at art conventions, naturally! Or one of my talks at a local library, or the like. You contact me like you would anyone else, via email or social media (as always, email is easier to keep track of). All you have to do is tell me who you are (no need for a whole bio, it's just like making a new friend), what you're working on, and how I can help! I don't need a whole proposal in an initial email, though you can do so, if you'd like.

Molly Patton: Easiest way to catch me is to contact me either via social media DM's or email (preferably email). If you have a project in mind, feel free to jump straight into it, if not, I welcome any and all questions - the most important thing is to start the conversation and we can go from there.

Echo Rivera: most artists are on social media, so that's a great place to start. Most also have websites and a newsletter, so another great place to start is to sign up for their newsletters so you can get to know them. For me, a Twitter DM or email is the best way to reach out. A good way to initiate the conversation is to send a draft sketch or description of what you'd like created, along with your timeline/deadline and budget range. Or, if you just wanna chat to get to know me, then send me a tweet with a gif!

Julie Johnson: Meet me online! I am posting photos of my paintings and process on my website, Instagram, Twitter, every day. Most of my clients don't live near me, so all of our communication is done online. Send me an email! Tell me about your research and what you have in mind for a collaboration. Then we can talk about the details, cost, and options.

Sofie Shen: As I said previously, I think local outreach events, be it at a museum, college, or NASA Center, are good places to meet people who aren't scientists but have a strong interest in it. Posting on Twitter and tagging with appropriate tags (#sciart) or even searching art online that's relevant to your work can yield artists with similar interests. Different institutions have projects where they bring in volunteers and some of them may be artists. You can also look on art sites like Behance, where excellent designers post their projects. As well, you could look at any design schools that are local to you, or publications that have illustrations, and find artists that way. I would just show that you have a reason that you've chosen me and propose what your project is in a paragraph or less. It's not uncommon to be messaged with a brief summary and then the rest is worked out later or after NDA is signed.

Amy Hill: Generally, social media is the best way to find your perfect sci-artist. Most scientists tend to find me on Twitter, but check out Instagram too -- there are way more artists and they're easy to narrow down by searching the #sciart tag. I wish there were more conventions where scientists and artists overlapped, occasionally you'll see events like Geek Girl Con which tends to have a higher concentration of sci-artists!

When first contacting an artist, it's always a good idea to check if they are open to commissions or collaborations before pitching an idea. Some artists may be at their commission limit, or some may not do them at all. Once you get the go-ahead, give us as much information and detail about your project! We'll follow up with questions to make sure we have all the information we need.

Karen Romano: Find me via email, Twitter, Instagram, or Facebook, or through my website.
wrenyoung@Gmail.com
@doodlebugKRY Twitter
KarenRomanoYoung Instagram and Facebook
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Madison Mayfield: Lots of us tend to lurk around at science conferences! Don't just brush someone off if they approach you to say they like your work and would love to create illustrations for you. There are also programs that crank out amazing artists like the one at CSUMB or Johns Hopkins so it's worth looking there for recent graduates. I might also plug Science Finds Art at this time! It's a searchable database that's just recently started with dozens of great illustrators you can browse and contact for work.

Q: What kinds of things, experiences, timelines, processes should scientists expect from working with you?

Gaius Augustus: I break my process into 3 phases: Negotiating, Creating, Finalizing. During the negotiation phase, we discuss the project, agree on a timeline, deliverable, and price. We'll dig deep into the project's needs and create a solid plan that goes from start to finish. The goal here is to clearly define the expectations on both ends at each step along the way. This typically happens over a video chat, and timelines/expectations look different depending on the type of project. During the creation phase, I typically work independently, regularly sending sketches, works in progress, and thumbnails to make sure I'm on the right track. If necessary, we can have another video chat. Then, in the finalizing phase, I create the final piece and really go into detail creating the art. Since we've been communicating regularly, clients typically have a good idea of what will come out of this. Once complete, I send a final proof to the client and a delivery link. The delivery link allows me to track that the client has received the product.

Molly Patton: I hope the overall experience is a positive one! I aim for the process to be easy, transparent and as efficient as possible. How long a project takes really depends on what the project is and the timeliness of communications, however, as a rule of thumb, however long you *think* it will take, double it!

Abrian Curington: It's funny when I get asked for something that a client needs "tomorrow!" After negotiations and signing of the contract, the rough sketches, round of feedback and final presentation for one piece takes about a week, depending on speed of contact. Usually a small project takes about three weeks start to finish, and that is a very quick turn around.

Echo Rivera: The process goes pretty smoothly. Once I'm provided with the ideal or needed timeline, have a good idea of the scope, and the budget range, I then provide a formal scope of work draft for you to review. That details what I will create for you, what I need from you and when (e.g., feedback) and other important aspects of the project (timeline, how many video calls we will do, number of revisions included, etc). I charge flat rate (not hourly), which means there won't be any surprises during the course of the project. You know the cost before I even begin. Overall this process goes quickly when I'm given the budget upfront because I don't try to haggle or upsell you. You tell me what you want to spend, and if I can do that I'll tell you what I will be able to create from you in the scope. Easy peasy lemon squeezy!

Then I move forward with the project. I prefer to have only 1-2 clients at a time, so if we work together you become my priority client during that time. I provide very fast revisions and am highly responsive. The timeline to complete a project has ranged from 3 days to 2 months--it depends on the size of the project.

Miriam Rivera: First of all, scientists can contact me through my email or my contact form, where I ask them all the necessary questions about their project. Once this is done, we have a video conference meeting to further detail that information so that the client can ask all the questions they need. I then send them a quote with different options so you can choose the one that best suits your needs and budget. When the quote is accepted, the contract is signed, half is paid in advance and the job begins. In my case I draw science dissemination comics, and the process phases are 1) documentation, 2) messages and synopsis, 3) ,4) storyboard and (5) final comic. After each phase of the process, there is always at least one round of revision and correction where scientists' suggestions and comments are discussed and implemented. Although it depends on the project, the process from the beginning of the job can take at least one month. For my clients it is very important that their target audience understands the information easily, and reviewing the work at each phage of the process helps me and assures them that everything is going well. The fact that we both share a scientific background allows us to communicate fluently and that we establish a very kind and trustful relationship. You can see the testimonies of some of them on my website.

Sofie Shen: Personally, I do all my work digitally, so I will give you files from sketch to finish, it will be digital up until the end unless intended to be printed, embroidered or in another format. It helps a LOT to know the scientist's timeline as well so we can plan a schedule. If something is needed in 3 months, the timeline will be different than if it is needed in 1 week. I've worked in time periods as short as 3 days, so I'm capable of working very quickly, but I do appreciate having some time so that the thoughts can marinate in my mind before I begin to work. Normally I'd propose a set meeting time every week where we can talk, you'll see the progress, and we can talk about what to expect in the next meeting. I'm always curious to hear about the science behind it all, so don't hold back!

Julie Johnson: My process involves multiple steps. The first is talking about the project and laying out a clear picture of what the client needs. Then we draw up a contract and finalize the project cost. The client will then send half or all payment, depending on the agreement. I will draw up rough sketches and the client will approve or suggest changes. I will then send final drafts for approval. The last step is creating the painting or digital artwork and sending it to the client for their publication and use. This process can take as little as a week or many months, depending on how large the project is.

Karen Romano: I'm very flexible. I've been involved in interactions lasting years, and done projects over a month's time.

If I come into the field with you to do science comics, such as #AntarcticLog, you can expect me to choose topics and come up with stories and visuals independently. You will not need to oversee me or monitor me, unless you want to control content/output particularly. (I have found that scientists generally are happy to have me come up with things on my own, and are pleasantly surprised by my stories -- but always will consult with partners on what I am doing.)

I will seek opportunities to include stories about people with diverse abilities, backgrounds, and jobs. Through this, I can help establish rapport with support personnel, improve an academic atmosphere, and add a sense of energy and fun.

One scientist who wrote me a recommendation described me as one of the most even-keeled people he has known. I take that as high praise, and suggest it as an additional strength.

Madison Mayfield: A painless experience hopefully! The process usually starts with agreeing on cost etc, creating drafts then the final product and making sure that the final product is all good. I personally am not the fastest worker, so I do give dates of when work will be finished.

Q: Anything else?

Julie Johnson: Today, everything is visual. Having stunning, scientifically accurate illustrations for your research will more effectively communicate your work to other scientists. Collaborate with an illustrator because your presentations will be more interesting, your publications will be easier to understand, and an artist may even help land your work on the cover of a journal.

Madison Mayfield: I cannot emphasize again how important it is to be upfront with your budget. There's nothing worse for an artist than having to pry that out of someone or give a price and then be ghosted. If a quoted price is out of budget, be honest about it and give the artist an opportunity to work with you rather than disappearing or simply moving on.

I also think that there isn't a general knowledge amongst scientists and academics on how to credit work to an illustrator/artist. This is something that I had to learn the hard way because I did not ever specify how I wanted to be credited. In scientific papers, it is not enough to simply list the artist's name under the figure. That name will get lost, it's not searchable, and it won't lead to any future work. Artists should be credited by full name in the Acknowledgments section for the work they contributed. Additionally, copyright and usage should be discussed with the artist to determine how often the image can be used, if the scientist owns it etc. I know that there is always a lot of misconception around copyright and that a lot of scientists automatically assume that if they have paid someone to create work for them, they own it. That's absolutely not the case.