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[FELICE FRANKEL] Christine Daniloff is the art director of the MIT homepage.

She's the person responsible for getting up these amazing images of what's going on on the campus.

And do quite a turnaround time, by the way.

It's amazing how she does it.

We're going to pick up in the middle of a conversation that I had with her.

I value her opinion on so many things, and I also value her friendship.

Here we go.

[FF] So they send you stuff that they think would work as an image for the homepage.

[CHRISTINE DANILOFF] Yes, they do, though - [FF] I'm laughing because I already know what you get!

[laughing] [CD] They do.

They often like images from the research.

And one example I'm thinking about was in one of the labs at MIT, they work on technology for photographs-- imaging technology.

And so it was this very cool thing where basically if you took a photo, say, with your smartphone and it was blurry and it was askew and all this, the chip they were working on actually corrected all of that.

All the information had been gathered in the photo, but it would automatically correct this photo so that it was almost like frame quality.

You could get this really great photo.

[FF] So the algorithm-- they've created an algorithm that corrects for that.

[CD] Exactly.

So when I asked, are there any images, what they sent me was an image of the chip.

OK, cool, and I think that's valuable with the story.

Like here's the chip.

But the image I put together was-- I started to think, OK, we're MIT, and I know that the local audience, and I think the broad audience too, loves "the dome" and all this...

But I thought, really what people are going to get from this, is that if you have this image on a cell phone and it's blurry and it's not really crisp, and then you see this image-- the same image-- clear, crisp, framed on the wall.

[FF] Perfect.

[CD] That sort of gets the, this is what it means to-- [FF] You're telling a story.

[CD] This is what it means to my life.

When somebody looks at this and is sort of like, OK, technology, but why does this matter to me?

Well, this is why it matters to you.

And so that, I guess, is one of the key questions I always think about answering in the image is why it matters in our lives.

It's important work that's being done, but it's sometimes so theoretical and so out there, you don't even understand that this algorithm will someday might make it possible for me to have a robot that does my laundry.

That, people can get behind.

[FF] That's actually very interesting.

So it's, "who is the audience?" And that's something that we talk about in the course as well.

That says it.

[CD] I agree.

[FF] So let me just ask you some technical things.

Let's say a researcher does have an image that is relevant to the science and it is compelling enough.

Does it have to be a certain file size, for example?

[CD] It does.

A high resolution is important because low res images are small images.

Even though I primarily am designing for digital display, which is low resolution, to work the image in high res just creates a crisper, sharper, more-beautiful image.

Plus, we're also able to use that image on the new site and offer it to press where, when press picks up this stuff, sometimes it's print.

It's often the Times or Financial Times or it's a magazine and they want images and they have to have high res for print.

So high res is always best.

Keep your image as large as you can when you send it out.

[FF] And you, as the art director, can zoom in and create your own framing.

[CD] Absolutely.

You can crop things a certain way to make something.

[FF] So does it matter if it's JPEG or TIF or do you care?

[CD] It doesn't.

High res JPEGs are just fine.

[FF] I think so.

[CD] And I guess it depends.

Sometimes in my own work or something, a TIF is a high res file.

High res JPEGs-- if it's just a flat image, you're not working with layers or anything like that, a high res JPEG is just fine.

[FF] So do you have some examples of some images that you've got that didn't quite cut it?

[CD] Yes, I do.

[FF] I bet you do.

[CD] We get images-- I think that overall my take is that the scientists and researchers, they really want great images for their stuff.

And I've had discussions with many of them where we laugh.

It's like they're the scientists and we're the image people, and I want to make sure that whatever I do for them is accurate.

But we've had jokes sometimes, well, you stick to the science, I'll stick to the images.

[FF] Our hope with the course, as I know you know, is to raise the standards of the researchers work and to get them to pay more attention to how they create their photographs-- if it's photograph-able, of course.

We're talking about material that's photograph-able.

[CD] Absolutely.

Here is one example.

These were images about carbon nanotubes that can catch cancer cells.

So the images that we got were sort of the SEM of the nanotubes and the proportions of the device.

But these are great with the story so people have a greater understanding of what they were doing in the lab.

But for something that's supposed to grab people's attention and make them understand what this will do, it doesn't really work.

So I basically did just that, and I used photographs that came from Center for Disease Control images that were available and able to be used.

But trying to think about how do you get this across, and make it visually compelling so that people want to click in and read about this?

[FF] So did you make this nanotube as an illustration?

[CD] This, yes.

The nanotube is actually an illustration of a carbon nanotube.

And it's basically just carbon structure in a tube form.

And sometimes, it's an interpretation of what's going on in this research.

It's not promising anything that they're not working toward, but we make it clear that this is a photo illustration.

This is not something that came-- [FF] It's not a documentary image.

[CD] No, it's a photo illustration of just what this research is talking about.

[FF] So there is an issue about scale here-- that the nanotubes are much, much smaller than the red blood cells.

Are they red blood cells or cancer cells?

[CD] No, the nanotube is around a cancer cell, and then there are red blood cells because the whole idea is that these nanotubes, I believe, are catching these cells in the bloodstream.

[FF] OK, so the relative size of those things in your illustration is actually not correct, and we've talked about this before -- about how far can we go when we make a depiction of something.

But for example, many years ago-- you might be too young for this-- but they used to show atoms and molecular configurations, and the atoms would show the reflection of a window to suggest some sort of three-dimensionality.

Now, there's no way in the world that an atom can reflect a window because an atom is a little bit smaller than a window. [laughing] Yeah, that's the way they used to show that stuff.

So that's just a depiction, but in a way, there is an issue here of showing something that's actually not possible.

But you feel that that's really OK?

[CD] Well, I think that you need to make sure that you're clear that this is a photo illustration or an illustration-- that it's not actual imagery from the research.

Like this wasn't captured in the body.

And I guess part of what I think about is when you say that-- I'm thinking in my head, well, I guess I could've made those blood cells huge, where you wouldn't even see the whole blood cell.

Just an arc of the red cell.

But the other thing is that people have to be able to see it on the homepage.

So everything has to be blown up so they can actually see, what is this showing?

Sometimes you think if you made everything, it wouldn't read at all at that size.

[FF] So the researchers did not raise this issue?

[CD] No, and I think - [FF] So it didn't bother them at all.

[CD] Because it was clear that it was an illustration.

And that's oftentimes what we're tasked with -- is illustrating something that we're trying to show the components at work here.

But we don't have anything in front of us to go by.

It's just sort of showing that it's just our interpretation of what is going to happen when these carbon nanotubes can capture cancer cells.

[FF] So for example, when I color an SEM, I always indicate somewhere that I've colored the SEM.

Do you think that we as journalists of science-- whatever we're going to call ourselves today-- do you think that we have a responsibility to indicate, for example-- would you have indicated this is not scale or something like that?

Do you feel an obligation?

[CD] I think that science illustration, absolutely.

But when I think about what I do, sometimes I think it's heavier on the illustration side.

I wouldn't tell anyone that this is part of a scientific document.

Like I sometimes think it's like art work to go with your story.

And I think that we do have to be not falsely, or give the suggestion-- knowingly give the suggestion-- this image is an accurate image or a realistic depiction of what's going on.

I think that is our responsibility not to falsely represent these images as something that they're not.

But for a lot of these, I look at them more as art to accompany a story.

And I say "art" because it's sort of just my interpretation of what's happening, not accurate depictions.

[FF] It's not a documentary.

[CD] No.

And the other thing about that, I think to do things accurately, as you said, I have to crank these out.

I think sometimes about the research I would have to do.

Like if someone said to me can you do a medical illustration for me or a scientific illustration accurately, that takes much longer.

I think accuracy, at that point, becomes critical because this is supposed to be an accurate representation of exactly what happens in a person's body when this is happening or in this chamber when my experiment is going on.

That's a whole other thing.

I think if I were doing that, I think I'd need more time.

[FF] Absolutely.

It's an ongoing conversation that we have on campus.

How much are we permitted to editorialize the depiction, in a way.

[CD] No, I agree.

I think being honest about what it is.

That's what I always feel.

I always try to be honest about what it is and then it gives you a little bit of freedom to editorialize.

I think you really depict the science in a lot of these devices.

And I sort of am illustrating what they could do or how they might work.

[FF] Yes.

I'd love to see another example of how something was-- [CD] Another example is turning on a key enzyme that blocks tumor formation.

And so I asked for an image, and they sent me a rendering of the enzyme.

And again, I know what will work on the home page, what's going to be compelling in that format.

MIT home page has elements on it, and you have to work with an image that there's a central image area and there's navigation areas that sit on top of the images.

So you're sort of working with images that will allow for all of that to happen around it, but still come through.

The image still pops from all of this.

And so, I sort of know looking at a rendering of an enzyme, it doesn't grab you on the homepage.

It just doesn't.

So this was about blocking tumor formation.

And so for the homepage, it's an image of tumor cells that was absolutely beautiful.

You just want to look at that.

The detail is stunning and that sort of thing.

[FF] So this is a scanning electron micrograph that's been colored?

[CD] Yes.

So we use micro-graphs a lot from research.

Sometimes they're absolutely gorgeous.

They are gorgeous.

I love them.

But if we have them straight from the research, if we color them or add color to them, we always try to state that just so people are aware of what's going on there.

And I think on the MIT homepage and covers of these things, your cover image has to be visually-- it has to really

pack a punch.

So sometimes the color, things like that, can really make a difference, I've found.

[FF] So when a decision is made, who else is involved with deciding whether it gets on the homepage or not?

[CD] Typically what will happen is myself and the director of news sit down and we go over the stories, which he's read all the stories.

He knows what is-- several things come into play.

Variety-- we try to have stories from across the different schools at MIT.

So they're not all biology or they're not all computer science.

We try to keep a good mix of stories coming out that are going to be on the homepage.

If a story is really incredible research or for some reason very important-- oftentimes, the big journals, that kind of helps you.

Like, well, if it's in Science or Nature or some of these really big journals, you know it's a significant story.

And the artwork.

Those two.

It's the artwork and the significance of the research.

Because if we can't illustrate it well or photograph, it's not going to work on the homepage.

On the home page-- you know, I know-- there's very little text about the image.

It has to really-- there's a short head, and a subhead, and an image.

And if you can't make that image really grab people's attention and be something to look at, then it doesn't get on the homepage.

[FF] Simple as that.

[CD] It's as simple as that because it really is a visual page.

[FF] You have enough lead time?

Let's say you know an article-- an important article-- is coming out and you also know that they don't have a visual to go with it.

Do you have enough lead time to come up with something?

[CD] I do.

I've become comfortable in the schedule that we have, and the schedule in our office with the news director and myself, we work well together.

I think he understands that I need time.

And I will often say, sometimes as a visual person you just need-- and some of this stuff is so, like I said, theoretical.

I will read whatever I have about the research.

Sometimes it's just the writer's paragraph pitch for the story.

And then I think about it.

I've got a week to work on this.

I know it's not coming up till next week.

Sometimes it's just a day.

But these big ones-- [FF] You have time.

[CD] Yeah, it's like I need some time-- like some hours-- to just think about massive entanglement-- something like that that you don't really have a lot of visuals to go on.

This is something that is-- [FF] It's all mathematical.

[CD] It is.

And so how do you show this in a way that's beautiful and accurate?

And how do you make this an important enough image to put on the homepage?

[FF] I think this is something that we're trying to encourage our students to think about, to not only talk to your colleagues or the experts in your field, but to think about ways to communicate to the public.

And we're not training our researchers to do that, and I think that that's one of the things that we are discussing in this course.

How do you come up with a compelling image of your work that is not only very much about information, but it's about wanting to pay attention to the picture.

It's actually not easy.

[CD] No, I think it's a really particular way of thinking.

And I think the researchers are great.

They always, as I said, will supply images, and they always are excited about-- some of them very much want to talk to you about their ideas for this and some of them are very excited about it.

But some of them, you can see they're scientists.

They do this incredible work in the labs, and they think about communicating to their peers.

And the thing is, people that can read the papers-- like the papers that are submitted-- I often feel like it's such a small percentage in a way because some of this stuff, I look at it and I'm just like, wow - I don't -- [FF] I have no idea what in the world this is.

[CD] Yes, I don't know what's going on here, and I know these equations are really significant.

And I know in talking about their work and in proving what they've discovered here or the advances they've made, that's absolutely necessary.

But to someone who has a real interest, say, in material science but they're not a material scientist, it's going to be very hard to break that down on their own.

So that's what we try to do.

I think the writers in our office are great at that.

And you sometimes grab people that have no real-- like I wouldn't say that I'm particularly interested in materials science, but that was such an interesting image.

And safe bridges.

Whatever.

I read that story and, wow, isn't that great.

[FF] It somehow was related to me.

Somehow.

[CD] Right, and image caught my attention.

[FF] Yeah, I think this whole notion of training the next generation of researchers to start talking to the public is not incidental any longer.

And frankly, we have the obligation to talk to the public.

And as you and I talk about all the time, it's through images.

[CD] Right, true.

[FF] That's one very exciting way to get somebody to at least ask questions about your research.

So this is not tangential anymore.

This should be part of the research, I think, from the very beginning, and you're doing an amazing job doing this.

It still blows my mind thinking about how you can crank out these stunning, stunning homepages.

It's just very exciting.

Do you have other people that you work with?

Do you hire photographers or video people sometimes?

[CD] We do.

I do hire.

Photographers are mostly what I hire to get photographs sometimes of the researchers, sometimes if there's a compelling set up in the lab, which there are.

Or devices-- tiny devices-- or something that really you need a quality photograph of to better understand.

We absolutely hire photographers all the time.

[FF] So there is a place for photography in this world.

And what I've also noticed very recently-- maybe over the past few months-- is that you try to make moving images-- some sort of animation piece to the still.

Am I right about that?

[CD] Yes.

[FF] So how do you go about doing that?

[CD] I can think of a couple.

For example, when I mentioned the massive entanglement, that was totally illustrative, but as the researcher explained how the photon moved through this mass of atoms that were all entangled and he described the trajectory of the photon and how it actually moved through.

So I replicated that in this illustration of what this sort of looks like or what it could look like.

So he knew how the photon actually went through this.

So I had that to work with and I illustrated that.

And then in animating, what I try to do is sometimes I will use various programs to animate.

And lately, my favorite thing is working in Photoshop making GIFs in their video timeline because they show on every device.

So people can see them on phones, people can see them or things like Flash-- you know, if you're on an iOS device, you're looking at the still image that I put behind it for you.

Or sometimes-- someone sent me a beautiful micrograph of a microfluidic device, and cells moved through this device.

So I had this beautiful scan of this device and the channel was very clear how the cell moved through this in the research-- what they were able to do.

And so I just animated.

And basically it was just a small sphere but representing the cell, and this is how the cells are moving through this

device.

[FF] So you overlay the animation?

[CD] Yes.

I overlay the animation right on the image.

[FF] And do you think in terms of how much time the animation can last?

[CD] I do.

First, I think several things.

Sometimes I've had looping animations on the homepage, and I've found that it's more of a local audience here at MIT, but people leave the homepage up all day long because they will say could there be an option to stop the animation.

I have this up all day and it keeps sort of-- I keep thinking something's happening over here because I'm catching the movement. [laughing] So I've taken that into account.

If you're animating something, I sort of feel like if it's a subtle animation-- I remember one I did with a series of photographs actually for the Collier Memorial.

And I could have done it various ways in Photoshop, but I did it with a series of images and smooth fades to make the candle flicker.

[FF] I remember that.

[CD] And I let that go all day.

[FF] Oh, it was so right.

It was just right.

[CD] Right, it just brings that little bit of life and thoughtful point of focus.

So things like that.

And that was all done with photographs.

So the length of the animation.

If they're subtle, I am more likely to just let them run-- loop them-- because I don't think that they're distracting in a way that some - I get it.

If you're shooting particles through a tube all day long, I can get how somebody sitting at their desk could just be like, enough.

So I keep that in mind and try to make it realistic enough or make it a good viewing experience, first-- so the timing is right and it's sort of lending something to the image.

Sometimes it's really showing you exactly how this device works.

Sometimes it's just like with the photon how this thing would have moved through this mass of atoms.

So make sure it's offering something more than a still image maybe couldn't.

And then also, I think about the length of it.

I want it to start fast enough that somebody doesn't click right off not realizing that there's movement that's going to happen.

But also, give them just whether it's a second, or a half a second, or two seconds to sort of catch it when it starts, but not have it last too long.

Because that's the other thing.

[FF] So it might be interesting for us to hear if you could take us through...

A starting point, and then where do you go from there to the next, to the next step, and what the final animation or image becomes.

Can you take us through an example?

[CD] Sure.

And I'll go back, again, to this entanglement, probably because I just finished this one, actually.

So every step of it is very fresh in my mind.

So as I mentioned, a big story coming out about the largest number of atoms that have ever been entangled at one time with a single photon.

So that was the story.

And I knew we were going to spotlight it because I believe it's in Science.

It's coming out in Science.

It's a major thing.

So entanglement, you know?

So I went over to the right.

I said, this is sort of what I'm thinking.

I said, I get entanglement.

It's two particles, not joined together.

I'm thinking separated.

I'm thinking the spotlight image area.

Particles representing atoms on one side, particles representing the other atoms on another side.

And I had first thought about multi-colored particles.

And blue will connect with blue, and green, and I'll animate a ghostly line that maybe shoots back and forth between these just showing that they're connected.

How does that sound?

And she said that it wasn't really that.

It was like pairs of particles entangled like that all together, but that it was a large bunch of atoms all entangled together.

So it wasn't pairs.

It was maybe-- and to me, there wasn't a particular number I had to represent.

Just a large group of atoms, and they were all entangled together.

So those two rows or two separate areas of particles in my mind came together as one big mass.

Great.

So I started drawing that.

I put a background in.

And I do look online to see how are other people representing entanglement?

What exists out there for this?

What do people see when they think entanglement?

And you go on Google Images, and it's all over the map.

So I thought, well, I think all of these particles together with some sort of lines just representing that they are connected somehow-- a line that connects them all together-- was not a bad way to go here.

And so I have a graphics person that works with me, and I told him what I think we should do here.

And I said, if you want to think about that and start working on something like that.

So he did an image and he had an oscillating wave of a photon come in and shoot up.

Because that was another big part of this research is that they're entangled with a single photon.

He showed me the image, and he had spoken with the writer.

And he sent it off to the researcher, and the researcher came back and said, you know, I think that the emphasis should be more on the atoms.

The photon is quite large in here, and it's really the focus of the image.

And so he thought that the atoms should really be more the focus of the image.

So he talked to me about this, and I said, well, look.

Let me show you what I've been working on for this because it's going to be a spotlight, and I do the homepages most of the time-- probably 99% of the time.

And I said, let me show you what I'm thinking for the homepage.

And I showed him what I'd drawn so far, and I was thinking of this line-- just this crazy, jumbled line in the background, but ghosted out.

It's sort of the suggestion of connection with these particles.

And so he asked if he could have my Photoshop file to work with, and I said, sure.

Why don't you work with this and let me see what you come up with.

So he basically did that-- took these particles and did the line and all this-- and showed it to me and it was looking good.

And he sent it to the researcher and the researcher said he thought it was probably the best rendering of massive entanglement he'd ever seen, which is awesome.

If an MIT researcher-- like "wooo!" So I had really thought about animation for this one because an image that just has a lot of spheres with a ghosted line, it's cool looking, but movement could mean a lot.

And so he said, do you think-- and I think at some point animation was mentioned to the researcher.

And he talked about showing this photon come in and then go off at a right angle.

The line that it came in on is the way that it moved in this research.

And so I thought, well, great.

That will be the animation part about this.

Rather than me making this ghosted line like a bright thing shoot around in these lines, but to actually trace the path that the photon took.

And so that's what it ended up being was an animation.

I brought some of the atoms up closer so that there was different scale and a different focus in the atoms or a focal point-- like this atom is bigger than the other and blurry in the background-- and then put the photon through the mass of atoms.

[FF] And you used Photoshop?

[CD] I used Photoshop for the entire thing.

[FF] Not Illustrator?

[CD] No, not Illustrator.

It was a simple enough illustration where you're basically just working with textures and spheres with gradients.

And it was Photoshop.

And honestly, Photoshop I work in more than Illustrator.

I do so much in Photoshop.

[FF] My experience is that when I have to make an image in order to explain the science, the process of making the image clarifies the science for me.

[CD] Definitely.

Somebody said to me once, when they asked what I did, and I said I illustrate the MIT homepage, they said, you must be a mile wide and an inch deep.

And it's sort of like you start to learn what the best batteries are being made of these days.

[FF] A little bit about tons of stuff.

[CD] A lot of stuff.

But I agree with you, it really does help me to understand the science more.

[FF] Absolutely.

And that's why we are hopefully encouraging researchers to think about presenting your science.

Because the very nature of thinking about the presentation clarifies what you are trying to communicate.

It's a very, very important part of their education.

[CD] And people will say-- sometimes I do have people that come up and say, I remember that story because I remember there was an image that showed.

And so I feel that gets it across.

People will remember a story because of the image that ran with it.

And they'll remember the words, but they remember it because the image sparks the memory.

And that's pretty cool.

[FF] Thank you, Christine.

This is what this course is all about.

It's been just great.

Thank you.

What a joy.

I'm so lucky to have a pal on campus who feels the same way as I do and who, by the way, does pretty unbelievable work.

[CD] Oh, thank you.

[FF] Thanks for coming.

[CD] Thank you.