

Defining Creativity S1E17: Jonathan Phillips transcript

Debbi: Hi, everyone. Thank you for joining me for this episode of Defining Creativity, a podcast that explores where and how creativity is found. I'm your host, Debbi Ponella, a creativity researcher, cultivator, and devotee. On today's episode, we're joined by...

Jonathan: My name is Jonathan Phillips. I'm a technical executive, scientist, author, and lifelong classical musician. I'm motivated by natural curiosity, my love of creative people and ideas, and my spiritual foundation.

Debbi: Thank you, Jonathan, for being here to talk all about creativity because I know it just applies in so many ways in your life. Let's just start with talking about how it manifests itself in your professional work.

Jonathan: Sure. I am the vice president of Imaging Science at Imatest in Boulder, Colorado. Imatest is a 20-year-old specialty company focused on enabling camera and component design in a myriad of products that have digital cameras in them. So, nowadays, that includes aiding companies around the world that make webcams and laptops, cameras and smartphones, and cameras and smart home devices such as doorbells. It also includes cameras in automobiles for safety, self-driving, night driving, and passenger monitoring.

It also includes security cameras, endoscopes, and even cameras in space. So, it's a really exciting role that I recently started this year in 2022. I was very excited to be asked to come to Boulder to be the vice president at Imatest. As you can imagine, with that breadth of market segments, there's a lot of creativity and a lot of learning and a lot of really fun experiences and learnings throughout that. So naturally, there's that creativity element across those different segments because the cameras are being used in many different applications.

Debbi: So even just discovering what this job is, it's something that maybe a few years ago or however many years ago didn't even exist or wasn't even on the horizon. So, to be able to have that imagination and to know that these are possibilities, I think is so creative.

Jonathan: Yeah, it's been an absolutely amazing career as the field of photography and imaging has really gone through tremendous change within my career. I started as an environmental chemist at Kodak in Rochester, New York, even while I was doing my undergrad at Wheaton College in Illinois. I had started as the summer intern chemist in the environmental groups at Kodak and then I entered the full-time role very easily since I had already been there for many years working while in undergrad.

And at that point, there certainly was digital photography happening, but I was entering Kodak as a chemist. So, my interactions initially were all with traditional photography as I moved into solutions for developing film and developing paper in the dark room. And that was very eye-opening to me, learning the technology and the science behind chemical photography.

Fast forward over 20 years of time working at Kodak and I was reporting to the chief scientist of Kodak who reported to the CTO and the chief scientist had entered after his MIT work in the electrical engineering role. So, at that point in time, it was even before we called digital cameras digital photography, it was electronic still imaging, I believe, was the term that was used. So, even the terminologies and how we describe technology changes over time.

So, moving from the very chemical-based imaging to the fully digital-based imaging has been the pathway that I've been on which naturally leads to learning and creativity and innovation.

Debbi: [4:54] So, in your introduction, you said scientists and you've spoken about science. And I think a lot of people think of science as very, maybe rigid or you know, you think math and science, it's very specific. And so, maybe explain how creativity works with science. Clear that up for me.

Jonathan: Sure. Well, I do identify as a scientist as opposed to an engineer, and there are differences. I'm definitely an analyst. I think people see what I do and we have conversations and they say you're extremely creative, but actually because I'm working with super creative people, I think of myself as the observer, the analyst, the person driving communication between those who are extremely creative in the label of these are creatives on our team at a corporation or a company, and someone such as myself who is really in that interpreter mode.

So for me, science is a study and an approach and an understanding of a field as opposed to the designer, which seems somewhat in conflict then with creativity if I'm not actually creating, but the creativity and being a creator really do have that essence. So, for me, I want to really understand something very heavily in order to then be able to apply that. But my main focus is analysis and what motivates me because of this natural curiosity.

I've spent a lot of my career studying the human visual system, which is really important to photography and imaging, particularly when it is something that's interpreted by the human visual system, as opposed to the more recent elements of machine vision and artificial intelligence, which also runs in parallel. If we think about what artificial intelligence is meaning to do, it's meaning to mimic the human processing pathways generally.

And studying the human visual system and machine vision for cameras, then the elements are there to do recognition and detection, such as the human visual system does all the time. So, the science of the vision science, color science, perceptual psychology, these are really important elements from the science in order for us to then understand what are ways that we can improve the technology or impact the technology or innovate.

One of the things I did toward the end of my time at Google and Silicon Valley was to work on a patent related to display technology and smartphones, and how to work with new technologies that are coming out relative to what that means to perception. So many displays, when you look at them more closely, have a cut out portion to allow for sensors and cameras and other type of technology buried in the hardware. So, you'll see a notch or a cut out or punch holes or these type of things.

So, there's a desire from a perfection standpoint, I guess I would call it, to have an entire display without any interruptions or occlusions to the content of a display. And what happens then is then you're putting your sensors and other hardware details, such as a camera, behind the content of the display panel. So, it becomes more complicated, as you can imagine, if you were to go take a picture of something and then you put lots and lots of sunglasses over the camera. It would certainly change the efficiency of the camera in detecting light coming into the camera.

So, there are ways then of making essentially micro holes within the structure to allow more light to come through. But that means then the display itself is not as densely populated with display pixels. So, we are looking at ways to make that more possible without being distracting. So, there are different elements of how we detect motion that I was able to then incorporate into innovation that could compensate for the differences in pixel density of the display that is going over top of a camera behind it, you know, the cameras behind the display.

Debbi: Um, also, I can push the button on my iPhone and take a picture that looks great. So, thank you for all of that.

Jonathan: It's been a process. Yeah. Having worked with the major companies for the past 10 plus years, specifically on camera performance within a smartphone configuration.

Debbi: That's amazing.

Debbi: [10:29] Okay, well, there's so many different things I don't want to miss out of that. First of all, I just want to comment on when you started talking about working with all these creatives and helping with the communication and connecting them. I mean, that's creativity so much right there. The listening and connecting and collaborating, that's huge.

Jonathan: Yes.

Debbi: And I want to get back to that because I have a feeling that we can connect that to the classical music. But I don't want to miss all these other things that you have just packed into that. Talking about pictures, some of my favorite pictures, most gorgeous pictures that I've seen over the past however many years are the ones you put on Facebook because you take these gorgeous pictures, truly. So, I think part of that is just this perspective that you bring and how you look at things. Tell me how you think this scientific and the way that you analyze and do all that, how does that come into your perspective and how you look at the world?

Jonathan: It's very interesting. I'm going to go to my graduate work in color science. I did that at the Rochester Institute of Technology, also in Rochester, New York. And when I did my master's in the early years of my

Kodak career, the field at that time for color science was very much looking at color matching of a single color patch. So, if you have two different green patches, how close or different are those patches?

And looking very specifically at the spectral components of the two different greens and looking at doing vision studies where we ask people to compare patches and how close or far apart do those colors look. I then returned after doing that master's work in the early part of my Kodak time and then in the ending part of my Kodak time, I returned to do doctoral work. And at that point, the color science field had now switched and matured, I would say, to color appearance and surface properties.

So, we have colors in and of themselves, but then we have textures of the surfaces or textures within a color where you could imagine mixing some colors together and getting swirls and other types of patterns, but also surface properties and angles. And we talk about this term called bidirectional reflection distribution function, which relates to how the light comes in and shines on a surface, what angle the light is shining from, and then what angle is the person who's viewing that content, what angle are they at relative to both the surface and the source of light?

So just as the graduate program content had matured over time, I then was able to really understand why I can look at some kind of surface or some kind of color or some kind of texture and just want to look at that for a very long time. And, a little bit unusual I realize, but it's related to then what I'm looking at.

And so from then the doctoral research and studies I did, I had such a better understanding of composition when it relates to photography, because now I am very cognizant of the angles of the illumination, which can be the sun or other kinds of lighting or combination of lighting, and the surfaces and textures that the light is shining on and how that can really create definition in a two-dimensional realm of photography and yet express multi-dimensions from a two dimensional digital photograph.

So when I'm looking myself now, when I look at surfaces, for example, I'm looking out my window and I see a pine tree and a maple tree, and the sun is shining coming from behind those trees, the maple leaves are now turning red because of the fall season, and because they're translucent when the sun is shining from behind, then they have a glow to them. Because the pine needles are not translucent, they're more solid in nature, then I'm seeing the shininess off of the surface of the pine needles.

So, because of my graduate work, because of the physics of illumination, I understand elements within a scene in a completely different way, and that helps me determine types of content to take, how to take them, where to stand, what angle. And photographers in general talk about the secret is in the illumination, in the lighting, whether it's studio photography, where you have control over the lighting in a specific manner, or when you're doing shots outside of that controlled environment.

Debbi: Amazing. Well, all I know is they're really pretty. No, it's just so interesting because you're talking about it at such a high level and it can be present in something as simple as looking out your window, but how it changes what you're seeing.

Jonathan: Yeah.

Debbi: I work with young children with music composition and I bring in live musicians to experiment with their melodies. And with that, we talk about the timbres and the colors and the textures and then, when there's an opportunity, we connect it with visual art, the colors and the hues and the textures, and that's just what comes to my mind as you're talking about these ideas at a very high intellectual level. The things these second and third graders say, as I'm asking them: what color is it to feel excited, scared, angry, relieved— fill in the blank, whatever emotion. What does sad look like? What does sad sound like.

I feel like that kind of connecting to yourself, your feelings, your creative expression of that, and then connecting to the world to get people to experience that. It's so important with creativity to listen. And we were talking about communicating and collaborating and the listening element of that, but it's also seeing differently to those perspectives and actually seeing your environment. And I think you illustrate that on every level.

Debbi: [18:00] As far as education, I'm talking about working with young people. You've talked about all this higher ed. What do you see in your experiences, maybe younger, that has contributed to how you are creative or understand your creative self?

Jonathan: I would say certainly the visual side is very much part of my memory library, if we would call it as such. I can remember back to the youngest of ages with my parents reading books to me and the content on the pages. I can remember the illustrations in the book very clearly, the colors, the hues, the content, the emotion on the faces, these sorts of things. So, the visual memory is very strong all throughout my learning.

So to me when we would go on class trips and such, when I was first going to formal education in New Jersey and then formal education in Rochester where I grew up for the majority of my life, the visits to art galleries, the visits to the Eastman Theater to hear the Rochester Philharmonic, and the times where they would point out at the Eastman Theater to all of us in the theater, "Look at the art on the wall. Look at the bust of the famous composers. What is the texture of the seat you're sitting in?" which was like a velvet.

These things are things I remember. They're important because then, when I got to the graduate level and started really understanding the science behind it, then it became even more interesting and more stimulating. So, I do think that throughout those early development stages that's important. I also recall doing my liberal arts courses for my undergrad at Wheaton related to sociology and developmental psychology. It was fascinating to me how our brain develops over the years and what that means to content and perception.

One of the papers I read during undergrad related to volume comparison at different ages, related to containers that we would have in a typical chemistry lab. So, if you have the same volume of water and put it in a tall, narrow cylinder versus a wide, short beaker, as you grow and develop, you have different perceptions of that volume. So, according to the papers that I read, the early development years, volume estimates were based on height, because that is what you would notice the difference. And then, as one developed more analytical skill sets, it would be more apparent that volumes could be different shapes, so it comes again to appearance.

So, I had friends in Wheaton who had children of the ages that represented the differences in perception, and got the permission, of course, from the parents to have them come to our class, and then went through a series of questions related to perception, visual perception and thinking, for those different ages. So, the one sibling was young, quite young, and I forget the exact age, but early elementary, and the other sibling was in high school.

So, and their answers, thankfully, followed the patterns that were in these various papers that we had looked at in terms of understanding. So, I feel it's the same for myself, not only in developmental psychology and perception, but also in just gaining understanding, right, as an adult, as the employee who's going to graduate school while working later past undergrad education.

Debbi: And a lot of that has to do with the experiences, what you're putting in there to gain that understanding and how broad that is. What kind of experiences were valuable for you in that way, or what do you see that we should be giving our children to help them add to their palette of experiences?

Jonathan: [22:50] I'm all for the liberal arts kind of education with having the different fields and being able to relate to those fields and understand the interactions of those. I get concerned when there are very specific fields that are leaving out other elements of life, because if there are people creating tools and inventions to be used by the general and the full population, then those who are very narrowly experienced and educated won't be seeing the world the way that so many other people do.

And so you have a very small percentage of the population generating tools and innovation and technology that is used by all types and all sorts of people, but yet it's being designed by a very limited training background of a certain narrow field. Granted, it's to an n^{th} degree of education, but it is narrow in scope. So, I think to have that broader understanding and have those correlations, just like you were describing.

I'm describing the visual perception, and I'm using terminology that then can also be applied to the hearing, to our hearing. We can apply it to our taste, we can apply it to our emotional feelings. And unless one is thinking in those areas, then it becomes more limited.

An interesting area that I probed to be able to communicate thoughts and ideas better is cross-modal psychophysics, which sounds very complex, but it's how we relate our senses across different sensory modalities— taste, hearing, smell, sight, touch.

And I did that because I wanted people, as I was educating engineers in some of my short courses, to understand how we can use perception to give us understandings that can be conclusive as long as we're involving a large pool of observers in how we do that experimentation. So, you were talking about what color relates to my feeling or what texture relates to this or that. So, I found a way that I could compare hearing and seeing and help people understand analytical quantification of perception.

So, what... I had read a paper that talked about levels of grayness going from white to black and then relating that to the frequency of pitch from high pitch to low pitch. And again, because I'm looking at theory, the theory in this research said there was a very predictable relationship between the frequency of a pitch from low notes to high notes and the density or reflection level of a gray going from white to black. And in photography, we take patches from white to black to design a camera to be responsive in a way that will look good in the picture.

So, engineers who work in imaging are pretty familiar with simple squares and different levels of grayness going from very light to very dark. And then I pulled together a series of frequencies from very low to very high. And so, what I did is I asked people in the class to listen to the pitches and then tell me which patch of gray from white to black related to those pitches. And, of course, I set it up in a way that we've learned in the field of psychophysics or subjective psychology so that I could have it in an analytical form.

And also, you put in a methodology so that you can remove the observers who don't quite follow the concept or aren't quite consistent in their answers so we can look at that. And then, just like if you want your ruler to measure in a predictable way, if the ruler isn't marked in equal inches or centimeters, it would be not a great ruler. We can look at the answers of all those observers and say which ones are solid, good predictors. They're going to answer the questions differently, but they're self-consistent and their spacing on a ruler, if they were a ruler, is consistent.

So, anyway, all that to say it's a very predictable relationship between pitch detection and recognition and lightness, darkness, detection, recognition. And I could do that very easily in the class and then gather the data, plot the data, compare the data from year to year, and let people see that we can do this cross-modal perceptual psychology. And to me, that shows how our sensations are interconnected.

Debbi: Yeah. Very creative science. There we go. You've answered my question about science and creativity and everything else.

Debbi: [29:04] I did want to pick up just a little bit on what you said when you were talking about perception and people who are the innovators and if they don't understand. And I think that that extends to how we look at each other, not just with innovations, but within community, within relating to each other, too. That not to get stuck in just our little understanding and to understand, you know, there's a lot more humanity out there.

Jonathan: Correct.

Debbi: And whether or not we're in agreement or we have the same tastes for whatever's being innovated or the same ideas, just to be able to see and to listen and to live in community.

Jonathan: And the acknowledgement as well.

Debbi: Yeah, absolutely. All right. So, getting back to classical musician, which is why I know you, because we gigged many, many fun gigs together in Rochester when we both lived there. So, I will refrain from viola jokes, but I'm thinking them. No, that's not fair. No, but so seriously, music, other than just being an outlet and a creative expression that just can fulfill you and be so important, what lessons, what does that bring to all these other aspects? What does music do for you?

Jonathan: Certainly, there is that emotional element, absolutely, the music itself and what it contains and how it inspires or impacts mood or feeling or energy level even or pace of working, pace of walking, pace of motion. Those are the entrances to music. Beyond that, I would also point to the analytical side since I am such an analytical person.

You know, I studied with George Taylor at Eastman as an adult while I was working at Kodak. The lessons I learned through music and how I applied that or how I could have perspective on my career at Kodak and now at other places has been really important. An example would be a frustrating realization, I guess is what I'm trying to say, of how much physical energy I was putting into making sound.

So if you're drawing the bow across the string to make a sound and intuitively, if I want a louder sound, then I have to press harder or I have to work harder or I have to somehow engage myself in a more intense way. There's actually an inverse relationship where you can be working too hard or pressing too hard or trying too hard. This frustrating reality was always when George's feedback was like, okay, now that's the tone that we're

looking for. And I said, but I'm not working hard enough to make a beautiful tone. I have to feel like I have to have this sense of it's better because I put more energy and more focus, I guess.

And when it was the point of sound, which of course I could hear and understand what he was saying, but then when I was taking note of the rest of my physicality, the contrast in that. So, I think therefore when I am in my career or doing whatever activity I'm doing, there can be a point where I'm trying too hard and it actually gets in the way. It gets in the way of progress. It gets in the way of efficiency. It gets in the way of impact.

But I wouldn't be learning that if I weren't studying music and really looking at how to increase the beauty of my tone, which is a very narrow description of what I'm trying to communicate. But I think that is the type of example where music, the element of music and how I have music in my life, then generates also the impact in how I do other things.

Debbi: And you mentioned a memory library. So, in my memory library, I can think about sitting in a string quartet with you. And another element that I think of with lessons learned from being a musician is that collaboration. And I can think about making eye contact with you, nodding, breathing together, nonverbal communication. So, because you had referred earlier to sort of that role as helping people communicate and connect.

Jonathan: Yes.

Debbi: Relate that one back to me for lessons learned with the viola.

Jonathan: [33:55] Yeah. Lessons learned with me and my viola. I do think that's true and absolutely an important part of the whole musicianship experience and being a musician, an orchestral musician, a chamber music musician. Absolutely. I miss that. We've been in this period of pandemic. We've been in this period of separation. It's different. Yes, I have set up my microphone system and my sound system and have done the recordings that then get compiled offline, but it's not the same.

So that eye contact, that element of trust, that element of following the same inner clock, it's hard to explain that if you haven't had those experiences. I recall there was, to be technical on the musical side, there was a, what is this? The Neapolitan chord progression. Yes. And I recall this moment of playing it wasn't with you, but with a string quartet and there is an element in a Haydn string quartet with this Neapolitan, and then the music moves to the new key.

And if I'm remembering the theory behind it, and the cello player, such as yourself, said. We now play in a different aura. We now play in a higher state of mind in this key. And it was a description of the feeling that the music conveyed and that was there. And it is, this Neapolitan transformation really brings in this transitional moment and you know it with your whole entire being. And to have that and to look at somebody when that is happening.

Or there's a part in the Schumann piano quintet, I think it is, where the second violin and the viola parts are probably in thirds, I don't remember but playing the same accompaniment element with the same notation. And if you have eye contact, if you are breathing together, you will play together more. It will communicate, it will reach the audience in a different manner than if you aren't.

Debbi: And the example you gave was in an accompaniment role. It's not even about I have the solo or whatever, but when two of you are connecting, it's still so fulfilling. You're still doing this together. And I think that what you were describing about how you come to this point, and you just feel something or something different has been created, I think with any kind of creativity or innovation, all those moving parts, we're all individuals and anytime you get to collaborate and then you see the fruition of that, it's like...

Jonathan: Totally, totally. And a scientific way from a physics standpoint where we have these waves, whether or not they're sound waves or other kind of waves, they come together and create a superposition. And it's an additive effect that would not be happening unless you had these two waves coming together. And I really feel that in music we create superposition after superposition. And even in the intonation elements, when the intonation is where it needs to be, that the resonance also increases, right? All of these things. So there's so many elements from my different areas of study and experience that overlap in insight.

Debbi: [37:50] So the last time I saw you, I got to catch up with you. Speaking of environment, which we had talked about maybe in a little different way, but you were working at Google and I got to experience that with you, which was fantastic because I got to see you after years. But also, I had been doing graduate work in creativity and in every textbook or every class, every example of how to create a creative environment, Google. You've got the slide in the building and all these different things.

Can you briefly just give me some ideas if there's something from that or a different environment where you've worked, but what kind of environment really stimulates your creativity? And maybe then on the flip side, if anything stifles your creativity.

Jonathan: Yeah. So, we're talking about the physical environment, which is touch, feel, see, observe. But there's also the imaginative environment. So, I will describe that in a moment. But absolutely, the physical environment is an important part of creativity. Google gets that. Their designers get that. Right? Because it's not just Google employees who are designing the work environment. It's agencies that they work with who study that.

And so, the point that is reached in that is when the humanity of the employee is recognized, that also becomes an element to support creativity. So not only do we have our work environments and how those desks are set up and the windows and lighting and objects in the room, but also there are the rooms for just needing a quiet moment with a relaxation, with a little lounge, private lounges or small lounges or rooms that have naturally increased communication between people.

There are the gyms. There are the laundry rooms. There are the cafeterias that serve food all day. There are the coffee shops. There are the outdoor gardens, the indoor plants, etc., etc., etc. Absolutely. And the land of creativity and the land of ideas, which is how I would describe Google, that is really important. But I also want to emphasize the strength of our own imagination.

So even if we aren't in that kind of environment, we can still visualize that in our imagination. We can still recognize that there are places, and we can in our mind go to environments that actually don't exist, but become a combination of our experiences or what we know or somebody describing something to us. So, I think that is really important, that we can also visualize. And so, if we aren't in the environment that is ideal or that we wish it could be, we still have the ability to think that way and imagine and create that environment.

So all that to say is then an environment that is less creative would certainly be something more plain, perhaps, or something more isolating, perhaps, or something without the tools that we really wish we had. And yet our mind is very powerful, and our emotions. And having read many papers over the years, there's functional magnetic resonance imaging, MRI, where one would be put into this tube to see what is happening in the brain. And functional MRI is when then you are giving a task to that person in that MRI, and what lights up in the brain.

And so, this is what I mean about the power and capability of the mind and imagining and visualizing or hearing something. We do know that the brain can have activities in those normal centers of physical objects stimulating something or sound or things, but because we have those pathways, then there can be still the activity. So, the mind, the brain, our neurology, these are important and unique things to humanity.

Debbi: And you were talking about combining our experiences to be able to get there, which sort of brings full circle talking about education and the experiences from young to old, all the incredible things you've done in the different areas with science and the arts and your liberal arts experience and connecting all those things to bring together in you as this incredibly inspiring creative being that I feel so blessed to know. And wish that I could still get together and play chamber music with you...

Jonathan: Yes.

Debbi: ...but it's a little hard. Before we go, I do want to ask, is there anything that you feel like you wanted to say that I missed?

Jonathan: Let me think. That's a great question. We didn't talk about the spiritual fundamentals of my upbringing and my personal. For me, there is an element, you know, because I think of perception, I talk about the mind, what we can understand. These are elements that relate to essentially unexplainable, but still related to the reality elements or the tangible, I guess, elements. For me, my spirituality elements and for me particularly on a Christianity element, but in the fundamentals itself, they're really important to me as a person. And I do believe that taking time to be there in that element of my pathways and the element of myself and thinking

through things and communicating with an ultimate being, which for me is God, then those are really important because I am enriched by that.

Debbi: Absolutely. Well, Jonathan, we have come to the final question. And because it is the *Defining Creativity Podcast*, that question is, what is your definition of creativity?

Jonathan: [44:31] To me, creativity is a unique element expressed by individuals who innovate and communicate in a distinct manner. And it often results in a motivational or responsive outcome. And that certainly is rewarding to the creator, the creative.

Debbi: And I think it benefits everybody who interacts and connects with that creator or creative. Well, thank you so much, Jonathan. This has just been a joy, not only to get to see you, even though the audience isn't seeing you, I get to see your smiling face and just interact with you and be inspired by you. So thank you very much for doing this.

Jonathan: Thank you so much for asking me to be part of your expanding panel of amazing people.

Debbi: Absolutely.

Debbi: That's a wrap for Episode 17, my discussion with technical executive, scientist, author, and lifelong classical musician, Jonathan Phillips. I'm so grateful for Jonathan and for you, the audience, for tuning in. Additional thanks to August Fackler for composing and recording the music. Join me next time as I talk creativity with an international student from Uganda in a PhD science education program at Indiana University, Esther Kataate Namakula. Meanwhile, be open to possibilities, make connections, and embrace your creativity, however it manifests itself in you.