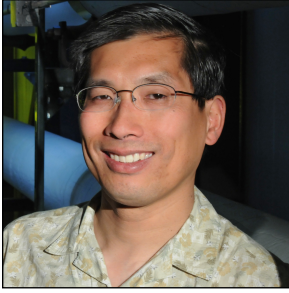


Ka Chun Yu: Immersion Before Computers



The *immerse!* book & podcast project was initially sparked by astrophysicist-educator Ka Chun Yu's essay, "A Brief History of Immersive Experiences Before Computers." Ka Chun Yu is the Curator of Space Science at the Denver Museum of Nature & Science. He has performed educational research on the utilization of digital planetariums for the teaching of astronomy. He has also created numerous planetarium shows as a universe maker and conceptualist.

Charlie Morrow: It's good to see you.

Ka Chun Yu: How've you been Charlie?

Charlie Morrow: Well, I'm delighted we can chat. Everything well over at your end?

Ka Chun Yu: Yea, yea, I'm just extremely busy. I have multiple multiple projects going. So, in addition to working on yours I have a story-telling one that I'm putting together. And I also have another one based on an immersive talk that I gave earlier this year.

Charlie Morrow: Oh lovely. I'm interviewing you today for my book *immerse* where your articles of lovely research is appearing, and I want to do, Since this is a podcast as well as a book, I wanted to interview you and ask you two questions: one is how immersivity is part of your current practice; what you're doing that's concerned with immersivity right now. And then the other is a timeline The book is based on talking to people about their current practice. And then how did they get there, you know, going backwards, so to speak down their project or thought ladder. So it's either a timeline forward or backward or up and down. So, which would you prefer to begin with?

Ka Chun Yu: let's see. I think what I'll do is, let me pull up my, write up. Yeah, so, the first question is how is immersivity baked into my current practice. Well, let's just go ahead and get started and what I'll do is just give you a little bit of background about myself. I'm an astronomer by training. I have a PhD in astrophysics and I got into the realm of immersivity via the Denver Museum of Nature and Science. When I was hired to help create planetarium software. I was a scientific visualization programmer and that led me on the path of thinking about how you can use planetarium domes effectively.

Digital planetariums at that time were a relatively new phenomenon and people weren't quite used to or didn't quite understand all of the different things that you could do with that and all the different ways in which this new medium was different from traditional planetariums.

The fact that you weren't locked to a geocentric perspective of the sky and that you weren't even locked to depictions of a sky; you could show anything that you wanted within this hemispherical surface and in some ways, planetariums and flight simulators precursors to the virtual reality technologies that we have today and actually the planetarium technology is derived from earlier virtual reality technologies.

I got into doing educational research involving the digital planetarium, trying to understand how you can use it to effectively teach astronomy. But I also got involved in using the dome to create compelling experiences for our public audiences, not only in astronomy, but also also in earth sciences and systems sciences.

So, while I was doing all that, I also got to thinking about what historically led to that particular moment in time where digital planetariums were possible or became possible. And so, that's when I started doing research into different immersive art forms, that preceded what we think of today where immersivity

means you need to have computers and you need to have computer graphics and to be able to use projection technology to create visual content. But the more I dug into it, the more I realized that that's not really the case and that people were attempting to achieve immersivity within the constraints of their culture and the technology that was available, going back many hundreds, if not thousands of years.

And of course, even understanding history, how does that relate to my current practice. That became a little bit more difficult because you can compile all this information, put it into a timeline, but how do you use the past to inform what you're doing now? And that was actually a question that I couldn't answer for many, many years.

So, originally I started working on this historical research at least 12, maybe even 15 years ago. And it was only until you contacted me, Charlie, that I, got back into it. And over that time, I've done a lot of my educational research work and a lot of my programmatic activities involving the dome. And so, during all that and having much more experience with this, it gave me enough context to help me figure out how this history is useful for today. I think the answer for me is the fact that we see this today where people are trying to create immersive experiences that have greater fidelity.

You know, you have more channels of audio, you have higher resolution imagery, you can go to higher frame rates. There are lots of different things that you can do to create immersive experiences. But people in the past had a lot of the same tools that we have; they obviously couldn't create the same level of fidelity to reality that we can today.

But, can you really argue that people in the past didn't have compelling experiences from either being immersed in frescoes or paintings or via traditional film. And then you can also find examples where very dedicated inventors, like Morton Heilig, who was creating one of the earliest virtual reality rides and he had put together patents for much immersive theatres that go far beyond anything that we currently have built today, but he had a lot of trouble getting funding for his dream projects. And I think this has to do with the fact that when you examine this history and you see even today that even though virtual reality has gotten a lot of exposure, there are a lot of companies putting billions of dollars into content and technology development, but the initial wave of interest hasn't led to widespread consumer adoption. I think that has to do with the fact that there is a certain level of okay-ness with how realistic the medium has to be. And so the public seems to be okay with the HD TVs that they have and other experiences that they have, but they don't feel like they need that extra level of immersivity that virtual reality requires, just because it's awkward to put on a headset that completely cuts out all of your surroundings. There are lots of issues with current virtual reality that are problematic for people. So, I think until you have really compelling content that drives people to adopt this new technology – and right now that content isn't quite there yet, or at least not to overcome the resistance of the new technology, the resistance of the fact that is difficult to use means that it might take a few more years before VR or augmented reality or mixed reality or whichever version of these types of computer-augmented immersive realities whatever become widely adopted. So, I think there is something interesting in this historical context that can teach us today. What I found was that just looking back at the history and combining that with a better understanding of what is happening today has led me to think about how much I can push what I do in my preferred field of digital planetariums and in thinking about how I also have to concentrate on having compelling stories to make a compelling experience for our audiences.

Charlie Morrow: Well, thank you. You've answered both the questions. I really like that. I think that the point that you make is an important one: that it does come down to the story. A storyteller can immerse you completely in a story just through the old image of the campfire and telling stories.

So it doesn't seem to change even if the technology gets more advanced. In a way it's about engagement; stories have a way of engaging you over time that create experience over time. I mean, I think experiences are incredibly deep and they're one second long. Others have to be sustained for a long time before they give their ghost up. But all of these topographies and time dimensions can be rigged to create that experience.

Ka Chun Yu: Yeah, and campfires were not something I wrote about in the chapter, but I do start off going back 30,000 years to art in European caves done by early humans too who had arrived on the scene and were creating some of the earliest masterpieces of art ever known. Yeah, and more recently I've discovered that there are researchers looking into the effects of telling stories around campfires and the fact that anthropologists have examined how hunter-gatherer tribes and the stories that they tell during the day, when they're out working or gathering food or doing other tasks that you normally find during the day versus the tales or stories or the accounts that they tell in the evening, after the day's work is done and they're seated around the campfire and the two are completely different.

And so you might be complaining during the day about someone who isn't pulling his or her weight around the camp or the village, but in the evening the story actually goes into more traditional storytelling where some of the stories might be mythical, some of them might be of a religious nature and some of them might in some ways be attuned to take a much more expansive look at the tribe or the people involved. And so they still might be critiquing the people who are not pulling their weight around the village, but they're doing it in terms of a moral that's part of another story as opposed to directly critiquing these people. And

so it seems like, just based on this type of research, storytelling has probably been important for millennia. But it also serves really important roles in society, even in very early society.

Immerse! Podcast 12: Ka Chun Yu Playlist

astrophysicist & universe maker

Interview by Charlie Morrow
Incidental sound samples used

Amplified Piano Alter Rereverb • Charlie Morrow vs b/art
Planet Sounds from Space • AryAnatomy
Kepler Star • NASA
Wave • Charlie Morrow
Wave Music III - 60 Clarinets & a Boat • Charlie Morrow
Two ReCharlies • Charlie Morrow vs b/art
Landing Apollo 11: Moonwalk One • Charlie Morrow

Mixed & collaged by bart plantenga, mastered by Sean McCann

Charlie Morrow: Well, thank you for sharing all of that. I appreciate your involvement but thank you because you're the inspiration for the book. I don't know if I've ever sent you my biography but my whole life's work has been based on working forward in some technical way and then jumping back in history. It's just sort of this cycle that leads

to jumping back in time; it happened to me in a number of ways. I think that we've been on the same path and I just would have never been inspired to make all this come together if you hadn't been on the path ahead of me. I thank you very much for your work because you're moving back there. So I appreciate your being a Pathfinder.

Ka Chun Yu: Well, that's really nice to hear. Thank you very much Charlie. I mean, it's nice to know that I've inspired someone.

Charlie Morrow: Well, it's true. Have a good evening and thanks for today.

Ka Chun Yu: Yea, have a good night.