Oral History of Chip Morningstar

Interviewed by:
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Garcia: Today is February 4th, 2019, and I'm here with...?

Morningstar: Chip Morningstar.

Garcia: Excellent. Okay. Let's start at the very beginning. Where'd you grow up?

Morningstar: That's actually a more complicated question. <laughs> A question with more complicated answer than it seems. Lots of places. My mom was a grad student. Childhood, Massachusetts and Palo Alto, mostly, that area. Spent my teenage years living up in the high Sierras.

Garcia: Nice.

Morningstar: Which was the source of many nontechnical stories that are very, very important in my, shaping my view of the world, but probably more than we have time for today.

Garcia: <laughs> And as a kid, were you a tinkerer? Did you build things?

Morningstar: Yeah. Well, I was more of a take things apart person. My mom learned to just give me things to take apart rather than having me take apart things she didn't want taken apart. Never that good at putting them back together again, but I got very-- I still do that. I mean, I'll, like, if I have a dead disk drive I'll always take it apart, because they have these cool magnets inside. I was-- I drew a lot. I made, you know, sort of fantasy drawings of rocket ships and secret underground bases and stuff like that, and at one point my mom noticed I was doing this and she bought me a little drawing board with a T-square and triangles and, you know, that sort of thing and I started playing around with those. So in junior high school, when I got to take drafting class, I ended up, you know, first day in drafting class and I could do all of these things that, you know, completely undisciplined. I didn't know the proper way to do anything, but I actually had the basic skills and I was actually a championship draftsman in high school.

Garcia: Oh, wow.

Morningstar: <laughs>

Garcia: Okay. The question I ask everyone. Did you read sci-fi as a kid?

Morningstar: Oh, yeah. Yeah. A lot. Yeah.

Garcia: <laughs>

Morningstar: Totally.

Garcia: You've stuck with it too, haven't you? <laughs>

Morningstar: I have. I have.

Garcia: Who you reading now?

Morningstar: Who am I reading now? It's one of those recall memory things. The last couple of things I've read were-- I've been doing a lot of audiobooks while I'm commuting, which has helped me kind of keep up with stuff. John Scalzi I think is a current favorite. I just recently discovered Ben Aaronovitch.

Garcia: Oh, yeah.

Morningstar: Which is awesome. It's not science fiction, but it is really--

Garcia: It's science fiction adjacent.

Morningstar: Yeah. Yeah, yeah, that's right. I don't know. Lots of stuff.

Garcia: Ah, excellent. Okay. Now where'd you go to college?

Morningstar: Went to the University of Michigan.

Garcia: Okay. And what'd you major in?

Morningstar: Well, Computer Engineering, or I should say I graduated in Computer Engineering. I entered in Aerospace Engineering.

Garcia: Cool.

Morningstar: And I got a summer job at the University of Michigan Space Physics Research Laboratory, one of these, you know, my dad had been kind of a figure around the University of Michigan for many years, so he had lots of-- he had a very extensive social network inside the university and so he could talk to somebody who could talk to somebody who knew somebody at someplace, and I eventually ended up getting a job at the Space Physics Lab as sort of a gopher, and the-- because I wanted to do space stuff. Became kind of disillusioned my first year in the Aerospace program when I discovered that aerospace engineers don't get to design spaceships, you get to design, you know, the third strut from the left.

Garcia: <laughs>

Morningstar: And but I was working in this lab, and I was just, you know, they were having me do things like, you know, run drawings down to the drafting department and, you know, organize my boss's files of electronics, product literature, just, you know, gopher type tasks, and they got in a PDP-11/34 computer, as it was going to be ground support equipment for a program called BOSS, the Balloon Observation of Stratospheric Species, which was a atmospheric research program where they would send a balloon up to extremely high altitudes and then drop this payload which would, with a gas chromatograph that would

take a essentially core sample of the air. Lots of stories about that too, but anyway, because the lead times for delivery were a bit extended in those days, you didn't know whether you're going to get, you know, you order a computer from DEC, you wouldn't know, you get it in two weeks or, you know, eight months. So they ordered it well ahead of time and it came early, and so all they could do was, you know, they set it up in a corner, a back corner of this office where I was, to turn it on and power it up, make sure it worked and stuff. But then they didn't need it for another six months, and so it was just me for the summer sitting there with not a whole lot to do, and these manuals, and a terminal, and end of the summer I changed my major. <laughs>

Garcia: That's a good change-your-major story. <laughs> So let's see. So was that the first computer you actually ever physically saw yourself?

Morningstar: Yeah, yeah.

Garcia: Oh, excellent. Cool.

Morningstar: Yeah, I think so. I mean, there're probably other ones earlier. My mom was, worked at, before we moved up to the Sierras, my mom worked at Stanford for Patrick Suppes, doing early computer-aided instruction research, and I probably had some computer exposure through that, but nothing that really stuck. I wasn't really aware what computers were or what they do. Although she was always insisting that she just knew that I was probably going to end up doing computer stuff, and I was always like, "Well, now, why do you think that?" Just... Course, she--

Garcia: Crystal ball.

Morningstar: She was right.

Garcia: <laughs> Excellent. Okay. And now... Because that got covered by accident, which is perfect. <laughs> And so the Environmental Research Institute of Michigan?

Morningstar: Yes.

Garcia: So tell me little bit about your work there.

Morningstar: So that actually started as an outgrowth of the work that I was doing at Space Physics Lab, which was I ended up being responsible for a piece of software that was maintained by the University of Michigan Computing Center called *WIREWRAP, which was a piece-- essentially what we call CAD software nowadays. It was a thing that did layout and wire routing for electronic hardware being prototyped on wirewrap boards, and it would-- you'd describe a device by essentially transcribing from your schematics into a markup language, which was essentially a macro language where you said, "Here are the parts and here's how they're connected," and it would figure out how to lay them out on a board, on a wirewrap board, and then generate either instructions for a technician or punch cards for a wirewrapping machine to create, to assemble, the connections, and it had some severe limitations and I

got tapped to extend it to do some-- do more generalized things, and ERIM was also a heavy user of that, and they were getting into some trouble and they said, "Well, what-- who can we find who knows something about this?" and they talked around the University of Michigan Computing Center and it turns out I was the guy who was responsible for this thing, and they basically came to me and offered me twice what Space Physics Lab was paying me, to go do that. I mean, this is, like, you know, a raise from, you know, dollar-seventy-five an hour to three-fifty an hour. That's-- it was, you know, big, big bucks in those days, and so I went to do that and then I got involved with-- the project that hired me was this-- I forget what the actual name of the project was. But it was the group that was responsible for something called the Cytocomputer, which was a pipelined, high-performance for those days, image processing computer based on nearest neighborhood transformations on images, a really interesting architecture that's kind of disappeared but could do bunches of things really fast in certain classes of operations. Like, it had, for a while, I think had the world's record for playing The Game of LIFE because LIFE was one instruction.

Garcia: Mm-hm. One instruction; six conditional things.

Morningstar: One instruction on a processing stage, which would pipeline the image through and then basically it had a series of stages and each one would buffer up two scan lines plus three pixels, and then out of that would come the transformed image and then you pipe the-- feed that into another one of these and you'd have a whole stack of these things. So you could run, you know, million LIFE generations per second as long as you didn't have to look at the image. You have to look at the image, then it was much, much slower.

Garcia: Okay. Always the case. <laughs> Yeah, so the-- now tell me about the Leonard-Morningstar algorithm.

Morningstar: Okay. That's actually-- that's on my resume. That's actually pretty, pretty minor. It was we were dealing-- we had a, developed a, an early version of what I guess nowadays they call lidar, which we called the flying, spot-scanning laser sensor, so lidar's definitely a more...

Garcia: <laughs>

Morningstar: Approachable term. But it essentially consisted of raster scanning a laser range finder across a scene and you'd get for-- you'd get an image, but what the value to each image was a depth reading, a distance reading. But if the laser hit something which was a specular reflector or something that would cause the laser to bounce off in some random direction you'd get a dropout, and but because of the way this worked you'd get a random value, and so what you get is this very nice depth image with this sort of measles scattering of random pixels in the middle. So the-- this was something that my officemate Patrick Leonard and I cooked up to deal with that, which was something that could be very elegantly implemented with eight instructions on the Cytocomputer.

Garcia: Oh, yeah? That would make sense with the neighborhood concept for-- <laughs>

Morningstar: Yeah, yeah.

Garcia: That actually makes good sense.

Morningstar: And I don't even remember exactly, was-- had something to do with mins and maxes and median filters and-- I could probably reconstruct it if I had to, but lost to the sands of time.

Garcia: <laughs> Well, it's always great to have an algorithm named after you. <laughs>

Morningstar: Yeah, it was, and it was one of those things where we published it, but the conference was one of these DoD-sponsored conferences where all the proceedings were classified, and I'm sure it's all been declassified in the meantime, and the funniest thing, algorithm itself was not classified. It's just a paper. The paper was. It was like, "Grr."

Garcia: <laughs> Excellent. Okay. We're going to move forward a little bit. Tell me a bit about XOC.

Morningstar: Okay. XOC was a corporate entity, stands for Xanadu Operating Company, and it was the Project Xanadu, which was Ted Nelson's big hypertext vision thing, which I got involved with while I was still a student, and XOC was just the corporate vehicle for, you know, we needed a, you know, if we need to buy computers or people gave us money or something, it had to have-- you had to have some legal way to do that, and it was-- so it was the, I want to say, corporate shell, because it wasn't a shell. It was a real thing but it wasn't a real business in the sense of being kind of put together on sound business principles. But it was the corporate embodiment of Project Xanadu, and I was nominally the number two person there for a while. If you can find an old copy of one of the early Xanadu business cards, we had these business cards printed up that had a list of all of the people who were involved and their titles, and all the titles were kind of wacky things, and anyway, it had, like, you know, 15 or 20 people on this one business card with their title. My title was Reality Interface.

Garcia: <laughs>

Morningstar: Because I was somehow able to sort of bridge the communications gap between these sort of really off-the-wall hackery, you know, very counterculture type folks who mostly made up Xanadu, and also be able to talk to, like, corporate businesspeople and, you know, not completely freak them out, and so that was one of the things I did, and I wrote a lot of presentation material and documentation. Actually, I was cleaning-- this is something actually museum might be interested in. I was cleaning my office at home this-- over the weekend. This is partly getting all the crap in order to, preparation to move at some point, and I found actually a document from 1984, which is a detailed exposition of the Xanadu architecture and data structures that we prepared for the System Development Foundation in 1984, and I hope to scan that and put that on my website some point.

Garcia: Oh, excellent.

Morningstar: Yeah.

Garcia: Yeah, and so what was sort of the state of Xanadu at that point?

Morningstar: It was very much a volunteer organization. This was way, way prior to the open-source movement and so the-- a lot of the kind of ideas you see embodied in that, you know, was a bunch of sort of free-ranging hackers, you know, all kind of volunteering their time and effort to make this thing happen. Although we had the whole thing shrouded in lots of trade secrets and mystery and that sort of stuff because we were stupid about intellectual property in those days, and there was a group of really scary-smart people who had gathered in King of Prussia, Pennsylvania, in 1979. I was not one of-- I was not part of that group, but who worked out a whole bunch of really fundamental data structure theory to make this work, and then from there on there was a group of people who kind of bashed on the code to try to build an actual back-end system for, you know, a universal, worldwide hypertext system, and we were all working on the code for that and then at the same time trying to sell it as a concept to find investors or business partners who would underwrite actually paying people to spend full-time working on this-- to actually pay for the engineering work that we knew needed to be done. Mostly unsuccessfully. But with, you know, fits and starts and kind of various waves of volunteers who would kind of roll in and then roll out and kind of all organized around Ted Nelson, whose vision this all was. Although somebody, some people, have likened Xanadu to a cult, but it's kind of weird in it's a cult where all of the cult members don't have a lot, necessarily, have a lot of respect for the cult leader.

Garcia: <laughs>

Morningstar: I mean, actually, we do have a lot of respect for Ted as a person and as a visionary, but not as somebody who's going to, like, run things, and he never really tried to run things because that's not sort of what he does. He's kind of a person who generates, you know, an idea a minute, and manages somehow to attract generation after generation of smart, energetic people to come work on this thing, and then they go work on the thing and say, "Ah, Ted, man, leave us alone. We're going to work on this thing."

Garcia: Yeah. That is completely in line with everything I've heard about it. <laughs> Let's see. Where did I go? Oh. Also, where did you first interact with Xanadu?

Morningstar: So the Ann Arbor Computing Club was sort of a quasi-student organization at the University of Michigan. There were number of-- also, the Stilyagi Air Corps, which was the University of Michigan Science Fiction Club. It's kind of in the same category, which was something which was nominally a student club, you know, 90 percent of whose members were not actually students, but had some students and, you know, we got to use university meeting rooms to meet and that kind of thing. But the Ann Arbor Computing Club was sort of the local social nexus of the I guess you'd call it the Ann Arbor hacker community. I don't think we called it that at the time, but that's essentially what it was. All the people who were interested in computers and computing. Once again, back when that was sort of exotic and not very many people had ever heard of that or knew what that was, and computers themselves were very expensive and access was kind of hard to come by, and so it all depended on who was working where and who had access to what labs and, you know, that kind of thing, and a number of the core Xanadu people in Ann Arbor were active participants in the Ann Arbor Computer Club, and I fell in with them as just a, you know, we're doing computer stuff, and, you know, kind of rubbing shoulders with all these people and all of these ideas were sort of in the air and they're, you know, bunch of people working

on this exciting thing called Xanadu and they kind of laid out, and I said, “Oh, that sounds cool.” You know, you do one of the, “And can I come work on that?” They said, “Oh, yeah, yeah. Sure. We’d like--” it was one of the standard running jokes at Xanadu, was somebody who’d come up to us at a trade show or something, “Oh, what you guys are doing’s so cool. Can I come work for you?” and we’re like, “Yeah, yeah, yeah. You know, you can start Monday.” Say, “Oh, great. What do you pay?” “Well, how much you got?”

<laughter>

Morningstar: That’s kind of how it worked, and so it progressed at the rate that a lot of volunteer efforts progress at, which is, you know, pretty much in proportion to the amount of time and energy people had to put in on something which wasn’t their, usually their primary focus of their time. With the exception of Roger Gregory, who was this force of nature who was just this just fanatic, crazy guy who just would not say “die,” and managed to keep the thing alive on an incredible shoestring and keep all of this really talented people kind of organized and working together in some haphazard fashion for just years and years and years and years. Up until the point where, you know, actually got real funding many years later, in, like, 1988.

Garcia: Excellent. Okay. You’re doing great. You’re actually covering things that I have in follow-up questions. <laughs> That’s even better.

Morningstar: Okay. All right. Well, that’s fine.

Garcia: Also, I never expected the Stilyagi Air Corps to come up in an oral history for the museum. <laughs>

Morningstar: Stilyagi was-- well, a lot of these same people were also members of Stilyagi, so, you know, it’s all one kind of cloud of people. Yeah. I kind of refer, particularly nowadays, I refer to the permanent floating startup, which is this sort of group of people who have been involved in various ventures in different permutations and combinations over the years and it just kind of rolls forward in time with, you know, as I say, different combinations, but it’s always all the same people.

Garcia: It’s a primordial soup. <laughs>

Morningstar: Yeah, yeah.

Garcia: All right. So let’s move on to Lucasfilm.

Morningstar: Lucasfilm. Okay.

Garcia: Yeah. So what brought you to Lucasfilm?

Morningstar: Okay. So-- well, actually, yes. How to get a job at Lucasfilm was actually-- it's actually an interesting story. What brought me to Lucasfilm was I was very, very impressed by their computer graphics work. Computer division at Lucasfilm was kind of legendary. At one point in I guess this would've been, mm, 1981 or '82, I'm not quite sure of the year, but the National Computer Conference, which used to be a big deal, was in Anaheim, and I somehow persuaded ERIM to, you know, they had a, you know, everybody gets to go to one technical conference a year kind of deal, and I somehow persuaded them to send me to the NCC, and my, one of my very, very best friends, Tom Gould, who was another fellow Stilyagi, another fellow computer person, who's the best man at our wedding, he had gotten a job at Atari, and this is back in the days when Atari was a big, impressive juggernaut, little did anybody know, and they had some kind of joint venture with Lucasfilm, and so he was going to NCC but he had arranged to fly in to San Francisco and get a rental car and go up to visit Lucasfilm, just because he thought that would be cool to do and he could justify it on the grounds that Atari has a deal with Lucasfilm. And he told me about this and I said, "Well, hey, my family, my parents, live up in the Sierras. You know, we could make an occasion of it and I could tag along to Lucasfilm and get to see that. That would be cool, and then we can go up, visit my folks' place and you can meet my family and see where I grew up in Silver Lake and all that kind of stuff, and then we can drive down to the NCC." He said, "Oh, that sounds great." So we did that, and so I got to visit Lucasfilm in San Rafael, and it was awesome. I mean, it was really cool. They had VAXes and they had smart people and they were doing-- and I got to see, like, early preview version of "The Road to Point Reyes," which they were working on at the time, and just like, "Oh, this would be such a cool place to work." I just-- and that summer they had the SIGGRAPH conference was in Detroit, and so I was able to attend because it was local, because I was living in Ann Arbor, and Bill Reeves gave his very seminal paper about particle systems, and I was just, like, just blown away, and super-super impressed just because here is this really interesting computer graphics stuff and it's not about drawing lines and polygons. It's about making images, and it's something different. Was like, "These Lucasfilm guys have it really dialed in," and the paper had their address right there on the colophon of the paper. So I just said, "Okay. I'll just-- I'll send them my resume." You know, "What the heck?" I guess this was summer of '83, and just on a flyer, because it's kind of like buying a lottery ticket. You know, you pay a buck for your lottery ticket; now you can fantasize about winning the lottery. So I, you know, sent them a copy of my resume with a very, very audacious cover letter and put it in the post. It cost me, you know, postage stamp. Sent it off, and then I got to fantasize about, you know, working for Lucasfilm. And then that fall, Xanadu got some money from the System Development Foundation that was enough to fund basically moving Xanadu from Ann Arbor to the West Coast and a lot of our friends had been saying, "You really should be in Silicon Valley because that's sort of where the action is and you're going to be much more connected to people who can fund things and help you out," and that was persuasive, and Janice and I had been, since we're both from the West Coast, been looking for an excuse to move back to the West Coast, and so Xanadu paid our moving expenses to move to California from Ann Arbor, and that's another story we don't have time for. But we were packing our, all our worldly possessions into a rental truck and about, like, literally an hour before the phone company guy was scheduled to come disconnect our phone-- that's how phones worked in those days-- our phone rings and it's Peter Langston from Lucasfilm, and he says, "Is this Chip Morningstar?" I said, "Yes, it is," and he says, "This is Peter Langston from Lucasfilm." I was like, "Oh, wow." Really excited, and he says, "Well, we got your resume and I think it was interesting, but I or one of my guys lost it, and now I'm going to catch hell from the HR Department for losing your resume," <laughs> and, "But I was able to track you

down because your name is distinctive. Could you send me another copy if that wouldn't be too much trouble?" and I said, "Well, sure, I'd be happy to, but, you know, we're in the midst of actually moving to the West Coast." He said, "Well, just give us a call when you get out here. So I did that, and then, you know, few weeks later we were in Half Moon Bay staying with some friends and called them up and they, at this point, course, they'd-- they had to invite me up for an interview after going through all of this embarrassing song and dance, so I went and it was sort of, you know, mutual love at first sight, and sort of second best interview experience ever. But I was, at that point, committed to doing Xanadu, and I said, "Well, I'm committed to doing Xanadu," but over the next few months Xanadu's money, you know, ran out. We had-- there were some more adventures involved in that happening, including spending a month in San Antonio working for Datapoint on behalf of Xanadu. But around about the spring, you know, Xanadu couldn't afford to pay me anymore, and so I called Peter back and said, "Is that position still open?" He said, "Yeah, yeah, come up," and so I went up again and had the best job interview of my life and they offered me a position and on I went to Lucasfilm. So the way you got a job at Lucasfilm is you have a distinctive last name and they lose your paperwork.

Garcia: <laughs> That's a very, very, very... <laughs>

Morningstar: It's...

Garcia: Got to change my name then. <laughs> And so what was your initial role?

Morningstar: So I was hired into-- I'd hoped to work on computer graphics, but Ed Catmull interviewed me and I guess I didn't impress him. I remember the interview consisted of one question, which was, "What's the longest computer program you've ever written all by yourself?" and we chatted for a while and I don't know quite what it was, but he said, "I think you're a better fit for the Games group," and-- which is Peter Langston, who's the guy who called me originally, and so I went to work for the Games group as their software toolsmith, and they had, you know, they were doing some things which were very out of the ordinary for the computer games industry at the time, including doing cross-development on really big machines as opposed to trying to actually develop code directly on, like, an Atari 800. And so the first thing that they assigned me was they had this 6502 macro assembler that they had, which I think Rob Poor had done for them as it was actually an embedded language inside LISP, and so it was kind of weird because you're programming 6502 macro assembler, but you were programming in LISP S-Expressions. But you had all of the power of LISP available for your macro facilities. You could write these super-powerful macros that would do all kinds of sophisticated analysis and code generation things and like that, and it was really, really powerful. Probably the world's most powerful 6502 macro assembler, and the only problem was is it took about 45 minutes or an hour to assemble a 32K ROM cartridge on a half a megabyte VAX. Because it was a half-megabyte VAX and it needed to be about a two-megabyte VAX, and they said, "Can you write us something more like a conventional 6502 assembler that we can use that'll run at reasonable speed? Oh, by the way, we don't want to give up any power of the LISP assembler that we're actually using," and the "that we're actually using" turned out to be an important qualification, but that's what made it possible, and so I wrote a thing, which I named MACROSS, which, with the obvious name derivation, which the macro cross-assembler, and it was, I guess, the world's second most powerful 6502 macro assembler, and that was used basically for all of the

6502 titles that Lucasfilm Games ever produced. So that was basically up until the point where they were able to switch over to doing PCs and programming in C, and I maintained that and it kind of evolved and grew into a bigger and bigger thing. But everyone in the Games group had the same title, which was designer/programmer. Except for Gary Winnick, who was our animator, who's an artist, whose title is designer/animator. But anyway, we were all very encouraged. We had a very egalitarian kind of structure, and encouraged to participate in, you know, design discussions, and so it wasn't like I was sort of this guy off in the corner. I was actually, got to be, you know, one of the game guys, and we did lots of games and things and mostly I was developing tools. But then I ended up leading a project, so you'll probably get to that.

Garcia: Oh, yeah. <laughs>

Morningstar: But I did a number of things. We built a bunch of really interesting things that let you take advantage of having, you know, a Sun workstation as the controlling-- to reach into the inside of your Commodore 64 and control its innards, which was really, really powerful, and also did a system called SCUMM, which was-- stood for Script Creation Utility for Maniac Mansion, which was Ron and-- Ron Gilbert and Gary Winnick were doing this game, which came to be called Maniac Mansion. Actually, I think that was my title. I was very good at naming things, so I ended up generating a lot of names for things, and they were struggling with some of the-- and Ron has this insight. He said, "Wait a minute. Most of the stuff that's compute-intensive, like rendering, that has to be very tightly coded assembly language, but we only have to do that once, but the stuff that is kind of constantly under churn and being changed all of the time as we figure out what the hell we're doing and debugging, that's not performance-intensive at all. So we could just have, like, a simple scripting language and just interpret that," and he comes to me and he-- because he knows I do, like, compilers and things, he says, "Can you write a compiler for this?" I said, "Yeah, I could write a compiler for that," and that resulted in SCUMM, which was the engine behind all of the Lucasfilm graphical adventure games. Also, I think the Humongous Entertainment games when Ron went off to form Humongous.

Garcia: Yeah. I know, that, the SCUMM engine, I mean, Monkey Island is sort of the big one, but what were some of the other games? I know--

Morningstar: Well, the first--

Garcia: Day of the Tentacle?

Morningstar: Day of the Tentacle was one of the later ones. That was certainly after I left. The first two were Maniac Mansion, and then Zak McKracken and the Alien Mindbenders, and Indiana Jones and the Fate of Atlantis, and all the various other Monkey Island-- I think it got Loom, and there are several others, and SCUMM was a system that kind of evolved over time. You know, after I left Lucasfilm it took on a life of its own and got much bigger and more complicated, so I can't take credit for what went into the later games there, but yeah.

Garcia: And so-- and this is all happening while it was still the Games Division of Lucasfilm before it became Lucas Games?

Morningstar: Well, yes. Yeah. Well, it was-- first of all, it was the Games group that was part of the Computer Division, and then there was a-- there was kind of a thing that happened. There's various tellings of this story. I have my own version of it. Actually, a really good resource, if you haven't talked to him, is Michael Rubin, who's the guy who wrote the book "Droid Works," or...

Garcia: Oh, yeah.

Morningstar: Or "Droidmaker"?

Garcia: Mm-hm.

Morningstar: Droid Works was one of the companies. Who was there at the time and has kind of researched, you know, all of the details of what actually, actually happened and "Droidmaker" is actually really, really well-researched book from kind of a sort of historical perspective. He managed to get lots of-- access to lots of inside information in return for basically not making a lot of noise when the book came out. But anyway, so summer of '84, I think, the Graphics group made this movie called "The Adventures of André & Wally B.," which was this enormous budget blowout, and George was kind of unhappy about that, because he had hired these guys with the idea that they were going to decrease the cost of filmmaking and then they went and made this <laughs> very expensive movie without his permission, and it wasn't even that great a movie. It turns out it had the seeds of greatness within it, and unbeknownst to us, Lucasfilm was having some financial issues at the time, which they did a very good job of hiding from the rest of us, but the end result of this was they reorganized the Computer Division into two companies which they eventually spun off, which were Droid Works and Pixar, and the Computer Games group became the Games Division and we stayed within the company because we were, unlike those other two projects which were basically about creating technology, we were actually creating creative content, which was the company's core business, and our charter from George was "stay small, be the best, and don't lose any money", and, you know, our kind of remit was we could do whatever the hell we wanted as long as it didn't cost the company anything, and sort of our prime directive was don't use George's money for anything, and so it was all about getting other companies to come in from the outside and fund whatever it was. We were kind of in the stone soup business where we provided the stone. It was very attractively branded, and companies would sign up for this, and we could only get away with that because we were Lucasfilm and people wanted to bask in the reflected glory of "Star Wars."

Garcia: And so many did.

Morningstar: Yes.

Garcia: So now let's move on to Habitat. So let's get a quick overview of what Habitat was.

Morningstar: Okay, so Habitat, well it's much easier to describe today than it was at the time. Habitat is the first of what are now called massively multiplayer online games. Some people will actually quibble with that, say it's not really an MMO, it's a virtual world, and they're not wrong. But it kind of-- it was the first thing to attempt putting a large number of people into a common online environment, where it's not two people or four people in a game, it was thousands of people all online at once in a common virtual world. It was basically-- its origin was a lunch conversation between Noah Falstein, who was my office mate, and I, arguing about artificial intelligence in games, and we came to the conclusion that we didn't know how to create an AI that was as rich and as believable and as detailed and unpredictable as real people, which was always sort of the Holy Grail, and I said, "Well, we'll just give up doing-- even attempting that, and just actually connect you up to other real people." And that evolved into a concept for a thing which at the time we called Lucasfilm's Universe, and it went through a whole bunch of different name changes before it ended up as Habitat, and Noah had a kind of a concept of what it would be, and I had a concept of what it would be, and we each kind of wrote up a proposal. The way things worked at Lucasfilm Games at the time is anybody who had what they thought was an interesting idea would write up essentially a two- or three-page spec document, proposal document, and say, hey, here's this thing, here's this idea for a game, and, you know, kind of pass it around and people would talk about it, and then Steve Arnold, who was the general manager, would, you know, put it in his file folder in his file cabinet and then when-- because we weren't allowed to do things with George's money, companies would come around shopping for opportunities to do business with us, and Steve would kind of assess what their interests were, and he'd pick out a couple of relevant proposals from his folder of these things that-- ideas that people had accumulated and have us go pitch it to whoever this was, and so we were approached in summer-- late spring, early summer of 1985 to--I think it was '85, might have been '84, I don't know, all of these dates blur together--by Clive Smith, who was at the time the chief of long-term strategy for Commodore, and he was interested in two things, he was interested in things we could do with the Amiga, because they were coming out with the Amiga, and things we could do with modems because every year they would come out with a new thing to try to sell to all of the Commodore 64 owners, and this year, this Christmas, it was going to be a really cheap 300 baud modem, and in conjunction with that they had made a strategic investment in a small company called Quantum Link whose business was games and things for consumers, which was-- and it just strictly targeted the Commodore 64, and it was kind of a weird service because it was only available evenings and weekends. So it was strictly consumer oriented, and by having it be evenings and weekends, they were able to buy a bunch of off-peak hour X.25 network capacity and charge really, really low rates for the time, where at the time CompuServe was charging between $8.00 and $20.00 an hour, they were charging $3.00 an hour, and so they were very interested in the idea of, you know, what can we do to get people to spend more time online, and this just made their eyes light up, and, you know, these two projects kind of went separate ways. They ended up not buying into the-- they would have been thrilled to have us develop an Amiga game, but Commodore's an incredibly cheap company, and their idea of doing something like that with us was that we would do it and they would be thrilled. But Quantum Link was interested in backing this game, which was called-- at that point I think it was called MicroCosm with a capital C, MicroCosm, which I thought was this clever play on words, and everybody was like, "Oh, you incredible geek." And that was the working title for a while until it turns out there were all kinds of trademark conflicts, which is how we ended up with Habitat, by the way, because all the other good names were taken, and Habitat was kind of just actually kind of a strange name, but that's how these things work. But anyway, so that kind of launched that project which

actually took a long time to get going because it took a long time for the lawyers to sort out all of the particulars of the licensing and the legality and the intellectual property, the ownership-- grrr, all that stuff. But it meant that I spent six months just waiting for this to come to fruition, and I spent all that time doing design ahead. So by the time I was able to actually start pulling in developers to start working on it, I had this like three-inch thick ring binder full of design documentation that had kind of worked out a lot of the stuff in advance, and most of that ended up being, I mean, big designs are always crappy and wrong because they're just-- because the world is different than you may have thought it was. But it turns out that all of that thinking ahead really paid off in terms of just having explored the space, and so I had this idea of, well, we'll have these, you know, animated figures walking around in the world, and, you know, what are we calling them? I don't want to call them characters. Because, you know, always one of the questions is so this thing, is it you? Is it a representation of you? Is it some other character that you're controlling? What is it? And I had read Poul Anderson's novel "Avatar," and so the word avatar was sort of in my vocabulary. I thought, oh, avatar, avatar is the projection of a deity into the, you know, another worldly entity into the world. Oh, that's just perfect. And I started calling them avatars, and that term stuck, and so we had this virtual world which was kind of sort of funky, psychedelic, quasi-sci-fi, suburbia, mix and match, was all very object-oriented, which was how you managed to squeeze it into a Commodore 64. We used Commodore 64 client which was kind of amazing because it was-- You have 64K of memory, which is not very much, but then realize you have to use half of that for the screen buffer, and then it had about a 15 or 16K core piece of software that ran-- the engine that ran the client, and then it had a 15 or 16K dynamically allocated heap where we did essentially object-oriented virtual memory swapping off of the Commodore 64 floppy disk, which is the world's slowest storage device, I mean, it's just, oh, my God, and it worked, and it was kind of slow and kind of clumsy, but it was this sort of eye-opening thing. We have since, by the way, I don't know if you know about the Neohabitat Project? The Museum of Arts and Digital Entertainment in Oakland, Alex Handy, you probably know Alex, kind of encouraged this, we took some later-generation server technology that Randy Farmer and I had developed and the original Commodore 64 client software, and we've reconstructed Habitat, and you can play it on the web now.

Garcia: Oh, excellent. Because they brought that to Vintage Computer Festival last year?

Morningstar: Yes. It was kind of in an early stage at that point, but now it's actually, you point your web browser at Neohabitat.org and you can actually run it. Commodore 64 emulators are amazing.

Garcia: They're so good, and then there's someone who made, what was it, the Commodore 64G, which is <laughs> a 64 gigabyte memory address. It's silly, but it worked.

Morningstar: So anyway, so that was one of these projects that kind of, you know, stretched on and led to many, many subsequent adventures. I don't know where you want to go with your questions.

Garcia: Actually you could just talk because you've hit four of my questions so far.

Morningstar: Well, the thing is, is that the eventual premier of Habitat was-- what Quantum Link was, I was kind of daily-- the Quantum Link guy who was sort of tasked with shepherding this to release from a

business perspective, because they had some very, very talented engineering people, but the business person was this 25-year-old marketing putz named Steve Case who I was constantly knocking heads with like every day. I was just so frustrated, and I was like-- This guy, he's never going to go anywhere, he's just kind of terrible, and it's just like-- This was not the first time I was to be wrong about something important, but this was like a major like, no, that was just really wrong because we know Steve Case's ultimate fate was, and Quantum Link, of course, became America Online. They were very nervous about sort of-- their market as they saw it was very sort of mainstream, middle America computer users who just wanted to get, you know, get online to chat with their, you know, their friends and neighbors and relatives, and they were kind of getting increasingly nervous about all of this sort of weird, goofy, sci-fi fantasy flavor that everything had, and so what they did is they rebranded it from Habitat, something called Club Caribe, where they repackaged it with a Caribbean Club Med resort metaphor, we called it Club Metaphor, and they took out all of the-- anything that had the, you know, whiff of the fantastical, of the science fictional, which were-- because everything was object-oriented, you know, these various objects which were devices that would do things, and then the major element of avatar customization was the head, and there was a palette of 256 possible heads, that number 256 comes up a lot, and, you know, and so they screened out about half or two-thirds of the heads and made it just all very kind of, you know, Caribbean resort sort of vibe to it, and I always kind of wondered about this because like they hired Lucasfilm, and we made "Star Wars," and you hired us because we made "Star Wars," and I kind of didn't understand that. But over the first six months of operation in Club Caribe, the users started demanding all of this stuff back, and they kind of eventually put it all back in again, and it was possible to do that because the disk that got distributed, the only difference it had between the final Habitat disk image and the Club Caribe disk image was literally this splash screen that came up when you started the game, otherwise it was bit for bit identical. So all of the stuff in the world was just a matter of making entries in a database from the server and saying, okay, now make one of these things, and now all of a sudden all the weird heads became available again and all of the strange objects that would do things like, you know, change the color of your face and change the gender of your avatar and, you know, various other scary things, all of that, you know, made its way back in and everybody had a fine time.

Garcia: Excellent. So what did you learn from the project?

Morningstar: Well, I think the main thing that I came away from, and it's kind of hard, of course, to tease out at this stage in my career how much of this is stuff that I learned then and how much of it is stuff that I learned in the meantime reflecting on the stuff that I did then. But the key thing was that the emergent social phenomena were a lot more interesting than the technology, and the stuff that people would do just constantly surprised us. Our ability to control or regulate what they did was almost non-existent, and we had to find other ways to manage the community rather than, you know, you couldn't just kind of lay down rules because how are going to enforce them. You had to do a lot more incentive engineering, this was, you know, a herding mice kind of problem. But, at the same time, people would be really, really creative. They'd come up with amazing things. Oftentimes they'd find the solutions to problems that all we had to do was enable them. So there was a lot of concern during Habitat Beta about people essentially not being nice to each other, and your classic sort of online, you know, it doesn't hold a candle to some of the horrible stuff that people do now on like Twitter and like-- But just how do you keep people's behavior within civilized bounds, and what they said was, "Well, we want to have a sheriff." Okay. So we figured

out how to create a voting machine so that they could have an election for sheriff. The users themselves organized candidates debates, and they had a couple of guys and they elected a sheriff, and what could the sheriff do. Well, we gave him a hat, we would give him a big, fancy sheriff's hat or avatar head in the shape of a big sheriff's hat, you know, which had a big star on it, and so he was the sheriff. So what could he do? Well, he couldn't do anything really, but he was the sheriff. It turns out he had like moral authority because he'd been elected by all of the people, and we could do some things like make it so that certain aspects of the game play, like all of the stuff having to do with weapons or combat, didn't work inside, in town, but then if you went out into the hinterlands, you know, all of that stuff was enabled, and so if you weren't into that stuff, you just didn't go over there, you know, if you wanted to just hang out with your friends and schmooze, you'd stay over here, and people could sort of self-- sort themselves into what kinds of communities of activity they wanted to be part of. People would do things-- like one of the things they came up with that just floored me was, I don't even know what you'd call it, choreographed group dancing things where they'd have-- in addition to just being able to walk around and change your facing and stuff, there were also a whole bunch of gestures that avatars could make that were controlled by hitting various keys, and people figured out that they could get like-- in the original Habitat the most people you could have in any one place at a time was six, which was basically that's all you could fit before you swamped the network connection and the rendering capacity of the Commodore 64. But we invented a mode which we called ghost mode where you could become a disembodied person and just travel around from place to place, and you couldn't interact but you could watch, and so you could have six avatars and any number of ghosts watching, and so you could have six people put on a show with, you know, 150, 200 people in the audience watching, and then they would do these sort of choreographed dance acts where everybody would customize their avatars so that they were like in costumes or something, and they would do these sort of-- as I say, just sort of put on these shows, and they had to do things, like apparently they would like get on the phone with each other and use stop watches to get their relative network latencies because some person would be half a second behind the others, so they would know that they had to push their thing half a second before everybody else, and they just worked at it's like-- you know, that's just an insane level of obsessiveness to do that, but people got very passionate and very engaged because it was stuff that they were creating was important to them, and the thing that really stuck with me, and Randy Farmer--who was sort of the lead client developer and has since gone on to be my partner in crime in, I don't know how many companies we've started and crash landed together at this point, but--and I eventually wrote about this. The lessons, the fact that the social dimensions were kind of more important, more interesting. I'm kind of mixing up the timeline, but I guess we don't have to be strictly chronological here, in 1991 we gave a talk at the First International Conference on Cyberspace talking about the lessons we've learned, and there are all of these people who are coming and they're showing off all of their things that they're doing like Silicon Graphics workstations, a $100,000.00 graphics workstation, you know, where there are fancy goggles and, you know, virtual reality headsets and the datagloves and all of this kind of stuff, and here we come in with this Commodore 64 computer, which is, you know, $150.00 at Kmart, or back at that point it was $10.00 at a garage sale and, you know, had we done all of this stuff, and we went into the conference with this really sort of kind of, you know, in your face kind of just very, very kind of chip-on-the-shoulder sort of attitude, and everybody just loved it. I mean, people were just like, "Oh, wow, this is really great." And we were able to, you know, make hay with those lessons for a long time. I think the world has largely

caught up in terms of, you know, appreciating the fact that it's the social dimensions which are both where most the interesting problems are and where certainly where all the really hard problems are.

Garcia: Excellent. And now you mentioned Randy, but who else was on the team?

Morningstar: Okay, so, let's see, the Habitat team was sort of, you know, Randy and I, the main people, Aric Wilmunder, who was one of the other developers at Lucasfilm also very heavily involved in client development for Habitat, and then on the-- and Gary Winnick, who was the lead artist and animator and art director at Lucasfilm Games, and then we had a bunch of other artists who kind of-- there was constantly various artists sort of cycling through doing contract work and all of that, and Gary kind of wrangled those people. Avatar heads in particular were-- a lot of the artists really liked that because it was this very nice, very bounded sort of thing where they could spend 10 minutes and they could create this complete work which would then go into the game. So we had a lot of heads created by Ken Macklin. I think we might have had a few done by Lela Dowling, I don't remember. Gary, obviously did a bunch. And so we had, you know, a number of different artists who had contributed to it, although it was mostly Gary, and then on the Quantum Link side the lead server developer was a woman named Janet Hunter, who, I actually haven't spoken to her in years and years, but wrote most of the bones of the backend. I wrote most of the sort of object personalization, all of the different things that were in the world, and she wrote the code that actually, you know, was kind of the organizing structure for it all, which is really interesting because that server architecture has then gone on to be sort of our template for building everything from then on, you know. Some people want to make everything, you know, a relational database problem, and other people want to make everything a web server, and I want to make everything an MMO game server, and I think I'm on like the ninth generation of that technology at this point. I have an open source system called Elko, which you can actually get from GitHub, which is really just as I said N generations descended from Habitat.

Garcia: All right. Now "How to Deconstruct Just About Anything."

Morningstar: Ah, okay. So Second International Conference on Cyberspace, so we had gotten this great reception the first time through, and then the CyberConf is a very interdisciplinary conference, it had a lot of sort of computer science and UI design and game design and technology people, and then it had a lot of arts and humanities and particularly people from literary criticism world of academia, and so we had a paper at the second conference which was in-- it was actually in Santa Cruz, and we were scheduled, it was a two-day conference, we were scheduled to give our talk on the morning of the second day, and so we went to the first day, and there were all of these people who were saying all of this stuff that was sort of couched in academic literary criticism jargon, and it was baffling, I mean, it was like just word salad, and I started taking notes because it had this kind of weird diaphanous quality, you know, like dreams have when you wake up in the morning and you had this dream and then five minutes later it's like I remember there was a dream, but I don't remember what was in the dream. It had that kind of quality to it, and so I started writing down, and I'd only capture like a two- or three-word phrase before I'd kind of-- short-term memory would kind of lose it. But I ended up with this amazing collection of notes trying to make sense of what are all these people talking about, and we realized that this is a group of people who are very, very obsessed with form, and we realized that the fundamental thesis we were going to be

presenting in our talk would be likely to be very offensive to people who were very form-focused. The fundamental thesis was people were talking about cyberspace as a thing that people were creating, and we wanted to shift the conversation from think less about design and construction and think more about discovery, and think about it as this unexplored space that humans are going in and colonizing, and we kind of took the settlement of North America by Europeans as kind of a metaphor. But, of course, that historically is something which is fraught with lots of very ugly history, which we didn't think was that relevant because this is a world which has no natives, this is an empty universe that is only populated by the people who have come there from the outside, cyberspace I mean, and we were kind of, okay, we're going to have to do some editing and kind of-- if people want to argue with us, we would like them to argue about the substance of what we're saying and not about the form, and we're perfectly happy to have people be upset about the substance, but we didn't really want to distract them. So we had this frantic last minute rewrite, and I, just as a gag, I took the stuff from my notes, and I kind and cut and pasted them into this paragraph of postmodern lit crit jargon, and this was actually all made of things that people said, but not all-- anything that any one person had said, and I constructed this beautiful paragraph, and you can look it up online, I won't attempt to reconstruct it here, but it was-- I was really proud of it, and so I got up and I started my talk by reading this paragraph as if it was just my talk, and, you know, there were like people in the front of the audience who were kind of going, "Oh, yeah, yeah. It's like deep." Until they kind of got half way in and kind of realizing they couldn't quite hold onto it, and it really didn't make very much sense, and, you know, and there were a few techies in the back who started to snicker, and by the time I got to the end, you know, nobody in the room, you know, everybody was just falling on the floor, and I just couldn't keep a straight face, but I mostly got through it, and anyway, that kind of sort of diffused some of the tension over this sort of lit crit stuff, and then we went on with our talk, and we had lots of people who got very upset, but they were upset about the right things, so we were successful. But then I kind of, you know, went back and was thinking, well, you know, that really wasn't fair. You know, I was just very kind of blithely dismissive of a lot of, you know, stuff that I really didn't actually know much about. Maybe I should, you know, to be a responsible person, actually learn something about this, and so I contacted Mike Benedikt, who was the organizer of the first conference, and at the time he was the chair of Architecture Department at University of Texas, and he sent me a bunch of--and who I knew was pretty much in that camp--and he sent me a bunch of references to things I could read, and I read all of the stuff, and it was kind of interesting, a little mind stretching, I'm not sure how I felt about it. But then issue number one of Wired came out, and they had this column called the "Hype List," and there in this little squib this thing called "Tekno Gets PoMo" or "PoMo Gets Tekno," I forget which is right. But anyway, it talked about this event at this conference, and they said that we had shouted down the postmodernists. I was like, "No, no, that's not wrong. We did not shout them down. We made fun of them. It's a completely different thing." And so I sent off this very kind of angry note to the people at Wired, emailed, you know, and they said, "Well, would you like to write something about this?" And I said, "Sure." And so I sat down and I wrote this paper called "How to Deconstruct Almost Anything" that kind of laid out what I had learned from my explorations of this stuff that Mike Benedikt had told me and kind of telling the whole story of this event, and I sent it off to Wired. Months passed, and I didn't hear anything from then, and they finally said, "No, we can't publish this. This is too weird." I was like, "Oh, it's too weird to be published in Wired. That's really something." And so I put it online, and we had a-- this is just pre-web, we had an FTP site, so I put it on the FTP site, then eventually had a website, and I put it on there, and then I started getting fan mail, and I continue to, to this day, I mean, this was like 1994, '95

when I published this thing, and I still, like I-- once or twice a month I'll get email from some disaffected English literature grad student or professor. It just has returned a bounty of delight. So I got an email from this professor at NYU named Alan Sokal who said, "Oh, I read your thing. It was very funny. I'm working on this other thing. Perhaps you'd like to look it over, give me some feedback. But don't tell anybody." And it turned out it was his infamous paper "Towards the Hermeneutics of Quantum Gravity," which was a complete hoax. It was an attempt to argue in very sort of postmodernist terms that reality doesn't exist that he managed to get published in the journal Social Text, and it created a huge scandal because, of course, immediately after they published it he revealed that this whole thing was a put-up job, and I was delighted because I got to be in on the plot. So where do we want to pick up?

Garcia: Well, let's pick up at what would you say is the lasting impact of Habitat?

Morningstar: Well, I think there's a couple of things. One is I think it was the first thing that got the people in the whole sort of social virtual reality domain to start thinking about the human and social elements of what they were doing rather than sort of conceiving it as an exclusively technological undertaking. Obviously there's this whole line of MMO virtual world games and products and services, you know, some of which probably don't have any technical roots in Habitat, but there was certainly influence there, and that, you know, is these little ripples in the pond that just kind of go outward and outward and outward. Obviously the introduction of the word avatar into everybody's vocabulary. In fact, it was great fun, another, you know, sort of dividend from all of these adventures was in, well, I don't remember what the year was, but-- well, first of all, it's in 1994, I'm not sure about the year, anyway, the book "Snow Crash" came out, and Neal Stephenson used the word avatar for, you know, these characters in this cyberspace he called the metaverse, and a couple people said, "Oh, this is a great book. You should read it." And I read it, and it was great because he had kind of keyed in on-- he'd come up with the same word, and he's using it in more or less precisely the same meaning, and so I was like, "Oh, I wonder if he knew anything about Habitat?" And then I started getting email from people saying, "Oh, there's this guy, and he's written this book, and he's stealing your word." I was like, "Dude, it's the English language. It's not like somebody owns these things, you know." And it's like he's using this word, and it's great, and it turned out that another of our partners in crime with Randy and me is Doug Crockford, and Doug and Neal shared a common high school buddy, and so Doug had a connection to Neal, and we ended up meeting with him at one point when he was in transit coming through the airport from one place to another, and we met him at the airport and spent a couple of hours hanging out and just chitchatting, and we, you know, compared notes, and as far as we can tell, his use of the word avatar was an independent construction. I mean, it was enough later that there could have been some, you know, subliminal influence from Habitat, but he's pretty sure there wasn't, and I'm inclined to think he's right on that. But nevertheless, he gave us, he gave Randy and I a credit in the forward to the paperback version of "Snow Crash," which was at that point just about to come out because that's the kind of guy he is, and as a result of that, we kind of have this ongoing friendship with Neal Stephenson, and so every time he has a new book come out he comes into town on a book tour or something we get together and have dinner with him, and that's awesome.

Garcia: Yeah. He's a good guy.

Morningstar: Yeah, he is a good guy. He came down to the Worldcon in Los Angeles when "Diamond Age" was nominated for the Hugo and we went out and had dinner, and I had a great time, you know, with everybody saying, "Oh, yeah, this is Neal Stephenson. He's going to win the Hugo tonight." And he was, you know, kind of very embarrassed by that, and then he won the Hugo and I was like, "Yeah!"

Garcia: Because the last time he was nominated was when I met him, and we were in the green room and no one recognized him because no one thought he would have shown up, and I just walked over to him and said, "Neal, it's great to see you. When are we going to get that Alan Turing fiction novel you've been working on?" He was like, "You'll get it, trust me. You'll get it."

Morningstar: Well, he ended up actually hanging out with us at Electric Communities while he was working on "Diamond Age." I guess, I don't know, he spent some time I think talking with Eric Drexler and some other folks as a result of that. So that actually the character in "Diamond Age" named Carl Hollywood, Doug Crockford is Carl Hollywood, that was-- Carl Hollywood was a persona that Doug had when in high school when he and some friends had a band called Gut, and he was the frontman for Gut under the pseudonym Carl Hollywood.

Garcia: Oh, excellent. Okay, we're going to bounce around a little bit, but--

Morningstar: Sure. We've bounced already quite a bit, but, go ahead.

Garcia: Yeah, right. <inaudible 01:13:50>

Morningstar: Time is non-linear.

Garcia: It's a flat circle. What was American Information Exchange?

Morningstar: Okay, American Information Exchange was the brainchild of a guy name Phil Salin, who was another sort of part of the, you know, this extended cloud of folks who had I think I connected to him through Xanadu who connected to him through the commercial space development community, L5 Society, that sort of thing, where he was involved in an early space launch, private space launch effort called American Rocket Company, and Phil was an economist by background. Phil was very interested in information economics. Phil had worked for I think McKinsey Associates, don't quote me on that, but some big consulting firm on a contract for the Federal Communications Commission doing a survey of the U.S. long-distance telecommunications market, and his study was essentially the thing that led to the breakup of AT&T back when before it reassembled itself, and he was looking at what the kind of economic consequences of cheap telecommunications and decentralized computation would be, and he kind of developed--and as an economist was very interested in markets and exchange--had developed a concept of what online information services would look like in-- then started looking at what actually was available in terms of online information services, which were things like CompuServe and The Source and Genie and those things, and it's like this wasn't anything at all like what he imagined these things based on sort of fundamental principles of economics ought to be, and he said, "Hmm, business opportunity." And American Information Exchange was set up and, it was I think the first person-to-person e-commerce

service with the idea of people, individual buyers and sellers, exchanging services and goods electronically with all of the interactions mediated through the service. The idea that you could be basically buy and sell information products, whether it was, you know, market research studies or software or, you know, basically anything that could be delivered through an electronic media and ultimately could be extended to deal with physical goods, kind of filling that the niche that eBay has nowadays though it never got to that. The idea that you wanted to create an actual marketplace as opposed to big giant corporation, there were things that were big corporation and individual consumers buying from the big giant corporation, but nothing where it was one individual with some knowledge or expertise or some product selling it to other individuals who wanted that knowledge, expertise or product. There was a lot of machinery to deal with the fact that when you're buying information as opposed to other kinds of physical goods, you don't really know what you're getting until you get it at which point you now have it, so you can't give it back, and so in order to be able to make a pre-purchase decision without actually just being given the product you needed to have things like reputation, you needed to have all kinds of contextual information that would tell you about what is this thing, what is the provenance of this thing, who are the people behind it, what are their reputations, what other things have they done, what do people think of them, and basically this entire superstructure of reputation and context information, and so we built a system particularly when dealing with things like small scale consulting contracts where there's a sort of structured email exchange where there are parts of a contract which can be mediated and managed electronically like, you know, keeping track of deliveries and actually facilitating payments and actually dealing with all the mechanics of moving the money back and forth, and including dealing with exception cases and refunds and what if the transaction goes bad and now you need to go to mediation or arbitration to resolve whatever dispute and all of that stuff, and built this framework for I guess the current term is smart contracts with the idea that it's not just machines buying and selling, but there's a piece of a contract which can be electronically mediated by automation and another piece which is human-to-human and you need to have a hybrid which can deal with all of that stuff. So American Information Exchange was this idea that Phil had, and he was also an advisor to Xanadu, and Xanadu at this point was approached by, I think there was a conversation between Roger Gregory and John Walker at the Hackers Conference in was probably 1987 where Walker was very interested in Xanadu. Roger, although he is a force of nature, is not somebody who is kind of temperamentally suited to negotiating business transactions between corporations and kind of dragged Phil in as an advisor, and Phil helped facilitate the thing which ultimately resulted in Autodesk acquiring XOC and dumping a bunch of money into Xanadu to hire all of the Xanadu alums who they could suck in and more to try to actually build a real product out of this, and in the course of doing that Phil turns to John Walker, John Walker was the CEO at the time and one of the primary founders of Autodesk, says, "I've got this other thing that I'm working on," and kind of pitches it to him, and Walker is very excited because Walker's a real, he's a real anarcho-capitalist kind of guy, and so this immediately, you know, caused his eyes to light up, and he said, "Oh, yeah, we should do that too," and as a result they ended up funding both Xanadu and AMiX, and we were both set up in joint offices in Palo Alto. We became sort of the information services wing of Autodesk and shared our, because we're all part of Autodesk, shared our facilities for the whole tenure that we were with Autodesk, which kind of caused me to cycle back into the Xanadu world a bit as well, and we built what's really the first major e-commerce platform, once again, pre-internet, pre-web, and then various things happened at Autodesk, which probably we shouldn't go into on the record, that caused that to end just before the web took off.

Garcia: And from there you moved to like was it Electric Communities?

Morningstar: Yeah, Electric Communities went through three phases. There was Electric Communities the consulting partnership, which was Randy Farmer, Doug Crockford and I, which was, AMiX had ended and we needed to, you know, pay the rent, and this is the point where there was this huge ferment in the VR, this was sort of the first wave of VR hype around 1992, and we discovered we could get companies to pay us and come-- go talk to them about our take on this stuff because they were looking for guidance on how to approach this new world of the future, and it was just the beginning of this sort of ramp up to what eventually became the internet taking off where all of these big telecommunications and media companies were engaged in this sort of frantic pairing off in random combinations, we called it the dance of the dinosaurs, of, you know, hoping that they would, you know, find the genetic material necessary to survive in the brave new world of the future, and so there were, you know, lots of big companies that were willing to pay consultants to come, you know, give them the consultant's take on what the world of the future would be like and the world of networking and telecommunications, and so we had a whole vision of how that-- what that world would look like, and at the same time we have several parallel tracks going on here. While we were doing AMiX, I had hired Randy away from Lucasfilm to be one of the core developers for AMiX, but we had left Lucasfilm with a consulting contract because Lucasfilm had just about at that time licensed Habitat to Fujitsu for the Japanese market. Fujitsu was in the process of coming out with a new high-end graphical personal computer called the FM Towns that they wanted a sort of flagship online product for. They thought Habitat would be just the thing, and so they licensed Habitat from Lucasfilm, and then Lucasfilm turned around and hired Randy and I as contractors to essentially shepherd them through the process doing all of the technology transfer and then kind of advising them when they got into trouble because they were essentially doing a full-up from scratch reimplementation of all this stuff on this newer technology platform, and so we had a relationship with Fujitsu, and then Fujitsu decided what they'd like to do-- now we're at AMiX has died and we're trying to make livings as consultants, and Fujitsu comes to us and said, "Well, we'd like bring, you know, the Fujitsu Habitat from Japan to the United States." Because at that point AOL had shut down Habitat because, you know, Commodore 64s, who uses those anymore, and they said, "Can you tell us how to do that?" And we said, well, sure, but we're much more interested in this sort of forward looking futuristic thing where we had kind of taken all of the experiences that we'd had from Habitat, and we'd kind of come up with this vision of all of the things that we hadn't been able to do. The two main ones is we wanted to be able to build this virtual world, but we would like it to be decentralized so that people could add new objects, new kinds of objects, and create new things in this world that weren't there before without it all having to, you know, funnel through one game studio, and also, at the same time, we'd like it to be decentralized in the sense of not just extensible, but that different people could run different parts of the world and have it all kind of interoperate, and there's all kinds of whacky technical problems that are really exciting and fun that are involved in that, and so we had created this-- Well, we had this idea, and Fujitsu said, "We'd like you to run the U.S. reimportation of Habitat," and so we said, "Well, we'll do that, but we want to do this other thing," and they said, "Okay, well, we'll pay you this ridiculous consulting fee to spend half your time overseeing the U.S. reimportation of Habitat and the other half of your time doing design studies and planning for this future thing." And so we were given something called Fujitsu Open Systems Solutions, Inc., which had previously been a company called Unisoft, I'm not sure, it was a company in the U.S. which they had acquired, and they gave us some developers and said, "Okay, you're

going to use these developers." And we ended up creating a system called Club--I'm mixing up the titles now--WorldsAway. We created a new business unit in Fujitsu called Fujitsu Cultural Technologies, and WorldsAway ran on Macs and PCs and ran through CompuServe, and then we also created this enormous thick piece of prime vision called the Cyberspace Protocol Requirements, which was this really visionary technical document which I think was really brilliant, some of the best work I've ever done and completely, totally, utterly wrong, but we had this tome, and then the internet started to, you know, catch and start running on all cylinders and was looking like it was going to be a thing and venture capitalists came sniffing around, and we had some VCs come to us saying, "Well, we know these people in Hollywood, and we'd like to do sort of a Silicon Valley meets Hollywood thing." And they had this whole thing, like, oh, that's stupid, but we've got this vision, and they said, "Oh, well, that's a cool vision. Here, have some money." And so we started a company, and so Electric Communities the consulting partnership turns into Electric Communities the company with the idea that we're going to take this crazy vision of this completely extensible, completely decentralized virtual world and realize it in technology.

Garcia: And who else was with EC?

Morningstar: Well, the founders of EC were Doug and Randy and me, and then we just started hiring people. Early employees included Jay Fenton now Jamie Fenton, who had been one of the founders of MacroMedia. Arturo Bejar, who was a kid who I had met at the Hackers Conference who was just this super enthusiastic guy, and he was like super into what we were doing, and I just wanted him on the team because he was really, really smart and full of energy, and those two things together are great, particularly when you've got a bunch of kind of stodgy old guys, and, you know, kind of gradually started accreting people. Doug Barnes, who was one of the sort of old school cypherpunks, started Illuminati Online with Steve Jackson down in Texas and then, in Austin, and Jim McCoy, who eventually went on to start MojoNation and the thing which ultimately rolled into becoming BitTorrent, and, you know, bunches of other folks, and we kind of assembled this, I don't know, just the most amazing collection of scary smart people that I've ever had the privilege of working with, somehow managed to create one of the most effective engineering organizations for solving really crazy hard problems that I've ever had the pleasure of working with. Turns out the problem we were trying to bite off was way too hard to be something you'd do in a start-up. Marc Stiegler, who was another Xanadu alum that we hired whose background was doing project management originally for big giant defense consulting companies and then he became the lead sort of manager-type person at Xanadu, and we hired him. He had elevated the construction and management of PERT charts to an art form, you know, to the point where you could actual use it to really manage a project, and he had this whole scheme where he had this color-coded set of patterns for filling in the boxes in the PERT chart depending on how they were going, you know, which were, you know, red, yellow, orange and green boxes that kind of tell you the status of things, and for us he said, well, he had to invent a new color which was a purple which was this box, requires somebody's PhD thesis, and our PERT chart had like all of these purple boxes on it, and you have purple boxes on, you know, PhD thesis on your critical path, this is a recipe for failure. So it was way, way too ambitious, but we did just some just bloody amazing things. I think if we had had another couple of years and had, you know, kept our heads down, we might well have, in fact, realized this technology vision. One of the problems which the technology behind a lot of these virtual world systems has is that-- and you can see this with things like Second Life today where a lot of the stuff is way more interesting to its implementers

than it is to its users, which is, once again, not a recipe for great commercial success, and then that morphed into a company called Communities.com, which was basically just a name change, where we got in a whole bunch more investment money and then spent it in lots of really stupid ways in sort of the classic dot com burnout sort of fashion, and I don't know how much you want to hear about that. <laughs>

Garcia: That's great. You actually transitioned perfectly through five different questions, and so I distinctly remember Communities.com. That was a time.

Morningstar: Yeah, yeah, it was. It was. Larry Samuels, who we'd hired as CEO fairly early on in Electric Communities, who was I think singularly responsible for the fact that we were able to raise significant money, who had previously been the CEO of Creative Labs and had retired, you know, and he was independently okay, I would say, retired to his nice beach house in La Selva Beach, and actually what happened was his wife's parents were next-door neighbors of Doug Crockford's parents, and so they were having dinner one time, and Doug's parents said to Larry's parents-in-law, you know, "Our kid is doing this thing, and we don't quite understand it, and we're kind of worried about them. Could you have Larry go talk to them, make sure they're okay." <laughs>

Garcia: Dad's worried. <laughs>

Morningstar: And so one day this guy shows up, and he says, "Well, my in-laws were saying go check on how the Crockford boy is doing." And we immediately hit it off, and he kind of immediately signed on to just sort of be a business advisor, and we quickly seduced him into, you know, becoming a full-fledged participant, and he became a CEO, and then he was able to raise amazing amounts of money basically just on his reputation of having made enormous buckets of money for Creative Labs, and until, this went on, I think we started-- that must have been 1995, and round about I think 1999, 2000, he was just getting burned out. Part of it was, you know, we'd gone on for years and years and hadn't quite got across the finish line, and part of it was the commute from Santa Cruz was really brutal. You know something about--

Garcia: I know a little bit about that.

Morningstar: Commute. But from La Selva Beach it's even worse, and then we turned it over to one of our head marketing people who completely just, you know, your classic case of somebody who just does not have a clue, but kind of knows all the buzz words and just an abyss of dysfunction and the whole thing kind of went to hell. It took about a year to do it, and the sad part was at the beginning of that year we got this big infusion of money, and, you know, in retrospect what we should have done at that point instead of ramping up and spending-- ramping up to be like 195 employees at our peak and spending money at a furious rate, if we had instead at the point where we'd gotten in this infusion of it was $10 or $11 million, you know, immediately laid off 80 percent of the company and all of these people who really weren't actually doing anything and just hunker down with the core engineering team for a couple years, and we would have had the finances to do that, we might well have come out the other end with something awesome. Of course, we might have well had just spent another couple years, you know, doing technological "gosh, we're having fun" and come up with the same outcome we did, so, you know, it's all speculative, but. You know, it was a classic sort of Silicon Valley, you know, money meets techies

meets stupidity kind of scenario. One of the things that happened was during the middle of this one of our investors was a big multinational venture fund, who will go unnamed, was in the process raising another round of their fund, and they had a couple of their higher-profile portfolio companies that were about to tank, and so they engineered a deal where we acquired those companies, you know, it was all just sort of, you know, paper transactions and stuff so that they wouldn't have to explain why a couple of their high-profile companies had gone under just as they were trying to raise, you know, $700 million, whatever it was they were trying to raise, and so we ended up absorbing those into our corporate body, and those had both been companies that had a long history of massive amounts of money being dumped into them by-- and so by the time the whole thing went down in flames, and I remember it very distinctly because it was March 5, 2001, which was my 42nd birthday, it was on my birthday that we filed Chapter 7, we had essentially every significant VC fund in the Valley was somewhere on our balance sheet, on our cap table. It was just amazing. Because it just kind of had accreted, you know.

Garcia: And so after that was State Software when you went there?

Morningstar: Yeah, what had happened in the waning days of Communities.com is we had-- Well, we had acquired-- one of the companies we had acquired was this company called The Palace, which had been-- it's background is kind of interesting as well. It had started out as a research project at Time Warner Research with a guy named Jim Baumgartner, who is a genius, brilliant guy, very creative, he is a musician by background, and he was experimenting with finding ways to get people to interact online, and he created this kind of interesting sort of 2-D graphical chat system called The Palace as a research project, and then the internet bubble went foom, and all these companies started looking around saying, "What do we got laying around in the closet that we can commercialize?" And Time Warner seized on this thing, and they did joint venture with Intel to create a company around this thing, and they took it from Jim and they invested in putting in a 50-warm body programmers to add crap to this code, and then it went up and then crashed, and then we ended up absorbing it because of aforementioned venture capital machinations, and Larry comes to me and said, "Well, we just acquired this stuff. Would you please do a security audit on the server." And I said, "Okay." And I started reading The Palace code, and The Palace code was terrible. First of all, Jim Baumgartner is, I told you, he's a musician and a genius and that this stuff was created in a research lab, and then also they had just, you know, bunches of people just throwing crap into this thing for several years, and so I ended up doing lots of stuff with the code to just try to clarify it, understand it, and in the course kind of developed a whole methodology for refactoring code, which is part of what has paid my living since then. It's just, "Oh, I now have a lot of practice in taking some pre-existing body of really crappy code and transmogrifying it into something nice." And over the course of about six or eight months transformed it from being this really unreliable server for this kind of goofy, 2-D graphical chat system into a general purpose application server for live real-time multi-user applications, and then we were able to turn that around and we did a project for Turner Broadcasting for the Cartoon Network where they wanted to create an online Cartoon Network-based online experience thing for-- it was never really well characterized and so it kind of didn't go anywhere, but they paid us a bunch of money to do that, and so we had created this nice framework, and then when Electric Communities--well, Communities.com at that point--went away, we said okay, but we knew we could sell this to Turner Broadcasting, so there were probably other companies where we could do a similar kind of thing. I wonder if we can get the rights to that code, and we couldn't for another set of complicated

reasons involving things which I probably shouldn't talk about for fear of getting sued, and so we said, okay, well, how hard would it be to just rebuild it and it turns out it wasn't all that hard because now we didn't have to go through all of the false starts and blind alleys and all of the other kinds of things that happen when you're actually doing software for the first time. But we could just take it as a template for how we want things to work, and I did a reimplementation from scratch, original Palace-- well, the framework which just ended up being called Passport, which is another missed opportunity, we owned this trademark and we could have sold it to Microsoft. Implemented another system and that was all written in C, and so I implemented a new thing from scratch that was all written in Java, and Doug and I originally formed a company to try to make a business out of this, and we called it State Software because there's this whole dogma about stateless servers in distributed services and we're kind of dissenters against some of that dogma, not in the sense that all of the advantages of having a stateless server aren't real, but real applications all have state in them and how you manage that state has a large bearing on the performance of the resulting system, and if you're using a relational database as your principle way of keeping your short-term memory, it's really slow and capacity limited, and so we sort of did it the old fashioned way by just keeping all of that stuff in memory, and then we had a much different story of how you scale and how you route all the communications to make that be able to get big, and so we called it State Software because we keep track of the state, and in the course of doing that we were using-- at this point using web browsers as the client and just running JavaScript in the web browser, and this is just at the point where people were starting to discover that actually JavaScript was a serious programming language that you could do serious software in and Doug was one of the early pioneers of that, and we needed to send messages back and forth between the server and the browser, and when the browser needed to understand those messages we realized we could just use a JavaScript object literal and just evaluate it and we'd have the data, and we kind of came up with some conventions for using it, and I said, "Well, we could call it, let's just call it--" and, oh, and the other thing which was we were fighting with potential customers who all wanted everything to be XML because XML was the new hotness, and XML was complicated and had all kinds of issues, and this was just the browser just speaks this natively, and so we said, "Well, let's call it, say, JavaScript Object Notation, because then we can pronounce JSON, like Jason and the Argonauts." And Doug went and he registered JSON, J-S-O-N, dot org, the domain name, and put up a one-page website that just had a syntax diagram and a little write-up of JSON, and then we would just point at that and pretend that it was a standard, and after a year or so of this it was a standard and everybody just-- and now JSON has largely displaced XML in a lot of the uses that XML used to be used for. I was like I feel really-- and that was just a little bit of, I don't know, it was just sleight of hand, but a little bit of smoke and mirrors and we were able to completely get this really annoying, crappy thing out of our world. Also, any time, a lot of people see JSON and they pronounce it "Jay-son" and I just have lots of fun. Whenever I'm in a meeting and somebody says "Jay-son", I say "Jason". It's like, "How do you know?" I said, "Well, because I named it."

Garcia: Great. After State Software, you ended up at Avistar?

Morningstar: Mm-hmm. Yeah, Avistar was a company doing a high end desktop video conferencing system, that was all actually based on analog video, hardware switched, although it ran over a standard unshielded twisted pair network cabling, so you didn't have to rewire your office. But it was full up, and so as a result, the video quality is really good and it was very responsive and reliable and didn't have all the

kind of weird artifacts that digital stuff had, and particularly at that point. But yeah, it was $8,000 a seat, but it targeted at desktop users and the original value proposition, was a lot of videoconferencing, even to this day is very focused on saving companies travel expenses. Rather than getting on an airplane and going and flying to some other city to meet with somebody, you can meet with them over video, and they would set up video conferencing rooms, with rooms that were set up with all of this sophisticated hardware in them. Avistar marketed to principally securities trading companies and banks and other things, where the real expense was getting up out of your desk and spending ten minutes walking to somebody else's desk. Yet when you talked to them over video, the video had to be super, super high quality, because these were guys making billion dollar deals, and they really care about being able to see facial expressions and body language and all of that stuff that tends to get lost through the video channel. But I joined at the point where they were going through a technology transformation, because even though they had built this business on this very high end, very hardware based analog video technology, the networking bandwidths were getting good enough and the video hardware was getting cheap enough that you could actually do this stuff using just software, cheap webcams, and IP networks, which maybe they weren't quite as good, but instead of being $8,000 a seat, it could be $20 a seat, which is hard to compete with. So they were in this transition of going from being principally a hardware company to being principally a software company. So I had experience dealing with a large legacy code base that had a lot of engineering issues, and they had a big legacy code base, because their video switch was this complicated piece of software. They had a million and a half lines of C++ code, and it was all oriented around managing all of this hardware, and transformed it from being a hardware video switch manager to a generalized network bandwidth manager for software video channels. So we could keep track of the fact that this leased line has got this much bandwidth and this one has just this little bit, and keep track of allocating. Because there's always this problem with having low value, high bandwidth things crowd out high value, low bandwidth things, like email, which can be really, really important, but doesn't take up very much traffic. But if it gets crowded out by your video frames, which if you lose a video frame, who cares, but uses vast amounts of bandwidth. Anyway, keeping all that, and so I did this big refactoring and out of this million and a half lines of C++ code, it turns out like, 60,000 of them are really the important part. Then getting your head straight about how all the pieces in that worked, and what the core abstractions were, and making sense of all of that was the key to this big transformation and we were able to slough off a lot of the dross. And having now done this twice, now I have a marketable skill.

Garcia: After that, was that the transition to Yahoo!?

Morningstar: Yeah. What happened was, Avistar was-- I mean, there were some good things about that company, but it always felt to me-- and I think they treated me very well, but it always felt kind of like a placeholder job. My passions weren't really in it. At one point, I just had a really bad day. I don't even remember what it was. It was probably something very transient, but I just sent a frustrated email to Randy, who was at that time working at Yahoo! saying, "Dude, get me out of here." Next week, I had an interview at Yahoo! So I went down and I talked to people at Yahoo! and they made me an offer. I said okay, and went to work for Yahoo!. Yahoo! at that point was attempting to up its social media game and I got involved in the thick of that.

Garcia: And that was 2004?

Morningstar: That was 2005.

Garcia: 2005, okay. So what was your initial role?

Morningstar: My initial role, actually the project that I was initially hired into was, they wanted to create something that they called the Virtual Economy Platform, which was a general purpose framework for doing virtual currencies for games, where you needed to be able to deal with things like, you wanted to be sure that currency was conserved, which turns out to be really important, but it's not something that a lot of the people building these systems actually architect in from the ground up, and then they suffer for it. The guy who was the head of Yahoo! Games at the time, Lee Crawford, had this vision of being able to do microcontent sales and that kind of thing. So I architected and built out this virtual economy platform for them, which then ended up not getting deployed, because the Yahoo! lawyers were not able to wrap their heads around how to do revenue recognition for virtual currency sales in a way that they could reconcile with the Sarbanes-Oxley accounting reporting requirements. They just basically backed out of that whole line of business, and they ceded that entire market to companies like Zynga, who basically said, we're just going to do it, and they just went and did it, and made billions of dollars, but billions of dollars for a company like Zynga. Then after that, worked on-- we built a general purpose reputation platform. There's some other project that was in the middle there somewhere. I don't remember what it was. Then finally, my last days at Yahoo! were working on the thing that was going to essentially be the rebirth of Yahoo!. They had this enormous project which was intending to re-- oh, the other thing I worked on at Yahoo! was the Core Identity Platform, which was the thing that surfaced outward facing user identity information. There was a time when any page you hit on Yahoo!, my service would be sending you stuff. Randy and I are both very interested and concerned with all the issues of identity and identity management. Yahoo! had encountered the problem that was the Yahoo! ID, which was your account name, was used as your login ID, it was used as your email address, and it was used as the handle which identified you in public activity that you did on Yahoo! which meant that if you posted a comment, say, on a message board in Yahoo! Finance, you were now divulging the key piece of information for somebody to attempt to break into your account, or to send you harassing email or spam, because you were essentially publishing your email address and your login ID. So we wanted to separate out the outward facing parts of identity, which is how you present yourself to the world, versus the identifier which the system uses to recognize you as you and as legitimate accessor of your account, and split those two things into separate universes. This is what we did.

Garcia: So reputation platform.

Morningstar: Yeah.

Garcia: Was that was that essentially doing, or was that more like response to the user?

Morningstar: No, this was another one of those cases. A lot of these things, Randy sort of worked out the idea and then I worked out how to actually realize the idea. In the case of reputation, Randy came up with a really interesting generalized formulation of what he calls a reputation statement, which is an assertion of some kind by one entity about a different entity in some context. That can range from

somebody giving a movie four out of five stars, to somebody rating a restaurant, to somebody doing thumbs up or thumbs down on somebody else's post, where those are explicit acts of assessment or assertion about something, to things which are much more implicit, where you're just observing somebody's behavior and you're capturing assertions about the things that they've done, where you're trying to create a model-- like, we used this at Yahoo! for building a model of the propensity of particular IP addresses to be the sources of spam, which was all based on just observed behavior. Then given this sort of fundamental notion of a reputation statement, having a general purpose processing engine for aggregating these and pulling information out of them. So a bunch of people rate this movie and then a lot of things, you're having various different sources of information about it that you're weighting in different ways. Anyway, it ended up being this sort of general calculus for combining and merging and analyzing reputation statements.

Garcia: That's excellent. So after that, was that directly to WeMade Entertainment?

Morningstar: No. Well, let's see, now you have to make sure I get timeline straight.

Garcia: It's always a problem.

Morningstar: Yeah, see, my career's kind of a series of jumps from startup to consulting to big company to consulting to startup, you know. So Yahoo! went through this paroxysm of cost cutting in February of 2008, where they decided they needed to shed some number of dollars of year of expenditure. Actually, it's been reconstructed to me. The VP in charge of our particular wing of the company did not want to have to lay off more people than necessary. So what he did is, he took all of the people in the organization, put them in a spreadsheet, sorted by salary, from highest paid to lowest paid, and started crossing names off of the top until he met his money target, which meant that they lost all of their most senior and knowledgeable people in the organization, and Randy and I were among those. So there then followed the usual several months of, "Oh my god, I've been laid off and how do I find another job? Oh, here's some consulting work." I've been fortunate in that my experiences with AMiX and Habitat both are rich lodes of prior art that can be mined by law firms seeking to defend against patent infringement lawsuits. I, as the person who knows about that stuff and has access to that material and can navigate through it, can get to charge those lawyers my extra special consulting rate. That has paid the rent through a number of lean years. But anyway, yeah, I got-- so it was around summer of 2008 that I got hooked up with AJ Redmer, who was another Lucasfilm Games alum, who was being tapped to form WeMade USA, or WeMade North America-- WeMade USA, which was the North American wing of WeMade Entertainment, which is a big Korean online games company. WeMade's CEO had this observation that Korean games companies' track record in North America had been poor, because the game market here is different. The things that the audience wants here are different. So his concept was, well let's just create an organic North American cultural competency, by starting a company in the US that we're not going to staff with Koreans from Korea. AJ was hired to do that, and he hired me as their CTO.

Garcia: Nice. So how did that work out?

Morningstar: That didn't work out great. The reason it didn't work out great is-- and this is something you learn about what things are kind of bubbling under the surface later. It turns out that there was actually, unbeknownst to us, there were five people on the WeMade board. Two of them thought this let's do a native North American subsidiary was a great idea, and two of them thought it was a terrible idea, and were bitterly opposed to it, and one of them was on the fence. The guy who was on the fence sided with the let's do this. That went on for about a year and a half, until he changed his mind, and then it stopped.

Garcia: Sounds like that thing that happens.

Morningstar: That's a thing that happens. There's always forces outside your control. People like to, in Silicon Valley, who've made bazillions of dollars, like to think of themselves as self-made billionaires or whatever, but there's a huge amount of chance and contingency that figures into all of this. Some of the billionaires I've met actually understand this, in their defense. But yeah, this is one of those.

Garcia: Now what was your role at Suddenly Social?

Morningstar: Okay, so Suddenly Social, well, a lot of the startups have had their birth in things that kind of emerged in the course of doing consulting. So with the demise of WeMade, I realized, there was another bit of consulting work that happened in between Yahoo! and WeMade, where I did some work for Microsoft. But that's a separate thing. Back into the consulting market, because that's where you get somebody to pay you a large hourly rate when you can't get very many hours. Ended up, among other things, once again a lot of patent stuff, but doing a bunch of work for Zynga, who at that time were dealing with fraud issues in Zynga Poker. So Randy and I are sort of the reputation engine guys, got brought in to work on that. Fortunately, we were brought in by their legal department, so we were being paid at lawyer rates, which was really great. Then we ended up doing various other things for Zynga in the course of that, and ended up bumping up against various other folks. I had been thinking for quite a while about-- I'd been teaching myself to do mobile app development. I'd gotten an iPhone and started just, well, what's it like to program the iPhone? I realized that with a mobile device that has GPS, you could do games which were embedded in the physical world, and started coming up with a whole bunch of interesting game concepts and ideas for things you could do with that sort of technology. I think the stuff that Niantic did with Ingress and Pokémon Go are kind of primitive, pre-images of what that kind of thing could be. I had a talk with Randy and he got really excited, and I talked with Noah Falstein, who was my former office mate at Lucasfilm-- told you, it's all the same circle of people kind of mixing and matching-- and we started getting all excited and coming up with ideas. Then Rich Mironov, who was a product management guy who I'd worked with at Yahoo! and we had roped in to deal with some product management issues at Zynga, started pushing us to, okay, how would you actually productize this, and start thinking seriously about that? Then another old friend who was a venture capitalist, who was an early investor in Electric Communities, but who was also a big investor in Zynga, so I was seeing him at Zynga, said, "Oh, that's great. We should do that," and we started a company to do this sort of location, geo-based game stuff. Then that company ended up-- I told you, I have this sort of nth generation descendants of the Habitat server that I'd been maintaining. So I had that laying around the kitchen to use as the back end. Somebody noticed that it was like a factor of 100 more capital efficient than the

stuff that Zynga was using for its servers. So it kind of morphed into trying to be a server platform technology company for companies doing the kinds of things that companies like Zynga were doing, and sort of transformed from being a game company to being a platform technology company, which is, it turns out, a terrible business, but that's ultimately what Suddenly Social was about. I would still like to go back and take another run at the geo-based games idea. I think you could take a lot of the data that you get from-- well, you probably can't use Google Maps-- say, Open Street Map, which tells you where all the roads and rivers and buildings and all of that kind of stuff are. Then you could use that to reskin the world as something else. Turn all the roads, all the highways into rivers, that you can't cross and overlay your fantasy world on top of this. I had this idea for, you could build devices that had Bluetooth or Wi-Fi embedded in them that could be artifacts that you could leave around the world and use as game tokens or as objects that represent other things. You can also do virtual objects that only exist in virtual space, because the server knows where those virtual objects are and it knows where you are, so it knows whether you're near one of them. We had this idea of, hey, I can leave landmines on my best friend's front walk. When he walks out to work, his phone will beep because he's been blown up. Anyway, there's all kinds of stuff like that, that you could do with gameplay. I think that whole space is just woefully under explored. Part of it is because interesting spaces are always woefully underexplored, and part of it is because the positional accuracy of GPS until recently has not been that great. Also, it sucks the battery out of your phone.

Garcia: Does that lead us up to Ampersand, I think?

Morningstar: After Suddenly Social, I went to work for PayPal.

Garcia: Oh, that's right, PayPal.

Morningstar: PayPal came about because I needed a job and Doug Crockford, who had worked with us at all these other companies, including at Yahoo!, and then after Yahoo! he went to PayPal. He has the best job in the world. He managed to make this deal with PayPal. I don't know how he did it. He's very up front about this. His deal with PayPal is, he said basically, he does whatever he wants, and they pay him. It's like, wow, that is so awesome. I don't know how you get a deal like that. But anyway, he was working at PayPal, and so he put me in touch with the head of architecture at PayPal. I had all of this experience, redoing large, legacy, crufty systems with lots of problems and issues and stuff like that. So I got hired at PayPal to do that. I spent several years at PayPal doing that.

Garcia: I don't remember if I read it about PayPal, but was that where you worked with a lot of the sort of transactional reputation stuff?

Morningstar: No, no.

Garcia: No? Okay.

Morningstar: No, my work at PayPal initially was just basic system architecture, cloud migration stuff. Then the last couple of years, I was working on their whole build and developer engineering system, which is this massive-- building out a massive distributed system to do decentralized build and test.

Garcia: Oh wow.

Morningstar: I had this cool thing that I developed there, which hopefully will see the light of day someday. Then once again, I probably shouldn't go into the details of how it was I ended up departing PayPal.

Garcia: I understand. A lot of people have that story on PayPal apparently.

Morningstar: Well, when the recorder's off, I can tell you the tale. Corporate politics, basically. Then once again, on the job market, so I ended up at Ampersand, just because I made a Facebook post that said, "Hey, looking for work." Somebody said, "What do you want to do?" and I said, "I want to work on interesting problems." Cory Ondrejka, who I knew from the Virtual World Mafia-- he had been one of the main people at Second Life, back in the early days of Second Life, and he knew Randy and I through that-- had this company called Ampersand. He said, "I have some interesting problems. Come work for me." So I did.

Garcia: So what does Ampersand actually do?

Morningstar: Well, did. They no longer exist. Their business was-- they were attempting to go after the publishing industry. Disrupt is kind of this overused, bad word. They were looking at a lot of the sources of dysfunction in publishing, where you have to think of publishing not as book distribution, which is what Amazon does, but it's this whole ecosystem involving editors and authors and agents and publishing companies and all of that. There's all kinds of things about that that are broken, including the fact that the principal workflow is emailing Word file attachments back and forth. It's just really basic technological stuff. The fact that it's really hard to get good metrics on when somebody reads something, what did they like, what did they pay attention to? Particularly getting feedback from early readers on a work of commercial fiction. Anyway, so they had this whole vision of revamping publishing. It's one of those ideas that I think was not enough baked to make it in the ecosystem at the moment. They had fairly generous first round funding from Andreessen Horowitz, but when it came time to raise a B round, they just couldn't quite get-- they got a number of investors, but they couldn't get a lead to price the round. They ended up deciding to sell the company instead, and they sold it half to Facebook and have to Evernote. That's how I ended up at Evernote, which is where I am now.

Garcia: Oh, there you go. What do you do at Evernote?

Morningstar: I help them re-architect big, bad legacy codebases.

Garcia: Sounds like something you've done before.

Morningstar: Yeah.

Garcia: So that's the basic thing, but a couple of them are more like bigger picture things. When you see a new problem, how do you go about attacking it?

Morningstar: I kind of have a process. I'm not sure-- I guess it's described as wallowing in the problem. I do a lot of stuff, sort of at the analytic stage, which is very inefficient, that forces me to do a lot of stuff manually, that automated processes could probably do more effectively. But this particularly, when I'm dealing with big legacy codebases, you can run all the code through a formatter, but if you edit the code yourself to reformat it, this causes the code to flow through your brain in the process of doing that. There's a lot of basically immersing yourself in the problem space and just accepting the fact that there's just large amounts of stuff that you don't understand, and just going over and over it and over it and over it, and a lot of repetition, a lot of churn, a lot of, I guess, like I said, because I call it wallowing in the problem, where you just kind of surround yourself with all of this stuff and you're just in it. Over time, you start to build a model of what's going on. You start to notice patterns and to accrete things into higher level abstractions, and to build a sense of where you want it to go. That's one kind of problem. That's the problem when you have a big complicated thing that nobody quite understands. There are also problems where what you've got is just a deep, figure out some singular thing, which is hard. I've been very fortunate to be involved in a number of very successful efforts to do that, that I would not attribute any success there necessarily to my own brilliance or skill, but to being in the company of other really smart people. There's a kind of, you get two or three or four or five people with relevant intelligence and a certain kind of mutual regard together around a whiteboard, and just sort of beat the problem to death. There is a, what about this, what about that, poke a hole in this, this very collaborative process. I think the thing I bring to the table there is, I'm very good at spotting, hey, what about this? Also, just at capturing ideas and writing them down. Dean Tribble, another member of the permanent floating startup cloud, has a great line. He said, "Nothing seems so clear as a vague idea you haven't written down yet." I think that's really true, and I'm very much a, I don't know quite what I think until I hear what I say, kind of person. So very often, my way of working through one of these analysis problems is to just write down a spec for a solution, which starts with writing down a description of the problem, and trying to explain it to somebody who isn't already contexted on it, because I'm not contexted on it. So I'm trying to understand these things, so I'm just kind of analyzing it by way of describing it. Then when you're done, what you have is a description of the problem. I like to think I'm a reasonably good writer. Now I have this artifact that I can take around to people, say, "Ooh, what about this?" You get various reactions of, "Oh no, that's wrong." And you fix it," or, "Oh, I never thought about that," and now you've made a connection. Then, as I say, a lot of collaboration. I think all of the best stuff that I've been involved with have been the results of collaboration with other people. I got a real appreciation for division of labor. Phil Salin, the guy who started American Information Exchange, was an economist, was a student of Friedrich Hayek. I think Hayek's stuff is just brilliant and very misunderstood by people with a political or polemical kind of agenda. But the fundamental idea that you get from Hayek is this notion of the distribution of knowledge, that different people know different things. They have different expertise in different sort of local knowledge. This person over here knows one thing. This person over here knows another thing. People know a lot about whatever specific thing that they're doing. What we want to be able to do it, we want to find a way to take all of that dispersed knowledge and bring it to bear. So I've developed a lot of

appreciation for having a team that has a lot of diversity of thought, where different people have different attitudes about the world. Different people have different life experiences that they're bringing to the table. Different people tend to worry about different things, think different kinds of things are important or unimportant, which can be a recipe for conflict. Once again, if you start from a baseline of mutual regard, you don't so much get conflict as you get this thing, people like jazz musicians, riffing off of each other kind of thing going on. Some of the most effective project teams I've been on have been like that.

Garcia: Excellent.

END OF THE INTERVIEW

