John Sack: Organizing the Community of Scholarly Publishing for Over 40 Years

Heather Staines and Tony Alves

From the early days of the World Wide Web, John Sack led HighWire Press from a fledgling technology organization based at Stanford University, to the premier content hosting platform for scientific and academic publishers. John is a scholarly publishing pioneer, innovator, and icon. In this interview, conducted by Heather Staines, Senior Strategy Consultant for Delta Think, John talks about how he became interested in technology via the old-fashioned card catalog, how Silicon Valley luminaries influenced his career path and approach to both organization and innovation, and how HighWire helped transform the scholarly publishing industry from a journal-based economy to an article-based economy. John also touches on how listening to diverse opinions can lead to innovative ideas, what he believes are the best uses for artificial intelligence (AI), and the benefits and drawbacks of remote work. This interview took place on March 30, 2023.

Science Editor: You spent a substantial part of your career connected to Stanford University, but I always wondered, how did you end up there, and what were your early days like at the university?

John Sack: Well, it's probably a 40-year story, but I'll try to make it more compact than that. I was an undergraduate at the University of Virginia in the 70s, and I was in an interesting program that allowed me to put together a mixture of studies in all sorts of areas. The upside was that it was a lot of fun, and I had some great professors, but I didn't look like an English major or a religious studies major. Even though I didn't look like what graduate schools were looking for, I did get into Stanford, and I was really excited to move from the east coast to the west. But when I got to Stanford, I found my interests were different from what was typical for

Heather Staines (https://orcid.org/0000-0003-3876-1182), Senior Strategy Consultant, Delta Think. Edited by Tony Alves (https://orcid. org/0000-0001-7054-1732), SVP, Product Management, HighWire Press.

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a Stanford graduate student in English. Most of them were studying one major author. I was studying how readers read. My advisor eventually figured out that maybe I'd be happier doing something else. And she was right!

I was involved with technology almost from the start of my time at Stanford, which was pretty unusual for a grad student in English. I had to teach the rules of grammar to freshman English students. So, I got involved with computers, using early computer assisted instruction as a way of teaching students the rules of grammar. It turned out the students loved it. I also gave them email accounts, and back in the 1970s, email was a big new thing, and they loved that too. Their generation was ready to adopt technology tools when the PC revolution hit just a few years later.

But maybe even more important for reinforcing my own change in direction, I was doing research in modern poetry as part of my PhD program and went to consult a reference librarian to see if I had found everything there was to find in the card catalog. He turned to a computer terminal, and in 5 minutes he reproduced my 2 days of work flipping through cards in the card catalog. He had found things I had missed,

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and I sorely needed to know what kind of computer program that was. Well, that computer program essentially launched my new career. It was an early database management system built by Stanford that supported natural language processing, so something like an early-stage Google. Coincidentally, this system was the basis for the first preprint database, built for high energy physics (predating and seeding arXiv). So, you might say, my career has come full circle from libraries back to supporting preprints in the sciences. Those are my early days at Stanford, getting into technology pretty quickly, and finding that technology—and particularly its uses in support of scholarship—was a better career path for me than becoming an English professor.

SE: While you were at Stanford, you met some folks who would become mentors to you over the years, and there are some names that people in the technology space will probably recognize. Can you tell us a little bit about some of those folks?

Sack: As a grad student at Stanford, I was formally being mentored by professors to become like them. But even when I left graduate school and became an administrator at Stanford, the same approach to mentorship applied. One of my earliest mentors as a young administrator at Stanford was a fellow named Don Kennedy. People who go back a bit in scholarly publishing will recognize that Don Kennedy later became the editor-in-chief of Science magazine. Before that, he was the provost and then the president at Stanford. One of the ways he conveyed to young administrators how to think about governance at a university was through mentorship: Don had a university "cabinet" with about a dozen of the most senior officers who would meet every week. Don would invite the next level reports of those senior administrators into the cabinet decision making, and into the board of trustees meetings, so that you could see how the university governance sausage was made. That was extraordinary because I got to see what values weighed in governance. To a very great degree, my approach to how to run organizations like HighWire, which exists for the service of scholars—just as Stanford does—came out of learning from Don Kennedy and his leadership cabinet.

I met my other major mentor while I was still a grad student. A grad student invited me to go on a visit to the Stanford Research Institute (SRI), where he was going to meet with a researcher to see how to build databases of text knowledge. In that meeting, I met someone who refocused my life in both business and intellectual terms. This was Doug Engelbart. People familiar with the history of computing will remember that name as a real giant in the history of computer technology. My friend and I went to Doug's lab at SRI, where we saw the first computer mouse. Doug was the inventor of the mouse, but Doug was also the inventor of windowed operating systems for text editing, early hypertext management systems, and early video conferencing. He is legendary for this. If you go to YouTube and look for "MOAD", the "Mother Of All Demos", you will see that in the mid 70s, Doug did a demonstration of networked video conferencing: full motion video with text editing and early hyperlinked documents. It just blew my mind. He made me think, "Oh yeah, I want to spend my time working on this." It was very important for getting me to think about the big uses and the big changes coming in technology. Doug's whole thing was about augmenting human intelligence, using the power of computers, not to just do payroll systems, but to make it possible for people to think bigger and faster.

SE: On the technology end, in those early days, the transmission of information electronically rather than physically was a big deal. Can you tell us a little bit more about how those connections were made in your brain in those early days.

Sack: One of the really exciting things going on in the early days of the PC and Mac revolution was happening at Stanford and MIT. Apple was hugely influential in those early days at Stanford, and I was lucky enough to be in meetings with Steve Jobs occasionally at Stanford. Jobs was essentially Apple's sales rep at Stanford, and Steve Wozniak was Apple's sales rep for MIT. Apple came up with the idea that if you put personal computers into the hands of students, they will become your future wave of adopters as they go out in the workforce. Stanford and MIT had Macs right from the start in 1984. As amazing as the Mac was, what really changed how I thought about the use of technology in research was when Apple introduced the laser printer. It was stunning because you could essentially send files across the Internet in email (the Web wouldn't exist for almost another 20 years!) to a laser writer that could print something out at 300 dpi that was pleasant to read, that was good enough to be compared to what was printed in a scholarly journal and a lot more conveniently accessible. Reading on screen was pretty unpleasant, at that time screens were 100 dpi, so they were just not pleasant to read with for very long. But the laser writer was like a desktop commercial printer. If I had a document I wanted to share with somebody across the country, like a scholarly article, I could just send it to them in email and they could print it out at relatively low cost. This gave rise, in my mind, to what became—with the Web and with HighWire press-the article economy. One article "just in time" on demand, not whole journal issues mailed to you or borrowed from the library.

SE: I want to hear more about how HighWire came about. There's an interesting backstory from your time at Stanford. Maybe you can set the stage for us.

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Sack: It's really one of the biggest coincidences of my career. I was a member of a hiring committee that was to select the next Stanford university librarian. The committee was chaired by Condoleezza Rice, who was provost. I was a member of the Libraries and Information Resources management team, and one of the ideas I had for librarian interviews was to actually engage with the candidates in solving a substantial problem. Take some big problem and work with them in a management team meeting to come up with solutions for that problem, rather than only have them deliver lectures to the audience of staff and faculty. The problem we decided to tackle with the candidates was the "serials crisis," which was a term used a lot in the 80s and 90s to describe what was happening with the prices of scholarly journals. Prices were going up and up and up and exceeding universities' ability to pay. In the team meeting with one particular candidate, Mike Keller, we essentially invented the idea of Stanford's creating a technology focus that could work among multiple scholarly nonprofit publishers to give them the technological organization that would use the new "web browser" tools to advance societies' abilities to communicate science; this was essentially HighWire Press. (We didn't at the time call it HighWire Press, I came up with that name a couple of months later.) After Mike was hired, I was no longer managing the Stanford data center. I became the director for HighWire Press, working for Mike as part of the Stanford Library and got to launch a pretty amazing Stanford intervention in scholarly publishing: essentially building a community of scholarly publishers around a technological focus, giving them the scale that the largest commercial publishers had, amassing the technologies they needed to move forward. This is right at the time that the Web was starting to flourish for the public. The Internet was long established, but this thing called a web browser was still pretty new in 1994 and 1995: You had to explain to people what "WWW" meant. Hard to believe now, but it was not obvious that the Web was the solution, and that articles were what people wanted to read rather than using apps to flip pages in a print-format journal online. We figured that out before others did, and we also put a naturallanguage search engine on the database of articles-this inspiration came from my early Stanford days using Stanfordbuilt natural-language search engines.

SE: We first met via Mike Keller. I found out about SIPX, the Stanford Intellectual Property Exchange, and I think we probably met at a HighWire meeting in those early days. When I think HighWire, I think technology. But when we were getting ready for this interview you said it was the community that was the primary driver. Can you talk about how you saw that community, and how that community had an impact on the day-to-day operations during your time at HighWire? **Sack:** The important thing about HighWire to me, was that it was not just a technological asset owned by Stanford University, it was a collective body of very significant scholarly publishers who happened to share in this technology platform. That was the good news. The bad news is it meant that you had to do a lot of collaborative decision making, which was something that I think I was pretty good at: getting people to gather around and make a decision that they were happy with together. This is something I had learned to do literally since childhood and as a teenager.

My first management position was as assistant manager at a country club when I was 19 or 20 years old. I was supervising staff who were in their 40s, 50s, and 60s. One of the things I learned is how to work with older and more experienced people to get them all to align to a common purpose. I didn't just order them to do something, especially since I was "the pipsqueak". I think management at Stanford University was somewhat similar in that the faculty were the giants in their fields, and you weren't going to tell the faculty what to do. This applied to the technology staff too-there was definitely a libertarian bent in tech in Silicon Valley then (and now). So, I had to gather very smart people, hugely individualistic people, and figure out what their common causes were and how to line everything up. Scholarly publishers are led by the same kind of faculty whom I knew at Stanford, and they had pretty similar ways of working together. Even the administrators at these leading scientific publishers had that same approach to working together. They wanted to work together, but they were also fiercely independent.

Leadership in this type of environment was more like community organizing, and I intuitively applied this kind of model to all my management roles, but especially to HighWire.

SE: You said you were often the littlest kid, so you had to become more of a persuader.

Sack: I grew up in a neighborhood where I was the pipsqueak. I mean, literally every kid was bigger than me; even my older sister was bigger than me. So, I didn't go and pick a fight with somebody. That was just not going to turn out well for me. So that's why I learned other models for getting things done: "community organizing". One of the members of the HighWire senior management team once told me, "John, you turn every problem into a community-organizing problem." I'm not sure if she meant that as a compliment or a complaint!

SE: It's really interesting how each thing you did led organically to the next thing that you were interested in. Your curiosity not only moved you in different directions, but it moved other people into that orbit to go forward and create things.

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Sack: Some people think I'm a smart person. Well, I don't know that I am. What I think I'm good at is talking to a number of people and listening to their best ideas and pulling those ideas together in a way that expresses the aspirational will of a community. I joked with you that maybe I was just version 0.01 of ChatGPT, pulling together ideas from across a very large information space. But if we had a problem to solve at HighWire, what I would do is talk to a lot of smart people; they were the staff if it was a technical problem. If it was a business problem, then I'd get on the phone and talk with the people who were most involved in it. That's where some of the seminal ideas at HighWire came from. The idea of toll-free interjournal links. I didn't come up with that, the publishers did. They had to convince each other that it was not a really dumb idea. "What? Give away my content? Send somebody a link from my article to somebody else's article? Why would I do a thing like that?" But they talked to each other, and they talked each other into it. What I did was facilitate those conversations, and provide technical solutions to the business challenges.

SE: I want to move on to what you're thinking about for the future, in terms of technologies that might change scholarly communications. We would love to hear what kinds of things you are keeping an eye on and why.

Sack: I like the idea of, "what are you keeping an eye on" rather than "what are you predicting will be the next big thing" because technologies have this roller coaster thing of going through a hype cycle of overestimating the shortterm impact while underestimating the long-term impact. I think the whole point of scholarly publishing is to leverage collective intelligence. To make it possible for people to stand on the shoulders of people who have gone before and done experiments and so on. The thing that always interests me is what those technologies are that create the most leverage. Search engines are an obvious candidate, as is the Web itself. It is a large database of text, and it lets us borrow from each other in ways when there's a thread of evidence though hyperlinks.

The thing that is making me think these days about the levers is everything to do with AI. About 3 years ago, HighWire held a workshop for journal editors. Normally, we would work with the journal publishers, but this time we wanted to talk to the editors themselves, along with their publishing executives, about what they wanted from AI and what they did not want from AI. What we heard from them was pretty astute: that they wanted to be in control of outcomes. They didn't want the AI capabilities making decisions for them, but they wanted the AI capabilities to augment their intelligence and leverage their time. In other words, if you will think of AI as augmented intelligence, rather than artificial intelligence, they wanted help with some of the checking that goes on in manuscript review and editing, the stuff that is often being done by postdocs and young faculty who are slogging through some pretty detailed findings. That seemed like a pretty good candidate for AI under the control of those postdocs and faculty. Again, this was a few years ago. But now, the capability for AI to essentially write text and to create images, not just interpret them, seems to be a stunning leap. What you see if you've tried some of the tools is, when it's good, it's very, very good and when it's bad, it's just horrible. The problem is that it's learned from the Web, and we know that the Web is full of a lot of varied stuff. My fantasy is to be able to use a ChatGPT that's been trained on Google Scholar: A very good information base like that could lead to some very high-quality capabilities summarizing experiments and helping people read through large quantities of papers quickly while maintaining a trail of evidence and without leaping across evidentiary chasms.

The other thing that I've been looking at is something I've often labeled as "friction in the workflow". Interviewing scholarly participants, like researchers, to figure out where they're encountering rough spots in using the research literature, and then helping to smooth or eliminate those friction points. Our industry has focused a lot over the last couple of years on the friction point of authentication, in other words, "Here I am at home, how do I authenticate myself to the Stanford Campus Research database?" Without going through 5+ minutes of fussing and having to look up access IDs and VPNs and remember how to do something. I think those technologies are getting much simpler but are still necessary. I'm really proud to have done work in that area with Google Scholar.

SE: We're recording this interview remotely, and I know you've thought a lot about how collaboration tools like Zoom will enable people to work together at great distances, which harkens back to being able to print at great distances as well.

Sack: HighWire has often done researcher interviews. This goes back to some of my training at Stanford in ethnography, where you basically listen creatively to someone describe their world and figure out how their world works for them. (This is a completely different approach from sending out surveys where people would check boxes.) One of the things we did the second year of the pandemic was interview about 25 researchers—most of them early-career researchers—to figure out how they were doing it. Because they couldn't be in their labs, a lot of them switched to writing up papers based on the results that they had when the lab shut down. Pretty predictable, but other things that we saw were how they were adopting tools for collaboration, and how they thought these tools were going to stick once the pandemic ended. Of course,

we thought the pandemic was just about ending at the time; little did we know it had another 2 years to run.

Another of the things we learned was how theoreticians were doing their work: It was often face to face, where they would have a shared whiteboard, and I mean literally a physical whiteboard. One of them would walk into somebody's office and write on that whiteboard with them. How do you support that remotely? Well, Zoom has a whiteboarding feature, but boy is it awkward. Do you know anybody who uses it? I don't. So those kinds of collaboration tools got better and better. I don't know that they're good enough yet. But collaborating remotely took a leap forward.

We are still watching the return-to-the-office debates. I live off the Stanford campus, part of Silicon Valley. Is remote work as good as working in the office? Is it better? Is it worse? For what? For whom? But what about in research-lab situations, where labs that are remote from each other often collaborate. Have the general tools for collaboration taken a leap forward as the nonresearcher economy has forced improvements? Or are research groups inventing their own tools still?

There are certain types of jobs where remote work is really good, but there might be aspects of a particular project where it's really good if the team is actually sitting in a shared physical space, or has some other kind of collaboration tools that let you make sure they're all on the same page. What about early-stage startups? It's really handy to be able to hire anybody from anywhere in the world, but when you've got to solve a problem, how do you get everybody on the same page? It's not just about worker productivity, it's about the future of cities, the future of retail, the future of restaurants. Imagine that changing.