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The following is a transcription of a live presentation at the 2016 Charleston Conference.

Adam Chesler: Good morning, and welcome to the "Who's Faster, a Pirate or a Librarian" session. I'm going to talk a little bit about something that's been, actually it was addressed in just the previous session about Sci-Hub, about the ways people get access to content, the perhaps questionable legality of some of that, but there are reasons why it happens, and we want to try and address some of those things today. We have four speakers, oh, it would be appropriate to tell you who I am. I'm Adam Chesler. I am with the American Institute of Physics Publishing, and I'm here to simply guide us through this. But, our speakers today, and their biographies are available to you, so I'm not going to read them all to you, but the order in which they are speaking is Carolyn Caffrey Gardner, from Cal State University in Dominguez Hills. We have Heather Wilson from Caltech, Georgios Papadopoulos from Atypon, and Scott Ahlberg from Reprints Desk. What we're going to try to do today is look at very broadly some of the legal, practical, financial, and technical issues surrounding access to content and the ways people are trying to address this today as opposed to, as Chuck alluded to, 20 or 30 years ago. So, without further ado, I will let Carolyn get started, and we do expect to leave time for questions, so I'll simply ask that you hold them until the end so that we can cycle through everybody's presentation as best as we can.

Carolyn Caffrey Gardner: So, thank you for having me. Just a little bit about myself, I'm an Information Literacy Coordinator, so I'm really approaching this problem, this issue from the point of view of our users and sort of really like, "Why?" And how can we really look at instruction in ways to really challenge with happening? So, I first got interested in this project when I was on my own personal Twitter timeline, and I noticed that there were these tweets

with the #icanhazpdf. This is just a selection of a few that I saw, and so I was very curious about this and tried to do a little bit more research and try to figure out what is #icanhazpdf? What are these people doing? And found that there wasn't a lot out there, and so I really started exploring it. Within the tweets we noticing all sorts of things like people saying, "I don't have university access." "I can't get this through interlibrary loan." I found this one particular tweet: "I can't find my own paper. I don't have access to my own research." And so I was very curious and kind of exploring what's happening here? What's being requested? And that his continued on into Sci-Hub and LibGen.

So, in terms of resource sharing outside of libraries, there's really sort of two things that are happening. There's peer-to-peer networks like we just saw with #icanhazpdf. It's a one-to-one person exchange. Reddit Scholar has a very robust community. It's got a couple hundred thousand people in it, very similar process. People post a DOI, a link to an article, and an e-mail address. It's posted; they remove their link and their information there. There are closed Facebook groups, and then this is not new. Right? It has been happening through e-mail, photocopying articles for colleagues. There's other peer-to-peer ways. It's a little bit cut off at the bottom but there's also these larger repositories. So, we have got Sci-Hub, LibGen, and Avaxhome. LibGen has been around since around 2007. It's one of the big repositories that powers Sci-Hub. There was a study in 2015, I'm probably pronouncing that name wrong, Cabanac? And he really looked at kind of what is in LibGen and found that for the top three publishers, Elsevier, Wiley, and Springer, that 68% of their content was in LibGen. So, without LibGen, Sci-Hub would not exist.

And then I'm also curious who is using these sites? This is pre-John Bohannon science articles, so I did not have a lot of raw data, but I used Alexa Internet

traffic data to really kind of look at who are visiting these particular sites. So, Sci-Hub since the last time I did this was a year ago, and it has gone up about 19,000 places in global rank, so it is growing in popularity. The United States and Brazil are only now just making the top five countries in terms of use, and they kicked off Russia and Indonesia, but I point this out to show that it's not particularly just a U.S. phenomenon, even those that may be the context from which we are approaching it. And this, of course, does not include mirrors or hard-drive version of Sci-Hub. I was looking at SciHub.bs for this, but there is also a SciHub.cc, .io, different mirrors.

And for LibGen, which powers Sci-Hub, the global rank is significantly higher, and again, the United States and Brazil have moved up kicking out Indonesia and Russia from the top five over the past few years, and I point this out to take a look at Iran in particular there and the rank and country, so it's in the top 1,000 websites for Iran, so kind of let you ponder, "What does that mean?"

In terms of my methods, and my other co-author, Gabriel Gardner, could not be here today, but we really did two things: We archived a bunch of tweets of #icanhazpdf to see what are people requesting? And then, our later project, we surveyed users of these peer-to-peer sites as well as these larger repositories. It was a convenient sample. We're getting people who are using these particular materials. Many of them reached out with us with very long e-mails and voicemails and then also Bohannon's *Science* piece. He was kind enough to give us the raw data as well, so we were able to take a closer look at that.

In terms of who are people using these services, what is being requested? Important there. When it came to Twitter, it was primarily journal articles. One of the things that I found really interesting is there was really no one journal title or one publisher represented. There were 494 unique journal titles within the 674 unique requests that we analyzed, and I thought that was really surprising, so it wasn't something about a particular "big deal" or a particular expensive journal that people didn't have access to. It really was across all disciplines, all publishers. Likewise it wasn't just new content that might be embargoed. Only 30% of the requests were published within the last year, though life sciences, biomedical sciences definitely had a larger percentage. Arts and humanities was a very tiny

sliver, but they are there. Again, in terms of Sci-Hub, the top three publishers downloaded were Elsevier, Springer, and IEEE, again, heavy representation from the sciences.

So, who are the people doing all of this? Within our survey we asked them, "Are you affiliated with a university? Do you have access to journal articles?" And again, surprisingly, only 20% said they were not affiliated in any way with a university. I thought this would be much larger. I'm not sure the 6% who are not affiliated but also not any part of a university what their affiliation status is? Grad students did make up a large portion of who is using these services. When we asked them the frequency with which they use the services, grad students use them more than once a week, and people who used LibGen and Sci-Hub were more likely to use them more often. #icanhazpdf and Reddit Scholar was very much like, "Once a month when I can't get an article," type deal.

We asked them why? What are your motivations for obtaining materials this way? And it was an open-ended question so we then coded the responses based on different themes that we saw. Not surprisingly lack of access was the number one reason why people said that they use the services. There were a lot of people who wrote on our survey, "Why are you asking me this? Of course, I don't have access. That is why I'm using it this way." And speed was another one. There were a lot of comments around interlibrary loan and things being slow, which is one of the reasons we got talking is speed was such a pervasive issue. It wasn't just access. Within that, we saw some comments about user experience, some about cost, and, of course, there were some people who had ideological motives. There was a lot about open science and free science.

Thankfully, this matches up with John Bohannon's survey that he included with his article about Sci-Hub and science, so we're not totally off base with our smaller sample size. Within his large sample size, this is cross-tabulated data on two questions: Have you obtained a pirated journal article through Sci-Hub or other means despite having access to it? And what is the primary reason you use Sci-Hub? So, you can see, among people who have access and people who don't, you've got under no access that is still the primary reason. For people who have access, people who don't, it was their primary motivation. But convenience is in there as well, right?

We then kind of drilled down further. People who said they use interlibrary loan, we asked them why aren't you using interlibrary loan here? What determines whether you obtained materials through interlibrary loan or another means? And you can see some of my favorite responses are here. There was a lot of, "Slow, it takes forever." "Interlibrary loan isn't free at every institution for users." And, you know, the \$5 charge might be too much. I liked the last one. That happens to me all the time too.

We asked them what do you think about potential copyright or terms of service violations within these different peer-to-peer services but also these larger repositories? There are a lot of "don't care," whole pages of "don't care," "don't care." These are some of the more robust responses. In here, when we asked people what they thought about copyright and terms of service, we saw a lot of responses related to ethics and ideology. You know, you can see here this person says, "Data should be free." So, why should we care about this? Well, it's probably not going away. Crowdsourced communities are motivated by these sharing and reciprocity goals. When our data we asked people how often do you post articles? How often do you get articles? And there were very few people who are just leeching off of the system. They really are communities doing both, very similar to file sharing of Napster in days of yore. These systems are decentralized. They're largely pseudonymous, so there is a low likelihood of punishment, though I've gotten in some hot water for saying this previously, they are very easy to use. Sci-Hub has a chatbot. You put in a DOI. You automatically get a PDF right there. There is no click-through. Again, Association of American Publishers, don't write me another letter. I am not advocating the use of the services. However, if you did want to look at the usability, there is open access content within these things as well, so you can look at one of those open access journals. And again, they have multiple mirrors, so not represented within a lot of this data is the fact that folks in Iran and China in particular download and put on external hard drives a lot of the data from LibGen and Sci-Hub.

So, closing thoughts. Again, I'm an instruction librarian, so I think one way to address this problem is greater focus and information literacy instruction, particularly on the information has value part of the framework. So, how do we work to educate users? There were a lot of comments within Twitter about how people losing access to library resources when

they graduated and not fully understanding what that was all about because all this time we as librarians have been saying, "It's free!" And not really putting in the, ". . . while you're here." Or, "It's not really actually free. We are paying it for you." So, we can do a better job there. And then I also think this is a social justice issue as well. It is not a U.S. phenomenon. How do we approach this from a global perspective? References are there, the full study as a preprint and college research library. And again, thanks to my co-author who couldn't be here today. So, without further ado, I'm going to turn it over to Heather.

Heather Wilson: Thanks, Carolyn. That was so interesting. So, I'm Heather Wilson. I'm an acquisitions and electronic resources librarian, so I deal primarily with mostly the linking and technical pieces of this, and really even in my acquisitions role, it's largely a technical role as to how those acquisitions are being accessed. So, I want to talk about some reasons people might be having those access issues that are not financial or they're not maybe even related to whether or not the library has the PDF to begin with. Yeah, because there are a number of reasons people may want to use Sci-Hub. Most of this will probably not be news to this room and just a resonant. So, some of the things that I want to talk about, first, okay, our linking difficulties might be a major reason that people use Sci-Hub. Of course, open URL failures are a big thing. Generally, people working with having their searches optimized and having their searches made as ideal as possible where we are not necessarily doing so and then large and complicated networks. This is like my favorite thing to cite all the time, ever since I learned about it. I think Ken Varnum is probably here at Charleston, but the University of Michigan did a study on their open URL resolver that I found very interesting. They wanted to see how successful that linking was happening, and just to give you an idea they started with, I want to say it was in the hundreds, but they started with a sample where they have self-reporting. They had an option for users to self-report when they ran into an issue very quickly, and then they also picked a sample of articles to use for their own testing and linking. Just to give an idea, this is the direct linking. This is kind of the traditional idea, and you can see the trends over different periods where they measured, and it's pretty much what you would expect, you know around 97%, 94%, barring technical difficulties. But, then they studied it through their open URL resolver, and the numbers came out

significantly different. They found consistently that, yeah, they were only successful linking 63% of the time in the most recent sample. So, that's 40% of articles that are not being linked to through the open URL resolver, and Sci-Hub does not have to deal with this, and so that might be a very good technical reason why somebody might go to a central place.

Another thing is the optimization of searching that can happen at one level. People are used to searches that have been SEO'd, used to searches that have been optimized to make their "one click" experience as good as possible and things like they're focusing on targeting "long-tail" keywords, or as we know them "known item searching," people who search for very specific items, whereas we seem to often be thinking more broadly about concepts. We seem to often be going in a different way. Thinking about improving their "bounce rate" and reducing the number of clicks and keeping people on the page longer, and which sounds like something that we would really be concerned with, and so, yeah, I think the average open URL linking goes through a least three clicks, and I think there is an average of five on some repositories and other types of open access things. And so as a result, yeah, we're certainly not meeting their experience. And the other thing is, of course, large networks. This is the publishing cycle, and every place that has, and you guys are all familiar with this. Every place that has a stop along the way, but it is, of course, important to know that each of these things have different servers, each of these things have different authentication measures. I'm gonna move real fast.

Another reason might be indexing and discovery insufficiencies. There's a lot of stuff that is just not being exposed. At Cal Tech, we are very concerned about hybrid OA, but there's also massive metadata failures, and the knowledge base structures don't always meet the content and the arrangement that it. So, one example, the hybrid OA situation, so one of the problems that we are having is that we may not have access to a journal, or we may not build to subscribe to a journal, but we have researchers who have published open access in that journal, but because we can't list it as one of our holdings, we can't really expose that content, and so that hybrid OA, the open access that is within a journal is very difficult for us to list. Another situation related to that would be like green OA, which doesn't really often have a lot of the structures that are required for open URL. It may not have a DOI. It may not have

a volume issue number, and Sci-Hub is acting as a search engine, and so, therefore, it doesn't have to be concerned with those structures.

A metadata insufficiency, of course. This is another thing I like to quote every chance I get from Kristen Wilson of the GOKb Project at NC State, and the metadata is not always what it should be because there's not really a true caretaker. As she says, "Publishers are in the business of selling content, not metadata." They're working to meet the user experience as well in the end and not necessarily as concerned with getting us all the things that we need to make that linking work, and that is a huge reason that we might have issues that Sci-Hub doesn't necessarily have to worry about. And, of course, knowledge base structures are pretty huge. Right now, I think most people in here have to work with a knowledge base that works at the publisher level. You list your titles under the publisher. You list your articles under that, and there's a certain hierarchy here, but if something doesn't have a publisher yet, such as the case with green OA, or it is a preprint or may not be linked to a title or increasingly a repository items, and there's not a good structure for that in the knowledge base. You kind of have to force it in there.

And then authentication barriers are, of course, the biggest ones that are probably the most common so I will go really fast through these. So, of course, DRM restrictions. We hear it time and time again. You buy the item. You download it properly. You lose it, and you end up a criminal trying to get it back where you downloaded it the first time, and you're a criminal. I think this is probably the most cited XKCD comic ever, but this is a major issue, and, of course, Sci-Hub doesn't have to worry about it that as long as we have PDFs and e-books with limited containers, we imagine that this is gonna be a problem. And then, of course, user privacy ambiguity is something that is rising. I include this graph just to show—this is from a Pew Research Center study on privacy where they asked people the different extent to where they're concerned about their privacy, but I mainly just include it to show there is a rise, a growing trend where people are concerned about their privacy. So, things where people have to create logins, things where people are very aware that they're giving personal information seems to be on the rise, and more over the idea that information has value. So, even people who aren't necessarily concerned about their rights are suddenly aware that they have a

commodity thanks to the global conversation, which I'm thrilled about, but as a result, that is something that becomes less problematic when you have fewer logins and pseudonymous operations. Alright. So, those are my references, and this is me. Thank you.

Georgios Papadopoulos: Hello. My name is Georgios Papadopoulos, and I am the CEO of Atypon. Let me tell you a few things about Atypon. Atypon is a technology company in the business of delivery, of content delivery building the websites and delivering the content for a number of publishers. We serve about 10,000 articles and about 40% of all research content. So, we work exclusively for publishers, and we try to provide them technical solutions to any issues that they have. We don't make any judgment as to the business models or anything else or the social issues. These are between publishers, regulatory authorities, and libraries to solve. We're there just to advise on a technical level.

So, Sci-Hub, of course, has been a big issue for publishers. Many of them don't know some of the other places. They know LibGen and some of the other places where the content is leaking, and, of course, that is a problem for them because it threatens to destroy the whole ecosystem of publishing. From a technology point of view, however, I really want to thank the Pirates in this case. It's been 20 years—I started a company with the first journal that went online, the *Journal of Biological Chemistry*, and really it has been a struggle to make publishers, and I think to some extent librarians, move over from these standards that were established back in '95, the proto-web as I call it, standards which were the ID authentication and a little later, the PDF didn't exist in '95. I think it came out in '97 or '98. I don't remember exactly. And PDF, and it's been a struggle because everybody has really acknowledged all these 20 years that these were actually bad standards. They're not really serving the users well. They don't provide the right user experience; however, nobody wanted to change them. So, this is the way, the reason I actually thank the Pirates because they're forcing the change that the technology companies could not actually force the publishers to do.

So, let's start with the big one: IP authentication. IP authentication, everybody has acknowledged that it doesn't actually identify the institution very well, that it creates problems for the librarians. They always have to update their IPs on over 50 or 100 or

over 200 sites. I don't know how many sites anymore, and, of course, there are all the problems with remote off-campus access or institutions that don't even have stable IPs. All kinds of things are there that you can find once you go into that, and there is really no reason for that. The technology for us to move over from IP authentication and create this frictionless experience that Sci-Hub has where you actually hit a DOI, and there you go to the content that you are—and, of course, Sci-Hub doesn't care about entitlements, but we assume entitled content. For me, as a technologist, the biggest problem is that many, many users actually have access to the content, but they are so confused with all the rules and all the things that they have to do that they actually lose access to the content. So, for me, it is very important that a user logs in on his device once in his lifetime from his institution, and from then on, okay, he logs in without even being asked to any publisher what is his IP, what is his username. He's not handed any tokens, codes, whatever, that he has to put into his device every time he starts a session, and this is something that we've actually demonstrated right now to the publishers, and the project is called I think Universal Researcher Access. And hopefully you're going to see it rolled out in 2017, so, of course, once you don't have IP authentication, there's no more Sci-Hub because Sci-Hub really depends on having IP authenticated access through institutions. Okay?

So, let's go to next one. Since we are in authentication, I thought let's throw passwords into it as well. I mean, okay, I understand that we have used usernames and passwords for a long, long time, and we're getting used to them by now. Of course, we are always hearing in the news about compromised sites, about stolen passwords, about what you don't know, of course, is all the password tracking attempts, fishing that goes on, identity theft and all these things. There's really no reason to have passwords. We can achieve perfect access without any passwords. If any of you have used medium.com, it shows you why passwords are actually not necessary. We don't need them, and if we get rid of passwords, we get rid of all kinds of problems associated with passwords. We don't even need to remember them too, which is a good thing.

Next one, the PDF. That's a big one. Everybody has come to love PDFs. I don't know why. I mean, they're really there to be an electronic equivalent of the print, and in the time that we don't print

anymore, why do we need this? I don't know. It's really—we create this artificial thing where even journals that are not even printed at all—they have PDFs. Amazing! How do they come up? So, and meanwhile they have all these problems, so if you cannot deep link the PDF, try to read the PDF on your smartphone. It's not referable. It's really terrible in terms of user experience, yet I can tell you users 3 to 1 or 4 to 1 use PDF frankly because the HTML that the publishers produce. It's not the HTML; the HTML is good. The HTML pages that the publishers produce have so much crap into them that nobody actually wants to read them. So, anyway, there is a portable format that has been around for a number of years, and it's open standards, and it's called ePub. It solves really all the problems that PDF has. It has all the deep linking, and it's referable, and you can view it in a browser, and it even has an open standard for DRM, so if somebody wants to enforce DRM so that only the people who have access to that ePub can read it, then it's possible to do that. So, of course, once we move from PDF to ePub, guess what goes away? #icanhazpdf goes away. LibGen goes away. All of the other stores where you have unauthorized posting of article, all of these go away. So, it's going to improve the user experience, and it's going to let the publishers and the libraries work out all the business models that they want to have, and that is what the technology can do. Thank you.

Scott Ahlberg: All right. I thought I would start off my section with a haiku. I've worked in a few different information companies, and about 10 or 15 years ago, a company that I was at to try and liven up the workplace decided they would have a haiku contest. And it had to focus on the work we were doing, and this is one of the entrants that kind of stuck in my mind and seems somehow relevant to this current discussion:

Copyright, piracy
Information wants to be free
But no, it is not

As Adam has mentioned in the introduction, we wanted to take a look at this from multiple angles, the challenge of piracy and what it means for what we all do. So, I think there are multiple meanings in this haiku, and I think with the current situation maybe even a couple of new meanings have come in. I attended Carolyn's presentation at ALA in Orlando in July and was really struck by the statistics

that she gave, particularly in the motivations for using Sci-Hub which she gave a few minutes ago and the speed access of it. It's—notice that cost is down there at 13%, whereas speed is at 26%, so I think the question that I would hope that everybody in this room asks himself is how you want your user community accessing the content that is available, that maybe you've already paid for or that you would be willing to find some way to pay for if the use could be granted to them? Now since I've been in the information business for a couple of decades now, I always find it informative to take a look at how other content industries deal with issues that are related to their delivery of their forms of content. So, I often take a look at what's going on with the delivery of video and what are the business models that are in use there, delivery of audio. I think software is different enough that it is maybe not quite as informative, but I think particularly with music delivery, obviously the Internet has brought us all kinds of forms of disruption to all kinds of business models. I think we all know what's happened to the music industry, so I think the lessons that I see in the music industry is that initially with Napster being sort of forefront of disrupting the music industry as we knew it previously. My interpretation is there was a real failure to pay attention to users and what users wanted, and while I think that that's been turned around somewhat very recently, and I think, I'll speak for myself here, as a listener of music, I'm much more satisfied with the options that I have available to me today than I was 10 years ago. I think that there's been lasting damage in the music industry by a failure to pay attention to what users want and need. I think the evolution in the video industry is a little different, and I think that there's been a higher level of success, a higher level of user satisfaction perhaps, and I think less of a lasting damage looking at it from the perspective of the content producers and content owners, less of a lasting damage to the business model.

Now, of course, copyright law underlies a lot of this, and I think again if you go back to the pre-Internet era, copyright law at least in the US was a matter of civil law, but through disruption we've seen changes to that. I think most noticeably the Digital Millennium Copyright Act has criminalized some aspects of copyright law, and that certainly comes into play any time you have DRM on content and then maybe a step or two removed, but the Computer Fraud and Abuse Act is something that

has been looked at as a potential way of addressing copyright infringement if it involves sharing of passwords or breaking what would be viewed as appropriate authentication to access that content.

So, when I started looking at putting this presentation together, my original intent was to give a little bit of an overview of the legal landscape and whether any of the legal challenges that have happened in other content industries might provide any sort of pointers or guidance or foreshadowing, however you want to look at it, to what might happen to the scholarly publishing industry and the user community if piracy continues in the way it has been. Are the users at risk? Are libraries at legal risk? But, not being an attorney, I wasn't prepared to give any sort of a legal analysis here, and I ended up changing my presentation just a little bit after attending the green and gold open access session on I think it was Thursday afternoon. I don't know if Jason Price is in the room? All right. Excellent. Well, I thought I was an excellent session, and I really enjoyed the way Jason presented the overview of open access and piracy and the user experience and what's available and while I don't think that it's—I wouldn't otherwise want to include open access and piracy in the same discussion, I think what really came out from Jason's presentation is that, from a user perspective, it doesn't matter whether it's pirated content or open access content. They just know that they want the content, and the distinction of whether their access is legal or not is often not necessarily known to them, or they don't necessarily care. So, certainly I think one of the differences with accessing scholarly publications, and I think in the last session there was quite a discussion of fair use. I think the fair use aspect makes it a lot less clear

whether the—if we're talking about scholars accessing content, at what point does the fact of whether that content was pirated or not, at what point does it matter? The point is that they want it quick, and they want access, and I don't think—Carolyn makes the point that it's a social justice issue. I don't think it's the intent of anybody to deny access. We just need—there's a business model behind publishing that obviously needs to be supported somehow.

I think one of the other key differences here in looking at the scholarly publishing industry and user community in contrast to music and video, for example, is that with scholarly publishing there is a professional class who is responsible for curating and ensuring access to the content. Well, obviously that doesn't exist in music and video. So, I really appreciated Georgios sort of laying out some of the basic elements of the solution. In the time that I've been looking at this challenge, I don't myself have any—I don't proclaim to know what the solution is to the piracy challenge. I do think, however, that we need to pay attention to the users. I think that was the point that I really got out of Jason's presentation. I think that's the lesson that we can learn from the music industry is that it's essential to pay attention to what users are doing and what users need to do and want to do and what their work habits are and what their workflow is in any solution that we come up with. Otherwise, we're not actually solving anything. And, I think if we fail to do that, the challenge of piracy is an existential threat, not just to the publishing industry but to libraries as we know it because I think that is as we heard both from Heather and Carolyn that users are essentially going around the library in order to get the access, whether it is easier, faster, whatever it may be. Thanks.