Episode 56: Kyle Niemeyer

# KL: Katie Linder

# KN: Kyle NiemeyerKL: You’re listening to “Research in Action”: episode fifty-six.

# [intro music]

# Segment 1:

# KL: Welcome to “Research in Action”, a weekly podcast where you can hear about topics and issues related to research in higher education from experts across a range of disciplines. I’m your host, Dr. Katie Linder, director of research at Oregon State University Ecampus. Along with every episode we post show notes with links to resources mentioned in the episode, a full transcript, and an instructor guide for incorporating the episode into your courses. Check out the show’s website at [ecampus.oregonstate.edu/podcast](http://www.ecampus.oregonstate.edu/podcast) to find all of these resources.

On this episode, I am joined by Dr. Kyle Niemeyer, an assistant professor of mechanical engineering in the School of Mechanical, Industrial, and Manufacturing Engineering at Oregon State University. His research focuses on developing new computational tools to better simulate important physical phenomena, including combustion, turbulence-chemistry interactions, and fluid dynamics. Kyle is also an advocate for open science and reproducibility in computational science. Thanks so much for joining me in the studio today, Kyle.

**KN:** Thank you for having me.

**KL:** So I’m really excited to hear a little bit more about your current research, in part because I really don’t understand it, [*mmhmm*] it’s totally not my area. As our listeners know, I’m trained in the humanities, so . . .

**KN:** Ah, one of those.

**KL:** Yeah, I am one of those. [chuckle] So let’s start there. Let’s, you know, can you tell us a little bit about your current research? What are some of the questions that you’re exploring?

**KN:** So my domain is mechanical engineering, although that doesn’t really help narrow it down very much, cause that’s a pretty broad field. So my specific research activities are kind of interdisciplinary, but centered around computational simulations of fluid flows and combustion. So combustion meaning, well it use to be just what’s going on inside engines, in cars, aircraft, but now it’s moving also more towards fire. I have one project, which we can talk about later, about smoldering combustion and wild fires, things like that, so it’s kind of expanding a little bit, but fluid dynamics and combustion. So fluid flows meaning air, gases, or liquids, those are both comprised of, they’re both fluids. That’s a kind of general term. And then combustion is where you have chemical reactions that are occurring associated with the fluid flow. So the combustion part of things is actually touches on a lot fields, because you’ve got the fluid flow, which is traditionally a mechanical engineering, although some, it’s physics. It’s a lot of applied physics and math, but it also has chemistry, which is somewhat ironic, because I never, when I was in school, I never thought I’d go into anything involving chemistry. But here I am, doing quite a bit of chemistry. So yeah, fluid dynamics and combustion, and I do exclusively simulations on computers. I don’t do any sort of experiments. I leave that to other people who are more comfortable doing hands on stuff. So as a result of that, my students and I do a lot of programming work, either developing new simulation codes or modifying existing ones. We don’t really use anything in the way of commercial, preexisting software. We typically use research codes, because they’re more accurate, more specialized, but yeah. A lot of code development, or analysis, or application of existing research code. So the themes of these realms that my projects are currently looking at is, it’s pretty expensive. Computationally expensive, which means it takes either really expensive, money-wise, equipment, or lots of time to do these kinds of simulations, and that makes it, makes them less useful, because what’s the point of a simulation if it takes you three months to run it? Like somebody who’s, for example, trying to design a cleaner engine for a car. They’re, if it takes them three or four months to run it on their computer, they’re just not going to do it. They’re going to use the wrong answer, or do something else. [*chuckle*s] They’re not going to apply these that we have and research to their actual engineering work, and so a bunch of our projects look at how do we make these faster? How do we reduce the cost so that you can still get the correct answer but in a less amount of time? I’ve recently branched out into more oceanography type fluid dynamics. I have one student working in that direction. It’s kind of fascinating, the actual physics that are occurring are pretty similar to what happens in an engine, actually, even though you think they’re nothing alike. It’s all the same equations, both for . . . so you have reacting flows in engines and fires, you have things that are occurring in the ocean, you have chemistry that’s occurring in the atmosphere. It’s all kind of the same stuff that’s going on, so the same things we learn, the same ways we attack them, we use for all these different fields. So that’s kind of fun.

**KL:** That’s really interesting, and I feel like I kind of understand, so that’s exciting. [laughs] I am going to show a little bit more of my ignorance here, because I’m just curious. You say you’re kind of branching in these different areas, do you find in your kind of work, and I don’t know that you can speak for the discipline as a whole, but are you finding that you kind of wrap up a question and move on to something entirely different? Or is it really kind of like the new question grows out of something that you were already working on and it’s more of a natural transition? Like how does that work?

**KN:** That’s a great question, I think it’s a little bit of both. Some of it – I think that if we had our way, you know, unless we get tired of a problem which can happen, you say “I’m bored” or say “I don’t want to work on it anymore.” I don’t think in a particular direction you ever really completely wrap up a project or you completely, you know this topic is, we’ve investigated fully. It’s done, there’s nothing more to ask, I don’t think that really happens. I think that people either people continue working on it, you know you spend a career focusing on one problem or, I don’t think that happens mainly because of the practical reasons. Like funding, you know you can continue – you could want to keep working on something but you just can’t find anybody to pay you to do it, you can’t convince them that it’s important anymore and so your forced for pragmatic reasons to move onto something else. You might not be able to find a student, or researcher to assist you, or their not interested in it. So I think that you know, for me my, and I’m fairly a junior, this is only my second year in my tenure track position, although I’ve been at Oregon State for…I guess this is my fourth year total and I’m certainly, you know the projects or the problems that I look at have evolved. I’m still kind of in the same themes, I haven’t quite completely wrapped out. For example the thing that I was working on during my PhD, which is reducing the cost of simulations of combustions, we’re not done with that – you know, we made progress but there’s still lots to do. I think what happens is, you know, for a little while you tackle one aspect of it and then you say “okay make some progress here, now this has become less important.” So in this example, if we’re talking about cost, we got a bunch of different things that lead to cost, cost meaning how long it takes to run something. And say you work on one of those, you know legs of the chair for a little while and it brings it down, but you’re still held up by all the other things. And so you work on one for a while, and you’re like “well, this is – I’ve done good here but now I got to go tackle these other things if I want to raise or lower the you know, the height of the chair, I got to go tackle the other legs too.” So that’s certainly what’s happened for me at least in some of these areas. And now on the other hand, I do, I have tried to branch out into completely, not completely new but new topics that are connected based on the underline physics. They’re similar, like this oceanography direction or a new direction with looking at smoldering combustions of more like fires, which is not really the same thing as the kind of combustion burning we think about in engines. Well it really is the same thing in a fundamental level, but the people who look at it the problems are different. So yeah, I think you take what your good at and what interests you and then you kind of look at well that a different problem, that’s kind of interesting to me and I think I could use some of the knowledge that I’ve gained and tackled that. So as your interest – and that’s kind of the benefit of a faculty job, you can do that. You can actually make those explorations that you may be in other position where you wouldn’t be able to. So.

**KL:** So I’m curious and I’m kind of glad that you ended on that point, because as you were talking, I was thinking about you know, you are a junior faculty member. And so I’m curious about as you’re thinking about moving into these new areas, how much does that impact, you know, your exploration of things that are maybe not entirely new? You say that they’re fundamentally the same, but you know, it’s a stretch, kind of shifting your direction a little bit. Does that impact, you know, kind of just thinking about knowing where you are in terms of your career and what you’re willing to take on, risks you’re willing to take as you move into those new areas?

**KN:** Yeah, absolutely. For me, my position may be a little bit different because before I started my tenure track position here I was in a soft money research professor position where most of my salary, I had to bring the money in myself so I was not able at the time to really craft the direction I wanted to go. It was more where can I get funding so I can get myself paid, and actually make a salary through the year and so as a result of that it was more of a shotgun approach, like I’m gonna throw as much out there and see what sticks, and what sticks, that’s the direction I’ll end up going. Now, and because of that right now I have a portfolio of projects that kind of is a little bit diverse. I think as I move forward now I can craft, maybe be a little bit more selective in the directions I want to go. Not completely selective of course, because you still have to, you know, continue to bring in funding and such but now I’m definitely paring down some of those directions that are maybe not my core direction, my core focus. So yeah I think you have to, I mean you have the freedom to move in new directions, but you also have to be realistic about it. You know, is it practical? I’m not an expert in this, maybe some other people are, maybe I should partner with them first, I’m not going to do it on my own. So that’s actually with the oceanography example. I have a partner at another university, we’ve talked about, I can help make a name for myself, get my name on some papers, you know work in that direction so that I have a little bit of credibility before just completely trying to enter that field where there are already people working for example.

**KL:** So I’m also curious, just for some of the graduate students who may be listening to this. I’m interested, so maybe more kind of advanced researchers are interested as well. To what degree is what you’re currently working on now tied to what you did in your dissertation?

**KN:** So I have, that’s a good question, I don’t know, I was trying to think in terms of percentage how much of what I’m doing is still connected. I certainly still have one major project that is tied to that work, it kind of, I guess it almost directly led out of the work in my dissertation. It was kind of, I made some progress there but there’s still work to be done so I actually have an NSF, a National Science Foundation grant to continue working on that that really led out of or was, came out of my PhD. So to that extent, yeah I still am, but in order to be successful as a faculty member, you do have to move into new directions, and in fact when you’re being evaluated for a tenure promotion that’s one of the things they look at is: are you working on the same thing that you were when you got here. That can be a little bit dangerous because your advisor is probably an expert on that area, and if you really haven’t made a name for yourself in your own thing, are you competing with them, are you still working with them, have you really become your own independent researcher? So I don’t think it’s a problem to continue working on those directions if they are good, interesting questions in that direction. You still can but you have to branch out and do your own thing for sure. Mine’s a little bit unique because of my advisor, what I worked on, I had a fellowship that I could be a little bit independent. So I didn’t necessarily work on the things that he was, what were his core activities so I’m not really competing with him now, because it’s still my research, but you do have to branch out a bit.

**KL:** That’s fascinating. Alright we’re going to take a brief break, when we come back we’ll hear more from Kyle about his work with Open Science. Back in a moment.

[*music plays*]

# Segment 2:

**KL:** So Kyle I was very intrigued when I saw your Twitter profile, which we will link in the show notes, that you call yourself an advocate for open science, and so I definitely wanted to really talk with you about that. I’m wondering if you could provide a definition for that term for listeners who might be more unfamiliar with it. So what is open science to you?

**KN:** So, there are probably other people who can speak more eloquently about the formal definitions and I’m sure there are more formal definitions of it. To me, it means that the work that you do and the things that you create through your research are available to anybody else to either access or reproduce or check the work that you’ve done. So to me, there’s kind of three pillars of open science. There’s open access, which means all of the papers that you write, the content, the literature that you create is available for anybody to read. And that’s unfortunately not the norm, or at least hasn’t been for a long time, most scholarly articles are published in journals that are only available through subscriptions, where you have to pay for them somehow. And a lot of times I think academic researchers, this is a bit hidden from them, because they’re at a university, the universities usually have, their libraries have subscriptions to these journals, and so to them, it just looks like everybody has access. And to them, it looks like anyone who needs access should have it through their university library. For the most part that’s probably true, most libraries have, they have to pay for this access and so they do, but there are lots of problems with this, and I guess I’m focusing on this one pillar so I’ll keep going with that. For one thing, and I think this is news to a lot of people who aren’t in academia, we publish these articles for free. We do not get paid for them, there is no sort of royalties or any sort of money transferred to the authors, we produce this content for free, and through our labor, at some point somebody pays for it, somebody pays for our time whether it’s the university or the government or sometimes private companies. But that content is produced and given to these journal publishers for free, and then they sell it. They sell it to us to read, we essentially have to pay for our own content. And on top of that, the work that goes into these, for the most part I’m talking about journals here, the work that goes into them is mostly volunteer, we review each other’s work through peer review, that’s mostly volunteer. Sometimes I think journal editors, who do a bunch of management work for the journals do get paid a nominal amount, but it’s not very much, it’s not a full salary. So it’s essential pure profit for these publishers, and on top of that, people in other parts of the world don’t have access to these. So that’s, there’s a kind of social justice aspect to this, is that people who need this, some of this research, technology, health related, in other parts of the world could be needed, they don’t necessarily have access to it. And on top of that, the cost of accessing these journals has been rising for some reason even though the content is free, so even major university libraries, I think Harvard libraries have been on the news for basically refusing to pay the rising prices for journals. So there’s kind of lots of issues there. So open access is the idea that anything that is produced, especially through public funds, should be available for the public to read. Whether they understand it is another question, but they should at least be able to access it. So that’s one major pillar of open science, another major pillar is open data. So you know, certain fields, some more then others, produce data through their scholarly work, and you can think that the paper that described the analysis or the experiments or the observations that has generated this data is kind of advertising for the data itself, the data is what’s actually useful for this scholarly endeavor. And up until recently, very frequently that data was not made available. The paper was, the advertising was, but the actual result of the work was not actually available. And so there’s major recognition that for this paper to actually be useful for general science research, the data associated with that has to be available. And there’s a similar, I think I mentioned this, the third pillar which for me is a similar one, is open software. So a good portion, if not the majority of modern research, and I use research more than just kind of STEM science and engineering fields, most research these days is done computationally. Even people who run experiments, they use computer programs to calculate their data, to create plots, everyone uses software. I don’t think you could, I think it would be hard to write a paper now and not use software in most fields. And again until fairly recently, this software, which could be the primary product of this research, was not available. People do their work, run the software, put a lot of effort into it and it’s completely invisible and hidden to everyone else, so you just have to trust that the people did this and if you wanted to reproduce that work, you’d have to start over from scratch and do what they did. So the open source aspect of open science is if you do research on software, that software should be available so that somebody else can reproduce the results. It’s another, I think sometimes in the US, all of this is publicly funded work, and it should be publicly accessible, otherwise it’s not as useful to the greater community.

**KL:** So the first time I heard about open science was actually from one of our librarians here at Oregon State, who we’ve done an previous episode with on Research in Action, Steven Van Tuyl, so I will link to that on the show notes in case people want to hear some of his views on open science as well. I’m curious Kyle if you could talk a little bit, I mean I feel like you’ve embedded this in your definition for the term, but why are you an advocate for this phenomenon? Why is it so important to you, and is it sort of discipline specific to what you’re doing, or is it a part of a larger philosophy you have as a researcher and scholar?

**KN:** So there are, to address part of your question, there are discipline specific issues, different disciplines have different traditions, they do things a little bit differently. But I think, at least to me, the philosophy is fairly universal. Where this originally came from for me was actually probably as a graduate student, and when you’re first getting started, a common way that you proceed is you read someone else’s paper and you try to reproduce what they’re doing. You say, this is kind of a model for what we’re doing, our eventual work is going to be different, but we’re going to start with what they did, try to reproduce it, and then change it, modify it, modify the techniques, modify the inputs, whatever it might be. And especially in my case, where I was doing computational work, and I realized I wanted to start with an approach somebody else used and they had generated software that wasn’t available, and I was trying to reproduce it myself, and they hadn’t described it enough in the paper. Because I mean, a paper, a full hundred percent description of the software is the software itself and you can’t use a paper to actually completely describe everything that goes into it, it’s just impossible, that would be, the paper would be the software. And so I got very frustrated, because I found that I didn’t have enough information to reproduce what they had, so I was able to kind of guess and make things up, use my best judgement and kind of get what they got. So we moved on but, because they didn’t provide enough information, I couldn’t fully reproduce that work, and that was very frustrating to me. In fact, I just had a meeting with my students today talking about this issue, and they’re starting new projects, they’re looking at other people’s software and are being very frustrated with the difficult in which it is to use it, to kind of reproduce this work in these other papers, because it’s not described, three’s not enough information that’s given. So for me, it’s actually a very practical motivation which is, I want to be able to do this work, I want my students to be able to do this work without taking a year to reproduce something and have to guess some of the inputs. So that’s where it originally came from, but at this point my main motivation or philosophy, why I care about this so much is that any of the work, most of the work that I do is publicly funded, it comes from the government somehow. And I strongly feel that because of that, the outputs, the information, the tools if tools are generated, all of that should be publicly accessible, anyone should be able to use it. I do not own it, right? I own the creative section of it, that’s my intellectual property or whatever. The actual, somebody else paid for it, the public paid for it so that’s where that comes from for me.

**KL:** So if people are interested in contributing or kind of learning more about the open science movement, what would you recommend, how could they do that?

**KN:** So if you’re, if you are a graduate student, or a researcher, I mean the best thing you can do is start to be more open in your practices. There is a wealth of literature, if you start looking, there’s if you’re on Twitter, there’s this whole Open Science Twitter account, there’s quite a bit of activity there. Mozilla, so the company that owns Firefox, they actually have a good working group and a whole subgroup that promotes Open Science. Particularly open science work, they have a whole open science team there. So there’s quite a bit of material online that you can find, but the best thing you can do is start being open in your practices. You know, when you’re in, sometimes advisors push back against this, because they might see that there are some downsides of being open but if you are writing software, there are places you can make that available and it’s not like somebody can steal it because your name is on it. But if you’re producing work there are websites that you can publish openly these preprints or eprints of your work, there are websites where you can put your data and cite it and then other people can cite it. So I think the best thing to do is just start being more open and start looking at these guides online to how to be more open in some of your work.

**KL:**  Excellent, well we will link to some of that in the show notes, for people who want to follow up. We’re going to take another brief break, when we come back we’ll hear more from Kyle about being a journal editor. Back in a moment.

[*music plays*]

# Segment 3:

**KL:** Kyle I thought it was really fun to see that you’re engaged as a journal editor for several open access journals so we would talk a little bit more about that. I do want to point our listeners back to a couple episodes back with David Brightman talking about being a book editor, because he talks a little about distinguishing that from journal editing. So I was really excited that we could talk about this topic, because it’s one that we haven’t addressed on the show yet. Let’s start with how did you get involved with the role of being a journal editor and if you want to talk a little bit about the kinds of journals you’re involved with, please feel free to share that too.

**KN:** Sure, so to clarify, to clarify I am not a member of any of my domain science journals that I regularly submit my kind of pure research articles to. And I probably, although it would be very prestigious of me to be, I think I’ll wait until perhaps post-tenure, because I think that has an added level of work compared to the responsibilities of the ones I have now. So right now I am, I guess the most kind of traditional role I’m in is an associate editor, or an assistant editor, I can’t remember which, for the journal of Open Research Software. This is fairly unique journal, well it used to be fairly unique I guess it’s not as unique now. But it’s specifically for publishing articles about research software, and so we call them metasoftware papers. So you have a software that’s used for research somehow, and then the articles in this research journal are describing the theory behind or the approach behind designing software, how to use it, examples, things like that. So it’s specifically a journal for publishing about software that you’ve created for research. You will still typically, what you’ve used that software for would go towards maybe a more traditional domain specific journals. So I became involved in that one, honestly through Twitter.

[*laughs*]

The person who is the editor-in-chief of that, I think who founded it, is the head of the Software Sustainability Institute in the UK, Neil Chue Hong. And so I had interacted with him through a couple of conference series, conference events, meetings, and followed him on Twitter and just saw that they, a little while ago, they were getting a bit more volume, were looking for assistant editors in different fields. And so I volunteered to serve in the engineering and fluid dynamics question, also covering things in specific programming languages, Matlab and Python. Fortran I have experience in. So that’s how I got involved in that one, and then just sent my application material and you know, they asked me to sign on. So since then I, you know, workload for that one is fairly low, because it’s not a huge. Even though it’s been increasing in popularities on very high volume journals, so I usually have a couple papers that I’m responsible for editing at one point in time, so I think to somebody not, at least in a science, engineering academic, editing maybe has a different meaning. So I don’t go through and edit in the sense of proofreading or modifying content in the paper. You know, what that means is I look at a paper, I maybe make a judgment. Is this appropriate for the journal? Is this on topic? Is this something, is this in my realm of responsibility at the journal? And then my main responsibilities are finding reviewers, peer reviewers, to look at it. So maybe two or three, some which have reviewed for the journal before, and so are familiar with the specifics, some which are maybe more relevant to the specific software domain that’s been submitted. You know, asking these people, trying to find sometimes it can be hard to find people to review, sometimes it’s not kind of sheparding their reviews when they give me responses. I’ll either look at them, see if they’re ok, or maybe send them back to the authors. So that’s mainly the role of the editor there, is to help through the peer review process. Now there are copy editors who work for the journal, who do the actual maybe proofing, make sure there aren’t any typos, make it look nice and all that. But that’s not one of the editor’s responsibilities. Though for that journal that’s mainly what I do, and so I’ve been doing that for a few months. I forget exactly when I started, but I’ve probably been responsible for maybe a dozen, or a little bit less papers through that journal. The other ones that I’m involved with are, so there’s a newer journal, and it’s different than most journals in that it’s online only, actually a lot of these are online only now. It’s called the Journal of Open Source Software. So we’ve got JORS and JOSS, the new one is JOSS. There’s a lot of Firefly references and Joss Whedon references with that journal. I was involved in the founding of this one. It was originally, the person who started it, with the assistance of a couple people like myself, was the, I forget the specific title, but he was essentially the open source science person at GitHub. So that’s the website where a lot of people do open source, collaborative software development, things like that. So he was the one who started this and was looking for people to help out, and I knew him from a couple different things. So that one is similar to the other journal I mentioned, in that it’s about software, but to the extreme. There actually aren’t papers, there are one page descriptions, one page summaries or abstracts of the software, but the peer review is the software itself, and so we get typically two-ish or more, as needed, reviewers. And this is all done in GitHub, where people review the software itself, the documentation, they make sure it works, it does what it’s supposed to do. You know, if there are tests built into the software, kind of verifying that it works correctly, you know, they check those. You know, if they can check and see if people can contribute if they want to, and then they look at the two paragraph-ish abstract and look at if it’s accurate. And so there’s not actually a paper, but it gives you a journal publication that you can site for that software. So that’s a pretty exciting one. We’ve actually, that one I’ve probably edited more than for the other, more traditional journal, just because it’s gotten quite a bit of attention. So the Journal of Open Source Software, that one’s pretty fun. The other thing that I’m involved in, which is not actually a journal, is called Engineering Archive, or ENGRXIV, and so that is a play off the word archive, which is a website that has been around for maybe two decades now, I forgot when it was started. And it was started in physics, but now it’s kind of expanded to physics, computer science, mathematics, a couple of areas, and it’s an e-print server, where people can publish their work openly, either before or after submitting to another journal. And so that website has been around, it’s quite recognized, but it’s very specific in the topics that it covers, in particular if you do more applied engineering work you probably can’t submit it because the topics aren’t relevant, and they will actually moderate it, remove your paper. And so I was talking about this a couple of months ago with a number of other engineers who are either here at OSU or externally, and we were kind of frustrated because we didn’t have a domain specific destination for our preprints, so we decided to fix that by creating the Engineering Archive. So that’s ENGRXIV.org. The X is actually a Greek chi and so yeah. That one we don’t really do any moderations, I’ve kind of been on the steering committee for that one, just not any editorial work, but that one’s pretty exciting too.

**KL:** That’s very interesting, so we will link to all of these resources in the show notes so people can take a look if they want to learn more. I’m wondering, Kyle, if there’s anything you wish researchers knew about journal editing or journal editors before they submitted their work?

**KN:** So there are a couple things, now that I’ve been on the editorial side, I can appreciate a bit more. When people do not respond to a request to review, it’s extremely frustrating. Now it’s totally fine if you want to respond and say no, because then we can find someone else, but if we send a request and it goes unresponsive, then we wait weeks and weeks and weeks until we finally realize that the person is probably not going to respond and have to find somebody else to send a request to. So I’m all for saying no to reviews, and I have done that myself for certain journals if I was too busy, or if the topic didn’t look like I could give it a fair review, but at least say no. [*chuckle*] At least respond with a no, please find somebody else, quickly, and that will help a lot. And I didn’t appreciate that quite as much before I started that role. The other thing is I think a lot of us take the lion’s share of the reviews, and this year, I guess this is maybe more of, I don’t know if this is my editorial hat or researcher hat, but make sure if it’s a journal that you submit to that you are also agreeing to review occasionally. There’s kind of a rule of thumb given by some people that for every paper you submit, you should be doing at least three or four reviews because that way the system is kept balanced, because usually your papers get three-ish peer reviews when you submit one. So if you’re not doing that number, then you’re not really contributing your fair share. Now on the other extreme, and I think I have done way more reviews than papers I’ve done myself over the last year. So if you’re doing that you’re fine, but at least say no when you’re asked to. That’s the main thing I have to say there.

**KL:** Good advice, and that’s advice I would echo as an associate editor of a journal myself. I agree with all of those things. Kyle, I want to thank you so much for coming on the show, sharing your expertise, telling us a little bit about your work. This has been really fun.

**KN:** Sure thing, thanks a lot for having me.

And thanks so much to our listeners for joining us for this week’s episode or Research in Action. We’ll be back next week with a new episode.

[*outro music*]

Show notes with information regarding topics discussed in each episode, as well as the transcript for each episode, can be found at the *Research in Action* website at [ecampus.oregonstate.edu/podcast](http://www.ecampus.oregonstate.edu/podcast).

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# Bonus Clip #1:

**KL:** In this first bonus clip from episode 56 of the “Research in Action” podcast, Dr. Kyle Niemeyer discusses the perceived drawbacks of open science. Take a listen:

Kyle, I know some people have expressed some concerns about open science and some of the potential drawbacks of, kind of, this new phenomenon. I’m wondering if you can talk a little bit about that. What are some of the drawbacks as you have heard them, or maybe experienced them?

**KN:** Yeah, I would first say that the drawbacks are perceived – they’re not actual drawbacks. So, the common complaint or the common concern people have is if they put their work out there, it’s going to get scooped. Somebody else is going to take it. They’re going to take credit for it and then the person who put it out there will lose their recognition for having done the work. And I think that, it is, that it is such a misconception. It’s actually the opposite of this. If you do not put your work out there, then it makes you more easily scooped. It makes it more easy, you know, while you’re working to get your paper published, or to finalize your work. Somebody else can come in and, and do the work themselves, or somehow steal it. I don’t know how they would I guess, but then, if you haven’t put anything out there, there is no prior credit. You know, no line of work established from you and you’re kind of out of luck. If you do make you work publically accessible, for example, you know, in progress papers on, like, Archive or figshare – or these different websites – that is timestamped and it’s not deletable. So, like, so anybody that tries to steal it, and you’re fighting them for credit, you can point to this and say, “no, I posted to this work there two years ago. It’s clearly existed before anything you’ve talked about.” You have actually established the precedence. Same thing is true for software and data. They all work the same way. So, by actually being more open and using these resources that are out there, you can actually protect yourself from being scooped. You can protect yourself from people making claims of, you know, doing the work that you’ve done. Because it is archival, it is out there. It is timestamped and, and saved and public. So, I think that is a common complaint, but it is actually the opposite. I think it actually protects you. Now I think that there could be, you know, in my view the only - I use quotation marks – drawback is efforts are not necessarily recognized by, you know, university administrations. So if you’re a researcher an you’re, you know, if you make your work available, say, rather than posting an article in a peer reviewed prestigious journal, you make it, you put it on Archive or you put it on figshare, one of these open, sites where it’s not necessarily reviewed and it’s out there. It’s publically available, it’s archived. Um, but, that doesn’t necessarily have the same level of recognition by the community yet and I don’t know if it ever will. I think, and I don’t know that it actually needs to, because we can do both of these things. We can have our prestigious peer review and all these other things that we associate with status, as well being open. So, I think that would be the only drawback is that it’s the efforts that are not necessarily recognized. I actually think it is changing a lot of places, um, you know, I think people are recognizing that this is something that should be done and giving credit to people who do it. So, I actually don’t honestly see any drawbacks. It’s a bit of effort, it takes a little bit effort to be more open and, for example, to do a good job at documenting your code or your data before making it available so that anybody else who grabs it knows what it is. Um, but honestly, we should be doing that anyways because if you look at it, I mean, it’s also future-proofing it yourself. If you, or a student, or somebody else comes back to it a couple of years later. If you’ve done a good job making it publically available, it’s also going to be available to you, and to anybody else that, you know, that you want to share it with. So, yeah, time – time is the only real drawback to me.

**KL:** Well, and what a great way, like you were saying, to publically keep these records for yourself, because when we privately keep them, I’m not sure we’re doing our due diligence it terms of. . .

**KN:** No

**KL:** . . .naming files and keeping records, like, exactly what you’re saying. You come back to it later and you’re like, “what was this?” And you have to sometimes duplicate you work because

**KN:** Absolutely

**KL:** . . . you’re notes are not clear. So this kind of creates a situation in which you have to be held accountable to yourself.

**KN:** Yeah. And I think it saves time in the long run. It might seem like it takes more time up front, but it’s, just like many things, being more organized early on, I think, saves you in the long run.

**KL:** Well thank you for sharing about some of these perceived drawbacks.

You’ve just heard a bonus clip from episode 56 of the “Research in Action” podcast with Dr. Kyle Niemeyer discussing the perceived drawbacks of open science. Thanks for listening.

# Bonus Clip #2:

**KL:** In this second bonus clip of the episode 56 “Research in Action” podcast, Dr. Kyle Niemeyer shares about his podcast. Take a listen:

**KL:** Kyle, I was so excited to find out that you are also a podcaster.

**KN:** I am

**KL:** So, for listeners who might be interested, why don’t you tell us a little bit more about your show.

**KN:** So, um, I should clarify, I am on the show now, but it was not started by me. It was started a number of years ago, um, and the website you can go find out more is gears-tt.com. Um, so, GEARS stands for something like Graduate, Engineering, Academic… it’s kind of a jumble of words. The actual podcast series is *Academic Trax.* So you can find out more if you go to the website. But basically, it’s four, now four, used to be two, um, mechanical engineering junior faculty bantering about different topics related to research, academia, engineering, um, faculty positions, politics that are experienced in these. So, if you’re an aspiring – you know it doesn’t have to be engineering – certainly if you’re an aspiring engineering faculty member, you’re a post-doctorate student it could give you some interesting insight. At least I think it could give you some interesting insight. But, um, it was actually interestingly enough started for, I think when I was still in graduate school. The two that started it: John Ellis and Josh, they’re a couple of years ahead of me, so I was in graduate school, I think, when I first listened to it when I first came across the website and I came across it because they have information about, and advice about, putting together your application packets for faculty positions. So, like, how do you construct the cover letter, how do you put together the research statement, teaching statement, and things like that. So, I actually came across their website way before I ever joined it and the through the powers of Twitter and the internet, I managed to connect with them, one of them that was running it. And, you know, eventually joined it. I think I’ve been on it a couple of months now. I hadn’t done a guest podcast. But, yeah, it’s fun banter about research, academia and engineering.

**KL:** Awesome. Well, we will definitely link to that in the show notes who might want to try it out. Thanks for sharing.

You’ve just hear a bonus clip of the episode 56 “Research in Action” podcast with Dr. Kyle Niemeyer sharing about his podcast. Thanks for listening.

# Bonus Clip #3:

**KL:** In this third bonus clip for episode 56 of the “Research in Action” podcast, Dr. Kyle Niemeyer talks about standardizing data and software citations. Take a listen:

Kyle, one of the things, um, I know you’re involved in is this movement to kind of standardize data citatiaons and software citations and to develop some more standard principles around these things and how they’re used. Can you tell us a little bit more about that?

**KN:** Sure, so, so these, um,, activities and interest are kind of related to open data and open source science, or open source software, but they’re kind of, not necessarily the same thing. They’re maybe complementary to, so, you can have available data and available software and not necessarily cite it correctly. So, the idea behind these efforts, and I’m involve on the software side, is that data and software are primary products of research – just like a paper. And so, it terms of referencing these things, they should be treated as primary research artifacts, rather than, kind of in the past, where they were either not discussed or secondary. And so, I’m involved on the software side. I was part of a working group, I was actually one of the co-chairs of a working group around standardizing principles of software citations. So, you know, we think that software citation should be a thing, so what do we think about it? What should it look like? So, we spent a year, year and a half. And I joined in - I didn’t join in at the beginning – I joined in a little bit later, but um, ended up in a leadership role there, um, and, this group was researchers, librarians, publishers, um, people who run these kind repositories for software online. Things like that. Everybody that can be considered a stakeholder was kind of joining the conversation. I won’t, you know, summarize or discuss the actual principles. There’s a paper, a position paper, *Software Citation Principles*, you can check out. It essentially says software is primary research artifact, it should be treated as such and people should get credit and attribution for the work that they do in creating research software. There’s a same effort, a similar effort for data, and it’s kind of essentially the same thing. Some of the mechanics are a little bit different, but, uh, long story short is if you use software for your research, which most of us do, there’s a good chance that software impacts the answers, right? You use a different piece of software, a different version, it could change the answers. So, if you don’t cite it, then there’s a missing link there if somebody tries to reproduce it.

Also, you know, the engineers and scientists who spend a lot of their time to create the software right now aren’t really getting credit for it. You know, you only really get credit in academia for papers right now, and that leaves out a good chunk of the workforce who are generating data or generating software. So, we’re trying to encourage the citation of software. Not just for reproducibility, and you know, tracing back to history of the work, but also giving credit to people who do that work in the same way you would get credit for writing a paper because, to be honest, writing a piece of software that’s many, many thousands of lines, hundreds of files, it takes a couple years, considerably more, or could be considerably more effort than writing one paper, right? The person who writes the paper gets all of the credit, the research engineer who writes the software probably doesn’t. So, yeah, we’re still working out what exactly it should look like and giving examples, but the principles are, at least right now, if you use software, you should cite it. If it matters to the answer you get. Now, Microsoft Word, for example, you don’t need to cite that, because you know, that doesn’t really matter. If you use Excel, the version of Excel that has statistical calculations, that could matter. That could change your results. Um, I won’t get into using Excel because that’s probably a bad idea for other reasons, but the principle holds. [*laughs]*

**KL:** Well, I definitely thing of software packages like *R*

**KN:** Absolutely.

**KL:** That are constantly being. . .

**KN:** Yeah, they change.

**KL:** Yeah, they’re changing over time and the different kinds of, even like data visualization packages you can use with it, they’re being, they’re in development right now, and definitely have, they’re alive in terms of just constantly being developed. SO, that might be a package that people are more familiar with.

**KN:** Yes.

**KL:** Thank you so much for sharing this. We will make sure to link to the principles in the show notes for people who want to learn a little bit more about it.

You’ve just heard a bonus clip from episode 56 of the “Research in Action” podcast with Dr. Kyle Niemeyer talking about standardizing data and software citations. Thanks for listening.