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MIKE LIVERMORE: Welcome to the *Free Range* podcast. I'm your host, Mike Livermore. This episode is sponsored by the Program on Law, Communities, and the Environment at the University of Virginia School of Law.

For today's episode, we're trying something different. This is the last recording of the first season of *Free Range* and it's also the end of 2022, so I thought I'd try and experiment with a solo podcast. So no guests, just me talking for an hour or so. I'm not sure how much of an audience is going to be for this, but I thought I would give it a go.

So the theory of the podcast is really just to provide me, in some sense, with an opportunity to speak with guests with lots of different backgrounds and perspectives about issues related to the environment and sustainability. It's fun for me. I hope that there's others in the world who enjoy it as well, but it is interesting to consider why this is valuable, why this is a valuable thing to do, if it is a valuable thing to do.

This idea of engaging across disciplinary boundaries. I could have a different podcast in which I talk to other legal scholars, or even more specifically, just to other environmental law scholars. There's plenty of environmental law scholars out there, we have plenty to talk about.

I stick within that disciplinary-- those disciplinary boundaries and have certainly many productive conversations. So why this? Why this alternative approach of talking with economists and philosophers and religious studies professors and natural scientists and folks from all these different fields?

Now it's common to bemoan the intellectual silos that we find ourselves with in the academy, in the university. We do have disciplines and we have departments. And folks will say, well, it's bad to be siloed into these departments, it's bad to be cut off, to have disciplinary boundaries.

That sounds like a bad thing. It sounds like you don't want to be cut off from anybody, and being in a silo doesn't sound particularly beneficial or a great way of opening your mind and spreading your horizons.

So there's that kind of intuitive way of thinking about the interdisciplinary thing and why you might want to engage. But we also need to recognize that there are trade-offs involved. When you engage with folks across disciplinary boundaries, across disciplines, there is the potential for confusion. People don't necessarily have easy ways of talking to each other.

One of the benefits of disciplines and operating within your discipline is that you develop a shared lingo, shared understandings. It's easier to have conversations, there's a background of assumed knowledge that you can work with so you're not starting from scratch in every conversation.

And also, even at a higher level of abstraction, there's just a trade-off between being a generalist versus being a specialist. There's only so many hours in the day. My brain, at least, is keenly aware of the finite nature of the amount of information that I can hold in my head, how much time it takes me to acquire information and to learn new things.

And we just have to make that trade-off. And you can't be a total generalist and be a specialist on absolutely everything. That's just literally impossible. You cannot have knowledge that is maximally broad and maximally deep. You just, given the finite nature of our cognitive resources, you have to make a trade-off between these things.

So nevertheless, I've kind of come to think of myself over time as a scholar who does really engage in interdisciplinary projects of different kinds. So I think it is worth dealing with some of these trade-offs, and as between being a generalist and being a specialist, I tilt more towards having more of a general approach, although I do recognize that comes with trade-offs in terms of my specialist knowledge that I might otherwise have acquired.

It's a little easier for me, given my particular place in the university, at a law school as a legal academic, it's actually a natural fit to engage in some amount of interdisciplinary thinking or to take an interdisciplinary approach to questions.

There's different ways of thinking about law schools. Certainly law schools are professional schools, we prepare lawyers for legal practice and for going out in the world and doing their jobs.

But in terms of how law schools are organized as an intellectual enterprise and for the production of knowledge, what we share, a law faculty these days in the 21st century, isn't so much a way of approaching questions or a discipline, it is more an object of study where what we're all interested in or at least what we are professionally interested in in our scholarship is the law.

But at a law school, again, at least at a US law school at the beginning of the 21st century, although we share that common object of study, that common interest, we take very different methodological disciplinary perspectives on that object of study.

So there are folks here at the University of Virginia Law School who are economists. So they come at the question of law and legal institutions, using the tools, and asking the questions that are common in the economics discipline. So doing data analysis, identifying what the causal factors are that affect judicial decision-making, or identifying how changes in legal regimes affect real-world outcomes.

So those are economists. We have philosophers on the faculty here who think about the law normatively and can consider questions like, what are the underlying normative principles that motivate anti-discrimination law? Or how do we think about retribution in the criminal justice system?

We have political scientists who are interested in applying social science techniques to political institutions, voting, thinking about the role of ideology in legal decision-making and the like. And then even more broadly, you can have anthropologists, sociologists, historians, many different disciplines are engaged in the project of understanding the law historians.

Of course, as a huge one, I should just mention, we have a number of historians at UVA Law as well, and they're taking a different perspective on it, looking at the development of law over time, obviously. The history is embedded in this question of time. But having different methods, not as focused, for example, on collecting data as the economists might be, or different kinds of data, not quantitative data, but going to historical archives, for example.

Or reading the communications between judges and their friends or between different legal actors engaging with different kinds of materials to understand the world-- and different interpretive methods. So the economists are very interested in causal identification and isolating, causal mechanisms, and building and identifying data structures that allow them to do that.

Historians aren't going to be as focused on that. That's just not how the field of history operates. It would be very constraining for historians to be as obsessed with causal inferences economists are these days. And so historians are engaged in a different interpretive task, staying close to their materials, but with a different explanatory motivation.

So in any case, being at a law school is very-- it's very natural for me to have an interdisciplinary orientation. And I've taken that into my own work. I've engaged with folks in the social sciences, with people in philosophy, with people in computer science and natural language processing and lots of different projects.

And so I found it to be really fruitful, but it is, again, not necessarily for everybody, and it's worth considering both why is it worthwhile to engage in interdisciplinary scholarship or to just engage in an interdisciplinary way? And then how to do that? Are there ways that we can do that are more fruitful than others?

And so that's what I thought I would talk a little bit about in this solo episode, are questions around interdisciplinary scholarship, interdisciplinary engagement. Why do we do it? Why is it useful? How can we do it in a way that's productive?

Just as a little note. I'm going to use the word interdisciplinary, but within the field, there's some different lingo that people favor and like for different reasons. So there are terms like transdisciplinary or cross-disciplinary. And I'm just going to use the term interdisciplinary as a catchall for all of these, notwithstanding that might grate on some people.

But just for the sake of simplicity, use the term interdisciplinary to be a higher-level category that these other terms fall into, and really just meaning all of the various ways that people might work with each other engage across traditional disciplinary boundaries. OK.

So maybe to start with, it's worth providing a little bit of a defense of disciplines. Academic disciplines, not a defensive discipline-- self-discipline that might-- self-discipline might be great, but that's what we're talking about here. We're talking about academic discipline.

So why do we have them? And for purposes today, what I'm going to talk a little bit about is not the historical explanation for why we have the disciplines we do or how the current structure of the university came about. That's very interesting for historians of science and historians at the university. No doubt there's lots of interesting work on that.

But what I'm thinking about is more how disciplines-- a functional explanation for disciplines. What value do they have? What role do they play? That's what I'm thinking about when I say why, not historical why, but a functional why. What's the best interpretation if we're going to think of them as having a goal or a purpose.

And I'll just note that there is a relationship between academic disciplines and academic departments that can be a little confusing because economics is both a discipline and a department. Law, I would argue, at least, is a department-- or actually, a school here, but it's not really a discipline properly understood. Or at the very least, there's less people in the law school who are not doing the discipline of law even if there is a discipline of law.

So in any case, there's an overlap between these things, but I'm really-- and I think in the context of thinking about interdisciplinary scholarship or interdisciplinary engagement, we're really not thinking just about, hey, people in different departments and it's just a matter of like walking across the hall to chat with somebody else who happens to just have a different departmental address than you do. That's, in some sense, straightforward. There's nothing overly complicated about that.

Disciplines are more intellectual structures, and as such, they create special-- that boundary between disciplines is more real and meaningful than just simply an arbitrary bureaucratic designation. So that's what I'm focused on.

So one of the reasons-- or one of the defenses that I would offer, a functional defense of disciplines-- and this isn't going to be overly novel, but it's worth getting on the table, is that they help us structure our knowledge production. And so-- and you can see this when you consider what the actual discipline-- what are some classic disciplines.

And one question that we can ask that's relevant here is whether the disciplinary boundaries that we see when we look at the university and we look at academia broadly, whether those, we might say, carve up the world at the joints. Are these just arbitrary? Are just created on a whim, historically contingent separations of people and fields of study? Or do they seem to map onto something important about the world?

Actually, it's not just totally a matter of historical consistency, totally arbitrary. Rather, there actually seems to be some way in which disciplinary boundaries map onto something real about the world. So what are some of the ways that we see the disciplines showing up in the university?

So for example, in the hard sciences, at least, you see disciplines emerging essentially at different scales. One of the ways that you could talk about this is in terms of emergent phenomena. So you maybe start with physics, which is, of course, at the smallest-- smallest scales and the biggest scales. Cosmology obviously is a very large scales. And so you have those extreme scales in physics.

And then you, at least from at the microscale, you move up from the absolute smallest scales of particles and their interactions, and sub-- smaller than particle entities. And you move up and then you get into the field of chemistry, which is operating at a higher physical scale, larger things-- molecules, and you're looking at those interactions.

And then there's a deep question of whether you need-- if you had a full understanding at the more, quote-unquote, "foundational" or smaller scale, would you even need the field of chemistry? Which could just be completely collapsed and subsumed and in the field of physics.

And putting that question aside, we don't really need to get to that, because what we do is, at least with our current understanding of physics and our current ability to model what we do understand about physics, it's a heck of a lot easier to understand what's going on with chemistry by studying chemical reactions in the field of chemistry at the level of chemistry rather than trying to model everything from the ground-up.

And so there's all kinds of value of constructing your models at different scales. And then we can move up again to higher physical scales, thinking in terms of biology or ecological systems. And again, what we do in all of these-- at each of these levels is we add a scale for models, essentially, that we can say, we're going to talk about cells, and we're going to talk about the functioning of cells or the functioning of components of cells, and that's the scale that we're going to talk about in a given field.

And that's really useful. Rather than trying to keep track of every photon and electron in a molecule-- not just a molecule, in a cell, which would be like a huge number. And you're going to run the Schrodinger equation or something to try to understand something about these cellular dynamics or how proteins work or whatever in a particular cell or particular context.

Or you're going to think about viruses and how they interact with cells, it would be so computationally complex to try to run that mapping at every subatomic particle, and so you don't do that. Instead, you construct entirely different models and entirely different scales to understand cells.

And then, of course, if you think about an ecosystem, forget about it. Obviously you're not going to map an ecosystem at the level of particle physics. And so not only are you buying a much simplified version of the world, arguably these models work because they're picking up on real phenomena that just exist at these different scales. You could call them emergent phenomena if we want. Obviously the term "emergent" has there's some different uses of that term. Hard emergence versus soft emergence and the like.

So what I'm talking about here is really soft emergence, where hard emergence is things like-- where it's impossible to understand system-level dynamics based on a lower level subsystem representation, and that there are system-level phenomena that literally can't be modeled or understood. Not necessarily talking about that-- maybe for purposes of today I'm just agnostic about that.

Really, it's just that it is much, much, much easier to model the system at higher scales. This is much less computationally complex, that there are macroscale phenomenon that you can capture and describe and model and predict and understand, don't require the finer-grained representation at some lower scale.

So that seems real. That's the point there. That doesn't seem just like an arbitrary historical contingency or some academic administrator in the Middle Ages made some decision and we're all stuck with it these days. This seems to represent real differences in the world. And of course, the carving line might be, in some sense, arbitrary. Maybe that's a little bit hard to know between, say, what we treat as physics and what we treat as chemistry and what we treat as biology.

And of course, these things shade into each other with the field of biophysics where physicists or people trained in physics, are applying ideas out of their domain to biological systems, and there's organic chemistry, and ideas out of physics like quantum mechanics are totally integrated into the field of chemistry.

So it's not like there's non-porous boundaries or that there's hard boundary, but there is utility in modeling the world at these different scales. There's intellectual utility. There's utility from the perspective of knowledge and complexity, reducing the complexity, computational complexity of your models.

And so that's real. Now again, the actual dividing lines, maybe there's some arbitrariness to that. And so this goes to one possible value of interdisciplinarity engagement, is-- and as much as those boundaries are at least somewhat arbitrary, it's good for them to be porous so that you can have this productive crossover where you can take tools that are developed in one domain and apply them in another domain or you can build models at a mesoscale-- maybe of a microscale and a macroscale and you're interested in the mesoscale.

And given the nature of the world, it may well be that we can select lots and lots and lots and lots of different scales to build our models. And so from an institutional perspective and from an organizational perspective, it might make sense to organize our disciplines in such a way that we have somewhat more fixed lines, but then allow for this engagement. And we could also-- those boundaries could adapt over time as well as our tools get better, as our understanding of the world gets better.

Nevertheless, again, the point here is that those disciplinary boundaries, at least within the hard sciences as I'm describing them, do seem to track something important about our world and how we come to understand our world in a very general way. And of course, we can think about something similar happening within the social behavioral sciences. Modeling individuals, thinking about fields like psychology, cognitive science.

And then we can start to think in terms of smaller aggregates, larger aggregates, we can think feels like social psychology, thinking about how human psychology is embedded in a social environment. Feels like sociology or economics that are modeling big groups in a field like economics, the idea is to abstract away from a lot of the individual variation that happens. Treat people and models as fairly simplified agents.

Again, for modeling purposes, it's a heck of a lot easier to do that rather than try to capture an enormous amount of psychological richness in an economic model, which would essentially make the model unbelievably difficult to compute if we're going to have a million or a billion agents interacting with each other. Very difficult to do. It's not clear what you would buy from that in terms of helping you address the questions that economists are interested in.

So that's within the heart and the social sciences. And again, we have emergent phenomena, we have structuring inquiry at different levels of phenomena that we might be interested in. Then, of course, the other big divide in academic life is between the sciences and humanities. It's actually worth thinking about whether that tracks anything meaningful.

So that's going to be very different, though, if it does, because we're not talking about scales, really, when we talk about the sciences versus the humanities.

And another issue, I think, arises here is that humanities is itself maybe not a wonderful category, or at least not a wonderful category compared to the sciences where there's a fair amount that holds sciences together, even if there's a lot of differences between physics and economics. Like lots and lots of differences, that is true, but there's something that holds them together in a way that the anthropology, history, and philosophy of mind say don't have.

It's not clear what exactly is holding together. So that's a tricky thing about talking about the humanities versus the sciences generally. But in any case, if we think about the humanities, what in the world or in how we come to know about the world are we-- as we break off the humanities disciplines from each other.

It does seem that there's something here, although probably much more related to us and how we come to understand the world than something inherent in the physical world, the same way that scale and phenomena existing at different scales really seems to have some kind of deep underlying reality to it.

Whereas, say, the difference between history and philosophy and why we break those up into two different disciplines is really much more about how we think about the world or how we come to understand the world. But anyway, that's, at least, seems that way to me.

And so-- and even something like philosophy or field like philosophy is really a bunch of different fields. There's philosophy of mind, there's philosophy of language. Those kinds of disciplines, those kinds of folks engaged in that work do very different stuff than people who are engaged in political morality or in ethics, and it's different ways.

And people who engage in metaethics are very different from-- which are questions, of course, about things like, do moral statements have truth? That kind of work is very different from applied ethics where you're asking questions about, say, reproductive technology and the ethics and morality of that.

So in any case, there's a lot of stuff that gets clumped together in the humanities in ways that maybe are not as obviously sensible as we might think some of the organizing that happens in the sciences might be. You have a continental philosophy. People are interested in like Hegel. It's very different from the analytic philosophy that you see in different philosophers that are interested in that stuff.

So in any case, it's interesting. There are ways in which the humanities does sometimes feel like a category. Just lots of stuff gets crammed into it. So maybe that tells us a little something about where the state of the world is with respect to the sciences versus the humanities in the university life.

There's also fields like my own functionally organized along be professional lines like engineering or law or business. Well actually, really, those are very interdisciplinary in a lot of ways. There could be different disciplines brought to bear in those fields, but they're organized for educational reasons, perhaps, although also, to some extent, organized along intellectual lines for knowledge production as well.

Now just another point that's worth considering here is a big at least cultural distinction within different fields is quantitative versus qualitative disciplines. And so that's one way of looking in a rough way at science versus humanities as well is thinking, OK, well the scientific disciplines are the quantitative disciplines and the humanistic disciplines of the qualitative disciplines.

I'm not sure I'm particularly in love with that way of understanding the science-humanities distinction, in part because I'm actually not sure where math goes. Mathematics, I think-- there's a case to be made that mathematics is probably understood as a humanistic discipline rather than a scientific discipline just because the mode of inquiry in mathematics is pure logic and is not really empirical. It's not about making theories and testing them against the data from the world in the way that science is.

So what holds scientific inquiry together, at least in my mind, is exactly that, is just the empirical nature of the project. And it's not clear that mathematics is operating in the same way. And so there are similarities between a field like mathematics and a field like logic which you would have in a philosophy department, or even I think fields like metaethics with theory of mind or philosophy of mind, again, which you would have more in a philosophy department. Now of course, mathematics is very different from history or anthropology, but that's the thing about the humanities, it is pretty diverse.

So these are-- so all of that is just to say that the disciplines that we have, at least in some general sense, do seem to map onto either real features of the world or big ways that we are engaged in the process of producing knowledge and thinking about the world, the difference between, say, historians and philosophers. They're doing very different things.

Now again, there can be borderlands between the two where a historian might be interested in history of philosophy or a philosopher might be interested in historical figures like Locke, of course, or Aristotle, and that's certainly happens and is true. And so there's a lot of philosophers who are very interested in classical philosophy.

But the way that a philosopher approaches Aristotle is very different from the way that a historian is going to approach a figure like Aristotle to the extent they care about a figure like Aristotle, but we're more-- let's just take a more recent group like the American Pragmatists, John Dewey or William James.

A historian is interested in the turn of the century or early 20th century philosophy. Philosophers are really going to be looking at those philosophies that's embedded in their cultural context and how they're talking to each other and maybe you want to read the letters, and that's just a different methodology than a philosopher who's going to really maybe look at the letters, but again, they're not trying to understand how these people are relating to each other on a personal level or that kind of thing.

For the most part, what they're interested in is their distilled ideas, you might say. They're trying to distill out their ideas and then evaluate them according to principles of reasoning and logic and that kind of thing. It's just a very different exercise.

So when I think about disciplines and all that haven't been said, when I think about disciplines as ways of structuring inquiry-- and this is, again, all in the service of a defense of disciplines as-- at least as a starting place, is that there are some things that matter that help us organize our inquiries.

And some of these things that matter are the object of study. What are we studying? We're interested in the law. We're interested in cells. We're interested in market interactions and commerce. Whatever it is, we have some things that we're studying. Or we're interested in ethics. We're interested in classical Greece and what happened in classical Greece. We're interested in the Reimann Conjecture. These are things that organize that we're going to spend our time thinking about. So those are objects of study.

And then there are questions that we're going to ask about the object of study. So I'll just take law as an example because I'm familiar with the area. So we can ask things like, are the decisions of the US Supreme Court on free speech justified on the basis of prior decision-making?

That would-- prior judicial opinions. That would be a very legal doctrinal approach. And to the extent that there is a method to law and legal analysis, you can answer that question internal to law, just the norms of how one does legal analysis. Or we can ask a question like, how has the change in presidents or change in politics affected the Court's jurisprudence? Be more of a social science or historical kind of question.

Or we could ask, is the Court's-- or the way that we've structured speech protections in the United States consistent with a good society or with democratic norms or with norms of personal liberty or whatever. That would be your philosophical normative way of asking these questions.

So we can have an object of study and we can have different questions that we might ask, and then we have methods for addressing those questions. How do people-- and how do we, actually once we've asked the question, is the free speech jurisprudence of the court consistent with a liberal democracy or with-- you can see a human flourishing generally. That's very general, but it exists with human well-being. Does it maximize aggregate welfare? That'd be another way to ask that question within a consequentialist moral framework.

And so then, again, we can have ways of answering those questions, or if we're going to ask a social science question, how has the Court's free speech affected, say, religiosity, let's just say. Let's just imagine that we could study something. It's very hard to study that stuff, but you can ask that question.

And you would-- as a social scientist, you would, at least in principle, have a sense of how you might try to get at the answer to that question. Maybe somehow you could, let's just say, hypothetically you had-- instead of the Supreme Court's jurisprudence, that's really hard to study, you could study state-level jurisprudence. And some states adopt different free speech norms than others or maybe it happens in different circuits at different times.

And then you can-- it's random. Maybe-- because judges are assigned randomly to panels. And so you could try to look at differences in how the judges are assigned to cases, then that's a little bit of a randomized process, and then you use that randomization just the same way you do in a randomized controlled trial for like a drug or a vaccine or something like that, when you have a randomized treatment here, some specific decision on First Amendment rights, and then you say, OK, there's treated group and an untreated group, and then try to look at differences and some outcome that you're interested in like religiosity.

Now that isn't like a study that anybody would actually do. It would be too complicated and way unlikely to find effects. But in principle, you can ask the question and you would have a method to get an answer. They had different types of methods, probably more than one, actually. And so these are things that help us structure inquiry. We have an object of study, we have questions that we want to ask, and we have methods for addressing those questions.

And when I think of the value of disciplines, what you're really accomplishing is you're creating collections of people that share things like objects of studies, questions, and methods, and that promotes the progressive production of knowledge over time. People start to frame questions together, they refine those questions so they make more sense, we can agree on how we might approach those questions, we can build the kinds of data that we need or the infrastructure that we might need if we're historians.

Then the infrastructure includes things like archives. If we're economists, the infrastructure includes things like data sets that we use. And there's also intellectual infrastructure around things like in-- again, in economics, inferential models or parameter estimators, whereas in history, the intellectual pieces are like how you-- interpretive methods, the appropriate time scales, what you can and can't infer from different kinds of historical sources.

And so we build the physical infrastructure, we build the intellectual infrastructure that allows us to actually answer the questions that we've generated in the field, refine, generate more questions, and progressively produce knowledge over time. So this is all a big, long defense of disciplines as a setup, essentially, to talk about the value and what I find attractive of interdisciplinary study and why I engage in it and why this podcast is, in a way, devoted to the practice of engaging in an interdisciplinary conversation.

So let's move on to that. What is the value? And I think there's practical-level value and then there's a higher meta-value. So the practical perspective we can think of overlaps and lacunas. So overlaps where fields are looking at the same thing, maybe through slightly different lenses, and then there's going to be areas that are missed by fields.

An interdisciplinary engagement can help with both of those. So I mentioned earlier, just in the context of chemistry and physics and biology, really classic ways of carving up the world, there's really, the world is a continuum. There's different scales and different levels where we can observe phenomenon.

And so-- and any given boundary might be arbitrary. And so there might be a missing zone in between fields where it's actually useful to model things at that scale. And so that just-- if there is a gap like that, then it's only going to be through interdisciplinary engagement that you going to identify that gap and then maybe engage in productive knowledge production in that gap.

And so just to give some example-- and then there can also be overlaps where you have an-- you're interested in something, but your field only takes a part of the picture and you really need to build a group of people that have a different lens or a different knowledge base or expertise in order to have a more complete picture of the phenomena that you're interested in.

So an example might be an economist who's modeling fisheries. Maybe the economist is interested in how people respond to changes in property rights regimes and there's some different fisheries and there's been changes in property rights regimes in those fisheries over time, and so that creates a nice context for the economist to study these changes.

But at the same time, it might be helpful for the economist to know something or to at least have a team of people who know something about fish if you're studying fisheries, or ecology. Or maybe these property rights and their changes aren't super straightforward, and so you need people with an expertise in property rights or the relevant regulations in order to understand the consequences of some legal changes that happened over time.

And so in order to get at your question that might be of interest within the domain of economics, you have to-- it might be helpful, at least, for the economists to work with folks from these relevant fields. Now in this hypo, in this setup, it's not clear that the people from the other disciplines get much out of it. If we're interested in how changes in property rights affect something like bargaining or collaborative behavior or something like that, if you privatize rights, does that mean that shared norms are degraded or something like that?

People are less likely to just offer a helping hand if they have a more well-defined property rights-- who knows? Whatever the theory is that could exist within economics. But that's not something that's interesting to ecologists or someone who's an expert in fish biology. Even though you might need those expertises for the project, it's not like the paper's are going to get published in an ecology paper-- in an ecology journal. It's going to get published in an economics journal because you're asking a primarily economics question.

So this is one value of interdisciplinary research, is to combine these different expertises, but it's a challenge because the questions that you're asking might not actually be of interest to people in all the different fields. It might just be that you need to draw expertise from some fields in order to ask-- to address questions, rather, in a given field.

So that's a challenge. It's both a value of interdisciplinary-- so it's a really obvious one, obvious case for why an interdisciplinary approach might be useful, but it's also one where you can see, putting those teams together can actually be quite a challenge because what's the reward for the ecologist or the biologist or for the legal expert? I mean, they can get paid, I guess, but they're not being rewarded in the currency of their fields, which is they're not producing knowledge that's seen as valuable in their domains.

So that's tricky. It's a tricky thing to develop collaborations like that when the rewards are concentrated amongst some of the players, but not everybody. That having been said, with the same project, you could, in principle, if it was the right project, it could be of interest to people in all of the fields, like maybe the ecologist is also interested in the effects of fishery practices on some of these ecosystems, either the fish themselves or their prey or whatever.

And so the change in property rights then leads to a downstream change in the behavior of the fishing communities, which then further has an effect on the ecology of the relevant-- in the relevant areas. And so the ecologists could, in principle, get something out of their research that she could then publish in an ecology journal.

But that requires a very, very special-- it's like lightning in a bottle kind of project where the team that you pulled together, there are rewards that operate for each of the components, everybody that's in there. Like our legal expert could then write a paper that's about those legal changes or whatever.

So that's very difficult, and this is actually, I think, a pretty substantial challenge to interdisciplinary collaboration, is identifying projects that have these kind of mutual rewards.

It's also not clear that we need to, and it's maybe a problem that we need to have these mutual awards. Like maybe the incentive structure could just operate a little bit differently so that if you're an ecologist and you work on a paper that's published in a major economics journal or you're an economist that works on a paper that's published in a major life sciences journal, that is seen as a good thing in your field, and it's not clear that we're there yet.

I think that-- in part because it's just hard to evaluate. Like how do you know? And what was the economist's contribution? Was it just-- again, so there's a reason why it's not evaluated as much, because here with our little toy example, the economists might be-- there might be something really interesting in this context to learn about how people respond to changes in property rights, and there might not be anything interesting to learn from an ecology perspective.

It might just be that having an ecologist on the team is useful and maybe even vital for the production of this economics knowledge, but the level of ecologists that you have isn't-- doesn't have to be. It could be someone with an undergraduate in ecology or a basic understanding of ecology. It doesn't have to be like a brilliant research scholar, because in a sense, they're not doing ecology research.

But again, that's tricky because a lot of times you're trying to work with graduate students, and if an ecology graduate student is going to be on this project, that graduate student is going to want to see an ecology paper. And if that ecology graduate student is then on the job market looking for a job and is being evaluated and their name is on an economics paper, that's not going to count for very much and maybe it shouldn't count for very much because it doesn't communicate their ability to actually carry out ecology research.

So this is just to say, it's actually very tricky. I mean, we can bemoan the incentive structure that exists and say, oh, it's bad for interdisciplinary collaboration, but there are reasons why some of these things are the way they are.

OK. So then, OK, just even kind of make this slightly more complicated, we could say, what about a historian? Can we bring in a historian into our research team?

And sometimes there are actually real incentives to that kind of thing, like the NSF, if you're writing a grant or whoever you're writing a grant to, if you put a historian on the team and then you can say, oh, this is super interdisciplinary, look at how great this is, there's at least some areas of the NSF where that kind of thing would be really favorably-- might, anyway-- lead to a more favorable disposition towards your grant.

But then the question is like, what's your historian doing? Now it could be that your historian is offering value to the project and there could be something really, really interesting in a broader engagement with the history. Of course, if they ask who this historian is and what his or her expertise is, but maybe the person knows about the fishing communities that you're studying and knows about how they came to have the property rights.

What arrangements did they do? Knows about stories of displacement for how the communities that are there displaced others or how the people that were there fled from other-- due to other kind of historical contingencies. Just the whole contingent nature of the system, that it's endogenous in some way to lots and lots of other features of the world.

And that can be very interesting, but it's also very, very different. It's not clear how it interacts with the purposes of our imagined project, which, at least at its initiation, was about coming to a more abstract understanding of the interaction of, say, property rights and some kind of behaviors, say, collaborative behavior.

If that's what is the motivating force behind the project, then it could very well be that all of this historical information is besides the point of this particular project, which doesn't mean it's not interesting, doesn't mean it's not worth knowing, doesn't mean it's not worth the history-- a historical research on those questions, but it's not clear what you get out of the aggregation of these projects.

There's also other difficulties like the time scales involved. A historian who's interested in questions about some set of fishing communities, for example, is going to be publishing an entirely different way. Maybe it would be part of a broader book project on coastal-- Americans living in the whatever, the early 20th century.

And so given that the publication timelines and the length of the projects and all of that creates complications for people interacting with each other and trying to build a collaborative research team.

So in any case, this is just to say that the little hypo is an illustration of both the potential value of interdisciplinary collaborations, why it's almost necessary in some cases to draw expertise from different areas to get at a research question, but also the difficulty of doing it and some of the challenges.

There are lots of other areas that you could think of-- I mean, tons. Just an extraordinarily large number of areas where interdisciplinary collaborations are being done or could be done. Just to give another example where-- just so I don't create the impression that humanities and sciences can't work together, humanists and scientists in a productive way, a bunch of research was done on deliberation by folks in the behavioral sciences that was motivated in part by work that was being done in political morality, political theory on in the field of deliberative democracy.

So there was a whole flourishing of literature on normative theories of democracy in the '90s in particular dealing with-- or arguing in favor of a deliberative model of democracy, sometimes civic republican model of democracy, basically the idea is that prior to that we had a very thin conception of democracy that was really about voting and aggregating preferences, and actually, a thicker conception of democracy would involve how we come to our preferences and how we come to hold the views that we hold about how best to live together in society.

And so we should fold in our notion of that preference formation, deliberation, public discourse process into our theory of democracy. And out of that, in part out of that are motivated certainly by that line of work and writing in political morality, political philosophy, social scientists became more interested in questions about how groups deliberate with each other. And research teams, collaborations between philosophers and political theorists and social scientists, political scientists, social psychologists and the like, there's a whole research field emerge on this question of deliberation and group deliberation and group dynamics.

The outputs of which were actually really deflating for deliberative democracy as a theory because it basically turns out, when people deliberate, they tend to polarize or their views become more extreme-- if they're with members of the same group, they become more extreme.

Deliberation and participation seem to be at loggerheads with each other, whereas the more people are exposed to ideas that are different from theirs, the less likely that they are to want to engage in politics. And so it's like the people who get engaged are the ones who are in their bubbles and never have to engage with people who have different views of them and then they get really polarized and motivated to engage in politics.

So there's this trade-off between deliberation of the kind that we would want, which would involve engagement with people who have different political views than you do and participation. So in any case, it's a tricky story, and again, it was a little deflationary for some of the most enthusiastic proponents of deliberative democracy as a normative model, but nevertheless, very useful and a really nice example of humanities collaboration that was interesting for both.

It was interesting for the humanists because this political morality, in part, had an empirical component to it about what would happen in the world when people deliberate? That was definitely part of what motivated the whole movement towards deliberative democracy was some theories at least or some hypotheses about what would happen when people deliberate and how they would-- I mean, broadly, the hope would be that they would come to a better understanding of each other's views, it would actually be reducing of tensions and that kind of thing.

And then you have the empirical question of whether that's actually true, and fields-- social behavioral scientists folks in those domains can help answer some of those questions.

And so it's super productive from both the philosophical discourse and just within the behavioral social sciences where the question about group dynamics and deliberation was really motivated out of the humanities and the ethical and moral arguments being made there. So provided them with a set of questions, and there was an empirical component to it, and then they could use their tools on it. So that was a really interesting example of interdisciplinary collaboration.

OK. So I'm going to wrap up because it's been-- if you're still with me at this point, I appreciate you-- your sustained concentration and willingness to stick with us through this conversation. I'm just going to end with some thoughts both on what helps make interdisciplinary collaboration work and some final comments on what I think some motivations for it are, besides the practical ones that I've been talking about a little bit.

So in terms of things that work, obviously-- maybe I'm not going to dwell too much on this. Obviously things like respect for each other's disciplines and taking the time to actually understand what motivates people. I think that the framework of understanding at least at a high level of generality in another field, what is the object of study that they're interested in? What are some of the questions that motivate them?

How do they go about answering those questions? And really, having a sense of that for the different disciplines that you're interacting with can be very helpful and can help frame interdisciplinary projects so that they're successful.

Knowing the difference between normative and empirical questions, knowing that either the empirical predicates to your normative inquiries if you're in a normative discipline or the normative predicates to your empirical inquiries if you're an empirical discipline is something, again, that can be really helpful and can help open up areas for cross-disciplinary collaboration.

The final thing I'll just-- point I wanted to make is that one of the motivations for me personally, and I think for others who are engaged an interdisciplinary engagement of various kinds, is just it helps to facilitate the understanding and appreciation of the incredible accomplishment of people engaged in intellectual life and scientific inquiry and humanistic inquiry and philosophy and history and in the hard sciences in the social sciences.

That this is just an incredible collective project that has had just huge successes, an enormous amount of collective effort has gone into it, and it's something that is really-- it's a marvel and it's wondrous. And having-- just being interested in that and wanting to appreciate it is something that I think drives a lot of interdisciplinary engagement.

One of the ways I think about this is almost like an aesthetic of knowledge, the same way that we might appreciate art or we might appreciate nature or we might appreciate human accomplishments in other domains like, I don't know, sports or technology or other domains of culture, music, we can also appreciate the accomplishments of science and mathematics and philosophy and all of the different intellectual disciplines that are engaged in knowledge production.

And to have that aesthetic, to be able to engage in that appreciation, we need to understand what the questions are, why they're hard to answer, why they're interesting, and why answering them or getting at them is such an incredible accomplishment. And when you have that underlying knowledge, that provides you with a capacity to engage in this aesthetic appreciation of just really marveling at that tremendous collective accomplishment.

And it's just really-- just adds to our experience of the world. The reality is, life is difficult. I'm not sure it's more difficult now than it was in the past, but there's-- the first noble truth of Buddhism is, life is suffering. And that idea has been with us for thousands of years and there's still some truth to that or at least arguably today.

But that doesn't mean that we can't see what is beautiful around us, and that's the nature of aesthetic appreciation. And there's some way in which we can all be part of the human project of curiosity and learning. And we just have that capacity when we come into the world, and part of the urge to interdisciplinary engagement, I think, stems from this natural and innate way of being in the world that we can cultivate in ourselves.

Even if the motivation isn't necessarily to produce knowledge or engage in some project ourselves, but is simply, and importantly, so that we can appreciate the contributions of others, and again, this tremendous collective intellectual project.

So at a very high level abstraction, that's the goal. *Free Range's*, too. It's provided me with an opportunity to cultivate that understanding. It's to provide others with an opportunity as well. It's been a fun first season, I look forward to other seasons in the future.

[MUSIC PLAYING]