Barefoot Innovation Podcast: David Rushing Dewhurst, Program manager, Defense Advanced Research Projects Agency (DARPA)

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Jo Ann Barefoot:	00:03	I have really been looking forward to today's show, because my guest is David Dewhurst, who is program manager at DARPA, leading the Anticipatory and Adaptive Anti-Money Laundering program, or A3ML. Dave, welcome. I'm so glad to have you on the show.
David Dewhurst:	00:22	Really great to be here. Thanks so much for having me.
Jo Ann Barefoot:	00:25	You are doing incredibly important work, I think of it as game-changing work, on the whole way we're attacking the money laundering problem. You have an amazing perspective on it, so we're going to talk about what you're doing and how you're going about it and why it's going to make the world better. But before we launch into that, I want to ask you first to tell us a little bit about yourself. What's your background?
David Dewhurst:	00:55	Yeah, sure. Thanks, Jo Ann. Well, I'm a program manager here at DARPA, the Defense Advanced Research Projects Agency. So the role of DARPA in the US federal government in the Department of Defense is to create and prevent strategic surprise for American national security. The program manager's job at DARPA is unique in the government, and to the extent that DARPA is a unique organization, unique in the world, the job of a program manager is to come up with radically new ideas, see them into reality, and transition technology, ideas, prototypes that come out of those programs into service with the warfighter, with the intelligence community, and in the private sector. So my background, I'm a statistician and economist. I got into this line of work somewhat accidentally. I care about national security a lot, I care about financial markets, I care about payments and capital flows, and so one eventually arrives at things like supply chains and like anti-money laundering, as the case may be, and here I am.
Jo Ann Barefoot:	02:02	That's fantastic. Part of what has struck me about what you're doing is that you're attacking the global problem of money laundering in the spirit of actually solving it, which, frankly, as someone who's been a regulator and worked in and around the regulatory world for decades, we don't often frame work in quite that way. People push against problems and improve them

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and chip away at them, but you're saying, "We need a whole new way of thinking," and that there's an opportunity to really, really change the game. To set the stage on that, talk to us a little bit about the threat presented today by money laundering and the related fraud and scam landscape.

David Dewhurst: 03:03 Yeah, that's a great question, Jo Ann, and I think it's useful to take a step back and examine each of those words that you just said, or each of those phrases you just said. So you distinguished money laundering and fraud and scams, and in other environments, we might say illicit financial activities. At the end of the day, what all of these have in common is transferring value that's gotten in some bad way, whether it's technically illegal or not, it could be legal in one country, but that country is one of America's adversaries, and so it runs counter to America's national security, that's illicit finance, according to me, according to the Department of Defense. It's all about taking value from one place and moving it into another place without losing too much of that value along the way.

03:51 The challenge that we have is that today, this explosion of innovation in financial technology and in associated technologies, the ability to start companies really quickly, the ability to change online personas really quickly, all of these capabilities mean that the transaction costs of moving value from one place to another is drastically lower than it used to be. Now, that's really great for your median-income person in the United States, that's fantastic for low-income people around the world, but it's also fantastic for people that want to move illicit value around. And so, when we think about reducing the harm to America's national security, we need to think about increasing that transaction cost for those who wish to do America harm, while not increasing those transaction costs for ordinary people just trying to go about their lives.

04:45 So the threat to America here is one of those very important threats, because it's not usually in your face, but it's pervasive. So a good example, and this was reported in the news and by the White House way back in, I think, 2022, is that North Korea funds over half of their nuclear program from laundered funds.

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		Now, the headline is North Korea goes and steals a bunch of cryptocurrency to fund their nuclear program, the White House has issued statements about this, that's been reported on CNN. Well, okay, but I don't go and buy uranium with cryptocurrency, at least I don't know how to do that. I have to go and take that cryptocurrency, turn it into fiat currency, things like dollars and euros and Swiss francs and what have you, that I can then go and use to purchase material for a nuclear program. So money laundering is underpinning that.
	05:47	I'll be a little bit light on detail, but there are numerous other cases. There's all sorts of publicly reported information about the nexus between, for example, Mexican cartels importing fentanyl into the United States and who is providing the money laundering services for them. There is lots of publicly reported information about China-based money launderers providing those services for the cartels, again, that are importing fentanyl that are killing millions of Americans. Lots of other examples, many of which I can't get into, but are extraordinarily serious threats to America's national security.
Jo Ann Barefoot:	06:25	Yeah. And you're touching on one of the points that I think is so crucial today, that we've tended to silo the anti-money laundering world, which has its own set of legal frameworks and requirements and regulations and procedures and reporting and so on, away from payments fraud, and there are also distinctions on scams that are not payments fraud and are not hitting the banking industry in the same way that a typical fraud is, and then other forms of corruption as well.
	07:04	Financial crimes in the past have been dealt with very much through siloed types of solutions, and also, different people have cared about them. So the defense and intelligence world cares, the anti-fraud people care and have a different ecosystem, consumer protection people have a different ecosystem, domestic law enforcement has a different ecosystem. And yet, the crimes, what they have in common is that people are making money by hiding their laundering in the system one way or the other, and if we can bring better tools and technology and cooperation to it, we can make more

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headway. So let me ask you to talk about the solution that you're offering in the A3ML program, what are you going to change?

David Dewhurst: 08:09 Yeah, that's a good question, and I'll go back to something that you just said, which is about differences in framework, yet commonalities in function. All of us are fundamentally going after the same thing, there is activity, that there is universal agreement on in the civilized world, is bad. We've scammed somebody out of a bunch of money or we're committing a bunch of crimes or we're financing terrorism, this is bad and money is flowing because of this. Okay, that's a functional description of what we're trying to stop, and we're running into issues because of what? Well, because of different frameworks maybe. Oh, because it's hard to share data from organization A with organization B, whether those organizations, by the way, are in the same government, across different governments or between government and the private sector.

08:57 We run into, in other terms, I would say, and people who listen will get sick of hearing me say this, we run into transaction costs of all kinds, and this, in my view, is at the core of the problem, and there's a couple of things that the A3ML program is going to do to try to address those transaction costs. So before I start talking about these items, let me be very clear. DARPA is a technology organization. We don't do operations and we don't make policy, but what we do is we make excellent technology that, forgive me, I'll say, removes excuses.

09:35 So a lot of times, we will hear statements, whether it be from parts of the government, whether it be from the private sector, "Oh, I can't possibly look through all of these suspicious activity reports, there's just too much information here," maybe somebody in the government might say that. Someone in the private sector might say, "I have to file all these suspicious activity reports, because if I don't and something slips through, I'm going to get smacked with a gigantic fine. I'm doing what I have to do to reduce my compliance risk." Well, both of those statements are true today, and I'm picking on suspicious activity

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reports, but we could extend this to a myriad of other types of reporting and types of information.

10:13 So maybe what DARPA can do is develop technology to massively reduce the cost to do what? Number one, to find new instances of what we would call tactics, techniques and procedures of illicit finance, generic reusable patterns that America's adversaries use to move value around the world. We can develop very high-speed graph algorithms to find instances or partial instances of those behavior patterns in different sources of data very, very quickly. Number two is we can impose upon ourselves the very technically challenging restriction that we don't do this all in one place.

10:59 So my A3ML program does not centralize data in one place for at least two reasons. Number one is an empirical reason. Guess what, guys? It doesn't work. Even inside the US government, the amount of work that it takes to get some sort of very useful intelligence information shared with maybe a financial regulator is astronomical, even when there are incredibly good reasons to do so, and of course, when it's completely legal to do so. So it's just not happening because of all the myriad, here it is again, transaction costs. Number two is a normative reason, it's about privacy. Americans want, expect and deserve to have privacy, and what they don't want to have is a big centralized repository of their financial information for nosy people to look through, that's not what we're about. We believe in privacy, number one, at DARPA. And so, how can we get to this place where we get more accurate and precise information for US government entities, lower transaction costs, lower compliance costs and compliance risk for the private sector, and increase the privacy of every American?

12:10 Well, number one is what I just said, we're going to develop algorithms that go and look for instances of these tactics, techniques and procedures. Fine. Number two is we're going to impose upon ourselves, and back to this, the restriction that we are able to run those algorithms in an asynchronous and distributed manner, fully asynchronous, across many different types of data stores that don't necessarily overlap very much in

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		the kind of data they have within them. We're going to create this network of extracted tactic, technique and procedures, abbreviated TTP, sharing, so that different organizations, both private and public, can share instances of threat finance behavior with one another without sharing Americans' and others' sensitive financial information. So we're going to increase the accuracy and precision of the data available to the US government, hopefully increase the predictive power of that information, so we know what kind of tactics America's adversaries are going to turn to before they've started putting them into action, while not sharing Americans' sensitive financial data.
Jo Ann Barefoot:	13:18	Yeah, that's the solution. It's exciting to listen to you talk about it. Maybe before I ask my next question, let me insert this one. How high is the barrier or the obstacle relating to people's privacy concerns and confidentiality concerns? Can you get people to believe that this system can keep information private?
David Dewhurst:	13:47	I think that's a great question. I'm going to be honest with you, Jo Ann, I think that if I had that answer already, maybe it's the optimist in me, the optimist in me says if we had that answer already, we would already be doing it. And so, the reason that we're doing this as a research and development effort at DARPA is because we want to see if this is possible, because if there is a true fundamental trade-off between the accuracy and precision of the information that we are able to get to anticipate and stop America's adversaries from moving money around the world leading to actions that kill Americans, well, then we need to respect America's privacy. That's my opinion. Again, I don't say Department of Defense policy, but I'm a very privacy-first guy, I'm a program manager in the information innovation office, there's long history of creating privacy-preserving technologies, I'm all about that.
	14:42	I'm going to be an even bigger optimist maybe and go out on a limb and say we're not living in a zero-sum world here. There are always these incredible improvements, and really, the last 20 years really have led to just amazing improvements in the accuracy and precision of information that you can pull out fully

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asynchronous distributed computation algorithms that don't involve sharing sensitive data. To some extent, banks internally will do this right now. So pick your favorite large financial institution, maybe someone's going and asking for a very large commercial loan.

15:25 That commercial loan team might go reach out to their payments team or their private bank or whatever it may be and say, "Hey, can you give me the results of running this particular query on this person's data?" And they'll use a technique called differential privacy, running that query, that gives them an approximate result. That approximate result is all the commercial loan team needs, it's either really, really high or really, really low. If it's high, it's bad, if it's low, it's good. But they're not going to actually know that person's data, they're not going to be able to reconstruct that person's private financial data. So in some sense, we're using this in the private sector already.

16:01 I think there isn't a fundamental technical challenge. I think what hasn't happened is that these technical innovations haven't been put in place in a network that people have agreed together to prototype, and if it works, to use. In other words, in the language of game theory, there hasn't been a focal point to solve this coordination game. We all want to do something about it, but nobody wants to be the first-mover, because it's expensive and it's hard. And I think maybe what DARPA has done here is step in and say, "We are going to create the focal point." In my view, that focal point is the A3ML program. We're going to put this technology in place. We're going to demonstrate, I think, what I just said, that we're going to be able to preserve privacy while getting more accurate and precise information, and I think people are going to come along for the ride.

Jo Ann Barefoot: 16:54 Great. And so, I know one of your themes is that we need to have public and private collaboration on solutions like this, what are the contours of the A3ML program? What's the timeline? Who's participating? How are you putting it together?

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David Dewhurst:	17:14	Yeah. So the timeline, we're about to kick off our initial technical development with our performers. So in DARPA language, performers are the elite of the elite academic institutions, private companies, sometimes nonprofits, that competitively bid to work on something. We, myself, my team, we go look at the bids that we get, essentially decide what we think is really great, negotiate with them for award, and then they begin to work. We're in the middle of that negotiation process right now, so I can't say who we're hoping to select. Check the news hopefully not too many months from now and that'll be public information, and happy to give an update at that time.
	18:01	Timeline-wise, so as I said, we're about to kick off. We have an 18-month... Boy, I wouldn't want to sprint for 18 months, my legs are sore already. But we have an 18-month quasi-sprint, where we are going to go from not quite zero, we're building on some really, really great work that an Air Force component has done, that some of our intelligence community friends have done, but we're going to build on some existing work, and either we're going to get to a prototype that works in 18 months or we're not. And part of DARPA is being able to take these kinds of technical risks. So we're going to know probably about nine months in whether the overall thesis of the program is feasible or not.
	18:45	Supposing it is and we've gone 18 months, what we're then going to do is we're going to branch out across the US government and we're going to say, "Which of our partners want to use this?" We already have substantial buy-in from Department of Defense entities, the intelligence community, our friends in the financial regulatory community and in the private sector, and I want to touch on that because that's extraordinarily important. The private sector, in my view, needs to be taking part in this, we need to create value for them. So again, DARPA's not setting policy, but when we say, hypothetically, compliance with the Bank Secrecy Act just means using an instance of these algorithms and reporting the abstracted information, not reporting Americans' sensitive financial information, but reporting the extracted higher level information back to the US government, it's automatic compliance with the Bank Secrecy

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		Act. Wow. What financial institution doesn't want to do that? Who doesn't want to lower their compliance, where it's not to zero, but to some very small fraction of what it is today? That would be great.
	19:53	So that's the value prop that we have. We're going to see if it's technically feasible, I think we're going to make it technically possible, and then it's going to be see who wants to play ball.
Jo Ann Barefoot:	20:03	So if you can prove that it works technically, both in finding the crime and protecting the data, then the next step would include that the financial regulators would adopt the type of policy that you're talking about, where if you use the approved technique, you're in compliance, and that would then solve, among other things, for the over-reporting problem that is so endemic in the system today, the industry and the law enforcement too complain that we have a very high percentage of false positives being reported and it's bogging the system down in useless data and that we're missing the true positives. I know you can't speak for people at this stage of the game, but it sounds like you're optimistic that there would be an appetite for that?
David Dewhurst:	21:05	Yeah, right. without getting into details, I can say, and again, keeping in mind, I'm a Department of Defense employee, I'm not employed by any of the financial regulators, I can't speak for them, what I can say is we've had many, many conversations with, I don't think every single federal financial regulator, but almost every single federal financial regulator.
Jo Ann Barefoot:	21:27	A lot of them.
David Dewhurst:	21:30	And the value proposition to them, again, is pretty simple.
	21:31	"Do you want more accurate and precise information while safeguarding people's privacy and making the private sector happier with you?"
	21:37	"Well, yeah, we'd love it, but I don't see a magic wand anywhere."

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	21:40	"Well, it's not magic. We have a little bit of time to work, but we think we can do this for you."
	21:45	There's been, I think, incredulity is the best word.
	21:50	And then, on the second and third conversation, where I say, "No, it's not a pipe dream, there's real evidence to suggest that we can do this."
	21:56	"Well, yeah, we would love to do this. You mean you'll give it to me for free?"
	21:59	"Yes, of course, I will, because that's DARPA's value prop. We solve seemingly impossible problems, and then give it to other parts of the US government for free."
	22:07	On the commercial side, and it's funny, I want to say more surprisingly, but actually, when you think about it, it's not all that surprising, there's been also incredible enthusiasm. In some sectors, there's been more skepticism, and I can fully understand why there has been, there have been many promises of, to them, government information sharing agreements, initiatives, that have really turned into one-way sessions. It turns into the private sector is going to give me more information and I'm not really going to help them out. Why do I want to do this again? But overall, I would say across payment rails, crypto, banks, even the brokerages and securities, there's been, at worst, cautious optimism, and at best, enthusiastic, where do I sign up? And we've had the indeed slow walks, some people saying, "You've got to wait at least 12 months from now until we have anything super useful to show you." So I'm pretty optimistic overall. There's always a chance of failure, that's why we're at DARPA, but I'm pretty optimistic.
Jo Ann Barefoot:	23:17	I am too. Our regular listeners have heard me talk about this through the years. It's clear to me that we have the technology to solve these issues if we can get the confidence and trust and the adoption. And also, there's such widespread agreement that in this particular aspect... Again, our show does bring the financial regulatory lens to things, broader than banks. But

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there's such widespread appreciation for the fact that this particular bank regulatory function is completely broken.

23:59 Our listeners know, I spent two years at Harvard on a senior fellowship researching how technology is changing consumer finance and how to regulate it, and one of the things that I saw in my research there was that this compliance area is the most expensive one. Even if you don't count the fines and penalties that the industry pays when they get it wrong and get caught, just the work that goes into complying with what we have today, and then, as you know, the UN numbers say we catch less than 1% of the crime, which is not catching anything, because there's no disincentive. So I want you to speak to this a little bit, because one of the things that you've talked about that I think is really interesting is you're talking about changing not the process, you're talking about changing the process, but your fundamental argument is that you have to change the incentives and motivation in the system, and to do that in this system, you have to make it really expensive to launder the money. Talk more about that.

David Dewhurst: 25:12 Yeah. This is... How do I say this? Sometimes, when you're an expert in something... And I will preface this by saying I am not an expert in money laundering, I'm not in ACAMS, whatever, I haven't spent years in a bank, I haven't spent years in a financial regulator, I'm an economist and a statistician, so I'm kind of an egghead and I run around saying dumb stuff and maybe it's right sometimes. So one of the things I noted a long time ago, this is an econ 101 insight, is, well, let's go back to basic price theory.

25:44 There is a supply and a demand for illicit finance. Illicit finance is a service, it's a good that I can purchase. And how do we get less of a good? In a lot of ways, we get less of a good, but very often, the price to buy that good gets very, very, very high, and the supplier is realistically unable to supply much more of it. So it's going to get bought up and there's not going to be much left, and people just aren't going to want to buy it anymore, they're going to want to do something else. That's interesting. What is the price of money laundering? The price of money laundering

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is essentially the transactions cost or the fee that you pay to the aggregate of the launderers.

26:29 Okay, that's an interesting thing to say. So maybe we shouldn't be focusing on each specific individual launderer or individual case, but we should be just taking a global constraint approach, which is to say, I'm going to have a useful capability, that's widely bought into, that's used everywhere, that just makes the probability of any arbitrary illicit transaction successful go down by, let's make up a number, a half. That's just a global way of looking at it, and I don't mean global in the sense of the world, I mean global in the sense of mathematics. So in mathematics, we talk about local phenomenon, which are true at one single point, and global phenomena, which are true for a whole system. So in this sense, this is a global approach.

27:17 Well, maybe that'll work. Certainly, that will ideally decrease the supply of money laundering, thereby increasing the price of money laundering, thereby if we increase the price far enough, making the demand dry up and go away, because people are going to say, "You know what? Forget this, I'm going to make my illicit whatever it is at home." If it's a piece of North Korea, well, okay, fine. North Korea is not very good at making nuclear stuff all by themselves, they've got to go by a lot of stuff. I'm much more happy with the state of the world.

27:46 So I don't know if that exactly addresses what you asked, but that's the approach. It's this global fundamental microeconomics-driven approach instead of a case-by-case whack-a-mole approach, where even if we're really, really great at whacking moles, still, if there's n moles, we've got to n different things to whack, and actually, probably we'll miss some of them, so they'll pop up, so we'll end up doing a lot more whacking than just n whacks. Whereas if we just start to put a big, big piece of plywood on top of all the holes, they're not really popping up anymore. So it costs money to get that piece of plywood, but I put it on top of the holes and the moles are gone. I don't know, analogy out of control.

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Jo Ann Barefoot:	28:29	Yeah. We have a little bit of that logic in the regulatory system today, in that obviously the industry tries to avoid penalties and have an incentive to do that, but as you say, the percentage chance of being in the target sights of a major penalty are narrow. I think banks are trying to comply, don't get me wrong.
David Dewhurst:	29:05	Yeah, yeah. So I would just add to that, part of the insight of A3ML is this recognition that if we had all the data in one place and all the compute in the world, we could probably, quote-unquote, "Find everything," but that's never going to happen, nor, for privacy reasons, do we want that to happen. But what we've settled for is the second-best thing, where, yeah, sure, all the good actors, and almost everybody's a good actor in America, is trying to reduce the amount of laundering that gets through. But it's just going to be impossible, because they don't have the full picture. No one entity, to include the US government, to include all the components of the US government, has one picture. And we can either keep fighting that battle, which, if I may, is the battle that the US government fights all the time, in money laundering, but in a myriad of other ways. Well, let's just buy more data, let's just unify X.
	30:02	Guys, we're spending billions and billions just in anti-money laundering, let alone the myriad of other defense areas that I won't get into for the purpose of this podcast. We're going to centralize the data, we're going to centralize the compute. Guys, you're still not solving the problem and you're spending billions and billions of dollars. Maybe let's think differently, maybe let's say there's nuggets of what we're looking for in lots of different places, and we can build a unified representation one piece at a time asynchronously. There are mathematical algorithms that describe, for example, how to do statistical inference in this way. Those algorithms are old, old, old, old, old, decades old. Have they been abstracted and translated for a problem like this? Well, not necessarily, but that doesn't mean they can't be, and again, that's why DARPA is here.
	30:54	So I think it's accepting that modern money laundering goes through many different stages, myriad forms of value transfer, because money launderers are smart and know that no one

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		entity has the whole picture. We're not going to get the whole picture. Let's meet them where they're at, let's not try to keep doing what we've been doing.
Jo Ann Barefoot:	31:18	Yeah, yes, yes. Do you have thoughts on how AI, and especially generative AI, are altering the threat and altering the needed response?
David Dewhurst:	31:32	Yeah, for sure. I think there are benefits and challenges with everything. Generative AI, highly parameterized models that can generate certainly text, but also coherent streams of numbers, like transactions or time series and images and videos. Huge positives, huge negatives. We can all think of the negatives.
	31:54	So I could open up my favorite GenAI tool from my favorite tech giant and say, "How would I be really good at laundering money from here to there?"
	32:02	It'll say, "You can't do that, it's illegal."
	32:04	Really easy ways to jailbreak that kind of stuff and they'll give you all kinds of illegal information. And so, the marginal cost of laundering a dollar has probably decreased. I don't know what the actual figure is, that would be fun to find out, thanks for that. But probably decreased tenfold at least with the advent of generative AI tools. Obviously, a really widely publicized problem, that's not directly in scope for A3ML, but is the application of generative AI tools, to fool facial recognition technology, or there's the possibility maybe they could fool thumbprint technology or something of this type. Okay, wow, the marginal cost of frauds just went down, I can fool this bank's facial recognition system. Yes, all true.
	32:47	With that being said, they can be incredibly useful for defense as well. Here's one hypothetical setup. One way of being potentially really, really good at catching our adversaries' illicit finance is for us to pretend to be adversaries. So part of A3ML, one of our technical areas, is creating hypothetical illicit finance tactics, techniques and procedures for the purpose of redteaming.

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	33:13	We're going to say, and performers propose wildly different approaches, you can imagine an approach that says, "Hey, LLM, you are an adversary and you are trying to launder value from point A to point B and you're really worried about someone trying to catch you. How would you do it? Give me 10 different ways, and none of the ways should look like each other."
	33:34	Well, great. "Here's 10 different ways."
	33:36	Sweet. Let's go see if we have instances of those, let's go look for those kinds of ways in the data stores that we have. So it also lowers our marginal cost of detection, I think. I think like with pretty much every domain, the advent of highly parameterized generative AI just reduces the marginal costs to a proposed solution. It doesn't mean the solution is good, but it does reduce the marginal cost to get to something that you can either try or you can look for.
Jo Ann Barefoot:	34:09	Yeah. I think you know and were able to send some participation to the battlefront exercise that we did in the spring, and I'll put the link to that in the show notes as well, on looking at AI attacks and defenses, and wow, was it eye-opening. We had very sophisticated people there, and I think everybody was shaking their heads at the creativity of what the attackers were coming up with, and the attackers won, so to speak, but some of the defenses were pretty impressive too, it didn't seem like it was hopeless.
	34:53	This may be beyond the scope of what you're doing, Dave, but are you dealing with what it would take the private sector to adopt these techniques and provide the data or be able to work with the data as needed? As you know, in banking itself, we have about 4,000 banks, 5,000 credit unions, most of them are very small, most of them are on operating systems with vendors that have some rigidity to them, some of them are quite outdated. And one of the issues we run into a lot as we try think about how to use technology to improve the regulatory and compliance realms is we can see that once we had it in place, it would work better, and very often, it would be cheaper than what we have today. But getting from here to there is expensive

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and difficult, and you'd get pushback from entities that don't feel like they can invest in the change systems and so on. Is that within your scope to think about?

David Dewhurst: 36:03 It absolutely is. In some sense, aside from the core technology development on RSDN, another one of my programs, Resilient Supply-and-Demand Networks program has nothing to do with what we're talking about, aside from the technology development on A3ML, that's probably the most important question, because we create a ton of value if our algorithms just go into use by the US government, but where does most information come from? It comes from the private sector. Well, again, we can either keep pushing on the same thing we've always been pushing on, or we can actually give them what they need and they can give us what we need while respecting everyone's privacy.

36:43 So I'm going to give two answers. First, I'm going to give a technical answer. So two, technical and budgetary answer. On the technical side. I don't know if we're going to succeed, but I strongly believe we are, if we succeed, anybody that has a database and an internet connection and a computer that's as powerful as a $250 laptop that you can buy at Staples will be able to run an instance of the A3ML system that we're building, that can connect with all of the other instances and share appropriately abstracted threat information without sharing Americans' sensitive financial information. So I'm very, very confident that technically, this is not going to be an issue.

37:34 A corollary, or I don't know about corollary, an adjacent thing I'm confident in is that, again, DARPA exists to give stuff away for free. So we are in the business of giving stuff away for free to the US government, we will be in the business of giving stuff away for free to the private sector. Now, there are caveats on that, we have to make sure that things don't get into the hands of our adversaries. Counterintelligence being what it is and intelligence collection being what it is, we know our adversaries are going to steal whatever we give to the private sector, so there's a little bit of a, hmm, interesting, how do I share all this goodness with the private sector without being too sad if my

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		adversaries steal it from me? That's a separate technical question that we can't get into too much.
	38:20	I think the most important aspect of this is something that I have the least control over. Again, DARPA develops technology, we don't do operations and we don't do policy. So I can suggest things that seem reasonable from the point of view of an outsider. So I gave an example earlier, if FinCEN woke up one day and said, "You know what? I think we're going to interpret the Bank Secrecy Act as meaning you need to run an instance of the software that we'll give you for free and is guaranteed to work and will report information to us while safeguarding Americans' privacy, that means compliance with the BSA." I think that pretty much every single financial institution in America would jump on that in a heartbeat. Economically, that would be the rational thing to do as far as reducing financial risk to your company.
	39:20	And truly, I'm not saying they have said they want to do that, I'm not saying they haven't said they want to do that. I can't speak for them, I don't think they can speak for them, because there's a whole ton of questions. Is Congress going to be happy about that? Is the President going to be happy about that? Is the Treasury secretary, whoever that is at the time when this eventually happens, because it may not be the current one or it may be the current one? There's these massive levels of uncertainty that are mostly policy and political questions that just have nothing to do with me, and it can't be DARPA's place to address those. What we can do is make things technically possible that aren't possible today, and we can make the cost of those virtually zero, and we can go and turn to other organizations and say, "Your move." There is no technical excuse to not do this.
Jo Ann Barefoot:	40:10	You talked earlier about the fact that some of these solutions could be applied across the government, not just on AML, and I completely agree with that, there's so much opportunity. You also said near the beginning that you think the reason that people aren't using better technology yet is... I've forgotten exactly how you put it, but I think it's mainly because they don't know about it, they don't know that there's something better

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because there didn't use to be something better. These are mostly new possibilities, and we have to be careful about how we roll them out, we have to make sure they work, we have to deal with unintended consequences and all of it, but the chance to actually solve some of these problems is so huge.

41:06 I know we're going to run short on time, I've got a couple of other questions. One is, so your technique doesn't require the personal data of the people involved, but to then take the next step and for law enforcement to go and roll up networks and so on, you'll have to go through the appropriate process to identify them, get access to [inaudible 00:41:38] and so on. At that step, and this might be beyond your scope too, do you think we need to have a new identity mechanism for identifying who people are with reliability, people and organizations? So there's been work done on this. I recently did a podcast, which I'll link to in the show notes as well, with Sean [inaudible 00:42:07] who is founding an entity that's going to be designed to provide banking services for financial agents that are AIs, and to make that work, you're going to have to be able to know whether you're dealing with an agent that is what it says it is. How hard is that piece of the puzzle for actually getting the crimes and money laundering stuff?

David Dewhurst: 42:33 Yeah, that's a great question, Jo Ann. I think there's a ton of layers to this, and I won't go into it too much. First of all, setting the stage with what DARPA's involved in, we may partner with some federal law enforcement agencies, but it's a one-way partnership. We will provide them with some of the software that we build, because they also have a national security and intelligence function, counter foreign intelligence function, that we care about a lot, keeping America safer in that way. As far as identity goes, first of all, I'm not an expert on this area.

43:12 Number two, I, of course, know that demonstrating identity is an incredibly difficult challenge. We gave an example earlier on the show where now I'm able to create, quote-unquote, "deepfakes" of people's face, and even video deepfakes, with much lower marginal cost than we used to. At the same time, mandating proof of identity in a certain way can be

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		extraordinarily deleterious to privacy. So without getting into policy conversations, I'd say there's going to be a very deep, and one might even say existential moral choice about how one maybe can demonstrate one's identity in a zero-knowledge-proof manner. There's all kinds of approaches there. But as a country, we are about the rights of people to mostly do what they want. That is a fundamental principle of America, starting from the Declaration of Independence. And so, if things become tied to you have to be able to prove something to be able to do a myriad of other activities that you may want to do that are legitimately not harming anybody, that would seem to me to be incredibly deleterious to the character of our nation.
Jo Ann Barefoot:	44:35	So if DARPA is able to produce the tool that you're talking about, and if people believe that it will work, it'll find the money laundering and it will protect privacy, then the next step is going to be these practical adoption issues, and I do think the digital identity, proof of human, all that stuff is going to be there. Do you know who will lead that? You used a term earlier, and I've forgotten what it was, that sometimes these kinds of problems need an entity that takes the lead. Who would-
David Dewhurst:	45:15	I don't know. And I'll say for your listeners who may not be familiar with DARPA, we are very different from other US government entities, including research and development entities, we're term-limited. We're not paid a lot, by any means, but we're paid higher than other government servants, we're term-limited, we come with an expiration date. So it's probably not going to be me. Maybe it's DARPA, maybe it's my successor, the next person who's interested in capital markets or financial intelligence or the broad areas related to this here.
	45:53	I will tell you, very candidly, and unfortunately, I can't get into too many details, there's not the same at least culture of risk taking, high-risk, high-reward research that can be fundamentally transformative for an economy and our country in the financial regulatory community. And I'm not talking bad about them behind their back, they'll say the same thing when you talk to them. There is no culture of that in many other

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		places in the Treasury, in the whole financial regulatory community, often in many corporate labs. So if not us, who? If not now, when? I'm not sure. And part of DARPA is to address these problems.
Jo Ann Barefoot:	46:42	Good, okay. We have a lot of work going on on many of these issues at NIST and other, lots of people are working on... The thing I find myself more and more searching for is, and I may have said this recently on the show, but we have many tech solutions that work at the point where they touch the problem we're trying to solve, but what we don't have is infrastructure and ecosystems that can get things adopted in ways that make sense. You can't impose it all from the top-down or you'll get it completely wrong, or as you say, by centralizing it, you'll get it wrong. But if it's decentralized, if it has to be, as you said, working asynchronously on these problems, creating that capability is just absolutely crucial.
David Dewhurst:	47:41	Yeah. I will add something, I recognize we're getting short on time, but I'll add something that I think is really key. I think it's two concepts that are almost dual to each other. One is, you said at the very top of the show, we can win, we don't have to keep fighting this. I really think is, again, basic microeconomics, we can reduce the supply of it by making it extremely expensive to supply it. That's number one.
	48:15	Dual to that is people, ordinary people, like me, like you, like ordinary Americans, with their finances and banks, on crypto, whatever it is, have to believe that the government is going to mostly let them do what they want, because if we "win", quote-unquote, against illicit finance, then that's great, and it also means that whatever our definition of illicit is, we can stamp out. That is a massive, massive power. And so, government, being a liberal republican democracy, all lowercase in the political theory definition of those terms, has to limit itself as to what it restricts, and that's why I've been in, and you can read my profile on darpa.mil and everything, I am so focused on our adversaries' illicit finance, and I'll say things like this to the financial regulatory community and they get mad at me, and

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		maybe some of your listeners will get mad, but I don't really care about the person laundering $2,500.
	49:25	Somebody probably does, I get that it matters, it's illegal, dude, don't do that. But that pales in comparison to the problems that we're facing, the mass smuggling of fentanyl into the United States that's killing millions of Americans, North Korea financing their nuclear program, the other nefarious activities by our adversaries. And if our government focuses on those and upholds its principles, I think people are generally going to want to go along with this. If it doesn't, well, that can be a huge issue, and that is a fundamental barrier to adoption of these sorts of methods, and honestly, it's a barrier that I'd advocate for.
Jo Ann Barefoot:	50:08	I am very tempted to end it on that note, because [inaudible 00:50:13] profound statement of the choices that we need to make as a society. Is there anything I haven't asked you though that you want to add?
David Dewhurst:	50:23	What's your favorite color? No, I think we're good. It's blue. And I appreciate it very much, Jo Ann.
Jo Ann Barefoot:	50:30	Yeah, I appreciate what you're doing. I'd love to have you back on the show as you get farther along, maybe it'll be your successor, but I want you to keep us posted on this. This is a [inaudible 00:50:43] for an audience like ours, we have listeners all over the world, and this thing about the silos is critical. There are just so many people with their head down, they're doing their job and their job is some fragment of this big problem, and pulling it up so that people can, A, think about it in a connected way, because nobody in any silo can solve it alone, and secondly, if people can have the hope that you actually can turn the tide on it... It's not going to be perfect, as you said, but right now, we are losing, we're drowning in a tidal wave of this illicit finance and crime that hurts the individual as well.
David Dewhurst:	51:36	Indeed.

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Jo Ann Barefoot:	51:37	And we can turn it if we can figure out how to harness the technology and agree on how to use it. So I cannot thank you enough. I just have found this [inaudible 00:51:50].
David Dewhurst:	51:49	The feeling is mutual, Jo Ann.
Jo Ann Barefoot:	51:51	Great, thank you. Oh, and where can people get more information about DARPA and the program? Is there a website?
David Dewhurst:	51:59	Sure, yeah. So they can go to darpa.mil, that's DARPA's homepage, you can see all of the publicly available programs that DARPA runs on that webpage. I don't remember what the link to my program is, but if you search DARPA A3ML, it'll bring you to the webpage.
Jo Ann Barefoot:	52:20	All right. We'll link it in the show notes as well. David Dewhurst, thank you so much for joining me today, it's been absolutely fascinating.
David Dewhurst:	52:27	Thank you very much. It was my pleasure.