FS: Over the last two weeks we have been crossing the country and counting the people in the room today I think we have engaged with over 100 people who are tech transfer stakeholders and are interested in making federal technology transfer and federal research investments better for the benefit of the American public. Institution

Very quickly I just wanted to go over what today is going to look like. So we’ll have quick presentation to give you some of the background and history of how we got to where we are in this moment. And then I’ll come back to the podium and talk about how we’ll run the comments session. I do want to remind you to silence your cell phones, please, and that we are recording today’s session and it will be transcribed for us to use at NIST for our reporting purposes.

We’ll take a quick break, probably somewhere around 10:30, 10:45 depending on how the public comments are going. I obviously don’t want to interrupt anyone in the middle of their sentence to send you all out for bathrooms and coffee, so kind of flexible. In the first two sessions we haven’t needed to enforce any time limits. So we’ll probably just start off letting the comments flow as needed and then if it gets necessary I’ll wave a red flag if it’s going too long.

There is Wi-Fi available in the room. There’s a pass code out at the desk if you’re interested in getting that. And with that I’d like to introduce Dr. Phillip Singerman who is the Associate Director of Innovation and Industry Services. He is my boss. And he is going to tell you about the Unleashing American Innovation, the Return on Investment Initiative. Thank you.

MS: Thank you, Courtney. Good morning. Welcome. I want to thank everybody for coming. I also want to introduce the other members of our team, Shyam Sunder is the Senior Science Advisor to NIST. Shyam, could you raise your hand, please. And Dave Cramer is the Deputy Director for the Hollings Manufacturing Extension Partnership. And as Courtney said we’ve organized this public forum to solicit your views on an important national topic, how to improve the return on investment from our federal investment in technology development and by doing so unleashing American innovation.

Before we ask you to present your comments I want to provide a little context on this Return on Investment Initiative. And what I'm going to highlight are the challenge and opportunity that is presented to us. I want to talk about the response which is through the President’s Management Agenda and in particular the lab to market cross agency priority goal, a little beltway, you know, nuts and bolts, but I think this is a sophisticated audience of technology transfer professionals so I think it’s important for you to understand the context and the vehicle that will absorb your comments.

I’ll talk a little bit about NIST and its special government wide responsibilities in technology transfer, the Return on Investment Initiative vision and objectives. And conclude with a website for more information and a reminder of the deadline for formal comments for the Return on Investment Request for Information. So can we go to the second slide, please? Thank you.

And as you know the federal government spends well over 150 billion dollars a year in research and development. About two-thirds to universities and there are several universities represented in this room and about a third in federal research facilities; laboratories, DOE labs, NIST, NASA and so forth. And again there are various institutions represented. The results of this investment must be put to productive use through applied research and services to the public and by transferring to private companies to create new products and services. Next slide, please.

As you well note our technology transfer policies and procedures are based on landmark 1980s legislation and they continue to support U.S. innovation and have been widely emulated by other countries. However, in an increasingly competitive environment it is important to ask whether and how current laws, regulations, policies and practices could more effectively promote transfer of federal developed technologies, knowledge and capabilities to productive uses. And I'm sure those in the audience have thought about this issue often. And so we are here to listen to you and get your input on this issue. Next slide, please.

Every administration annually prepares a President’s management agenda to modernize the government. And in the last few years part of that management agenda has been a lab to market cap goal, cross agency priority goal, which as stated is intended to direct the activities of a multiplicity of agencies.

And pursuant to that cross agency priority goal NIST has launched an ambitious initiative in coordination with the White House Office of Science and Technology Policy to enable a greater return on investment from the federal government’s 150 billion dollar annual R&D investment. And I'm sure there will be discussion and questions today about what we mean by return on investment and we’ll be interested in both your questions and your observations about that. Next slide, please.

So a word about the lab to market goal. Again it’s a cross agency goal. And the intention is to improve the transfer of federally funded technologies from the bench science, from the lab to the marketplace. Again, it’s co-led by the Department of Commerce via the National Institute of Standards and Technology, NIST and the White House’s OSTP.

And we are using the concept of a Return on Investment Initiative to shape and channel the input and recommendations that we will be developing. And these findings and recommendations, proposed actions will be coordinated, reviewed and implemented through the National Science and Technology Council Lab to Market Subcommittee. So there’s a formal governmental structure that’s overseen by NSTC that will ultimately approve and release this report. Next slide, please.

So a couple of words about NIST. How many people have heard of NIST? Great. I'm not surprised. And you probably know us best because of our research in metrology and standards. We have a laboratory, a major facility in Gaithersburg, Maryland. Has anyone visited our facility in Gaithersburg? Thank you. And we also have a smaller laboratory in Boulder, Colorado, which is co-located with Colorado University.

And we’re about a billion dollar agency with about 3,500 to 4,000 federal employees and an equal number of guest researchers, post docs and so forth. We’re very proud of our Nobel Prize winners, four Nobel Prize winners in physics in the last 20 years. And mostly in Boulder, but also in Gaithersburg. So that’s a sign of the quality of the science that our researchers perform. Next slide, please.

But we also, and this is well known, have interesting responsibilities in federal technology transfer. We provide leadership for promulgating and reporting on polices, practices, and regulations. And I think some of you may know that we just issued a regulations on Bayh-Dole (ph.), updating that to align more closely with the American Invents Act.

We coordinated the Interagency Work Group for Technology Transfer and Interagency Work Group for Bayh-Dole. We prepare an annual technology transfer report on the federal government and also a report on the Department of Commerce and many other agencies also prepare reports. It’s a very interesting document. And if you haven’t had an opportunity to review it, I would encourage you to do so.

We also co-chair the NSTC Science and Technology Enterprise Committee with the National Science Foundation and DOE. And this is a new committee that was organized under this administration. We co-lead the NSTC Lab to Market Subcommittee. Courtney Silverthorn is the Executive Secretary of that subcommittee. And we are the host agency for the Federal Lab Consortia, which I suspect some of you are members of. Next slide.

So Return on Investment. So our new Undersecretary Presidential appointee with Senate confirmation, Walter Copen (ph.), is a physical chemist, but also has been very active in economic development technology transfer. He was the Head of Tech Transfer at Brookhaven National Laboratories in Long Island and also the Director at Nrail (ph.) in Colorado. And he has also been very involved in entrepreneurial activities. He was a founder of the Rocky Mountain Innovation Partner. So this is somebody who is really part of our community, but also with a very strong, and with a very strong scientific background. And he has identified I think singularly among NIST directors that technology transfer is his number one priority.

And in accord with that he this year launched the concept of a return on investment group view of the federal government’s technology transfer policies, procedures, regulations and, if necessary, statutory provisions. And it is, as this slide indicates, intended to take advantage of the enormous investment that we make as a nation and that we are all responsible for to further our national economic goals and national security. Next slide.

And so specifically … can you go back a slide, Courtney? Okay. Next slide. And so the vehicle that we’re using is a formal request for information. We issued, as you know this RFI in the Federal Register. It will be open until July 30th to give people plenty of time to respond at length. We will be reviewing all of that material as well as information that we gather in these public forums, as well as reviewing the numerous studies that have been conducted over the decades on technology transfer, both at universities and federal laboratories.

So we’re casting a very wide net to ensure that we gather all the information that we can and then we’ll be preparing a report. We’ll be preparing findings and so forth. And sometime in the year … Can we go to the next slide, please?

Here are some of the areas that we are particularly interested in. My slides are a little out of order here. Sorry. So we’re looking at principles and practices, both those that should be protected. You should tell us what’s working and things that should be changed, how can we improve efficiency and reduce regulatory burdens, new partnering models and mechanisms that you have observed and developed in your own institutions, new approaches to reduce and eliminate barriers, metrics and methods, this is an issue that’s come up in the prior forums, you know, what’s the best way to evaluate the performance of our technology transfer of activities and new approaches to, it says motivate, significantly increase, what are the proper incentives that should be developed and aligned with the missions of our universities and federal institutions. Can I have the next slide, please?

So as I mentioned the RFI will be open until July 30th. There’s a website that will receive comments. We’re also, as Courtney mentioned, recording these sessions for our own internal assessment. These will not be made public. The RFI comments may well be made public, and you’ll see in the Federal Register notice a caution to avoid any confidential information or any inappropriate information. Can I have the next slide, please?

This is the third of four currently planned public forums. And we’ve have groups about the same size as each of those. We’ll have a final forum in Washington in mid-June, where we expect, currently I think there’s almost 100 people who have … 130 people. The numbers grow every day. We’re delighted. So we’re tapping into the wisdom of the community. Is that the last slide? Yes, it is the last slide. So we also have a website with lots of information. We’ve put on it the prior studies. We’re posting information that is relevant as this process continues.

So once again thank you very much. And Courtney you’re going to come back up and take us to the next step.

FS: Alright, thank you, Phil. So the slides that you’ve just seen today are available on this ROI website. There’s also information about our kickoff event that took place back on April 19th. You can see all the video presentations from the speakers, from that session, and also information about the RFI and the public forums as well.

So I'm really excited about this process. This is actually the second iteration of the lab to market cross agency priority goal. The first one started in 2014, right around the time that I came to NIST. And we did not do this stakeholder engagement process the first time around. And we still managed to do some really great things. I think maybe even in spite of ourselves.

But the fact that we are able to go out and tap into the wealth of knowledge and experience through these public forums and through the RFI process to really shape and inform the next iteration of the cross agency priority goal I think is such a great thing and I'm really looking forward to seeing how we can take your ideas, your concerns, your ways to think out of the box and turn that into actionable items for the federal tech transfer system I think is to going to be a really wonderful, wonderful thing. So I'm so glad to be a part this.

So in just a second I'm going to throw those RFI questions back up on the screen and we’ll open pressure the floor to you all for your input. We’ve heard a lot about the concerns in technology transfer and I do want to encourage you to share those as well. But if you have ideas about ways that we might think about addressing those concerns that would also be incredibly welcome. You can comment on any of the RFI areas, you can comment on other things that you’ve come across in your tech transfer partnerships and commercialization process. You can post questions to the rest of the group if you’re interested in hearing more about the expertise in the room.

The intent is really not for us to kind of engage in a real back and forth conversation, but really for us to listen. There’s such a breadth of experience in this room that we really want to make sure that we capture all of that.

As I mentioned earlier we’ll take our break sometime around 10:30, 10:45 just to kind of break it up a little bit and then we’ll keep going up until 12 o’clock as long as you guys have things to say. So with that I’ll put the questions up on the screen and then we’ll open up the floor mikes.

MS: Shyam, I think you wanted to start off with introductions.

MS: Yes, we can do that. So one of the best ways to kind of get everybody to know each other is to have each of you identify yourself, your organization and why you might be interested in this session and how you might be able to contribute to our discussion.

FS: Hi, I'm Christy Frasier. I'm an Assistant Director of Technology Commercialization at the University of Chicago. So I manage inventions that come out of the labs and the IP and licensing process for those inventions. I'm here because I'm interested in hearing how people are thinking about tech transfer and hopefully contributing to the discussion.

MS: Good morning. My name is Joshua Luke. I work with Congressman Dan Lipinski. I was one of his district representatives. I'm here interested in obviously policy suggestions. Everything that gets discussed here today I will be shooting over to our D.C. staff who is very interested in everything that comes out of this meeting. So thank you.

FS: Thank you for being here and thank you for Congressman Lipinski’s support of NIST and of tech transfer.

MS: Good morning. I'm David Balay (ph.). I serve as President of the Illinois Manufacturing Excellence Center. We’re part of the U.S. Department of Commerce Manufacturing Extension Partnership. So I'm here to learn as much as I can, but also to try to help give voice to what’s going on with the small and mid-sized manufacturers and how that we can think about this tech transfer from their perspective and what’s going on there to help grow that opportunity.

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FS: Hi, I'm Cherry Schmidt. I'm the manager of Partnerships and Technology Transfer at the FERMI (ph.) National Accelerator Laboratory, one of the DOE National Labs. I’ve also been engaged in tech transfer with the Department of Energy since 1989. So I’ve got some history to bring and I do have some suggestions for you today. So I will be reading a prepared statement, which I don’t normally do, but for you I'm doing it.

MS: Hello, my name is Mike Caruso from BOSH (ph.). I'm the Director of Public/Private Partnerships. And I'm particularly interested in this topic because our executive management who is generally supportive of us collaborating with universities and national labs and by and large is a positive experience. But I'm still taken to task for the same things that we all are, which is, what is the return on investment for doing this in the first place?

And there’s a lot of, as it’s been described to me a lot of very interesting page two stuff, but when it comes to can you show me the actual sales that have resulted from this. So saying that everybody is trying to figure out this too only goes so far. But I want to align with the best thinking about how do you really evaluate return on investment for these kind of partnerships?

FS: Hello, I'm Elizabeth Thelan (ph.). I am from Milwaukee Seven, which is just north of here, a Seven County Economic Development organization. I just started there with a project funded by EDA out of Chicago to work with NASA GRC, Glenn Research Center. So it’s a very specific project about moving tech transfer out of NASA and in. However, we already are looking at it as all federal labs. So I'm more here to listen. However I do have some very great stories already. I'm not sure I want them public though. So I have to think about that.

I just finished about 20 plus customer interviews so on the industry side. I am more like a startup entrepreneur so I think that way and running in … anyway. And the other thing I was going to say I just left the Water Council, which is a water consortium in Milwaukee, and we have, I keep saying we, but they have a program that digs into all federal labs, so it’s a platform where they’re scouting. And it can be university as well. So just a background on where I'm coming from.

FS: Hi, I'm Nicolle Janovich. I'm from Northwestern University, the Innovation and New Ventures Office, which is our tech transfer branch. I’ve seen I think tech transfer in a couple of different universities. University of Illinois was another one. And I’ve just seen the evolution of what we’re doing in our activities and I think, I'm just willing, really willing to contribute how I can here or listen to ideas and present our own, just based on from where we’re sitting and all the activities that we’re tasked with. So if we can come up with a magic answer to this today I’ll be thrilled.

FS: Hi, my name is Heather Fletcher. I'm with Innovation and New Ventures at Northwestern University as well. I'm fairly new to tech transfer. So I am mostly here to just listen and learn and hear suggestions.

MS: Good morning. I'm Phil Hockburger from Northwestern. I'm the Association Vice President for Research there and I'm responsible for the research facility, space planning and university industry partnerships.

FS: Hi, I'm Diane Hart from Argon National Laboratory. I am the Manager of the Sponsored Research and Contracts Administration Team within the Technology and Commercialization and Partnerships organization. So with that kind of a title you know why National Laboratories always speak in acronyms. That’s the way it works. I have a little better than 20 years, certainly not as long as Cherry, but about 20 plus years, going on 30, in this particular arena, both in an NSA lab as well DOE. So looking to absorb as much as we can and certainly have some recommendations for continuing to move things forward in a positive direction.

MS: Hello, I'm Matt Hamilton. I'm at Well Spring Worthwhile. We’re a software company. So we’ve been around for about a decade. I'm the Chief Operating Officer there, so largely I'm responsible for managing all our services, software development, product, engineering group. So I guess personally I’ve been involved probably in like 150 implementations of software from both corporations and universities in terms of seeing the kind of operational challenges that everybody has. And so I'm interested in being here today to talk a little bit about the barriers that we see, I guess as a vendor, in terms of working with folks. But also interested obviously in hearing what everybody else has to say about new ideas and where this area is headed.

MS: Hi, I'm Dick Cox. I'm with the University of Notre Dame Idea Center. I'm the Director of Licensing and New Business Development. I'm here to learn from all of you all. We take these opportunities to get together with our colleagues and people from industry and learn from them, but also to perhaps share a little bit about a new model that we’ve adopted and just throw it out there and see what kind of reaction we get.

MS: Thank you.

FS: Hi, I'm Lisa Lorenzen with Iowa State University Research Foundation. We are the tech transfer office at Iowa State. We also negotiate research contracts with industry. And I'm here because several of my colleagues are here and I'm just sure you all already know how to solve all of my problems and you’ll tell me how.

MS: Hi, I'm Ernlie Perton and I'm President of Apio Innovation Transfer. It’s a five year old consulting company. We work with universities and SPIR, STTR recipients to enable technology transfer. Prior to that I spent 25 years in academic technology transfer, starting at the University of Utah, Colorado State University, and Oregon Health and Science University. I was also past president of AUTM (ph.).

MS: Hi, I'm Jamie Crawline from the University of Michigan. I'm Program Director for the Economic Growth Institute and I'm new to the University. So I'm also learning all the acronyms that everyone speaks in here. I’ve been there about ten months now. Prior to that I worked for 25 years with a small manufacturer, we had about 150 man shop. And that’s what we work with at the Economic Growth Institute, the small to medium sized manufacturers.

And one of the things that we try to do is get them ready to take on that next level of innovation so they can remain competitive and keep the communities which they are the life blood of supporting and growing vibrant.

FS: Good morning. I'm Jennifer Gutwald. I am with WARF, the tech transfer office for the University of Wisconsin, Madison. And I’ve been there about 15 years now doing licensing and am a huge advocate of tech transfer out of nonprofit out into industry. And I'm interested in hearing what people have to say today and have some ideas of my own.

MS: I'm Kevin Walters. I'm also with WARF, the Wisconsin Alumni Research Foundation, at UW, Madison. I'm in the Communications Department and I'm a historian of tech transfer. I'm currently finishing up a dissertation on the founding of WARF and the creation of it. So I'm interested in the broader history of Bayh-Dole and Stevenson and Widdler and those kinds of things.

MS: I'm Dennis Owens. I'm with the University of Utah, specifically with the Office of General Counsel, but assigned to be the liaison for our office with our tech transfer office. Been there about 12 years and seen the organization through about four or five different administrators with very different styles and all looking towards the same objectives and goals, but coming at it from different approaches, so it’s been helpful to see that.

I also work a great deal with partnerships with pharmaceutical companies doing research with a lot of our health sciences professionals.

MS: Good morning everyone. I'm Rich Shula. I head up tech transfer for Michigan State University and I’ve been there about six years. Before that I was at University of Michigan in a similar capacity doing engineering tech transfer. And for about 20 years before that I was in private industry. So I’ve worked at this for industry academic tech transfer interface for most of my career actually. So looking forward to talking about it. Also probably wear my AUTM hat on today a little bit. I'm on the AUTM Board of Directors, so we’ll talk about that. And I do have some ideas that I'm happy to share today when we get to that part. Thanks.

FS: Good morning everyone. My name’s Caroline Nowinski Collins. I'm currently the CEO of UI Labs and we have a number of our partner universities in here. We’ve run the National Digital Manufacturing and Design Innovation Institute. So one of the manufacturing USA institutes. But I’ve been like many of you in the room personally passionate and committed to this industry, university, government interface for my entire career, first as an entrepreneur, licensing technology out of a university, then as a venture capitalist with an entire portfolio of university spin outs and then as a banker before moving to the University of Illinois, where I was part of the Economic Development Office. So really seeing how this interface really enhances economic development from a broad U.S. perspective as well as a regional and local perspective. So really excited to share some ideas and hear from lots of you in the room as well.

FS: Hello. I'm Grace Fisher. I feel like I'm a little bit of an outlier in the sense I'm a patent attorney. I represent, have represented several universities and I certainly represent many startups, small entities, all of whom are very interested in return on investment. I'm here primarily for background information.

FS: My name’s Erica Fisial. And I'm the Director of Tech Transfer at the Dall and Danforth Plant Science Center down in St. Louis, Missouri. I’ve been there for about four years. And, of course, I'm interested in translating the bench ideas out into the marketplace. So that’s why I'm here.

MS: Good morning. I'm Keith Lester. I'm a public affairs manager at Rockwell Automation right up the road in Milwaukee. World’s largest industrial automation provider. I'm here for Dave Vasco, our Director of Advanced Technology who can’t be here today.

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FS: Thank you so much everyone. We have such a wonderful breadth of experience and expertise in this room. So we’ll go ahead and have you start coming up to the microphones. If you could just say who you are each time you come up so that we know who’s making the comment on the transcript. Thank you.

FS: There’s a reason for a prepared statement, because I could talk for the entire three hours. While there are many opportunities, again, Cherry Schmidt from FERMI National Accelerator Laboratory. Also a member of the Federal Laboratory Consortium, a member of the Technology Transfer Working Group at DOE, and the member of the National Laboratory Technology Transfer Working Group, also at DOE.

While there are many opportunities to improve the technology transfer process and increase the return on investment in the federal laboratory system, there are two fundamentals that consistently rise to the top of the list. One, sustaining technology transfer as a mission at all federal laboratories both government operated or contractor operated and, two, securing the necessary resources to bridge the gap from basic research to industrial application.

Every few years during another technology transfer reform effort someone will say that we “need to make technology transfer a mission.” Yet technology transfer is clearly a mission for federal laboratories including DOE’s national labs. It is a statutory authority under Stevenson Wildler (ph.). It is explicitly included in the prime contracts for every DOE laboratory and facility. It is reinforced periodically by Secretary of Energy Policy Notices and it is monitored by both DOE and NIST through annual data calls and reports.

The issue isn’t whether technology transfer is a mission, the issue is whether technology transfer is an important mission for a given agency, program, laboratory or facility and whether that importance is sustained over time. One of the best metrics for determining the mission priority of technology transfer within an agency or a laboratory is to measure the investment that is made in the Office of Research and Technology Applications or the ORTA functions at a laboratory.

In the early 1990s, for example, DOE demonstrated a significant commitment to technology transfer by establishing a floor of 0.5 percent of a laboratory’s operating funds to be allocated to technology transfer activities. Every program office, including those funding basic scientific research and those funding national security missions or directed to support that level of effort if not more.

As a result the technology transfer programs at all DOE laboratories began to grow dramatically. By the early 2000s the focus shifted and the floor became a ceiling of 0.45 percent. The impact was significant for many laboratories. Loss of knowledgeable technology transfer personnel, loss of valuable relationships with industry and a reduction in the number of inventions disclosed, protected and ultimately transferred to industry.

Now that the pendulum is swinging the other way many laboratories are still struggling with restoring the momentum that was lost. The first set of recommendations therefore are the stick part of my carrot and stick story today that would require agencies to properly fund the ORTA (ph.) functions at a laboratory.

So the first recommendation is to increase the ORTA staffing levels that are defined by Stevenson Wildler. Currently labs with over 200 scientific employees are required to have only one full time tech transfer professional. So for a large laboratory this level of staffing is clearly not sufficient to provide even the most basic services. Perhaps the statutory expectation could be reframed such as stating that there should be one technology transfer professional for every x number of scientific personnel, drawing on the combined experiences and best practices of both federal laboratories and universities.

The second recommendation in the stick carrot category is revise the definition of sufficient resources that is included in Stevenson Wildler to execute the technology transfer mission. The resources that are needed go beyond the ORTA staffing. Patents’ budgets need to be aligned properly with the technologies and the realities of a global marketplace. Researchers need to be provided with the time and the budget to participate in the patent process. At a minimum the definition of what should be funded should be expanded so that laboratories have the authority to request and allocate sufficient funding and a more aggressive solution would be to establish a statutory floor for each laboratory and agency.

Securing the necessary resources to bridge the gap from basic research to industrial application is an even bigger challenge. Good ideas need to be developed at least to the point of component or breadboard validation in a laboratory environment or technology readiness level four, if not to the point of prototype technology readiness level six, in order to attract more industry investment and interest.

Although cost share requirements in various technology development programs provide some incentive for industry to engage earlier in the process, it does not appear to be sufficient to increase the number of companies that engage with the labs or accelerate the transfer of technologies into industrial application. A more incentive based set of options, the carrot, include first special R&D tax incentives for companies who engage in collaborative R&D with federal labs and universities.

Tax credits are a proven device for stimulating private investment in R&D. Special tax credits would provide a more market driven alternative to minimum cost share requirements, increasing not only the investment in joint R&D but also the number and types of companies participating. For example, small companies are not always able to offer a 20 to 50 percent in kind contribution since the near term opportunity cost is greater than the long term benefit. A tax credit, however, could change the economics of the decision for even the smallest companies.

Incentives are also important for the laboratories. So the second recommendation is to allow laboratories to charge a two to three percent technology transfer fee for reimbursable work that could be reinvested in technology transfer. Licensing revenues have served as a significant incentive for those of us who can receive them and that’s particular the large multi program labs at DOE that engage in materials research.

These revenues are very flexible and can be reinvested at the laboratory in a wide range of activities. For smaller basic research labs, like FERMI lab, the potential for meaningful license revenues is typically quite small. So researchers have little incentive to commit to patent and licensing activities since it takes them away from their primary mission.

However the unique technology capabilities and facilities at most labs provide the opportunity for joint research with industry. Charging a small fee would provide a revenue stream that like licensing revenues could be reinvested in technology transfer functions at the lab including investments in research of interest to the participating research. That concludes the formal remarks and I look forward to the rest of the discussion. Thank you.

FS: Thank you so much.

FS: I guess we’ll get the National Labs out of the way. I also have prepared remarks.

FS: Thank you.

FS: So thank you for the opportunity to be able to participate, so we do appreciate it. So this will give a little bit of a different context. We are a different laboratory.

MS: Please identify yourself.

FS: I'm Diane Hart, from Argon National Laboratory. And I manage the sponsored research program there. So the DOE National Laboratories are mission driven organizations. The mission of the DOE is to ensure America’s security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. Argon National Laboratory is a DOE Office of Science multi program laboratory that conducts cutting edge science and technology, research and development in multiple scientific domains in support of that DOE mission.

Our focus is typically on longer term multidisciplinary challenges rather than near term solutions to commercial issues. We leverage investments from DOE and other federal and non-federal sponsors to develop science and technology expertise and infrastructure in order to execute that mission. We define technology transfer in the broad sense as the process of transferring scientific findings from one organization to another for the purposes of further research, development and/or commercialization.

As such, Argon as with other DOE National Laboratories has a number of ways in which we execute tech transfer including through publications, presentations of our research efforts, hosting scientific users at our cutting edge user facilities, sponsored research activities, conducted with non-DOE federal sponsors as well as with non-federal sponsors including industry, not for profits, foundations, etc.

Personnel exchanges with industry, joint appointments with academia, licensing of patents and copyrights secured through our research efforts, spinouts of startups run by entrepreneurs who want to move our science and technology into commercial applications and through novel commercialization mechanisms sponsored by the DOE that leveraged the use of lab expertise, such as a small business voucher program, the lab embedded entrepreneurship program, technology commercialization fund, etc.

Past legislation including Bayh-Dole and Stevenson Wildler has been instrumental in enabling the transition of research conducted at the National Laboratories to commercial use. Given that it’s been about four decades since the passage of these laws and given the global economic landscape is very different today than it was then, this is a good time to revisit those core federal technology transfer principles and ask the question as to whether they should be adapted or changed in some way.

We have the following suggestions for enhancing commercialization impacts from federally funded research.

First, the role of software in research and development has grown significantly over the years since initial technology transfer legislation. There’s an opportunity to create clear and uniform policy and procedures for asserting software copyright ownership and enabling transfer of licensing and federally funded software. We believe that the absence of such policies has created confusion and served as an obstacle to commercialization success.

Two, we recommend clarification of the U.S. competitiveness provision, such as substantial manufacture in the United States in relation to sponsored research and licensing activities conducted at the National Labs. Given the multinational firms and global supply chains even U.S. companies balk at the provision which is an obstacle to greater commercialization activities.

Three, we recommend making available federal funds to support technology maturation to proof of concept and/or prototypes stages of development to partially bridge that valley of death in translating early stage technology and to commercial applications. This can be done in a number of ways including making funds available to labs for this effort, motivating entrepreneurs in small businesses to increase such activities and supporting collaborative commercialization efforts between the labs and industry.

Since commercialization is not a one size fits all activity we recommend all of these approaches. And lastly we recommend offering flexibility and cost share expectations when industry collaborates with the laboratories as oppose to more stringently requiring the one to one matching type funds. And I thank you for the opportunity to comment. So look forward to conversations.

FS: Thank you.

FS: So we’ve had our National Lab representatives. Others to the mic?

FS: So I'm Lisa Lorenzen with Iowa State University. And we’re a fortunate tech transfer office. We were the second oldest tech transfer office. WARF beat us by about three years. So it must be a Midwest thing. And I guess we’re also second to them because our budget’s nowhere near what there is. Our endowment’s much, much smaller. But we’re fortunate that we have been able to self-sustain since the 90s. And we have a budget model going forward that looks to continue that. So we’re in a really fortunate spot that we can continue to look forward, we can make decisions and take chances, which I know a lot of offices can.

But what we’re seeing more and more, I’ve been officially the director for seven years, but I worked very closely with the office before that, and what we see increasingly is industry’s unwillingness to license technologies before, somebody said TRL4 a minute ago, we’ll even go towards six, okay? It’s about six. And if we don’t get them to TRL6 they’re like, well, let us know if you ever get that de-risked.

I did an evaluation of a couple hundred of our technologies before I came here. 82 percent of our technologies are a TRL2 or below. So how do you get them from two to six? And that’s a struggle. What increasingly our faculty feel like is the mechanism is to do a startup company. Ooh, let’s do a startup company, because those SBIR funds they’ll get us from TRL2 to six.

Now I'm taking a risk here putting this on record with my name but that doesn’t work, because they’re faculty members who are trying to fund their research. And they’re funding their research by forming an air quotes company that they never have any intention of selling anything. They just want to get their technology funded, get it to a point where maybe industry’s interested and quite frankly they honestly don’t care if industry is interested either, but if they get research dollars and can keep feeding their graduate students that’s what’s most important to them.

So what I would encourage you to think about are alternative mechanisms to startup companies that can help get our technologies from two to six. We struggle to even engage companies in research, cooperative research at that TRL2 level. You almost need to get it to four before they’re even willing to say, yep, I’ll put some money in and help co-fund it. So how do we get our technologies to that point?

Just yesterday we were reviewing a technology that, I won’t go into details, it looks really promising, it’s a really, really cool technology. And we all sat around the table and went well, he’s out of money. How are we ever going to get this to the point where it can really make a difference? So that’s the first thing that we see.

The second thing that we see is also increased complexity. And this owner’s expense I will use a real example. Many years ago, it’s probably been six, seven years ago we received a technology that on the really large transmission poles it can prevent catastrophic failure. So if one pole goes down it creates a cascade and all the poles go down. It’s not a very high tech solution, but it’s a way that if the first pole has this addition to it it will bend, it will not break and it will prevent the cascade failure.

It seems like a no brainer. But by the time, and we actually got an individual to license it to try to move it forward, but it required eight different industries to all come together and all agree that this was a good idea, because it wasn’t just the people building the poles, it was the electric company, it was the people who had the wires on the poles. I can’t even remember what all the eight different industry sectors were.

But when we get technologies like that we struggle with having the resources to pull somebody off their day to day, I’ve got to get technologies evaluated and try to market them, to really spend time invested in these technologies that require you bringing in multiple parties and might take two or three years of multiple parties having discussions to move them forward. But ultimately they really could make a big difference if you could make that investment.

I don’t have a solution on how to solve that one, or even a recommendation, but that’s just an observation. Then I finally just wanted to echo the U.S. manufacturing issue. We run into that with a lot of our technologies, we license it to a large multinational and it goes nowhere because their manufacturing is all, usually in Japan, and even though they try they’re not able to get the waivers and the technology dies. Thank you.

**(END OF FILE)**

FS: I’ll echo what everybody else said, thank you for the opportunity to comment. So my name’s Caroline Collins and I'm the CEO of UI Labs and again we run the Digital Manufacturing and Design Innovation Institute. So got a couple of notes. Not quite the great prepared remarks that you guys shared.

But as I mentioned when I introduced myself I’ve seen technology transfer from a number of different lenses and have seen all sorts of challenges too, from trying to sell a Northwestern based startup to a Japanese company and dealing with the things around manufacturing requirements and merchant rights and government use rights and I think those things still exist today. I don’t have some great solutions on those, but I think that there is just a general need to redefine and clarify those. And I think that’s something that is well known.

But instead I wanted to talk a little bit more about some of the themes that come up around what we mean when we say technology transfer and how that has evolved over the last several decades. So we at UI Labs have increasingly been thinking about, I should say when we launched five years ago roughly we talked a lot about innovation and commercialization. And we have actually moved ourselves to innovation to adoption, because I think that there is, when we say commercialization and we say technology transfer it can mean a lot of different things. It can mean things like publications, it can mean things like licensing. But until these technologies actually get in the hands of a user and there’s a commercial impact on that, then I don't think we’ve done our job. And so clarifying what we mean by successful technology transfer.

And so I think some of this was also I think raised before, but there’s a lot of things happening in the marketplace and so I think anchoring on what some of those things are. One is the accelerating pace of technology and the complexity of technology, the need for technologies to work together. And the fact that frankly a lot of our research now is being outpaced by the commercial markets. And so how do we continually evaluate where our investments are made so that can, that the U.S. can keep up. But then also that our federal investments keep up with commercial investments.

And there’s also a challenge of decreasing resources and that’s not just at our universities and labs, which we’ve already heard about, but it’s also within our corporations. And I think you mentioned this with respect to BOSH (ph.). I mean, I think there is an increasing need to be able to validate ROI and we have an increasing limited ability to prove that early on in the life cycle.

So quick and measureable ROI and this is also where we’ve got things like activist investors causing troubles that you don’t even think about that having the impact on university and lab tech transfer, but it does when our corporations are forced to really rationalize what their investments are.

And then we also have just the challenges that are typical sources of commercialization dollars, things like seed capital, angel capital, venture capital continue to move north in terms of the stage that they have the requirements around TRL levels to be able to make those investments. And so I think we have to be thinking about how we invest and how we extend.

So let me move to what I think needs to be done and maybe a couple of proposed solutions. So I kind of bucketed this into three different areas. The first one is how do we bring technology closer to the customer? So what are some of those mechanisms to advance the TRL levels?

And I think from the Manufacturing USA perspective and Phil and others have heard me harp on this before, I think there was a challenge in how it was set up to look at TRLs four through seven because the reality is we performed a lot like the universities and some of the challenges that were just mentioned from Iowa State that we operated in that TRL four through seven and most of our technologies that we invested in early are still at four and five. And there aren’t resources to get them further.

And we have actually said that seven might even still not be far enough along that we think we increasingly see our commercial partners looking for technologies in the seven to eight range before they feel like there is an opportunity to invest. And so how can we create more partnerships around application? I think programs like Manufacturing USA, I mean, some of the energy hubs. There’s actually a number of different mechanisms. How do we create those partnerships around applications that allow us to get that voice of the customer early and that partnerships to move things later on?

I think this also has to do with just understanding of customers. So programs like ICOR and Lab Core are using the lean startup methodology forcing that function earlier into the stages, and so, and I mean requiring some of these types of activities as a necessity for making and accepting that investment from the federal government.

So if number one is bring us closer to the customer, number two is we’ve got to actually train the talent, so the entrepreneurial training and I think again things like ICORE and Lab Core begin to get at some of that training. I think newer programs like hacking for defense, some of the earlier programs that our universities have used around incubators and accelerators, but I think that we need more investment in those things. So again how do we better connect what’s happening at our universities? And there’s a number of mechanisms obviously through commerce that are designed to do this. But I think that we need to begin to figure out where there are more resources to make those investments.

And that leads to the third piece, which is access to and coordination of resources. And I think that the access … generally speaking there’s more and more resources. There’s not enough, but there’s more and more. However, the connection of these resources and the coordination of them I think is something that I’ve seen as a challenge across a number of different dimensions. And so increasing the opportunities for collaboration across industry, academia and government I think are critical in being able coordinate those things. But even within and across universities and within and across the federal agencies.

And so how does, and this is something, Dave and Phil know this well, but how do we better connect the manufacturing institutes to MEP? But then how do we even go back a step further and connect maybe some of the investments in programs like ICORE and Lab Core and the university incubators to the manufacturing institutes? I think it’s again it’s the connection across these things and the coordination of resources that will begin to get us further along.

So thank you again for the opportunity to make some comments and I really appreciate the ideas that are being shared today.

FS: Hi. Christie Frasier from the University of Chicago. I actually have a question. So it’s getting back to something that you mentioned in the presentation and that’s a definition of return on investment, just to help with the brainstorming, especially around number two on the bullets up there. I'm wondering if you can just define what you mean by return on investment.

MS: Shyam Sunder. We actually, the Director of NIST, Walt Copen, who actually owns this initiative, defines return on investment very broadly. So we are not talking necessarily about financial returns through licensing fees, but we’re talking about return on investment to the nation in terms of national security, economic security, the unleashing of new products and services so that while we do recognize that a lot of the data that is collected on an annual basis is on things like licenses and patents and revenues associated with that and partnerships like CRATAS (ph.) and things.

Are they the right metrics, they’re easy to measure, and sometimes they may not be the right things to measure, because as you know metrics tend to incentivize behavior and having the right metrics is really important. So if the overall goal here is benefit to the nation, America, then how do we go about measuring those metrics?

By the way a lot of the kinds of issues that surfaced in the discussion earlier this morning really revolve around, particularly the topic of manufacturing and so on revolves around benefit to the nation. I mean, if the American taxpayers are putting in this money into this R&D what is the return to the American taxpayers as a result of that investment?

MS: So again, I'm Phil Hockburger from Northwestern. I'm the Associate Vice President for Research. And Christy I want to just mention to you that there’s a publication that many of us in the field use by the National Research Council, the National Academies in 2014 and it was an entire issue devoted to return on investment including definitions, and it was called Furthering America’s Research Enterprise. And so it’s available online as a PDF file. So I would start there.

And one of the take home messages from that is that research is an ecosystem and trying to parse out the return of any piece of an ecosystem is a challenge. And I think that’s one of the important elements in the difficulty that we’re all going to face with trying to answer that question of what is that return, because the returns are spread. On any one particular development those returns get spread. So anyway we can spend the whole time on that and that’s not what I want to talk about.

And I don’t want to talk about tech transfer. I want to talk about something that Caroline introduced but didn’t go and that’s partnerships. So university/industry partnerships, university/national lab partnerships, which we have strong ones with Argon, developing ones with FERMI. But there are challenges in these partnerships. But I'm going to pick on the university/industry ones for the moment, because I think there in the area of public policy is the area where we’re going to need to consider big changes.

So my colleague, my Vice President of Research has spent five trips in the last three months in China. I'm going to in September. We’re developing partnerships and agreements with universities there and one of the things we’re learning is that the universities in China have relationships with industry that are integrated tightly. We have traditionally in this country, for the last century, thought of universities as sort of public investments, if you will, even in private institutions, and so we have in a sense shackled ourselves from being able to really let loose with the power of our intellectual property by saying universities, you’re nonprofit, you don’t do that, you don’t develop partnerships with industry.

And I think today in the modern world we need to revisit this. I think this could be as radical as the Bayh-Dole change in attitude. What I'm proposing here is to take a step back and ask ourselves why don’t we let the universities partner with industry? Now again this is a very different social contract, one that says universities have traditionally been thought of in IRS terms as nonprofit, you know, you do your thing, but separate.

But we have many examples of other nonprofits who are allowed to move into the private sector. As long as they don’t invest in other competing technologies, they are allowed to grow their business as it were. So that’s one model that already exists. What I'm proposing is even more radical than that in thinking of the way the Chinese are now thinking about setting up.

So for those of you who don’t know the Chinese have only since the late 1940s gotten serious about universities in their country and starting in the 2000s, really recently, are investing in massive growth in their universities right now. All you have to do is pick up Science Magazine to see all of the ads. They’re recruiting massively throughout the world to populate and developing partnerships. I'm on my way there for a ten day trip in September with three of the universities, developing partnerships with them. We have a large number.

But one of the things we’re doing, and this is university to university is we’re not talking about doing that here with our industries. So I'm throwing out there this notion that university/industry partnerships have been shackled by what I consider to be a century old idea that universities as nonprofits shouldn’t do that. And I’d like us to reconsider that.

FS: Can I ask you a quick follow up question? You opened by saying that you weren’t going to talk about tech transfer and then talked about partnerships. And so I'm curious to know, what is your definition of tech transfer?

MS: Well, they’re integrated. Once you develop these partnerships there are questions of who owns what. And we do this already. I think of tech transfer as outgoing, information that developed within the university and now goes out to the world in some form that allows us as a society or through an industry to capitalize on that.

A partnership to me is very different. A partnership is the integration of the intellectual property in the beginning when you’re sitting down and you’re not even sure where you’re going, you’re just saying I’ve got a company or a business, manufacturing initiative, whatever it is, let’s sit down and develop some ideas together where from the very beginning. Whereas to me tech transfer is that’s already happened and now how do you get it out?

FS: Okay. Thank you.

MS: Yes, good morning, David Bulite, President of the Illinois Manufacturing Excellence Center, the Illinois Manufacturing Extension Partnership with U.S. Commerce. I’d like to just give briefly a perspective from the small, midsized manufacturers, some of the work that we’re doing and what we see as barriers with a few suggestions for improvement.

So as many of us are likely we’re, 99 percent of manufacturers are small, medium sized manufacturers. 70 percent less than 20 employees. This is an increasing share of the manufacturing base. And small, mid-sized manufacturers are becoming an increasing proportion of supply chain, supply chain cost. So the importance is getting more and more critical, particularly if we get into the conversation about the gap of the adoption of technologies of the small companies versus larger ones.

In our work we do, as a center here in Illinois, about 500 projects a year, last year just under 500 projects with companies in-depth, onsite. Approximately 75 of those I would call to be technology adoption projects. Candidly a vast majority of those would be very late stage or already commercially viable technology adoption, but certainly new technology from the company’s perspective.

And in our work in the scouting of technologies and helping understand the technologies we certainly see good intentions by all parties, but then we become challenged by execution to finalize the project. And there’s a couple of those barriers that I think we all understand, which is around time, it’s around money, it’s around expertise. And the other one I would add is intellectual property.

So time is one of the, where does a small, midsized manufacturing leader spend their time? They wear many hats and have a lot on their plate, focused on generally shorter term time horizons. So how do they invest their time? Equally where we see when we’re working with tech transfer organizations is also where their time is spent and how they’re focused on their priorities that may not be aligned with the specific small project.

When we talk about money there’s the access to money, but then the return on investment question or comment, and certainly understanding the greater definition of return on investment, these manufacturers are certainly going to look at return on investment from that very narrow financial lens with a shorter time horizon of let’s say two years or even less. Having that expertise on staff or access to expertise I think falls relatedly with the financial aspects of it.

So how do we pay for or get access to the expertise we need. And then the challenge of not knowing or not understanding intellectual property and how to navigate that and navigate that efficiently and know as a company that we’ve made the appropriate decisions for our organization.

So some ideas for consideration as we look at these barriers and we look at how to solve some of them. It really is around mechanisms or incentives in three ways. And the first one is around the tech transfer programs, around the universities, the Manufacturing USA and others, and the relationship and working with organizations such as the MEPs, other facilitators or intermediaries that can work closely to help navigate and work through. As an example, brief example, working with DMDII and MEP about an embedded staff, right?

So how do we focus staff time and how do we focus resources to be able to look at how we allocate time that complements the translation of conversations from tech transfer to the conversations that a small, midsized manufacturer does. One of the barriers or hurdles we’ve had ourselves along the way is particularly when it comes to federal program, working with federal program and how do we think through the business model of this as our organizations and that federal funding can’t match federal funding. And so how we think through and overcome that hurdle I think is an important step.

There is, and this was mentioned earlier, but the incentives around the small, midsized manufacturers themselves, the R&D tax credits and ways to look at the ways to enhance that even further when we look at the federally funded technology. R&D tax credits generally would qualify. But again I think there’s avenues to really improve, tighten that or heighten the awareness of the opportunity.

And then the mechanisms or incentives for the tech transfer offices and the labs themselves, particularly around the idea of leveraging their expertise, phenomenal knowledge base that sits there, to help solve current solutions, or current challenges that manufacturers are facing. And these might not be the early stage technologies, but they truly are the barriers and the hurdles and the opportunities that technology investments and the application of expertise could help overcome and make these companies competitive in way that shows a quick return on investment.

Last recommendation or idea to consider is really around the language we use to talk about technology. And it is about making that technology into useable form, very common language, perhaps as examples of use cases and potential scenarios of use cases of what this technology could mean for me as a fabricator metal manufacturer in my common industry language, being able to understand this wonderful technology and how it fits into my workplace.

Having that translation of the language so that it can be understood about the potential scenarios, I think is an important step for the leaders of manufacturers to be able to step back and say, okay, I can see the potential fit of this technology, therefore I want to invest more time, energy and resources. Thank you for the opportunity to speak here today in the public forum.

FS: Thank you.

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MS: Good morning again. My name is Rich Chilla with Michigan State University. And I do have several bullet points of some suggestions, recommendations that I’d like to provide. Before I do so though, we were talking about this concept of return on investment and impact and one of our challenges at a university is always trying to tell our story about why the public should care about the research that goes on at a university in federal funding.

And actually our VPR had a great story here was telling to a lay audience. He says a really high percentage of you have iPhones. And you think that hits comes from Apple and it does of course, it’s the creative engineers and talented Apple that developed this product. But what you may not know is an iPhone contains over 150 individual inventions that were initially all funded by federal funding at either universities or federal laboratories.

So, yeah, you have an iPhone and you have it from Apple, but all of that is built on the backs of the basic technology that came out of federally funding. And that’s why federal funding is important to the quality of life in the United States and in the world. And I think that it’s just a great story that captures the importance of it.

A couple of things that I wanted to just mention from the perspective of a major research university we think that Bayh-Dole is working well. And even with its revisions we think it’s an excellent law and we aren’t recommending any additional changes to Bayh-Dole. One very, very small suggestion, the way you improve impact is by measuring something over time.

And we’ve observed that the federal labs do not regularly report their tech transfer metrics in things like the AUTM survey. It just is a very, very small recommendation to encourage federal labs to report all their technology activity every year in things like the AUTM survey so that it can be measured, benchmarked and the improvements can readily be measured.

A lot of the federal lab folks were talking about the importance of translation research funding. The fact that our university research is in such early stage TRL2 or lower and we need to get it to TRL6 for it to be interesting. Very much true at my university. So to put it in perspective our university has a research budget of about 700 million dollars a year.

My office between the state and our own internal university funds, my office spends more than a million dollars in translation research every year, taking TRL2 inventions and trying to get them to TRL6 inventions. And that’s a pretty significant investment. And we’re fortunate that our administration is supportive of it and that the state of Michigan is actually supportive in those activities.

Finally, I’ll just end with an AUTM initiative. So Association of University Technology Managers (AUTM), we’re working on impact key performance indicators. And we have a project where we’re working to try and help identify what those key performance indicators are for impact rather than just getting beyond the dollars, the licenses, the accounting, if you will, of technology transfer. So look forward to that in the next couple of years. Thank you for your time.

FS: I have a bit of a different perspective. I'm Elizabeth Thelan, Milwaukee Seven. Nice to know some WARF colleagues, and Rockwell is here. So I want to start with a little bit of a story, and please note that my background is like industry, entrepreneurial, and behavioral science. So though I love what I'm hearing in here, I'm so glad I took the time to get here. But I want to offer a different, an additional perspective that behavior needs to change.

So I'm working with this national lab who I mentioned earlier but won’t mention on this recording, and I asked for a 200 dollar pop up marketing, you know, those things that pop up that tell you what’s in the national lab. And I got an email back. Well, first of all there’s like three conversations and then I got an email back that copied four people, including an attorney, and basically it said no.

And I'm thinking, wow, 200 bucks, I could go make it and buy it, but I can’t because there’s … and I also kind of get it, because there’s a logo on there that we have to protect. But I'm in a cooperative agreement where they’re listed in the cooperative agreement, so it was very challenging. And somebody like me who comes from building things, starting things, just thought this is too overwhelming. I can’t … 200 bucks, it’s an item, can I get it?

Now what I want to say about the behavior piece to that that I think we all need to consider, and I’ll go to the industry side in a moment, is find ways to say, yes, there just seems to be this automatic no, and here’s the policy that backs me up. It’s so challenging. And in my team I laugh, I mean, we joke, I got here we are, right at the problem again. How is industry supposed to interact?

How are we supposed to … we want to, or the intermediary, I'm more in the intermediary stage, but the hurdles when something like I just shared with you is so simple, because I'm trying to promote that these technologies exist in this lab and I will be in my region and I could stand at a table and talk about it.

So that’s one side of it. I think just that there are things, incentives are important, policies are important, skill level. So in my behavioral science background you pick a behavior, like find ways to say yes or how can I say yes or how can I help you, let me see. Whatever that action is, there are like six plus sources that we could, like policy, social pressure, structure which I heard, you know, structure would be resources and organizational charts and I can’t have one person for 200 researchers. So all of that is part of the equation. It’s just that I'm saying look at exactly what it is we’re trying to change.

Now back to our region, so we are Midwest and there is this tendency … I'm actually having a meeting, I told you about customer interviews, there’s a, I would call it a lack of awareness on the manufacturing … I’ll just say business side, small, medium, large, it doesn’t matter. I don’t even know what the resources are. So we have one federal lab that’s in Madison and then we have awesome universities, but again the industry says it’s hard to navigate, where do I go, I got to go to my favorite one.

But I’ll just stick to the favorite lab side, which is when I tell people how many federal labs there are they’re just … you know, it’s the marketing side. Now I go from behavior to marketing. But in our region we’re starting, and I’ll tell the Rockwell, I don't remember your first name, but … Keith, thank you. There’s a woman there who came to me and we’re going to start, we’re actually meeting Monday morning. And just talking about open innovation, how do we share, where do we go? So the ecosystem, whoever mentioned connections? Yes, you did. That is absolutely critical.

So we’re looking on the industry side and what behavior might they change. An example of that in a positive way is, I told you I was at the Water Council, there was a large water company and they say I don’t even care, I'm going to share our challenges out there for people to understand. So that’s a mindset of being open. They do corporate accelerators, they do the IUCRC, they do the local accelerators, they do mergers and acquisitions. But most companies aren’t thinking that way. They’re thinking it’s mine or my engineer has to come up with it. Or the small and startups don’t have time. So that’s a resource question.

I love all the suggestions on the policy and the incentives in R&D. I just wanted to offer a different perspective that in the end we have to get some behaviors to change because, wow, I've only been at this particular project for, I don't know, let’s call it six months, and I just bang my head against the wall and go can we really solve this?

And I feel inspired being in this room, which is why I came, and I feel inspired by the new policies that are coming out, yet I hear these long term perspectives like we’ve been there, done that, we’ve heard it all before, but I hope we can do it. And I would like to be part of it. So thank you for offering this and thank you for everybody to share.

MS: Hello. So I guess I'm just go to give a little context to maybe my experience before I jump in.

FS: Name, please.

MS: Matt Hamilton at Well Spring. So we’ve been involved in building software tools, both for technology transfer as well as scouting in companies looking for technologies as well as public products that pull together portfolios of intellectual property, research publications and things like this.

And so we actually internally always refer to this as the knowledge supply chain, because we’re not after technology transfer but really that whole chain of events of knowledge that gets transferred from both directions. And I think everyone’s sort of talked about that, which is having a technology and not knowing what it’s going to be applied for and how it translates to industry is a big problem. And most companies don’t have time to think through all of that.

They actually need those people to be involved in, somebody to be involved in sort of making that translation. So from speaking with them and certainly hearing from everybody here that challenge of understanding the level of technology development as a barrier to technology transfer I think is really there. I mean, I talk to companies regularly who when I show them tools that we have that support them and I'm like well, you can interact with universities and they’re like oh, it’s too early.

They want to see what companies are coming out of there or maybe the spinouts that have come out of there or how can you tell me exactly how ready this technology is so that I can bring it in? And so those are the kinds of tools that we’re thinking about as a company of like how can we create better ways to communicate that to industry, but also I think from here how are we creating the right infrastructure that supports that like tier advancement?

So I think some of that comes from getting your entrepreneurs, certainty barriers, theirs, to understand like what can we do to make it easier for folks to get involved and actually make that effort? It’s not as someone pointed out creating more startups if it’s just faculty startups, you know. Faculty are not coming from that perspective of trying to necessarily like really understand an industry and maybe necessarily know how to translate.

I don't think that’s true for everybody. I’ve certainly met many that are. But it’s about recruiting people from industry, from the small companies that actually want to engage either for a period of time, maybe in sabbatical type programs that gives them some structure and reduces that uncertainty of taking on being an entrepreneur where you feel like oh, I’ve just dropped everything to try to make this technology happen as opposed to people that might have the expertise and can contribute to moving the TRL levels forward.

So I think from my standpoint creating programs around that, and many already exist, but supporting those at a greater level to get more people involved would help push that.

The other barriers that I see are probably from a vendor perspective as a software company. And so I can tell you that there’s a lot or regulation in dealing with government agencies and more and more universities. So you guys have probably read about GDPR, which is coming from Europe, Fed Ramp, does everybody here know what Fed Ramp is? That in itself is surprising.

So Fed Ramp is a federal program that one must go through if you’re going to be a cloud provider of software, so if you want to move things in the cloud. Obviously lots of software is now in the cloud. Lots of tools. Lots of the technologies you might want to develop in software were supporting other products could be cloud based programs.

But if you’re going through a regulation where you need to get certification to even become a cloud provider it’s not necessarily fostering small business by making those regulations so hard. It’s basically adding to the cost of trying to deliver software or innovate software within the federal sphere. So you know I think that’s something to look at. I think when that program is around, I mean, obviously security is very important, don’t mean to diminish that, but I don't think it was necessarily thought of from the standpoint of how is this going to impact innovation and how does it impact small companies’ engagement with the federal government?

MS: Mike Caruso from Bosch. And I'm Director of Public Private Partnerships and I’ve been facilitating collaborations with university, national labs, since about 2007. And Bosch is a nearly 80 billion dollar company, globally 400,000 associates. And a typical investment in R&D of about seven percent. And so it’s not surprising that I'm often asked the question or given the challenge by our executives for is this time that we’re investing in these types of collaborations paying off?

Maybe said in another way what’s the opportunity cost? If we were to spend a million dollars on the funded collaboration where there’s a cost share requirement from the Department of Energy or do we spend a million dollars on our own, on our own dollars. And it’s a perfectly fair question and it’s exceedingly difficult to answer. That’s not because if I invested the time to chase down the rabbit hole to look how to put a frame around the sales that resulted from that collaboration we had back in 2007? It’s difficult and often anecdotal. And so this is the challenge that I get.

However, when I pose that question to the regional leadership that participated in the project they might say can I make a direct tie with commercialization? No. Would you spend it? How would you spend that dollar? Unequivocally and every time they’d spend it on the collaboration is the feedback that I get. And it’s not necessarily because of the commercialization, it could be there, you know, if you invest the time to make the connection. But in this one particular case it is because of the people that resulted.

He described, there was one particular project we were involved in, at one point we had something approaching 40 different PhD students working on an advanced combustion project at the University of Michigan and Stanford, and he described the people that had come to our company after that as crowned jewels that would not have been there but for the project. And so in that way it’s extremely useful.

I’d also, I also want to give a lot of credit to the usefulness of solicitations themselves. I’ve said so many times that there’s no better way to start a collaboration than two people that get around and crunch on a solicitation to work out what could we work on together? It’s here’s this national challenge, it’s some level of efficiency that you’re trying to achieve that is expressed in the form of a solicitation.

That’s been very helpful for us even just to go through the process and think about for something that’s maybe a lower TRL level what are we even thinking about this, let alone what is our national lab partner, our university partner thinking about that? We’ve had more great university relationships begin just that way, even if it doesn’t result in a proposal.

I’d also like to re-highlight the fact that this is a global competitive overall. I started by just giving a perspective on how big Bosch is as a large global manufacturer, but when it comes to localization, so in general we localize manufacturing where we sell, it’s somewhat of a different matter when you’re talking about the technology leadership. So absent of some clear market driver, you could imagine that say some of the most promising technologies might reside in the home country.

And so in the case of the one example I gave that was this great story about the number of PhD students that was a case where an expertise that resided in a country other than the United States was brought here and has flourished and evolved because of that seed that was planted.

And so when it comes to how do we do more participation, how do we decide if we’re going to invest that dollar in the United States, for example, versus some other country or localizing the investment I thought it was interesting the one example that you gave us an alternate means of cost share that is always a challenge, you know, especially at some of the lower TRL levels when a regional business has decided here’s what our budget looks like for the year and certainly we didn’t plan anything for cost share for this, it’s all been mapped out. Some way or another through some magic, I'm happy to say that we find it, but that could present some interesting opportunities to do something different or to make something happen.

And maybe less specific, I don't know if permissive is the right word, but say the H1B policy in that if there is some proactive way to bring talent from somewhere else to the United States that could be useful. Also the U.S. manufacturing requirement. Again as a global manufacturer this can be an impediment to whether or not we participate in something at the outset.

And then the work itself in that same vein if some technology leadership, obviously maybe not the whole thing, but if some technology leadership exists in some other country in order, like if the solicitation was permissive enough that some of that work in the scope of that solicitation could be done somewhere else that might allow more flexibility for more participation.

I think the one other thing I’d say about institutes in general, my experience so far has been I’ve seen lots of great institutes with fantastic objectives and charters that I ultimately am somehow unable to participate in. I know it’s always difficult grinding through the terms and conditions. That happens no matter what and that’s come to be expected, but what I do find is that decisions are made about, it’s like a microcosm of the other competitive landscape.

So, for example, if a company that might be participating in the institute is competitively disadvantaged at the current time because they feel they’re behind in that particular technology, they have more of an incentive to participate. If another company is in a leadership position and so some manufacturing institute, they have an incentive not to participate, because you have to give something to participate. So I have had the experience in just evaluating an institute based on who’s participating. You know, obviously these people are behind so they need this more than say we do or vice versa. That’s an important consideration. That’s what I have so. So thank you.

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MS: Mike, your comment about working together on solicitation made me think of, so I’d be interested in whether people have experience in prize competitions, which is a different mechanism to advanced technology. And in subsequent comments if anyone has any experience with that as a viable mechanism for developing technology we’d be interested in hearing about that.

MS: Hi, I'm Jamie Crawley, from the University of Michigan. And I’ve only been in this tech transfer area for about ten months. And so I’ve promised my boss, Paula Sorrell that I would sit in the back and keep my mouth shut. But since we’re being honest, the lady in the back said that doesn’t work. So I thought I might as well join in and I just wanted to come from a perspective of my past life, which was a small to medium sized manufacturer and currently at the … we’re a small subset of the University of Michigan, the Economic Growth Institute.

And currently we’re working with the Defense contractors, small supplier, anywhere from 10 people on up to 500. That’s what we consider medium. I know there’s different definitions of that. But I ran the shop for about 25 years and the things that, it was a sheet metal fabrication ship and we did quite well until we made the mistake of getting a big order from General Motors right before they went bankrupt. And that kind of put us on the skids. But that’s the type of thing that a lot of small to medium sized manufacturers deal with every day.

We’re always looking for better ways to work. We worked with Rockwell quite a bit in automation. We did a lot with the automotive industry, obviously being in Jackson, Michigan. But we didn’t really have time to take advantage of all the technology that was out there because what kept us up at night, what kept me up at night was making payroll and trying to pay my suppliers so that I could get the components to build the machines so that I could ship it so that I could finally be paid the second day of the second month after I’ve shipped it so that I could pay my people so they could eat.

And so that is the thing that really hurts the small to medium sized manufacturers that they’re dealing with, real world situations that they have to, the owner walks out on a shop floor and he learns everything that there is opportunity know about the people who are on that shop floor so they can’t take time out in order to go for any of the innovation that might help them or make them more competitive.

Now fast forward to a different part in time, 2018, anybody who wants to be busy now is busy. And so if you have anybody who has time to be involved in tech transfer or take on new things they’re not good, so you’re not dealing with the best companies, because they’re just think to keep their people busy.

So there’s got to be a way to incentivize the small to medium sized manufacturers to take time away from their current customer base in order to take part in the development of a lot of these great technologies that are in the universities and in the federal labs because that’s, I see just from the small amount of time that I’ve been here that that’s where it lags is in that time that okay now how are we going to make a prototype and if you’ve got a good manufacturing partner then they might be able to do it a little bit better than what you would think you could discover doing it in a university environment.

There’s an example of one company that we work with in Hillsdale, Michigan and he makes small motorcycles for professional racing. Now if your child is anywhere from eight to 14 years old and they professionally race motorcycles that’s a thing, then they drive a cobra motorcycle out of Hillsdale, Michigan. And he’s working with that size motor is able to develop, is able to fly a drone.

And so now what the Navy wanted to do is fly drones further. So anyway we worked with them on a couple of different projects and we did some cross collaboration. And there’s a lot of things that can contribute to the collaboration of a good manufacturer, but he’s got to be able to want to take his eye off the ball of his current customer.

And that’s just one of the things that I feel that gets lost in this is that the small to medium sized manufacturers want to take part in this. But they’re not really incentivized in order to do it. Thank you.

MS: Quick comment and we can take a break after that. I just want you to know that in those four questions, look at questions two and three, they’re not simply about tech transfer. In fact it’s transfer of technology, knowledge and capabilities. So the idea of partnerships is embedded in those systemic questions. I just want you to remember it’s a broader set of questions we’re interested in, not just things being thrown over the wall. So that’s one piece.

The other piece is I was curious to hear, and I’ll leave that as probably a thought before we take our break, I believe it was Caroline from UI labs who said sometimes research is outpaced by commercial markets. That implies that innovation really doesn’t need the research. So I want to kind of throw that out as a question because there’s a lot of stuff being said, oh, we need to put more money into more higher TRL stuff. Let’s take that maybe as time if you want to take a break and then come back. That’s a rich area for us to understand what it is the dynamics of this value of debt issue which we all come at very different points of view.

FS: Sure. So let’s go ahead and take about a 15 minute break. If we can reconvene at 10:55. Coffee shop is out to your left, bathrooms are out to your right. And coming back in if you have not had an opportunity to come to the microphone, please feel free. But please know that you are not limited to one trip to the microphone. So if something has been said already that has sparked an idea or something else that you’d like to add to your previous comments, please feel free to come back for a second or a third or however many trips you need. Thank you.

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FS: So we have about another hour here for those of you who have not had the opportunity to make comments yet or those of you who’d like to come back to the microphone. If we end early we’re not required to sit here and awkwardly look at each other for the last 10 or 15 minutes or however long it ends up being. But I did want to reiterate that the conversation does not end at noon. We would love to encourage all of you in addition to the public comments that you’ve made today to please follow up with the opportunity to provide more in depth comments through the RFI process that will be open through July 30th and you can send those directly to ROI at NIST.gov or through the ROI website, NIST.gov/TPO/ROI. So turning back to the microphones, thank you.

FS: Alright, thanks. So I'm Jennifer Gotwald. I am with WARF. I also want to thank the organizers for bringing this together and everybody else for coming out and being so open with your comments. This has been a great sharing experience. So I'm going to speak a bit more pragmatically and probably narrowly too about licensing. That’s what I work in. I’ve been doing licensing deals for about 15 years and I also work in collaboration with my colleagues at national labs quite often because we have joint projects, joint IP, we have a couple of national labs in Madison and our researchers work with other national labs as well. So kind of talk about what I see as the differences and what I think might be helpful for my colleagues doing tech transfer at federal labs to help out a little bit.

So I say this jokingly but with a lot of affection when I work with my colleagues working in licensing at federal labs I always think man, I am so lucky. Licensing early stage technologies out of universities out of research institutions into companies is difficult enough but they’re doing it with one hand tied behind their backs. I have so many more resources, so much more freedom, so much more creativity than they do that I'm like the super star who should be going in and working at those groups, because they are affecting so much with many, many more barriers that I don’t necessarily have.

So speaking from my experience and what we say at WARF I see Bayh-Dole is hugely successful. I’ll echo Rich’s comments there. And a couple of the things that I think make it successful for what I do day to day, is that we have local control over technologies and what we’re going to do with them with oversight obviously, we have clear title and uses of those technologies, what we can do with them, who owns them and the certainty for the companies.

There are incentives both for the inventors to invent things and to help to commercialize them, to develop them, get them up on those readiness levels. And there are incentives for me and my office to get those technologies out there into companies and we’re licensing for use, which I think is what drives me every day is that I want the technologies to get out there and get in there.

So while I want to make a couple of careful suggestions, I want to say that all the things I'm talking about I know are well intentioned but are getting in the way and maybe there’s a way of kind of finessing them a little bit so they don’t slow things down so much. I think federal labs and national labs could have more local control over their licensing and technology transfer. Things are being sent to attorneys in the D.C. area all the time where the get caught up for sometimes six, nine months. I'm working on an inner institutional agreement that took over a year for a D.C. based attorney to review and then comes back full of a lot of things that the actual person I'm dealing with doesn’t understand either, because it kind of came from afar. We need more local control and also more local authority to actually interpret those FAR clauses.

Sometimes different labs even will say I can do this, no, I can’t do that, of course not. And I don't know what they have to go through in order to say well here’s what the FAR clause says and here’s how we’re interpreting them. It seems like I don't know what level you get to before somebody takes the risk to say, yes, we can do this and here’s why the language supports that. So more local control for interpretation, for autonomy, for empowerment and for speed.

Conflicts of interest. I know that’s really, really important, but I love being able to go to my inventors and say I'm talking to this company, here’s kind of what I'm thinking about for field of use, for royalty rates in this industry, do you think that makes sense? If I'm working with joint inventions I can’t talk to the federal lab inventors that way because they’re getting money back out of it and that’s seen as a conflict, they can’t be involved in that. And ours are conflicted as well, but they can manage that better. And I wish there was more ability to tap that expertise of the researchers who are working closely with industry to help us on our licensing.

Also in startup formation I think there should be so much more entrepreneurship coming out of federal and national labs but conflict of interest just seems to slow all of that down into a big syrup of some sort. The Federal Register notices of exclusive licenses. Again, I understand where this comes from. But that makes it so difficult for a company to come forward and say we’re thinking about developing this technology, we’d like to license it from you, why don’t you put our name out there for all of our competitors to see. And even if it does have to happen from where I hear from my colleagues is that at time period when it has to be listed in the Federal Register but there’s no control over the time period to get it into the Federal Register, so things can be again slowed down months and the company’s not go to hang around and wait for all of that.

And then I just think clear expectations of what my colleagues in federal lab tech transfer should be doing. Again the incentives, the goals, making sure that that is recognized at all levels and appropriately resourced at all levels. So in conclusion I just want to say I think tech transfer out of universities and nonprofit labs is working really well. It could always be made better, don’t mess it up, please. But you know let’s make it a little bit easier.

FS: Jennifer, I actually can tell you that we’ve solved one of those problems.

FS: Alright!

FS: In the recent change to Bayh-Dole in 404, the Federal Register notice. We have given agencies the opportunity to utilize other appropriate means other than explicitly in the Federal Register. It’s a little bit circular in that if they’re going to use like an agency website or portal that they do have to announce that they will be posting those things in the alternate place. They have to do a Federal Register notice to let the public know about that alternate location, but agencies at their discretion can announce exclusive license opportunities in a place other than just in the Federal Register.

FS: Oh, that’s wonderful. So I’ll be interested in seeing how that plays out and what people do with that. That’s great to know.

FS: Thank you.

MS: We might as well do the WARF people back to back here. I'm Kevin Walters. I'm an historian with the WARF and actually I’ll complement Jennifer’s comments well, I'm not in the trenches every day, I'm an historian, so I’ll step back and take a broader perspective I think. But it won’t be surprising that our comments dovetail together in that way.

First I'm speaking in a long tradition of WARF people going back to Professor Harry Steambach and Dean Harry Russell and a group of Wisconsin alumni who created WARF in 1925. But there’s been a lot of people along the way and I want to particular cite Howard Bremer who was our patent counsel for many years in the 60s and 90s and passed away a few years ago after a long successful life and one of my jobs as an historian is to make sure that a name like Howard Bremer gets mentioned in places like this. He was a huge force in crafting Bayh-Dole and implementing Bayh-Dole and then defending Bayh-Dole over many decades. And I'm honored to be standing in his stead here.

But as an historian I guess I have three things that I want to say. One is that Bayh-Dole and Stevenson Wildler were both responses to a specific problem in a particular moment and historical time. And they were trying to figure out why is it that federally funded money doesn’t create products. And I do think that at a time like this if we compare 1978, for instance, as a benchmark we’ve done, we’ve been wildly successful over the last 40 years. And I think it’s appropriate to keep that in mind as we look at a return on investment that we’re starting from a good benefit. We don’t need to reinvent the wheel. Perhaps we want to pave the road in front of the wheel so the wheel can go faster and smoother, but we don’t want to reinvent the wheel.

And I think Bayh-Dole in particular has been successful and speaking more from the university side because that’s my background I think it was successful because of the opportunity and the obligations were both clear and that the opportunity for universities to be able to patent and license their technologies, but then the obligation to then serve the will of the people of the American people in the form of a Congressional act by making sure that the fruits of their labor got to the public.

And I think that that should always be the groundwork of what’s guiding us forward is to remember that that’s a simple principle and that working in science and technology that we know that the universe tends towards entropy but I think if we have something that works we should be maintaining it and keeping it and doing it well.

I think the second thing too is that historically Bayh-Dole and Stevenson Wildler were alternative solutions originally. One was the idea that if the government’s not good at this we should make the government better at it. The other was if the government’s not good at this we should find somebody else to do it for us.

And I think that we’ve seen the discrepancy and result in some ways about those two alternatives but I think it’s important to remember that they were originally alternatives and that perhaps we know in hindsight that those two groups were never as separate as we thought they were going to be. They were never really alternatives and where the successes have been is that we’ve been able to combine those two.

And I think speaking back to the success of Bayh-Dole and the opportunities and obligations I think if we can have the principle that scientists should be allowed to do science but we should give them the tools to transfer that to the public and it should be, the obligation should be very clear. I think that would be the benefit. And I need to look at my notes here to make sure to remember my third point.

So the other thing I learned about studying the history of this is that the legislation as important as it’s been it was also a response to movements that were happening more broadly in society. So WARF grew out of a lot of different things, about progressive ideas about the academy, about opportunities, growing it in business and the relationship between business and university. It was not a preconceived model of what technology transfer should be.

And so I think when we think about where we go forward in the same way we remember what was happening in 1980 that we can think less in terms of how to manipulate incentives or how to make people do what they don’t want to do and think as much about what’s happening out there now. What’s the equivalent of those universities in the 1970s? And we’re saying that we want to be free.

We want to be able to move forward in these things and how do we take those shackles off. As opposed to, because sometimes in history we tend to think we can change things, we think we can create a new revolution. And often the revolution is there, it’s finding it and directing it in the right direction. And so I think those are the three things I wanted to say. So thank you.

MS: Hi, I'm Dick Cox with University of Notre Dame, the Director of Licensing Business Development. I should say I'm with the University of Notre Dame Idea Center. Two years ago Notre Dame had a very traditional technology transfer operation, small office, understaffed, underfunded. Too much work to do. But as I was sitting here thinking about this, kind of inefficient by design and I think in a lot of ways that has defined the way that tech transfer’s been done for years and years both in the federal labs and at the universities where you have people who are generalists who are handling technologies from disclosure to licensing and everything in between.

And so a year and a half ago two years ago the Board of Trustees authorized the moving the technology commercialization out of the Office of Research and put it in under a VP for Innovation. And it has made a world of difference, because we now have someone who has the horsepower to go talk to many of the donors and so forth about the things we need as opposed to being filtered through a VP for Research who’s talking about the things that they need and where their first priorities are.

The real thing that I want to talk about though was in turning the, or in creating the Idea Center we’ve kind of turned the model on its head and we’ve moved away from the generalists profile to more of a specialist profile. And I don’t mean specialist by scientific discipline, this is more specialty by process or by operation within the process. And so where I used to be a licensing officer who had a portfolio of frankly 120 or more technologies that I was trying to juggle at any given time now I deal strictly with licensing. And so my colleagues at the outset of the process deal with the intake and the early evaluation. My colleagues in the middle of the process deal with de-risking. And I think that’s one of the big things that we’ve learned is that technology commercialization, and many of you all have talked about this, getting to a higher TRL level, is really all about de-risking. And then the third, and then it comes to me for a licensing.

And then the last stage in our new process is we have a Director of Startups. And so we’ve become very intentional about looking for startup opportunities versus traditional licensing opportunities. And it really comes from our new VP for Innovation, Brian Richie, who came from Utah, so give a nod to the University of Utah, and the recognition there that most of their successes both in terms of technology utilization and in terms of revenue generation came from their startups and not from their traditional licenses.

And so we are now very intentional about that. And as a result of that we’re able to spend a lot more of our time focused on things that really do have potential instead of trying to move everything along to get to a point where ultimately it gets dropped. And so we see at this point about 55 percent of our technologies dropping out in the first 12 weeks. Put them through an early 12 week evaluation process, 55 percent of those drop out, the other 45 percent then move into the de-risking phase. And in that phase we have three separate departments, three managers. A manager of problem validation, a manager of market validation and a manager of technical validation.

Is there really a problem that needs to be solved? Do we have a solution that people will buy? Is it a solution that can be scaled? And so with that we’re able to move things through and we’ve had some success. Now it’s early. It’s only been a year in. At the outset of the start of the innovation center we got together as a staff and said what are we going to do that’s going to make an impact, let people know that we’re here? And we talked about it and talked about all the things that we could do and so to this idea of measuring outcomes and what it is you measure. Finally we said there’s nothing like startups and make an impact, at least inside our university people pay a lot attention to that.

Previous to this we had never seen more than three startups in a single year. We’d never done more than six licenses to a startup in a single year. We set our goal at doing ten faculty licenses. We opened the doors to the community and said and initially to the students, and said if we could do ten faculty startups, boy, maybe we could get five students who would show up and want to start up and we could work with them. And possibly there would be one in the community that we might be able to convince to come and work with us.

So our goal was 16. We passed 16 back in November. We set the new goal at 26. We’re currently at 28. 27, excuse me. And so the student startups is really what has taken off. The students just showed up in droves. Because we’re very intentional about startups we’re now at eight faculty startups. We’ve got three more that we’re trying to get wrapped up before the end of our fiscal year, end of next month.

So I would say that one of the things that has really helped in regard to the students is that they bring a lot of energy and enthusiasm and we’ve been able to leverage that with the people who have resources to share with us. And so knowing your audience, playing to them, doing the things that they care about has been extremely useful to us. Startups, engagement with students, engagement with community.

FS: Can I ask is it undergraduates or graduate students?

MS: Both. Our door is open, want them all to come and work with us. Frankly I think most of them are undergraduate student startups.

FS: Michael I have follow up question. When you were talking about the licensing evaluation versus start up evaluation, is there a structured process where you’re looking for specific criteria that would direct it one way versus another? And can you elaborate on what some of those criteria might look like?

MS: So just getting through the initial evaluation it’s not a particular focus on is this a good start up opportunity. It is more is there really a, does it look like there’s a problem that needs to be solved and does this look like it might be a feasible solution? So we’re just trying to get past that point. When we get it into our middle process, our de-risking phase that’s really where we’re starting to sort it out and say this looks like a good start up opportunity and so we’re going to try and move it down that path. And, no, there is a problem, it is a solution, there’s, you know, we don’t have the resources or whatever so this is going to be more of a traditional licensing model.

I will say that one of the keys to our success I think has been that we’ve been able to attract the resources that have allowed us to have internal start up management. And so we don’t rely, in fact, we don’t want the faculty to leave their faculty position and try to start a company. We want them to stay in the lab and support what we’re doing with their technologies. We have hired what we call interim CEOs, part time. Well, excuse me, they are full time employees of the university, but they are dedicated to one or two startups. We incubate them inside the university so they’re safe, they’ve got some resources, they’ve got some full time talent that is paying attention to them.

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MS: Ranoop Perton (ph.) with APO Innovation Transfer. So I’ve been doing academic technology transfer for almost 30 years. And one of the things that I’ve noticed, and you actually hit the nail on the head, and one of the things I’ve said for the longest time is a university is full of solutions, looking for problems to solve. And that model doesn’t work. That’s what we’ve traditionally done.

So when I'm talking with faculty or when I'm teaching a class, the thing that I ask everybody to consider is asking the question does this solve a problem? Does this address a need? And if it doesn’t then how do you get it to a point where it does? But in order to do that universities need an ecosystem, a budget, a program that enables them to do that. And a lot of the universities just don’t have that.

So is there a way to include within a grant, or a separate piece of the grant, a portion that’s allocated to technology transfer function? Because right now that technology transfer function gets rolled into indirect costs and the administrative portion of that. So that’s point number one.

We’ve talked about U.S. government license on federally-funded research and how there’s a push back on that from a lot of companies that you’re negotiating with. I think a possible solution is coming out either with a policy statement or something that says okay, we’ll look at the licensee first. I know that’s done, but it’s not explicit. And if the licensee doesn’t have the capability of fulfilling the need for the U.S. government, the government can either fund the licensee to build capacity or ask them to license, sub license the technology to somebody who does. So I think that would reassure companies.

Most of my colleagues here are from larger institutions. I’ve been at larger institutions. One of the things that is dreadfully ignored are smaller institutions, universities that have a research budget of between five million and 25 million. They’re ill prepared to even implement a technology transfer program.

So a possible way to address that, and there’s a lot of research, there’s a lot of good opportunities there that can be, I don’t want to say commercialized, I want to say monetized, is there a way to create an SBIR or an STTR type program to kick start for smaller institutions a technology transfer office?

My definition of technology transfer is very broad. So the way I define technology transfer is that a university is full of opportunities that can be monetized. They’re not technologies, they’re not software. But there are opportunities that can be monetized and we need to think of monetization in a much larger framework, licensing is one of them, research collaboration, industry sponsored research are some other mechanisms.

But there are also other mechanisms, for example, directly providing software or products to companies from the university. And there should be some clarification of policies with respect to that. Another push back that we get from companies is when we’re doing industry collaborations or industry sponsored research companies want to negotiate the terms of a license at that point. And universities can’t do that because of IRS regulations. So is there a way to address that part where you can say, okay, we will be able to negotiate some terms at that point because that gives a company reassurance?

The last point I'm going to make is my university colleagues are going to gasp, is that … the first part of that is Bayh-Dole should be expanded to include software. So it was originally written for patents and then later amended to include non-patentable biological materials. But things have come so far in terms of what is commercializable that I don’t want to have an argument with a faculty member who says no, my code is creative work, exempt under university policy and not part of Bayh-Dole. A lot of university policies address that, but I think it would just be simple to include that.

And the second part of that is universities should possibly be allowed to assign patents. As of right now patent assignment is not allowed. When you take, typically look at universities, you know, you get the invention disclosures that are really broad and of course you narrow down. Something like 20 percent of those invention disclosures get licensed, maybe 50 percent of those have patents. And so those patents that are sitting there, sit there forever, and the university pays maintenance fees or decides not to pay maintenance fees. But it’s another opportunity, it’s another mechanism to allow universities to push that technology out towards companies and saying, okay, here are some patents that we have that can be licensed.

Notre Dame has a great model and that’s emulated by a University of Cambridge model. They started the same process about six years ago, seven years ago. And they license 99 percent of their patents. And the reason they do that is they start at the very beginning by addressing the questions that Richard just talked about and they work with the faculty members. So some of those discussions may happen for six months, but they may go on for four years, five years. They don’t launch a startup company, they don’t license a technology until they feel it’s ready.

Now again they have the resources to do that internally. A lot of universities don’t have the resources to hire university employees as interim CEOs. And so you have to work within the larger ecosystem to enable that. So those are just some of my suggestions.

MS: So it looks like we have a little bit of a lull. I’d be curious if anyone in your further comments or in your written contributions later, so we’ve heard today about marching (ph.) rights and government use licenses and we’ve heard that before of course. And I'm curious as to how much of a real impediment that is to partnerships and licensing. And what would happen if we didn’t have those rights? If we didn’t require marching, the ability to march in or government use licenses, what difference would that make? If anyone has any insights into that now or later I’d be interested in that.

FS: I can give you one example. We would have a large multinational electronics company that would be manufacturing and using one of our technologies in several of their product lines right now. But they can’t because they haven’t been able to get a waiver for U.S. manufacturing. That’s just one example. But that’s real. It’s a company, we keep extending their option because they keep saying we’re still trying, we’re still trying, we really want to use this.

MS: What if instead of a waiver we asked them pay a fee to be able to exercise without the requirement?

FS: They would probably take that out of our license fee.

FS: Another quick point on that. In my particular experience the technology I'm thinking of is a couple of years outdated so this may have happened but I think the delay in that deal was primarily driven by waiting for permission and clarity. And so I don't know if it can be simple as, I don't know if it needs to be waived, but some sort of guidance, standard guidance around how often is this actually, does this actually take place?

I mean, I remember getting attorneys on the phone to have to explain to the other attorneys that the chances of this happening are so rare. But that’s time and it’s frankly a lot of money in that case as well. So is the guidance…

FS: Marching rights have never been exercised in the history of Bayh-Dole.

FS: Is there a government document that says that?

FS: I don't know.

FS: Because that in itself would probably be. I mean, that’s literally what we check. I mean, I remember being on the phone with attorneys.

FS: I think there’s been about eight requests and seven were to the NIH and one was to the VA? And in all cases the agency declined to exercise marching rights.

FS: So something like that, and maybe it is, there’s a GAO report can do that, but that would be something that would be useful I think. I was going to actually respond to the question that you had asked earlier, but if there are other…

FS: Come to the microphone, please.

MS: Just one other answer. I'm not aware and I’ve negotiated over a thousand licenses, I’ve never had marching rights or government use rights interfere with my ability to license. However, I think an interpretation about what marching rights means could use some clarification. It could use some central clarification from NIST not rely on individual agencies to interpret them separately. That would be helpful.

FS: Thank you.

FS: I just wanted to clarify the comment that you had made. When I was saying that we have seen some circumstances that this had actually happened to us within DMDII where some of the earliest projects that we funded, it was a two year project, it was based upon an earlier federal R&D investment, and by the time it had gone through all the hurdles then there were private companies that had kind of surpassed where we were at. So it was not so much that there’s eliminating the need for federal R&D investment but rather diluting the value of the earlier stages of that federal R&D investment.

So I think some of that can be changed maybe from a mechanistic perspective, a lot of that is or course cultural change as well. But I think just broadly speaking I think there are opportunities to be able to accelerate the pace of whether it’s award or even condensing the amount of time that is available for grantees to be able to complete the scope of work. So that there’s, and again some of this is cultural, but maybe there’s a little bit of a stick that can be made from the agency side to recognize that the longer this research takes to advance the TRL levels, the greater the chances of diluting some of that earlier investment.

FS: Hi, this is Christy Frasier from the University of Chicago. So just following up on this idea of the markets outpacing university research. I just want to give an anecdote about that.

So every once in a while people from tech transfer, from our group we go to partnering meetings to hear what companies are doing and I work a lot in the life sciences space, and the last sort of partnering meeting/pitch event that I went to a national level meeting, big organization that we all know the name of, had organized it, I'm listening to these startups pitch for investment and I'm just thinking the whole time that everything we’re doing at the university is so much more innovative and that why can’t we get the industry, interest the investor interest? And it does come back to technology readiness level.

So I just wanted to sort of put that out there as in my experience university research is a source of innovation and is what we’re doing tends to be more innovative than what, at least in life sciences, at least with life sciences startups.

MS: If I could, my name is Dennis Owens again, and I'm with the University of Utah and I'm a bit of an outsider because I'm with the Office of General Counsel and I’ve advised our tech transfer office for over 12 years, and just a couple of observations, and I'm certainly willing to be educated if perhaps my colleagues in the university setting have a very different view, but a couple of things, one, it seems like we can come up with a better way to finance the operations of tech transfer offices.

There are a handful, as I understand at very lucky institutions where revenues generated from royalties and fees sustain the operations and otherwise they’re really dependent on senior administrative personnel who do or do not support the efforts of the TTO. Perhaps one idea, and I think it’s already been suggested, Ranoop, I think this may have been one of your points, this idea that some portion of the overhead be specifically allocated to support tech transfer operations.

Maybe some of it is a little boost in what the feds provide and some of it is a little cut from what is otherwise available for general operations at the institutional level through overhead, so everybody has a little bit of discomfort, but at the end of day tech transfer offices are not, their efforts are not dependent on whether they have necessary funding. I’ve been in an institution where we are flushed with cash and as it turns out they’re not quite as efficient as they could be and should be.

I’ve been, I’ve seen very lean times as well. And so perhaps many opportunities are lost, because there isn’t the funding available to file the patent application that you might want to file. But another observation I’d like to make is that, and I could be completely wrong about this and our friends from AUTM probably have a thing or two to say about this, but having worked under a number of administrators there’s clearly a wide variety of ideas for the de-risking process, whether it be lean canvassing, or some other methodology.

And I’ve worked with Brian Richie, he’s a very thoughtful, very innovative guy. All of our directors have been. And so it’s kind of remarkable to me that as soon as one director comes in he or she seems to feel the need to kind of collapse the prior program and create something different to address the same problem. And I kind of wonder if we’ve been doing this long enough that we kind of coalesce around some best practice ideas.

And what I’d perhaps suggest is at some funding be available to permit some type of study or something that will permit some of the folks out here who are leaders in the field to kind of create some ideas around best practices that could be utilized by other institutions that either aren’t as well funded or who just simply don’t have sort of the leg up that a lot of these very successful institutions have. And the idea being that if institutions adopt these best practices then the money that’s allocated from overhead to tech transfer is available to them. If they don’t yet have the best practices perhaps until they do then monies that they receive as part of the overhead they need to utilize to have another institution vet their technologies and commercialize their technologies.

And again that’s probably not very, it’s not going to be very popular among universities but in Utah we have state institutions that run the entire gamut of very large to very, very tiny and small and it’s so difficult for the smaller ones to do well and then the larger institutions just don’t have the bandwidth to help them out. So those are just a couple of ideas from a little outsider’s perspective.

FS: Yeah, I have a quick follow up question. So in terms of funding TTO offices we have heard this need expressed in other forums, in other conversations both at the university level and at the federal tech transfer office level. The solution for the federal tech transfer offices while maybe not easy appears to be very simple in just a change in the statutory provisions of Stevenson Wildler. What does that look like on the university side? Is it a change to just grant language? Is it a regulation? Where would we go to solve that issue if it was something that we sought out to do?

MS: I mean, it’s a great question and frankly I don't deal with research accounting enough know where that would be, but requiring universities to sort of support these efforts would be one step in the right direction wherever it’s … but I apologize I don’t actually know what that would be.

FS: Can I pose that question to the audience? If anyone else has ideas, please come to the mic?

MS: So I think, this is Ranoop Predon (ph.) again. Dennis made an excellent point where if you spread the pain over several entities it’s much more palatable. One of the things that you’re always going to encounter and we encountered this when the percentage for SBIRs was increased from two to three and a half percent, all the faculty members started pulling their hair out going that’s going to impact us. So I think you’re going to have the same type of reaction.

But if, for example, there is in the indirect cost, there is an extra. So right now I think there’s like 28 and a half percent is set aside for administrative, if that was to increase to 30 percent and that one and a half percent was to be allocated to the tech transfer office with a match from the university that might be a way to address that. I think universities, you have to change the mindset of universities from having it to be a self-sustaining model to thinking about technology transfer as a core function of the university that they need to fund and then whatever money comes back is used for university initiatives.

MS: Rich Chilla from Michigan State University. Just to build on something Ranoop just said, when I talk about why our office exists it is not to make money for the university, it is a knowledge dissemination method, mechanism. In the universities what do we do, we educate students and we create new knowledge and we disseminate knowledge. Tech transfer is just another knowledge dissemination mechanism and that’s why universities should support it. And that’s the reason that we do, that we give to our senior administration.

FS: We have about 15 more minutes if anyone else has any thoughts that they’d like to express.

FS: First I have a question. So does the use of federal … Elizabeth Thelan, Markie Seven. Does the use of federal lab facilities fit into this discussion?

FS: Yes.

FS: Okay. So problem and then I’ll offer, I don't know what the solution is, it might be policy. But within our consortium in our region we have an idea so we have to do pilots within our cooperative agreement. And I mean testing of an idea or process. And one of our ideas was to have some of the small businesses I’ll say in aerospace be able to use that federal labs facilities to get even their TRLs up high.

So there’s two parts. One was the behavior piece of no, but the other was it wasn’t really so much no, but it was back to the limiting of policies and regulations that it’s so challenging, and I got two reasons, one was it cost money to use the facility, that’s understandable, okay, maybe we find somebody else to fund that, and number two was not only does it cost money but you have to sign off that if something breaks, even if it’s not your fault you will be responsible. And I don't know if that’s very specific to that particular lab in Cleveland, or if that’s across all labs. But I thought, well, so there must be some sort of policy regulations or solution because that’s a resource for our private side to be able to test. Just thought I’d offer that.

MS: So I’d like to follow up again, Phil from Northwestern, that particular point because in Chicago I led the open access initiative. This is provost signed by the three major research institutions in Chicago that agreed that we would all share each other’s facilities and not pay the indirect costs because it was going to be … it’s reciprocal. We meet each year to follow the reciprocity and make sure that’s the case. We don’t offer this to everyone, because the three big ones, U of Chicago, UIC and Northwestern use each other’s enough that it balances.

But I want to dovetail. So we’ve worked out all these kind of problems and we have external users who come in, but what isn’t happening is we’re not putting our shingle out, because we’re told not to do that. If companies want to come and use our fee for service laboratories they’re open to this. But what we’re not doing is openly advertising even though we have capacity, all three universities could take on more. Most of the externals are academic who use our facilities. But we would like to be able to open it up more broadly to fill that capacity to expand.

Again it’s part of this more thinking of universities as resources for the entire community, for the entire regions across the country. I think other groups, we now have equivalent groups in San Diego. I'm working with a group in Seattle to create it and in Houston. And so what we’re doing is we’re creating equivalent hubs in different places where the facilities are all available to all the academic medical centers in those regions.

Trying to move this beyond just the academics to our biotech startups and the like, which would really we’d really like… And they are allowed to use it and we have rates specifically for them. But we don’t encourage it, we would like to encourage it. But we feel that there are obstacles in the perception of what nonprofits are supposed to be doing.

FS: If I can just follow up on the comment that you made. I don't know the answer to the question about liability, but in terms of the use fees, I do know that there are different models at different agencies. A lot of them will work on a proprietary versus non-proprietary model of the results where if you’re willing to publish the results that come out of the use of that user facility they will waive the fee. If you want to keep the results confidential, then they would ask you to cost reimburse. So that’s one model.

There’s no explicit across the board, you must pay to enter through the door. I don't know. If anyone from the national labs would like to, if they know how their user facilities operate.

FS: Yeah, this is Cherry Schmidt at FERMI lab. I'm actually going to talk more broadly about the labs and the user facilities, because FERMI lab is a non-traditional user facility. You’re absolutely correct, it’s a non-proprietary, proprietary user agreement structure. In terms of how the various users interact within the facility, for example, Argon’s advance photon source, a company could have an entire beam line to themselves. We would expect them to be responsible for everything in their space, because they are operating their experiments at the end of that space and if in doing that they actually damaged the facility that we provided to them we would expect them to pay for that damage as well.

The other thing we would consider on a standalone facility, let’s say using a piece of scientific equipment, situation we would look at whether or not we were letting that company operate the piece of equipment themselves versus us operating it for them. And that makes a huge difference in whether or not you would agree to any kind of different structure than them being responsible.

So, for example, when a company pays us to say test a magnet in our facility but they’re not going to be onsite, they’re not going to be running the test, they’re not going to be directing us as to how to run the test we can actually waive the general indemnity entirely in that circumstance. However if they come on our site and they’re starting to direct it and starting to change how we would normally operate it, then that shifts back to them. So I think that’s fairly consistent across all the DOE labs. I think we all operate with the same basic model. There can be some local variations, but I can’t really speak to the government operated laboratories at other agencies.

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MS: I guess I’ll ramble for the few minutes that we have left here. Kevin Walters at WARF again. One thing that occurred to me is that WARF is not just a technology transfer office we’re also a foundation with an investment portfolio. And that was, a couple of our founders described this as, one, was Harry Steamboch said this was preventing the socialization university if we fund ourselves we don’t have to rely on the government. But another one of our directors said that it is actually to socialize research, which is if one person makes a lot of money from an invention we’re going to put that in an investment portfolio so that the entire university can benefit from it.

But I think it’s up to say that we, our mission is not to commercialize research, our mission is to support and encourage and aid research at UW Madison. And when I think about the federal government’s role I'm wondering if there’s … I’d actually be curious to know if you think about it in that way in terms of the federal government being socializing research and providing that research, providing a service. So for us it’s not so much about here’s an invention that made a lot of money what are we getting back for it, it’s a cycle of innovation as we call it, which is that if we keep doing this, if we do it well, we do it right, they’ll be an engine that will be generated over time and eventually we have faith that our researchers will do good work and good things will come out of that. And so it’s a broader definition of ROI, I think.

It also occurs to me too, you asked a question about prizes earlier and so when we do prizes it’s less about necessarily rewarding good inventors and more about drawing attention to good research as an educational effort, do we go on campus and we say we’re going to give you money, people show up and they learn about WARF.

But I think it’s also a way to get people to articulate their science in a way that is relevant to technology transfer and to get them to, if you say here’s a prize then they have to develop a pitch and in some way the (unint.) and they have to think about that and they have to articulate it in a way that will be competitive. And it’s also a way for us to not necessarily say we’re going to give people who already have money more money, it’s to say we value your work and we value it in a particular way. And it draws that attention to it.

So I think it all gets back together that this is as much about, we do have faith that research is good in and of itself, and that ultimately our technology transfer services grow out of that and not the other way around.

MS: Just to follow up on that and other comments, in your written submissions I would encourage you to think about how to frame the question, right, what is the return on investment, what’s the language that we should be using to describe the enterprise, how should we measure that? I mean, obviously patents and licenses are not the sole measure.

And others have talked about the many ways that universities and labs transfer knowledge. It’s harder to measure. But it’s an issue that obviously we’re grappling with and in some fashion we’re going to have to come to grips with that if we’re to make a better case for the enterprise. So language and framing and measurement. We’re very interested in your thinking about this.

MS: And just to add to Phil’s comment I think this issue of TRL four through seven permeates a lot of discussion and the question really there is we know the federal investments tend to focus on the lower TRL levels by definition. And ideologically and politically that is the way it’s probably going to be for a very long time. And on the other extreme we know its industry’s role. And that innovation system since the early 50s and Andover (ph.) Bush days have served the nation very well and at a time where U.S. was head and shoulders above most of our competitors in the innovation ecosystem.

Where we are now is in a very different place. And the innovation ecosystem still operates really well. And I think there’s a lot of innovation coming, exciting innovation is coming every day and in every field. The question now for us is in the new competitive landscape globally what should the U.S. be doing to get a better bang for the buck for the investment it’s already making, the 150 billion dollars? So that’s in a way if I were to frame your inputs when you start writing our inputs back to us, it’s easy to say give us more money, it’s not clear give us more money translates to more innovation. That case is not yet been made.

So I think we really have to think about what is it we need to do to address the systemic barriers that exist, and that’s where the questions were, systemic barriers that will move the needle in terms of our innovation ecosystem.

MS: Dick Cox, from Notre Dame. So to that question I noticed in some of the materials that you all have provided there is a chart of four year trends, 2011 to 15. And it’s interesting when you look at that chart that license and activity has grown by 25 percent, research dollars have grown by something like eight percent, something like that, patenting has grown by 35 percent and number of disclosures has dropped by eight percent. That is not a sustainable model.

And so to this question that looks to me like a systemic problem. And it looks to me, and it goes back to the question also of what is it we’re measuring? If we’re measuring patents it makes perfect sense. But it’s not sustainable and we know that from an economic standpoint. So I think part of the solution is getting to what is it we should be measuring, I think that’s a key point, and then, two, I think we really ought to look at, it’s something that we’ve had to take a look at, is how are we spending our dollars?

In our case we’re cutting out 50 percent of those technologies that in the past we might have supported, probably not all of them, but some of them with patents that we just would have kept putting money into. And I got to think of that 35 percent increase there are a number of patents in there probably shouldn’t be put money into.

FS: Thank you. So I’ve put the ROI website back up on the screen one last time. That will be your central hub for all things ROI over the next several months. We’ll be collecting responses to the RFI through July 30th. I think right now we’re targeting a final, final, final report in early January. A link that’s not on the screen, but I wanted to draw your attention to is performance.gov. As we mentioned earlier lab to market is a cross agency priority goal. And that’s part of the requirements from OMB. We do report quarterly to the public and that will be on performance.gov.

The first report should be going up within the next few weeks. And when you look at it you’ll see that every strategy area says make more milestones. And so what we’ve done here today and what will be coming out of the report in about six months will eventually feed into that cap goal as milestones that are tracked and implemented by the agencies and you’ll be able to see the progress through those quarterly reports. So I wanted to let you know that that information will be transparent and available online.

And really just what to thank you all for coming out here today. Like I said this is a really exciting time for me, having been through the first cap goal process where it was entirely contained within the federal government and I think that we’re going to do even better things the second time around. So thank you, submit written comments, stay in touch through the website. Yes, question in the back.

FS: Are you hearing similar things at the different forums? Or are you hearing new things?

FS: We’ve heard a lot of general themes. I think that there are specifics that have come out of different forums. The first forum we talked a lot about conflict of interest. This one just seemed to be more about partnering models. So sometimes, different things get mentioned and then people pick up on them in their comments. I don't think there’s anything that has jumped out at us yet that has shocked us.

And if you’d like to make those comments in writing that might be shocking, please feel free. But the tech transfer community both on the university side and the federal side is fairly small and we talk to each other and we’ve heard a lot of these issues for a number of years, even before we started this formal process. But having somebody reiterate it and that we can point to and say this needs to be an issue to take forward is very helpful in getting things done. Thank you. (Applause)

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