Keynote Address

Session Transcript:   
2021 Proof of Concept Network Annual Meeting: Keynote Address

>> Ashim Subedee: Welcome back, I hope you all were able to stretch your legs and walk around. We are ready to get started again. We are very excited today to have Dr. Jon Lorsch, the Director of The National Institute of General Medical Sciences join us. John joined the NIH in August of 2013, he came from John Hopkins University where he was a professor in the Department of Biophysics and biophysical chemistry. In the nine years, eight or nine years or so that John hat been at NIGMS there have been a lot of really exciting programs the ones I am excited about are the mirror program, the mosaic training and career development program, and a number of research capacity building programs at NIGMS that are extremely useful to a lot of academic whose are interested in this research and development and also in entrepreneurship in career development and training and the ideal program is a great program to really foster entrepreneurship in the ideal states. So we're really excited that John is here to elaborate on those programs a little more and tell us more about his thoughts and academic innovation and entrepreneurship. So with that, I will pass it onto John, who I believe is going to share his screen.

>> Jon Lorsch: Thank you, Ashim, can you hear me? Okay. Great. Can you see me slides?

>> Yes, we can.

>> Jon Lorsch: Perfect. Great. Well, thank you very much, thanks for the invitation, it's really nice to be here to talk to you. I'm going to give you an overview of some of the things that are going on at NIGMS, that are relevant to small business development and entrepreneurship development, it's not going to be a complete catalog of everything. Just a few highlights that would be of interest to this group, we'll get some discussion going. The first thing I want to talk about this was mentioned just a minute ago by Matt are the technology transfer Accelerator Hubs that we have been supporting in the idea space. So just as a reminder to those of you who don't know, the idea program is a congressionally mandated program at this point of almost $420 million a year. It supports capacity building, research capacity building, research, and training in states that historically haven't received very much NIH funding. At this point, that's 23 states and Puerto Rico shown here. We organize them into four geographic regions, the northeast, the southeast, the central and the western as you can see in this map on the right. The program was started in order to spur innovation and to try to build a diverse and inclusive entrepreneurial ecosystem in the under resourced IDeA states, in addition to not having a large amount of NIH research funding, these states also tend to have under developed biotechnology sectors we hope to create, amplify a ecosystem of resources and best practices through these transfer Accelerator Hubs to have academic become successful entrepreneurs, and increase regional biotech related jobs and biotech activity in the states. We were awarded about four years ago four different grants, one in each region. There's the ASCEND Hub, in the mountain west, that supports that region. The accelerator network in the southeast. The DRIVEN Hub in the northeast, and the SHARP Hub in the central region. And they've all been working very hard over the last four years or so. And I think have really come up with some pretty impressive accomplishments. I just want to highlight one of them in a minute, but overall, the activities that were supported by these Hubs include starting with conducting a gap analysis of each region and their academic institutions to understand what are the needs of the institutions in those states in order to build entrepreneurial activity and commercialization. They developed and delivered entrepreneurship training, education materials that they produce based on those gap analyses. And those are designed for faculty postdoc fellows and graduate and undergraduate students of the training pathway. They supported the establishment of a technology transfer offices in many academic institutions this was something that we realized on before we set up the network with some institutions, some institutions have tech transfer offices, others have very underdeveloped transfer offices, imagine if you're trying to commercialize discoveries and ideas out of academia the institution doesn't have a office for technology transfer that's pretty challenging to do, that's one of the things the Hubs have been focusing on. Then to develop a network of technology transfer expertise throughout the regions.

We also supported pilot projects beginning supplements, support these pilot projects on their own, explore how their materials are working, whether they facilitated the transfer of ideas from their academic sector into small businesses. So far, 222 pilot projects have been supported -- 22 pilots were supported, some between 4-7 depending on which of the Hubs was doing it. I want to highlight some of the Hubs by way of an example, all four of them. But just a couple of things that have been happening in the accelerator network Hub in the southeast region, this has led in Kentucky. They were able, and you know, really impressively to leverage their idea Hub award to compete successfully for a Small Business Administration catalyst award just this year. Their program is a SBIR/STTR readiness program with the goal of increasing the number of faculty, researchers and students from HBCUs and other MSIs participating in that program. They had two different parts. There's the train-the-trainer part of it, where they are working to train trainers who can help at each institution, each state train people to apply for SBIR/STTR grants set up small businesses that can manage them. And this is a way you can leverage a smaller number of trainers with exert tease to create a larger number of trainers have an amplification effect. From there, they have an SBIR/STTR readiness program that builds the foundation for commercialization grants, they provide seminars, they'll review submissions, prior to review submissions from a reviewer's perspective which is important from writing a good application. They provide overviews of the expectations and the importance of thinking like a reviewer, and helping pa participants how they'll move on and move forward with the business plans et cetera. They have workshops on things like finding customers, establishing entities, securing your IP, identifying talents, budget issues, things like that, all things that are important for successfully launching and carrying out a small business. This shows the institutions that have been involved in this program.

Related to this, they also started a program called ENRICH, engaging researchers and innovators for commercializations HBCUs which is focusing on developing the commercial and entrepreneurial sector at historically black colleges and universities, there was a cart will in Forbes that described this partnership through the XLerator network through Jackson university and Kentucky university. They have harvesting and pre accelerator programs with education centered around technology transfer entrepreneurial lean startup mindset and growing a sustainable business. This is really very exciting to us, an area of tremendous interest, how we can help HBCUs and other minority-serving institutions develop that entrepreneurial culture to get the increase the rate of spinning off commercial entities and commercialization of their ideas to generate both economic growth in their regions and eventually, provide additional income streams for those institutions. They're planning to expand this to include Hispanic-serving institutions, with a program called the TRUST and to increase focus on women as entrepreneurs and protocol engagement. So these are really exciting things. We are looking forward to seeing how they turnout and how they grow moving forward. We are really pleased to see this as an offshoot in part of XLerator southeastern Hub.

We have now released a new version of the Funding Opportunity Announcement for this entity, these entities, these XLerator programmed the I-RED program, the idea regional entrepreneur victim program, they will report small business concerns to develop educational products to develop biomedical entrepreneurship program, that I can be didactic, in person product, virtual products, recorded they can be manuals, cases, databases, algorithms. But they're products that will be tested by the small business concerns for eventual commercialization and sale. To help IDeA state institutions to develop entrepreneurial expertise and culture. They'll enhance entrepreneurial skills, patent files, business plan developments, and capital-raising expert. They'll develop and strengthen the technology transfer programs of the institutions, as I said was a great need. They'll stimulate technological education, technologies, materials and services from the academic research partners into commercial products. Those are overall goals of the I-RED program. Sort of three phases we view the first product design, novel products that meet the needs of these IDeAs regions, they are quite different from Cambridge, Massachusetts or San Francisco, California, obviously there's overlap to some degree, but they're also significant together. They'll test those programs through actual entrepreneurship programs attracting students, handing on training, in order to see how the products work in real life situations.

The ultimate validation will be to see whether that training produces actual entrepreneurs who can go out and get pilot projects from the centers and try to get things to commercialization. Really a very hands on and real-world evidence-based approach to seeing if these training materials that they're going to produce will actually be useful. So the FOA has been issued. It's FRAGM-22001, the SBC, the small business concern must be from one of the four IDeA regions and must partner with one academic institutions, as the central part, there will be a lot of other academic institutions involved. But one central partner that's in the same idea region of those four regions. The partner must be an institution with a robust biomedical research program and have an established technology transfer Hub. So they're going to be helping other institutions develop their tech transfer offices and enterprises. But the academic institution that's the primary part but out must have a strong office to start with. They'll design tests and validate entrepreneurship education program products that have commercialization for end are you sourced underserved schools and institutions. You still have time to apply, January 5 is the deadline. There was a pre-application webinar at the beginning. If you're interested, Davani, who I saw is attending right now, will answer your questions. So I encourage any of you who are in an IDeA state to think about sending in an application to us.

Now I want to talk a little more about diversity. I mentioned the really exciting things that the southeast regional Hub was doing in terms of HBCUs. NIH overall has a new initiative called UNITE which is an acronym that stands for these five things, it's focused on trying to end structural racism as it impinges on biomedical research and the research enterprise. And the particular efforts that I think are the most interesting to this group are, from the committee there's one committee for each of these letters. And the committee that's focused on Extramural Research and Extramural Research ecosystem. That committee is being co-chaired by myself, along with Anna from NIMH and Ericka Boone from the Office of Extramural Research. We have worked on a variety of areas and have a number of different branches working their way into implementation in the next six months, I see a number of them coming out.

I want to highlight one which has to do with entrepreneurship innovation in terms of small business. This is work that was spearheaded by Eddie Billingslea a member of the committee, his day job is working on the NIH Office of Women's health. Eddie has been a tireless proponent, quite visionary in his innovative thinking about how we might enhance diversity within the business sector related to NIH funded research in a variety of different ways, he's been working closely with Stephanie in the SEED office the brainstorm ideas, now trying to move those ideas forward into implementation. And I did want to highlight one of them, because it's something that we can already, I think, use your help both with disseminating and thinking about. To increase the use of diversity supplements for SBIR and STTR grants. So NIH has a diversity supplement program that will give supplement to most of its research grants for bringing whether it be students it can start in high school go all the way up to faculty into a research program from various diverse backgrounds including people from underrepresented groups. And there is a program specifically for SBIR and STTR grants, which is frankly not used as much as we would like to see it used. As Eddie and his group start to think about this and look at what are the barriers and students, it was clear one of the barriers was just outreach and the many many people that didn't even know that this existed. another is sort of like in academic where you think it's easier here is a student or postdoc that's interested in a certain kind of research, so we can bring them into this lab that's doing a certain kind of research, making that match between a student maybe somewhere else in the country and a small business that doesn't necessarily have any direct connection to students postdocs et cetera can be much more challenging. So there may be many small businesses that would love to have, say a summer intern from an underrepresented background come work, and their company and learn what it's like to work in a biotech business and maybe make that their career, making those matches is difficult. So Eddie and his group are working on ways to increase our outreach to trainees and small businesses to make them more aware of this opportunity and the funding that can enable these kinds of things happening. Also thinking about whether a match-making service can be created in some way. That small businesses say we are interested in having a graduate student or undergrad, whatever, come work with us. And students could write in and say, we are interested in doing this, and then matches can be made and connections formed.

Again, this goes the overall program goes from high school students all the way to faculty. So, lots of different opportunities there, lots of pathways. And this has been a great partnership, spearheaded by Eddie and the NIH SEED office, this is more things, the innovation that they are planning is really quite impressive. So expect more. But we would love to hear your ideas. Both on how we can make better use of the diversity supplements in the small business community, and also, in any other kinds of ideas I don't say you have for what we could do to further the diversity within the small business community supported by NIH. I want to shift to another kind of training, this is training that is specific to NIGMS. So we have the largest training diversity building workforce development portfolio at NIH by actually quite a lot.

And about half of all of the graduate students on training grants, institutional training grants that NIH supports are supported by NIGMS. So really, a very large footprint if graduate students and undergraduate students in training. We give training grants T23 graduate student training grants to institutions in the areas shown here. So, a variety of different areas and fundamental or basic science. And I want to just highlight one for you. Because I think it's of particular interest to this community, one that's maybe not as well-known or as well utilized as it should be. That's the biotechnology NIGMS training grants. So, this is a program that's actually existed since the 70s. It was set up at the behest of Congress which saw the need for more students going into biomedical research who are trained and the intersection between basic and applied research. So, it was the goal was to have broadly trained investigators who have facility and orientation to combine basic applied research with the goal of supporting the commercial sector. The design is an interdisciplinary one with a heavy engineering influence. So just as an example Michigan has a program that comprises four of their colleges and minority great programs, Stanford has one that involves the School of Medicine engineering humanities and science, very broad-based programs. Like other T32 supported graduate programs, there's a combination of course work, structured activities, very importantly mentored research experience. What's different about this program is they are required to have internships as part of what they do. So that's specific as a requirement for this biotechnology T32 training program. Other of our T32s are started to get interested in internships and we've strongly encourage them to explore it. But this one has to have industrial internships for the students. These are five-year grants, they're renewable, they go to the institution. The institution that supports the graduate students on them. It pays the stipend, pays them institution support and additional money called TREs, training related expenses that can allow them to cover administrative costs and allow the program to do some innovative exploratory work improving how they do the training. Right now, we support 18 programs. In the biotech part of the T32 portfolio, they're across 32 states, they're supporting at any given year, 167 or so students, this shows where they are. One thing I'll note is there is a big gap you'll notice in the country in terms of where these institutions are. So I think, that is an opportunity to expand the reach of this program across the country and synergize that with other efforts that are going on like these proof of concepts networks that are the focus of today's discussion. Hopefully you're starting to think in your head about the way the students in these programs might be brought into some of the endeavors that you're doing in your commercial sector lives.

So, the way it works in general is that the internships happen early in the training process. So, usually the T32 supports two years of training then the students picked up on the mentor's research grants after that. And the internships usually happen sometime in the first three years. The internships take place in the industry, so pharma, bio pharma, they can be either local, they can go somewhere else. They can even go internationally. But they can't go to national labs or federal agencies; this has to be the private sector. These are some examples of companies that are taken students on these internships, these are some examples of the products, or the products working on new antibiotic tissue engineering for wound healing, evaluating synthetic microbes for use of bio pharmaceutical production, some really cool stuff that students get to work on, they're usually two to three months in duration, what's the novation? If this is going to work, there has to be something in it for all sides. This is the case there. It's got to be set up right. So from the industry side, in theory at least, this provides an influx of creative young researchers who bring new perspective to and new energy to their endeavors. Workforce development, it allows them to test people out, they get some short-term skilled labor, of course these are trainees that requires some training. One thing that's very important to recognize is that all of our training programs have a strong emphasis on diversity, equity and inclusion. And so, that we're pushing on constantly. We are seeing it grow. We want it to grow a lot more. But that means that these programs should increasingly be a source of students from diverse backgrounds into your company's organizations.

Of course it allows you to strengthen ties with academia either one institution or multiple institutions. And to access a pool of qualified nextgen generation leaders, these could be people who eventually come to your company, you get to test them out for a few months see if you like them. Maybe when they graduate they'll now have a connection to you and they want to come back. The trainees give insight to industry careers and atmosphere, something that was a black box if you're working in a lab in academia. This allows this epito actually try it out, see how they like it. It's a networking opportunity that seems very important. They're more informed and enable them to change course corrections during the studies. So maybe they realize that they need to take some other courses. Maybe they need to realize they approach things differently. That could be how they do their science, it could be how they think about safety in the lab which is something that I've thought about a lot. All kinds of things about how they could become more valuable and learn skills that are going to be increasing their value when they go out into the real world.

And then that will make them a more competitive applicant later on. From the institution's point of view, this allows them to bring industry into thinking about things like their crime luck and training program, how do they make it more aligned with the training industry. They can build the connections that allow them to get people to serve on steering committees, thesis careers, guest speaker, leaders for case studies, participation on panels, advice, mentoring for faculty and training, help with commercialization eventually, students for sight visits and tours for larger groups of students, there's really win, win, win, if it is organized appropriately. There are challenges though, establishing the connection between industry and academia can be challenging. Especially with multiple academic sites all competing for the same companies perhaps, which is why I'm thinking there are probably additional opportunities we start thinking with the small business sector. There are a lot more organizations to work with perhaps. Faculty mentor experience buy-in, the academic mentors often worry it's time away from the lab. Maybe that's not going to be a good thing for them. They don't necessarily buy-in. They don't necessarily have experience working with the private sector. I had a graduate student who did actually a three-month internship and he came back, even more productive than he was at the beginning. So to me that was worth it. But it takes convincing to get a lot of faculty on board. Timing of the internship is a little complicated. Early let students think about what they want to do, make course connections if they decide industry is the way they want to go, doing it early is better. From the point of view of being more skilled, maybe getting more out of the actual research experience, maybe having the company have more research experience later, so there's a trade off there. There are financial issues, if the student starts out in Iowa and moving the company to San Francisco, the cost of living can be very different that can be problems. There can be legal issues, intellectual property is a big one, who's paying the opportunity during that time it turns out to be important from a legal point of view.

Then the liability issues of course housing. Then NIH policy is going to make things hard. To be on a NRSAT32 they have to be full-time in training, they have to be fairly active as part of their training not a separate thing. But that can kind of run headlong into some of these other issues. Who's paying them? Who gets the intellectual property list? We require all of our programs to post their outcome publicly on the website. These are just some examples of the biotech training programs, north western, Wisconsin and Rutgers, pretty impressive overall. Overall over half, somewhere between half and 60% of the students in this program, which is way higher than the average for our general T32 programs. It does seem to be working in how much of that is self selection, students are already interested in going into industry, going into it, that's why they select the programs, it's not turning them off, so anyway, it will help you think about whether you will be engaged in this program, either with your local institution or the institution somewhere else. Maybe give us some feedback on how we can improve. I think it's a great program. But it hasn't been updated a whole lot since it's exemption, the last thing we want to talk about is the technology development pipeline.

So over the last five years we've taken a close look at how NIGMS was supporting technology development. We actually, one of the bigger institutes in terms of our footprint in technology development at NIH, it wasn't terribly strategic in how we were doing it. It was more, it happens. And so we've tried to create a more coherent pathway or pipeline through our programs to support really pure technology development as opposed to technology development that is in the immediate service of having a particular biological question. And so what we created is a pathway that starts at untested concepts where there is no proof of concept and the goal is to get a proof of concept to feasibility studies where this proof of concept now the goal is to test, evaluate, prototype, refine until you have something that actually works. At least on a small limited scale. For technologies that really can have broad applications, we have a hardened pathway that's for late stage technology development and optimization, and then broad dissemination, and at any of these stages, we envision and encourage it to lead into commercialization. So that is an explicit outcome that we're saying we're looking for as we are evaluating the program. So this is all positive based on the virtuous cycle of Freeman Dyson, others, technology development and others feeding off each other, strengthening each other. So for the untested concepts part of it, we have an exploratory research and technology development R21 program. It's for high-risk ideas. Things that are -- novel technology development idea that's untested, has no preliminary data. In fact, you are not allowed to have preliminary data, you put preliminary data in. Also you can't have any biological enhancements; it's purely for tech development. Once you have feasibility tech, proof of concept, you can go to focused technology and awards these are R01 renewable one time. The idea is you're really trying to move as quickly as you can to get this technology to the point that it really could be broadly disseminated, hardened and maybe even commercialized. It can have proof of concept all right that should be preliminary data. You can't be testing biological hypothesis questions with it in this grant. This grant is just for technology development. So it's not coupling it to you're asking experimental questions. You are just the technology developer, you have some proof of concept in how you want to make the thing and show that it really works.

Once you have that, if this is an important enough technology that maybe really applicable to a lot of people, you can apply for one of our biomedical technology development and dissemination center grants. This is the successor of the PTRR VP41 program it's now a different activity role, RM-sit has a different focus, which is RM-1 which has a different focus, late stage technology, to demonstrate utility to harden the technology to make something that lots of people can use as opposed to just being used in your lab in collaboration maybe. This is hardened, disseminated to the research community. Coupling it to actual use cases, testing is very important. Ensuring that it's robust and generalizable. Really the end goal of this is commercialization through patents, through partnerships, through small business development or venture capital. So we are really hoping this pipeline will be coupled very closely to our small business development portfolio and our SBIRs and STTRs. So, just to summarize all of that, I'll have you take questions. Some of the key areas of focus.

Our entrepreneurial development, thinking at NIGMS is first to support technology development and entrepreneurism at minority-serving institutions and idea state institutions. I think there's a huge need, a huge opportunity and really impressive things that I think we can and do for those institutions. We want to promote commercialization of technologies that are developed through our technology development pipeline. Again, that is a key goal of our pipeline. We want to see that happening more to the rigor of that's where you're going if you're part of this pipeline eventually to commercialization. We want to find ways to help you do that. In terms of building the diversity of our overall research portfolio that we support, we are moving to incorporate a plan called the plan to enhance diverse perspectives into all of our research and resource FOAs. This was developed by the NIH BRAIN Initiative. We have it now in two of our FOAs, the regional and national resource FOA that was just reissued has it. We require the applicants to talk about what they will be doing to enhance the diversity of the research and the perspective that they are bringing into their research. And so we hope that that will help incentivize and enable technology developers et cetera to increase the diversity of the group -- to increase the diversity of the groups they have, the communities they're serving, the ideas and research questions that they're trying to approach. As I said, I want to optimize the NIGMS buyee technology T32 program and expand its reach across the country, your ideas there would be very welcome. You're applying for those grants, you're working with the existing grantees to bring students, bring faculty to your companies or internships, I think that would be terrific.

Finally an area I didn't touch on before, I really like people to be thinking about more is how we can incorporate training and discussion of honesty and ethics entrepreneurialism, my wife has been listening to a loft the pod cost about Thernos maybe some of you have as well. Thernos, what is clear is that a is an extreme extension of some of the stretching of the truth, and, it's all about story and not necessarily about the reality that I think exists unfortunately in this world. The ability to make a pitch and to tell a story is really important for an entrepreneur. But it's actually important I think to be grounded in honesty and ethics and thinking about the fact that the ends do not justify the means. As we're supporting these training programs, I think we're going to need to be putting more of an emphasis on that in a very explicit way. I'm not sure that's been done enough up to this point. Thernos shows us, it can go badly, badly awry. So with that, I really encourage all of you to follow us on social media, we have all of these things, I don't know what they are but we have them. We do have two blogs that I encourage you to sign up for. You can just sign up and get emails about every time we put out any blog posts. Feedback loop is more of our for the grantees and applicants et cetera. Biomedical beat is more for the general public. I think it's cool for everybody, here's our website to go. Thank you very much. Happy to take questions from you.

>> Thank you, John. It's great to see a lot of these exciting programs that you have developed in NIGMS. There's a few questions, type your questions in the Q&A and chat, we'll try to answer them. A few questions that came in, one of them is related to the technology development program. With that one, I think a couple of people asked, is it -- is it only open to academics? Or can small businesses apply for the R01 and the R21 as well.

>> If you are eligible to apply for those grants in general, you are. You can apply for those as well. Yeah.

>> That's true of all of them, all of our R01s, small businesses are eligible. So definitely, someone asked about the bio technology T32, I think there was -- they were wondering if there's support for PI, co-PI or like any other T32 where it's mostly focused on the support.

>> The T32, the support is for the graduate student to do their training. The PI and co-PI can take some salary support, we actually encourage multiple PI grants for the bio technology one it would be great to see one of the multi-PIs is a professor research in the tech transfer, license support for the administer, let's see, there is, so I think, you can take out as a compliment as well, someone mentioned how NIGMS seems to be ahead of the curve. Will the other institutes have product development focused on, it's good to hear the positive feedback.

>> Yeah, I hope so. You know, I think, there are a number of institutes that are doing great things in the space. But, we're trying to serve as a model for at least some.

>> Yeah, one thing that I did want, there a number of others that have similar programs in terms of supporting entrepreneurship and that's one thing that the SEED office we're trying to do as well acting as that coordinating office to try to bring all of these programs that are focused on these product development and entrepreneurship support, and, you know, really encourage the institute to do it, bring them all together to do it in a manner which like sort of coordinated effort rather than this fragmented.

>> And the way that the idea, accelerated one, by you and to work with the REACH and NCAI hubs. Terrific, that's a huge win for the SEED office and for the rest of. Thank you so much,

>> Talking about it, and, really, great to hear support that NIGMS is providing to foster like capacity building and ideas on that program has been tremendous, and, thank you again for spending some time and talking about all of the terms.

>> I will send my slides to you and to Arthur, and, welcome to disseminate them, I saw somebody put that in the chat box.

>> That sounds good. Thank you very much. We have again, 15 more minutes per break, and we will will, we'll hear from four innovators who have really succeeded in taking their idea forward, so you know, it's a very good mix of innovators who are still academics there are some innovators who are described as academics who are transitioned to leading the company, it's going to be a great panel, we'll be back in 15 minutes.