

Message from President Cook

February 19, 2025

Hello, everyone. Joining me today is Aditya Goyal, a doctorate graduate research assistant in the materials and Nanotechnology program here at NDSU.

And along with him is his faculty advisor, Doctor Achintya Bezbaruah, a professor and chair of the Civil Construction and Environmental engineering department.

So welcome to you both. I'm really, really excited to talk to both of you today.

So Aditya is this year's winner of the three minute thesis competition.

So congratulations.

So it's quite an honor and quite an achievement.

So the three minute thesis competition is a really cool program that we have where our faculty and really your students get involved with explaining very complex research in a way that people can understand it in three minutes.

And so, that's what we're going to learn a little bit more about today.

So, congratulations again. And so Aditya, tell us a little bit more about yourself.

So my name is Aditya Goyal, and I belong to Dehradun, India, and I have been here for two years.

Okay, wonderful.

Is the weather pretty similar in India, in Fargo?

So my place has snow as well, but not for nine months. So? So do I like the weather over here?

Okay, well very good work. We we're so delighted that you're here.

And so, doctor Bezbaruah, tell us what it's, like, a little bit to have him working in your lab.

Okay, sure.

And I know I heard of Aditya because I was in Dehradun for my Fullbright Fellowship.

And that's where his advisor said he's a good student to, you know, work in your group.

I said, okay, come over and he has a physics and chemistry background. So that really fits into the research we do.

Currently, Aditya is working on a USDA supported project for developing new phosphate fertilizer. So because phosphate is an interesting thing, because, phosphate is pretty underutilized by plants, we are trying to increase the efficiency of plant use of phosphate, and Aditya is fitting

in pretty well because he is bringing in his you know, physics knowledge and also the chemistry knowledge to this class.

That is kind of a becoming slowly becoming an engineer as well.

So it's good to have him here. You know, one of the very one of the brightest student in my group.

Well, that's quite the praise.

That's fantastic.

So, Aditya, Can you explain?

I'll say it in three minutes or less.

Right.

Can you explain, the main focus of your thesis?

So basically, like the US also is facing eutrophication problem where excess phosphate kind of goes into the water and 34% of the lakes are kind of eutrophic in the US.

So we are trying to repurpose and reuse, recycle all the phosphate that is kind of being wasted because of the fertilizer drain off and waste water from the lakes and extract it from the wastewater. The eutrophic lakes and repurposed as a fertilizers. That's what my main part is.

And we are using we have developed in our lab calcium peroxide nanoparticles that have been shown, like, efficient to us we are like it takes out like five minutes only and takes out all the phosphate from the lakes.

And we are repurposing as a fertilizer. That is all for now.

So important work just in the field in the discipline, but really important work the North Dakota as well.

So I always take pride of being...you know...land grant research university and also also kind of we really do some of the work is you can follow the fundamental work.

You have a lot of material also.

It has a pretty practical purpose.

In fact, our group, we recently got a patent for one of those phosphate removal thing.

Actually we are working with two industries, one from Canada and from US to basically not go for the commercialization part.

Yeah.

So love that the research matters and makes a difference here in North Dakota, in the upper Midwest, and even to the point where you're commercializing and creating patents.

That's that's exactly the kind of work that, we want to have done here.

So I'm inspired.

That's very exciting.

So, so, how do you support these?

You know, really brilliant, graduates, students.

What what is your role as a faculty member?

I think what we do, I think one of the things we realize that they will be on the other side of the table, you know, three years or four years from now. Right?

So one of the things to do in our group, I do not micromanage, you know, let them do mistakes and learn from there. I think that's have been the philosophy of our group. And we have successful students who have gone faculty position in industrial positions in the U.S. and other countries.

And I think that's how we mentor at the same time, just not that I'm totally hands off.

You know, we have weekly meetings and all. We discuss problem. We criticize each other in a positive way, such as, you know, constructive criticism.

Right.

And, you know, come up with the good solutions.

It's a it's a collaborative research activity. People see a lot of I do what my students are working on phosphate, others working on papers, and somebody's working on arsenic problem, and all of which is getting to place in other crops.

So a lot of, you know, together we work and we emphasize a lot on science.

And they are kind of -- I learn a lot from them as well everyday.

So yeah.

And you don't make any mistakes. Right.

So so how did participating in the three minute thesis competition help you grow as a researcher and as a student and as a scholar?

So basically, like when you are in the same field as a science, you are able to talk like science language, right?

So everybody in the science field is able to understand. But when you talk to common people like, oh, I'm doing this, I am doing that, eating is going in everything. Nobody is kind of able to understand like what?

What is this?

So we have to explain it.

So because the three minute like, it kind of presented me an opportunity where I could present my research in simple terms because I was like every common person, because this research is not just about doing it in a that it's about like doing it for the community.

Also because we are taking out phosphate from the waste water and taking out for repurposing fertilizer.

So like basic farmers also need to know like what I am trying to do here. So that's why I came in. It kind of put me in the community where I could present in a simple way, rather than a science language.

Yeah, I love all of that.

I kind of said this before, but I'll say it again, I think research institutions -- R1 Research institutions do amazing work.

We do amazing work here. But if you're not in that field or discipline, it's hard to understand the amazing things that are happening. And the three minute thesis competition allows us to take complex information, synthesize it in a way for a non researcher to understand it, which is exactly what you just said.

And you knocked it out of the park. You won the competition.

And so we're very proud of you and well done for that.

So thank you everybody for listening.

Congratulations again once again.

And we're very proud of all that you've done.

And I gotta I gotta ask for it. So

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