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...Welcome to this episode of My journey as a physicist.

Each episode features an interview with a physicist to learn about their work, their interest outside of physics, and their professional journey of how they ended up where they are today. Season three features physicists involved in the long range plan for nuclear science. I hope you enjoyed today's episode...

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Welcome everyone.

This is going to be a somewhat unique podcast compared to what we've done before. I'm joined by a co-host today Kenza Hasan...She's going to introduce our main guest for you now.

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Hi, we are happy to have Shelly Leshner with us today.

Thank you for joining us. To get started, could you tell us a bit about yourself...

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Yeah thank you.

So, a professor at the University of Wisconsin La Crosse which is a comprehensive university at the Wisconsin system. And that means that we are a four year institution.

We don't have a PhD program or a master's program. We concentrate purely on bachelor's students. And we have quite a large bachelor physics program here.

I'm also a director of the McNair scholars program at my university.

And this program helps first-generation and low income students or those who are underrepresented in graduate education, pursue opportunities and graduate school and succeed once they get to graduate school. And that's for the whole university, not just in physics. So that's what I do.

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That's really awesome. Yeah I like to hear all about helping people.

You know... go to grad school.. So can you give us some ideas of what your research in physics is about?

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Right so I've done a lot of different types of research but what I am doing now...is about the shape of nuclei, not just the shape but how nuclei vibrate.

So it's basic nuclear structure. I work on a problem that...won the Nobel prize The year I was born. It's a it's an old problem but I find it interesting because it hasn't been solved yet...And that's why we do physics right?

Because we're interested in something it hasn't been solved.. We want to just keep digging into So basically we know that nuclei can have different shapes, right?

There's no reason to have to be spherical. even though in our mind that is what we imagine them to be.

But they're going to take on a shape that conserves energy.

Now if you can imagine that nuclear... is also going to rotate.

And what I look at is... It's easy to see that you can imagine if something is the shape of say a rugby football and it starts rotating.

You can imagine that it's easy to to see that it's rotating.

But if it starts vibrating that is not as easy to see.

So vibrating meaning, I'm going to use a different analogy here although it's not quite right,

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it's a little easier to kind of visually see, especially on a podcast.

Which is.. And I'm mixing my models here. So for people who are actually nuclear physicist and know the different nuclear models forgive me for mixing my models but okay.

So imagine taking a balloon and filling it with water like you used to do as a child and tying it at the end.

Now hold it by that end. Okay So you have the picture in your mind of this water balloon.

So it has this skin that's the plastic and the water inside.

Now we're looking at is... something like a vibration So the question is:.

it just the water inside that's moving around?

which would be kind of like an internal vibration? Or, does the outside plastic part, that rubber part, actually

move all together and vibrate?

So is the surface actually changing shape?

Or is just the inside moving around and changing shape internally?

That's the question we're asking....That's really interesting.

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I've done some nuclear physics research myself and I recall the rugby and the prolate and the oblate but yeah Do you come at that from the experimental or the theoretical side?

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Definitely the experimental side.

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I am just really intrigued....

I'm just trying to imagine it in.

How would the inner vibration cause the other skin to sort of move?

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That's a good question. So the question is which one is happening?

We know the little inner vibrations are happening. that's easy to see.

The question is: does the outer vibration actually happened?

Cause that's the interesting one. So does the whole nucleus decide that it's going to have this external like whole nucleus vibration?

That's the question. Because the little ones inside, we can argue those are happening.

It's this big kind of whole nucleus vibration.

That's the question. And it's a very simplistic explanation but I just kind of liked the idea of that water balloon.

And experimentally I come at it and this is kind of the fun part for me is that there's a lot of different ways that you have to look at this.

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So what I do is I kind of find an accelerator.

I find a apparatus that works for me.

And then I have to travel the world figuring out where to do an experiment.

Right now we haven't been able to find the kind of the last step that we're looking at.

So we do spectroscopy. We do transfer reactions.

The last step of the process is trying to look at electrons.

We haven't been able to find anyone who's able to do the electron conversion measurements the way we want.

So we have built our own apparatus to do this.

So we're in the process of building a detector system to measure this final step in trying to solve the problem.

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That's really interesting.. Maybe just quickly define a few more things you said?

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Yeah, absolutely.

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And electron conversions.

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You take a particle and hit a nucleus. So a transfer reaction in my case (I'm just going to define it for me) would be a proton coming in and interacting with your target.

And then for me it's going to be a Triton or

a Tridium and you know what tritium is I can't help but teach right?
Do you know what a Triton is...

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I don't know what a triton is but isn't tritium one proton a neutron.

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Yeah it's still hydrogen. Yep So it's an isotope of hydrogen.
So you have a proton come in. And then the transfer reaction means that you have a different particle that comes out.
So proton comes in and then a proton and two neutrons come out.
So it's called a PT reaction. in the process then you have a different result?
And so we're interested in that resultant.
And different reactions do different things. And there's like...a whole field of reaction theory.
So that's a little too complicated but, we're interested in specifically this PT reaction that does what we want.
For these vibrations. And then electrons we're interested in those because I'm a gamma spectroscopist, at heart, and we're interested in looking at the gamma rays or the light that moved between two different energy levels.
But when you look at there's rules that govern what transitions can happen.
It turns out that if you have a spin zero state and a spin zero state.
A gamma Ray can't go between two spins zero states; only electrons can.
And I'm interested in looking at spins zero to spend zero, which means I need to look at electrons.

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Yeah that's interesting. I know you know gamma ray are photons with spin one So I think some of those transition rules..

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So we're getting like way into the weeds here, but basically you have to do a lot of different types of experiments to be able to kind of to solve this complex problem.
What I really like about nuclear physics And as an undergrad, what I really liked about it was that, like I said this problem is old...
But we build upon the knowledge that other people had.
So it's not that what was accomplished...
10, 15, 20, 30 years ago is wrong.
It's that our detectors have gotten better. Our computational power has gotten better.
Our knowledge has improved or, you know, advanced And so we're just improving what we've known
.. we're adding onto the knowledge base and not just saying you know, that paper from the 1970s is wrong, I mean in some cases perhaps they didn't have the complete picture and their interpretation is incorrect.
But we can just build on.

The the scientist who's come before us.

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Yeah definitely.

My understanding of science which isn't everyone's understanding of science is that, you know it's not that they're wrong.

it's not fully complete. So we got to, you know build off of it Like you said.

So changing gears, unless we have anything else to say, could you explain what your typical day is like as a nuclear experimentalists, if such a thing exists.

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No no such thing exists. My day is different because although I am a nuclear experimentalists I'm at like I said a comprehensive institution So.

My job is more teaching and less research.

So, in the summertime all I do is research So my day is just doing research.

Now because I mentioned I'm a director of that program I don't teach anymore.

So I'm department chair. And I run the program the McNair scholars program So

...I'm more in an administrative role now.

So unfortunately my day consists of a lot of

meetings which is not really the way I like spending my day.

It involves you know today I just had four tours with potential physics students which I love I love working with students I love talking to students I love interacting with them So that's the fun part.

Budget meetings not fun. All chairs meetings, not fun, right?

So, there is really no typical day.

Yeah, I'm sorry; I don't have a typical day.

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That's okay I think you still gave us a lot of information.

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How would you explain to an undergraduate student or to a first-year graduate student: what's your role is in the long range plan and what activities are you particularly be involved with..

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...Right...I think I have a very valuable role in the long range plan because...I am the chair of the workforce development and diversity inclusion and excellence chapter.

And for young people I think that is one of the most important chapters because the science is amazing, right?

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We're all here for the science. But if we don't create a environment in

which everyone feels comfortable and everyone is welcome, then, everyone is not going to be able to accomplish their best.

Everyone's not going to be able to be their best and we are not going to be able to get the best science that we can out of everyone... That's why I think what we write in this section is going to be very important and I think the young people in the field are going to be paying a lot of attention to what we say in this chapter. do you agree? do you think this is an important chapter for the younger people?

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I absolutely think so. Yeah totally..... So, how do you think And the very next few years the younger generation you know the people who are just about to graduate are going to. , you know immediately benefit from what you're doing right now? In the long range plan.

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Okay. first of all in the long range plan there's always been a workforce development section. And that lets everyone know how we as a community have done in producing the students: producing PhDs, producing bachelors students who are ready to enter the workforce.

And that's really important, right? It's to let the community know how we're doing kind of taking the pulse and we're able to do that every seven years. But I think what is...going to be immediately evident when the plan is released is that. this is the first year in which kind of a a new chapter a new section has added to that chapter and that new section on diversity and equity.

And that I think is going to be an immediate impact for the community and that the long range plan which is a plan that looks to the future.

As a community we are saying, we think that creating an inclusive environment and these are suggestions that we have or these are ideas or these are the ways that we think are important.

I think that is going to have an immediate impact because we are putting that on part with the science that we think is important: that we think the workforce development is important that as a community we find it as important as everything else that we do.

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I guess I had some follow-up questions. So being someone who's already interviewed a bunch of people. These town halls over different topics Were you involved in any of them very specifically with a bigger role?

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Yeah I was involved in two of them. So I am a member of the low energy community. And I was the chair of workforce development and education in the low energy community town hall.

So I was able to hear from a lot of the members of our community on what they thought of , you know, the challenges in education and workforce development.

Diversity inclusion was a separate committee.

So I wasn't involved in that one but I was involved in workforce development and education in those town hall meetings.

So it was interesting to see what, not just what was going on in the community as far as what had been accomplished in seven years....

And the other town hall I was involved in just slightly.. also gave a workforce development talk at the neutrinos and symmetries meeting in Chapel Hill.

So I was less involved in that one, but I did attend. they didn't have a whole section on workforce development, like the low energy community had.

they just had a couple talks and the low energy meeting had hours of talks on workforce development and education.

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Yeah that's really awesome at least it was in one meeting I guess Maybe not that it isn't in every meeting.

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So I want to clarify the difference is that the low energy community has a town hall every year ...So we do this every year.

So I think, because of that we had a little bit more flexibility on what we can cover.

The other sections they only meet every you know five or seven years where every year the low energy community the nuclear structure nuclear astrophysics comes together in the summer and talks about our priorities So.

You know the science arguments had been fresh on our mind because we had just done it in August.

So I think we had the flexibility to be able to dedicate a lot of time to other issues.

And I don't think the the other sections had the luxury to do that.

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Yeah that makes perfect sense. I guess my question is, maybe what specific points were you looking at during the town hall to improve workforce development and also a DEI if you know about that as well.

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DEI I know less about because we haven't gotten the white paper on that yet.

Workforce development I mean a it's a hard question right? because we haven't figured it out yet...The special thing about nuclear physics is that because we send a lot of our PhD students to national

labs including NNSA labs.. there is a requirement to be a US citizen.

So we have this barrier in nuclear physics that other fields don't have.

So that's one issue that we have. we have more a higher percentage of our PhD Students are US citizens.

But they need to be able to funnel into the national labs.

Like all physics, we still have issues with attracting students to the field. We have an issue of how the percentage of women that we have, we have a problem with the percentage of underrepresented students that we have. We are still predominantly a white middle-class heterosexual male field and, then we still don't have enough people in the field. So, it's a very big problem that we couldn't solve in a day. Yeah absolutely...And then of course the other thing is that even if you do have a couple of nuclear physicist in a department, You don't have the ability to teach everyone nuclear physics. And so there is a large swath of the undergraduate physics population that doesn't even know that nuclear physics is a viable career path. So not only do you have, you know students not going into physics but the ones that are going into physics don't know about nuclear physics and haven't been exposed to nuclear physics except all the bad stuff they hear on the news.

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Yeah. Nuclear radiation and it's going to kill us and bombs and stuff, of course. Yes. It is scary but that's why we need good nuclear physicists, you know helping the world instead.

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Right. It's really interesting to see how you're encouraging more people towards nuclear physics. So how did you exactly decide and when did you exactly decide to become a nuclear physicist...? Could you maybe tell us a little bit background...

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Yeah, so it's actually an interesting story. What I tell students is there's no kind of right way or straight path.. And I think your podcast shows that. You know students think that you...want to become a physicist. You go to undergrad to be a physicist. You go to grad school, you become a physicist, you become a professor. Like there's some sort of like magic way to do it.

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There isn't. I actually wanted to become a political scientist. I wanted to go into politics. I was going to be a lawyer. I went to undergrad as a political science major. but I went to a college prep astronomy. but I thought astronomy was cool. I mean it is the gateway drug to physics. Let's just, you know, admit that. And I loved astronomy. I thought it was super cool and I loved the professor and he was teaching physics the next semester.

So I have a BA so I have a bachelor's in art not a bachelor's in science.
So I had to take a lot of different general education classes but I didn't need another lab science.
So I took physics. Because this really great professor was teaching.
and I liked it. And I wanted to go as a political science major.
I wanted to go out to DC because that's where every political science major wants to go.
And this guy had just moved from the Goddard space flight center and he had
a undergraduate research project for me to do out in DC.
And I said: fantastic. So he sent me out to Goddard.

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okay you will not know what this is but maybe someone will, They
took data on this big reel to reel machine but they were getting rid of it.
So he needed someone to go out there. And transfer this reel to reel data onto the computer.
And then I also worked on spectroscopy. Funny thing because I land up doing spectroscopy as
a nuclear physicist, but instead of absorption, I did a mission, but.. and so I went out
there I worked at Goddard space flight center and did this like real to real movement and did a
bunch of research on a binary stars...But I didn't like it.

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The reason I didn't like it was...when I would go and find papers.
I go back to my research advisor there... and he'd go oh no no no no like that one's not right
anymore.
I'd be like, okay, how am I supposed to know that?
And so I'd have to ask him every single time.
Because astronomy changes so quickly.
So I went back. And said like you know like I don't really...like astronomy.
Like it's just not for me. And he literally said you need to go work with a
woman...And he actually did like I'm going to do the motion like oh you need to go work with a
woman.
And I went okay. Like I was young and dumb I knew nothing better.
And so he sent me to go work with Ani Aprahamian I know this is a long story I'm sorry.
He sent me to go work with Rami and out at the university of Notre Dame which was just a few
miles down the road from my undergraduate institution.
And I started working with her my sophomore year of college.

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Keep in mind I'm still taking political science classes.
I'm still a political science major but I just kept taking physics classes cause I thought they were
fun.
I started doing undergraduate research at the university of Notre Dame.
Kept taking physics classes and then one day this guy just said you know what You have taken
more physics classes than political science classes you should really change your major.
And I did I think my junior year or something, but I decided that I would just keep doing

physics until it wasn't fun anymore And that's still how I feel.

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So when students say like oh I don't know if I can spend the next seven years of my life or 10 years or 50 years.. Like what am I gonna do I'm like, I don't think that way like.. I'm just going to do this until it's not fun.

when it's not fun I'll figure out something else...And so that's just how I've always thought about physics.

So that's kind of how I became a physics major and that's also like why I went to grad school because I started working with Ani Aprahamian.

And she was so interested in what she was doing And I was just fascinated like, why is this woman so interested in this Like, I just couldn't wrap my head around it.

So she gave me a project. And I kept working on it cause I'm like why is this so interesting And one day one day...

I couldn't sleep So I went to work first thing in the morning.

And before I knew it. It was like dinnertime.

Like the whole day had gone by and I hadn't even like left.

That's when I realized that I could do.. like this is a job?

Like I can do this for my career. okay.

And then I just decided that's just what I was going to do. so that's how I became a physicist. there's no apifany it was just kinda like it just kind of slowly like boiling a frog took over.

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It's really interesting.... I actually had a follow-up question on that: So what got you into nuclear physics, in particular...

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Yeah So the woman that I got sent to work with was a nuclear physicist...And the problem was so interesting.

And what really solidified it for me though was the nuclear physics community.

So I was doing this project. It was a big puzzle.

And like I had mentioned earlier that, you know you're building upon what other people did.

So astronomy. Nothing mattered anymore, right?

Like everything was wrong. But in this project, I was going back to papers, like I could trace the sources And I could go back to like the first time anyone had ever looked at gadolinium 158.

And I could look at it and go okay what did they figure out Okay That level is still there.. Oh the energy's better.

But that level is still there. Right So I could actually. like build this source document.

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And everything was still right. Like that soothed me.
That made me feel good that I was adding on this knowledge base
, instead of going like that's wrong, we can't use that paper anymore.
That paper is two years old. That doesn't work. And when I talked to astronomers like that's
what they love about astronomy.
That it's always moving. That just makes me anxious.
I like that nuclear physics build on itself.

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But what really clinched it is: I got sent to
the division of nuclear physics meeting to give a talk.
And the field is very warm.
it's a very collaborative space. People welcomed me as an undergraduate student.
people were very nice. it was actually the first year of the CEU
program So it was the first time undergraduates really came to a conference.
it's not a competitive field because nuclear physics you need collaborations to run experiments.
And I really liked that. I really liked that people supported each other.
And it was a community and it was small. And I just I felt like I belong there and that's
really what to be a nuclear physicist.

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That's really awesome. That's also your general becoming a physicist is...probably one of the
most interesting ones I've heard Some were different but it was interesting that you were like
so invested in poli-sci and decided to go into physics because of someone saying: hey come to
my lab and work on this computer system that's ancient.
You mentioned one thing that I'm sure you want to plug this you
said the CEU could you, go on and tell about that.

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So it's interesting. The CEU is the conference experience for undergrad.
And what it does is, funds about 150 undergraduate students from across the
country to attend the division of nuclear physics conference and present a poster on the
research.
It was started by Warren. So I'm just dating myself here.
That was the first year. And I was part of the first class.
and about five years ago, I took over from Warren.
And so now I run the CEU program.
it's a wonderful opportunity for undergraduates to present their work at a national conference.
And hopefully they still feel as welcomed to the conferences as I did... way back in 98.

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I was actually a participant of the CEU, what was that 2021?

So that was.

Yeah that one was unfortunately online which wasn't quite as fun for me.

I did go to a in-person conference like a year later or something was like, oh this is really it.

But it did That was like my first conference presentation and was.

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Oh really cool to do even if it was online. Yeah it's too bad It was online but you know, not quite Hawaii...

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Yeah, of course we want more people in nuclear physics and, not all of them just get thrown a line like you do so for our student listeners, that are interested in doing nuclear physics research without many opportunities at their local institution... do you have any suggestions on what they should do?

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Yes. You have to reach out to people.

I was lucky in that...I was sent

somewhere to do nuclear physics that I was close to a nuclear physics lab.

But reach out like. no one's just going to come to you and pick you to do some thing.

You have to apply to REU programs. If you're interested in going to MSU or at Michigan state for...experimental nuclear physics.

Even if you want to go to Notre Dame for nuclear physics, email a professor and tell them you're interested.

you have nothing to lose. And guess what? You're going to be told no a lot in your life.

It's not a big deal. But you could be told, Yes.

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Definitely I agree. Cold introduction emails are difficult but...you send them and you're like whatever happens happens. I don't think you should stress on that

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Yes and you know this is something that I've grappled

with recently because you know my interest in political science has always remained and I started a class that is the intersection of nuclear science and society and then a podcast.

And I've had to do a lot of cold introductions to really famous people.

And they could easily say no but guess what? more likely than not they say yes.
So, you know and they say no or they don't answer. oh well I just go about my day.
They're not going to remember

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In case students don't know about this but, could you talk about REU in general?

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Yes I'm sorry REU are research experience for undergrads.
And they're run by the national science foundation. They are at schools all across the country.
if you search NSF REU, you will come up with a page from the national science foundation.
And even if you're not a physicist they are in all science fields.
They are in some social science fields. Some humanity no
I don't think humanities have them but like psychology will have them.
And the NSF will have a page just listing all the REU programs.
There are other programs. there's one called SULI. it's through the department of energy,
national labs.
So you can go work at a national lab. There's a lot of other programs.
If you just type in summer program physics, you will find a lot more but...probably the best
bet is either an REU or really if you're interested in a specific university, Email a professor
and they'll tell you what they have available because a lot of places have local programs that
are self-funded.
So for example MIT has a self-funded summer program that isn't through NSF or isn't through
any of the national agencies that they would hook you up with.
And you wouldn't know that if you didn't go to their site specifically.

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Thanks for going into detail on that one.
It took me a while to figure out what an REU was when I first heard the
term in undergrad and then I got one and it really helped.

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Yes and apply to a lot of them. apply to a lot
because there are a lot of people applying to these REU programs.
And I've heard that it's harder to get into an REU program than grad school because there's so
many students applying.
There are like 10 spots at every school. So don't be discouraged just apply to a ton of them and
see what happens.

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I had another followup question. You mentioned about your podcast about and how did you start it?

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Oh yes, Thank you. so you know we talked about earlier that students. not just students but the general public associates nuclear with everything bad. And it's hard to blame them. Right. Because that's what the media talks about and as physicists we haven't done anything to really change that narrative. And so that's kind of what I am trying to do with the podcast And so it's called "My Nuclear Life" and I have different guests on the show. Kind of like what you guys do. And I talked to them about a variety of topics. So I've had Richard Rhodes who wrote "Making the Atomic Bomb" on to talk about kind of the history of the Manhattan project. But the one episode that released recently was Art McDonald who won the Nobel prize in solar neutrinos was on to talk about solar neutrinos and how he got into physics. there are other ones like how nuclear physics had a hand in the modern day environmental movement. Artemis Spyrou I just talked to you today about nuclear astrophysics. So it's to a general public audience explaining the way that nuclear science impacts society and impacts your life. Just to kind of make people more familiar with the way that nuclear physics is kind of all around you and...just the positive and negative ways that it's there.

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that's really awesome. It's a lot of fun as you know having a podcast is a lot of fun: You get to talk to a lot of great people. And it gives you an excuse to reach out to people that you would normally not reach out to, book authors, and historians and just you know whoever, I mean cause, you have a podcast, So you're a curious person. I'm a curious person. And so you know I have a question I'm like" huh? I wonder this guy knows or this lady knows So I'm just going to ask her. And I'll use the excuse of having a podcast to ask her about it. That's really what it is. A podcast is just my way to ask people questions that I have.

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It's really fun. One more technical question that I kind of missed before.. we were talking about REU and stuff. REU and SULI are mainly during the summer. Do you know of any remote research opportunities during the semester that undergraduates can do well also completing their coursework?

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So SULI actually is during the semester as well.

It's not remote but a lot of students if they want to take a semester off, can do a SULI.

And if you graduate early you can do it....So for example I had a student that graduated a semester early, he's now at Pacific Northwest labs doing an internship for the summer.

So you do have many different opportunities with the SULI program.

Remote is a little bit harder. There are some programs

from the department of energy but they have very specific requirements.

You could look at INCITE is a program that you could look at
and those are some opportunities if you meet the qualifications.

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Yeah, thanks for that information. I will say personally cause I did an REU when I was an undergrad, I was on nuclear theory and it was mostly computational.

So this helped but I continue doing research virtually when my semester started back up.

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So. It would be good. Especially if you don't have that ability to do it at your home institution.

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Yeah absolutely...What obstacles did you overcome along the way?

You know when you were toward your journey of becoming a physicist.

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It's a very personal question, right? It's hard not to sound like you're complaining...But it's also a very important question because I don't want students to think that they're alone in the way that they feel, especially if you are a woman

or well I guess anyone who's not feeling like they belong.

Yeah. Experienced obstacles. It gets easier as you get older.. imposter syndrome where you feel like you don't belong is definitely something I think men and women experience.

it helps when you can talk to other people. It's been hard being different.

You know you walk into a room and you're the only woman; you notice. The guys don't notice but you notice.

you notice when you're not called on. You notice when you're talked to differently, right?

It's about not letting them stopping you from doing what you want to do.

Now. I think it's gotten a lot better...I don't think it's where it needs to be, but that I think is the obstacle.

00:34:58

I had a lot of problems in my early undergrad... Oh wow It wasn't going to talk about this but I think it's actually important: when I was a junior, I was sexually assaulted and I had some serious medical injuries and had to take a semester off school. As you can imagine that also comes with a lot of mental difficulties that was very hard to get through and deal with...And then on top of that, I'm going to graduate school and being in a male dominated field. Mentally was very challenging to deal with...Luckily I had a good support system; so that's very important.

00:35:39

Thank you so much for sharing that. That's that was real brave. And we really appreciate that. just letting people know that...There are people who have encountered these big life-changing events and you've made it so far and you've become successful.. And you're, you're here working now on the long range nuclear plan in hopes of trying to improve the field. So. Thank you so much. Yeah.

00:36:04

I mean it's important for students to know that people are messy, right? And, you know you can do it. What whatever it is that you've experienced there's someone out there that has as well and has made it through.

00:36:17

Absolutely. Yeah. Thank you so much for sharing that. I also wanted to ask what advice would you give to young people who are going through something in this field and any advice on how they can get through it and they can be, you know , courageous enough to just follow their dreams and how you would like to see on that...

00:36:36

Yeah. a support network is important. It doesn't have to be in physics. It helps if you have a couple people in physics. I mean one of the things that I love about my job in McNair is that I kind of feel my job as being a cheerleader because I've had a couple of really good cheerleaders in my life. I still do. And sometimes you just need someone to say your amazing. And you're great. Like you can do this. right? Like someone you respect. that's a good person to have If you don't have that person, you'll find one.

00:37:12

The other thing is: I wish I started this a lot earlier but I have something called a "yay" file. So, you know you get emails that make you feel good. Oh someone said something good about you. Put them in a folder and your email that just says "yay". And when you feel like you're a horrible person and you can't do it. Go to your "yay" folder and read all the great things that people said about you in the past. That's your little support system, right? all the great things people said.. and you're like well maybe I'm not so bad after all. I only started that a few years ago. So my "yay" folder isn't so big yet but it's good to listen. It's good to read those.

00:37:44

The other thing I think the best advice I have and it took me way too long to realize it is: define what success is to you. Write it down... This world is full of people who are going to tell you what to do and tell you what's best for you, tell you what they think you should do. Whether it be your professor or your parents or your friends or whoever. Everyone has an opinion of what's best. The only person that matters is what? is you right? What is success for you? For me it wasn't getting an R1 position. I wanted to work with undergrads. I wanted to have a position where I had a little bit more freedom. I have research grants but I didn't have that pressure of.. If I didn't get a research grant I wouldn't get promoted; I had all these graduate students that counted on me for their funding, right?

00:38:42

I wanted a job like I have. So whether it be that you want an industry job. Whether it is that, you don't want to go onto a PhD, even though people say you should, whatever it is, whatever it is that you think is success, write it down. Look at it if you need to, but don't let other people define it for you. That's my advice.

00:39:03

Thank you so much. That's very very valuable.
And I'm definitely going to start on the "yay" folder today. Okay.
so moving on from physics. What do you do to relax?

00:39:11

when you're not doing research and teaching... Yeah I'm really boring. Actually someone asked me to give a work life balance talk. And I told them that I could give the theory but not actually the practice, because most of my

job is like teaching and administration like...research is my relaxing part.
So research is my hobby. Which I know is kind of weird.
My program administrator actually jokes about it. That research is my hobby.
So that's what I do to relax. I also do my podcast to relax.
So all of my hobbies have to do with nuclear physics. So it is really boring.
I do have a dog. I do enjoy walking him.
And I may or may not be involved in why I like nuclear physics right?
You get to travel to great conferences. You have experiments all over the world.
So I do like those things. besides that I'm actually very very boring.

00:40:06

I don't think nuclear physics is boring. Thank you.
Other people do. I thank you for understanding.

00:40:13

Thank you for sharing that with us that. It's always good to hear people's hobbies even if they are quote "boring".
Just knowing that something outside of research, even if you're still a physicist at heart.
Exists you know, That's great.

00:40:29

Yeah And some of my research or some of my traveling is nuclear related too by the way, like we went to Chernobyl.
We're going to the death bunker which is, the bunker that the Canadian government was going to go to in case of nuclear war.

00:40:44

So you know still more nuclear fun.

00:40:48

Yeah, that's awesome.
We've given a lot of advice, and a lot of information on.
I was wondering if you had any additional advice that you wanted to give.

00:40:55

Students tend to think a lot nowadays. you have way too much information at your fingertips with the internet but just do what you like doing and it'll all work out.
Parents all over the country just went, "Oh!" but nah it'll work out.
Life's too short to do something you hate. Yeah, absolutely.
I think I missed the mark a bit earlier but if physics is fun, keep doing it.
If it's not fun, go find something else.

00:41:20

I know a lot of people say I have to do this.. I have to it's the sunk cost fallacy.
You know I've already put so much of my life in physics.
If you don't like it, you don't like it. Nope. Do something else.

00:41:31

Yeah. It's it's not failing. It's just changing gears.

00:41:36

Absolutely.

So yeah Thank you so much for being with us here today.

And we got some great advice and we let you know some great stuff about your research and
thank you again

00:41:43

I hope you enjoy today's episode. This podcast was created by Brian Stanley and Professor
Huey-Wen Lin. This episode was hosted by Bill Good and Kinza Hasan.
This episode was edited by Varalee Sakorikar. Thanks for listening...