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Host: Kinza Hasan
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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…

00:00:00,000
Welcome everyone I'm Bill Good and I'm here with Kinza again.

00:00:03
Hi everyone! We are happy to have Filomena here with us today….
Thank you for joining us. To get started, Could you introduce yourself?

00:00:11
Yes I am Filomena Nunes. I'm a professor in physics and astronomy at Michigan state university and also at the facility for isotope beams.
I'm a theorist. I am a nuclear physicist; that's from my job perspective.
I'm professor, I'm a mom.
and I really enjoy interacting with people and nature in general.
So, that's a little bit about myself.

00:00:40
Now can you give us some ideas of what your research is about?

00:00:43
Okay, so I'm a nuclear theorist and my research is really
focused on understanding reactions, in particular with rare isotopes.
Now, rare isotopes are these sorts of nuclei that are very unstable.
and so that one of the main ways in which we can learn their properties is through reactions.
And so I'm that person that will model these reactions and try and understand what's going on.

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Maybe for the more experienced audience, could you go into even a little more

detail about like what kind of reaction theory looks like?

00:01:16
Yeah the sorts of reactions I'm interested in are the reactions in which only a few degrees of freedom play a role. And so you really are solving like a Schrödinger equation for scattering for the continuum. and it depends what is going on in the system, whether the system is going to break up,
whether the system is just going to transfer part of its mass, whether the system is going to fuse... So several things can happen.
And the theory tries to capture that in the
formalism but it's basically quantum mechanics and it's all glory.

00:01:49
Yeah I did some nuclear structure research that also touched on some nuclear reactions and I'm like, wow this is actually pretty understandable when
I was an undergrad and had done quantum mechanics and everything.
Part of it is just solve the Schrodinger equation and I think that's pretty cool…

00:02:07
Exactly
that's what I tell people when they asked me what do you do for a living: I solve the Schrodinger equation…

00:02:14
Could you go into detail about what your day to day is typically like.
I've heard it's usually not a standard set thing for most professors, but if you could sum it up…

00:02:24
Yeah It's not a standard thing at all.. Like, you know, today as a teaching day So I started my day just looking at... preparing for class and doing, you know, actually teaching.
And then after teaching had a bunch of meetings, and so I was involved in meetings all day.
But typically I also meet with my students, my graduate students.
I might be working on a paper. so I might be also, kind of working on the graphics for the paper or things like that.
I might be reading.. I might have to catch up with some reading.
so it's quite diverse and sometimes it also involves reaching out to collaborators, if there are aspects of a given project that I need expertise that we don't have.

00:03:08
Yeah that sounds really interesting. Like a full day.

00:03:11
Yeah it's very diverse. and no day looks alike.

00:03:15
Yeah I like that you mentioned you work on the graphics for your papers a lot.
I've experienced a lot of that already.

00:03:23
Yeah Sometimes, you know a picture captures much more than pages of text.
And so having a good way of presenting your results is really key.

00:03:33
Yeah. That sounds very interesting. So moving on.. how would you explain to undergraduate or first-year graduate students what your roles are in the long range plan?

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So the long range plan.. I guess you've already had some
podcasts with people from the long range plan.
but just in a snapshot if people haven't heard those.

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it's a way of organizing the scientific community and defining priorities for the field that
then are taken quite seriously by the funding agencies.
so I am a member of the long range plan writing group.

00:04:08
So there are these various stages in the long range plan effort.
And ultimately there's a group of about 60 people that get to write the long range plan.
And I am part of that committee. Within that we are organized by subcommittees.
I'm involved in three of those. One of them I'm chairing which is the theory subcommittee.
The other two are workforce and development. And the nuclear structure and reactions scientific part.
So yeah I'm quite up to my neck in things Long range plan related.

00:04:44
Could you go into detail about what are some like big
, important things from the subcommittees you're involved in?
And like specifically on the theory side since that's what you're working on.

00:04:55
So I think when we going through this processm I'll keep it rather general because, you know,
I'm not supposed to be talking about all the discussions in detail that we having.
But typically what we try to do is look back at the last period since the last long range plan.
Analyze what were the accomplishments? What did we say we were going to do?
What did we actually manage to do?

and then look into the future and what do we think we are
going to accomplish in the next period?
what are we going to set ourselves to do? for the next period.
And so It's quite an interesting exercise because it's sort of reflection and at the same time vision into the future.
And particularly if we think that things have gone wrong somehow, right?
the something that wasn't quite right and that we need to correct past.. this is a very interesting way of doing it.
Because the whole community is coming together and discussing about it.
If we think there's an opportunity now that there wasn't there, seven
years ago, then we try to harness that.
And get it on the books. So there's a lot of back and forth in the discussions that makes it for a pretty wide scope kind of exercise.

00:06:06
Yeah that's really interesting I don't think I'd had actually heard people consider.
if we screwed something up in the past you know how can we fix that?
or if we were going to do something and then we didn't think well
actually, perhaps we want to reframe that, right?

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00:06:21,513 --> 00:06:27,213
Because perhaps what we were thinking has changed and then we think about it differently.

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00:06:27,213 --> 00:06:30,618
or then just new opportunities arose it so we can

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00:06:30,618 --> 00:06:34,428
do something completely different than what we said we were going to do.

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00:06:34,428 --> 00:06:41,238
So typically we do follow the long range plan pretty closely as a community

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00:06:41,238 --> 00:06:48,006
So…It's not the big stuff that we would reorient, but there are things in theory

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00:06:48,006 --> 00:06:52,341
that we might say: okay this didn't have as much emphasis before we're going to give an

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00:06:52,341 --> 00:06:58,186
emphasis now because we think it's really important…Yeah that's really interesting.

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00:06:58,186 --> 00:07:03,406
Can you say anything about whether there's been discussions of things like that we're having to

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00:07:03,406 --> 00:07:06,406
rethink for this next decade or so?

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00:07:06,406 --> 00:07:12,391
So in this cycle, it's clear that the machine learning, artificial intelligence, quantum

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00:07:12,391 --> 00:07:18,346
computing, quantum information science, you know, all these things have come front and center

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00:07:18,346 --> 00:07:24,301
and was they were not there in 2015 in the last Long Range Plan So that's one example of

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00:07:24,301 --> 00:07:29,701
something that we are considering much more in depth.

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00:07:29,701 --> 00:07:34,111
also we got a charge that included workforce development and diversity

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00:07:34,111 --> 00:07:39,406
equity inclusion in a way that is sort of weaved into the whole long range plan.

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00:07:39,406 --> 00:07:44,086
So that's also different. We are taking a look at that with different eyes this time.

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00:07:44,086 --> 00:07:50,836
So these are two examples of things that we looking at in a different light than we did in 2015.

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00:07:50,836 --> 00:07:56,626
Absolutely. Yeah. And I think obviously the latter is something very important that, you know

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00:07:56,626 --> 00:08:01,516
, we should have been focusing on for a long time but I'm glad we're getting it now.

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00:08:01,516 --> 00:08:07,326
are you having any part in diversity equity inclusion and workforce development…Yes I have to

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00:08:07,326 --> 00:08:10,521
say this comes up in all the subcommittees I've participated.

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00:08:10,521 --> 00:08:14,841
So of course one of them is focused on this. So That's all they discussed.

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00:08:14,841 --> 00:08:19,641
But even the other two subcommittees, we are talking about it quite a lot.

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00:08:19,641 --> 00:08:25,845
I have a real concern for creating an environment in

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00:08:25,845 --> 00:08:29,691
nuclear science that is welcoming for all.

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00:08:29,691 --> 00:08:35,271
So I really really have a strong push in this direction.

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00:08:35,271 --> 00:08:42,126
And I am really hoping that our Long range plan will... We'll come up with

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00:08:42,126 --> 00:08:45,531
good initiatives that can promote this.

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00:08:45,531 --> 00:08:49,431
Definitely I totally agree. Yeah … I think that's really important.

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00:08:49,431 --> 00:08:52,656
I am so glad that the physicists are looking in this direction.

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00:08:52,656 --> 00:08:57,111
They're working on diversity and inclusiveness for all... So moving

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00:08:57,111 --> 00:09:02,001
on … when and how did you decide to become a physicist?

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00:09:02,001 --> 00:09:07,041
How did I decide to become a physicist? Well, it was sort of a gradual thing.

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00:09:07,041 --> 00:09:13,581
So my parents are not scientists. My parents were not in anything related to science.

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00:09:13,581 --> 00:09:18,681
When I was in ninth grade I had a physics course.

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00:09:18,681 --> 00:09:24,546
And I remember picking up the books for that year and just looking at the physics book and just

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00:09:24,546 --> 00:09:28,176
devoured the book I just gobbled up the whole thing in one go.

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00:09:28,176 --> 00:09:33,756
So it was very clear that all those questions that were hovering in my head that my parents

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00:09:33,756 --> 00:09:37,266
couldn't answer... there was a way to get the answers in this book.

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00:09:37,266 --> 00:09:40,416
Somehow I started to see some of the things that.

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00:09:40,416 --> 00:09:46,311
cause I had all sorts of whys, like. You know why is the cloud not falling Why is, you know,

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00:09:46,311 --> 00:09:49,821
these sorts of silly questions that you ask as a kid?

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00:09:49,821 --> 00:09:53,226
so I knew that physics was really interesting to me

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00:09:53,226 --> 00:09:57,126
because of way I reacted immediately when I had that first course.

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00:09:57,126 --> 00:10:02,016
But I didn't imagine that I would become a theoretical physicist.

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00:10:02,016 --> 00:10:05,196
I actually thought I would become an engineer and I followed some

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00:10:05,196 --> 00:10:09,366
engineering route and then it just through the practice.

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00:10:09,366 --> 00:10:15,696
it becomes very very clear that I was way more interested in equations than I was in actually.

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00:10:15,696 --> 00:10:22,056
Doing experimental work. And so by the end of my engineering degree I was just.

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00:10:22,056 --> 00:10:25,446
Completely a physicist and completely a theorist.

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00:10:25,446 --> 00:10:31,106
So that became clear. So, then my PhD was in theory…That's so interesting.

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00:10:31,106 --> 00:10:34,736
I had a followup question You also said that you are a nuclear physicist.

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00:10:34,736 --> 00:10:38,756
What sparked your interest in that area? Yeah.

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00:10:38,756 --> 00:10:43,781
Just the other day I was talking to students about this that I could have really ended up in

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00:10:43,781 --> 00:10:49,676
atomic or molecular I could have ended up in in multiple fields because what really.

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00:10:49,676 --> 00:10:53,276
And I mean I really fell in love with quantum mechanics.

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00:10:53,276 --> 00:10:59,036
As a theory right? And so you can there are many systems that fall under the umbrella of

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00:10:59,036 --> 00:11:03,236
quantum mechanics, and it just happened that there were opportunities.

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00:11:03,236 --> 00:11:09,656
In nuclear reactions. So I had undergraduate research in nuclear reactions, and one thing led

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00:11:09,656 --> 00:11:13,406
to the next into the next and suddenly I'm a nuclear theorist.

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00:11:13,406 --> 00:11:16,913
So, I don't think it's just because

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00:11:16,913 --> 00:11:20,861
I'm only interested in the nuclear problem.

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00:11:20,861 --> 00:11:25,511
I think I'm actually interested in multiple problems in multiple scales but there's some

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00:11:25,511 --> 00:11:28,946
serendipity in the area in which you end up, right?

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00:11:28,946 --> 00:11:32,261
It's you meet the right person has the right opportunity and suddenly you're working in this

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00:11:32,261 --> 00:11:36,371
problem and you find it interesting It's quantum mechanics no less.

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00:11:36,371 --> 00:11:41,966
And so we just progress. But there are great problems to be solved in nuclear physics.

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00:11:41,966 --> 00:11:45,926
So…I think it will keep me busy for the rest of my life.

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00:11:45,926 --> 00:11:52,661
Yeah, I'm just starting my research work as a grad student And I'm like, I'm going to be busy for the rest of my life.

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00:11:52,661 --> 00:11:56,156
I totally agree. I don't think we're going to run out

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00:11:56,156 --> 00:12:00,056
of nuclear reaction problems for quite some time.

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00:12:00,056 --> 00:12:03,581
So…I'm going to continue at it.

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00:12:03,581 --> 00:12:07,616
I found it very interesting that You mentioned specifically that…

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00:12:07,616 --> 00:12:11,726
you kind of had a moment with a physics textbook.

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00:12:11,726 --> 00:12:14,991
Saying. I'm going to be, you know, at least.

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00:12:14,991 --> 00:12:18,311
I know you started in engineering you want to do something more practical but

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00:12:18,311 --> 00:12:21,716
started with this field of physics area.

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00:12:21,716 --> 00:12:27,506
Which it's a different path for everyone. Yeah. So you said that There's so many problems in nuclear physics.

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00:12:27,506 --> 00:12:31,046
If there anything in particular that you are specifically interested about

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00:12:31,046 --> 00:12:34,676
or interested in solving or something that just excites you.

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00:12:34,676 --> 00:12:40,616
Yeah So one of the things that at the moment is really sparking my interest and I haven't really

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00:12:40,616 --> 00:12:47,366
been working on it but I am starting to…try to, redirect efforts in that direction is this

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00:12:47,366 --> 00:12:54,146

prediction by nuclear structure theory that there is an island of stability in the super heavy elements.

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00:12:54,146 --> 00:12:58,616
So I don't know if you guys have heard about this but. For quite some time now.

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00:12:58,616 --> 00:13:02,876
A vast array of models predict that there are

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00:13:02,876 --> 00:13:07,826
elements, super heavy elements, elements that we haven't seen ever, right?

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00:13:07,826 --> 00:13:10,976
That are much heavier than lead or uranium.

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00:13:10,976 --> 00:13:17,516
and that. We should be able to get to them you know and actually use them perhaps for some purpose.

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00:13:17,516 --> 00:13:23,051
so the problem is how do you get there You know you have to manufacture this the only way that

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00:13:23,051 --> 00:13:30,011
seems sensible is that you throw this nucleus onto some other nucleus and through some sort of reaction.

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00:13:30,011 --> 00:13:34,106
You end up generating these nuclear these isotopes.

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00:13:34,106 --> 00:13:39,386
And and so that's a line of research I'm I'm starting to get super excited about and I want to

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00:13:39,386 --> 00:13:42,911

work more on, but the sorts of problems that I've been working on have

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00:13:42,911 --> 00:13:46,766
mostly been related to nuclear astrophysics.

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00:13:46,766 --> 00:13:52,151
and so. Very often you can't actually measure the nuclear astrophysics reaction of interest

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00:13:52,151 --> 00:13:56,606
because the rates are too small to be measured in a laboratory.

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00:13:56,606 --> 00:14:00,806
Or it's just impossible, practically to do it.

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00:14:00,806 --> 00:14:07,796
And so I've worked a lot with nuclear astrophysicists to come up with reactions that can be

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00:14:07,796 --> 00:14:11,666
used that can get at the same information.

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00:14:11,666 --> 00:14:16,856
and so, you know, I've worked on things that connect to the solar neutrino puzzle.

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00:14:16,856 --> 00:14:20,006
I'm sure if you've heard about this you know in the nineties

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00:14:20,006 --> 00:14:23,636
we were getting so the neutrinos in the detectors here on earth.

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00:14:23,636 --> 00:14:27,656
And it turns out that the answer was really not provided by nuclear physics.

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00:14:27,656 --> 00:14:31,106

The answer was provided by neutrino oscillations, but at the

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00:14:31,106 --> 00:14:34,886
time we didn't know And so we were trying to fish into that.

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00:14:34,886 --> 00:14:41,651
I've also been working on halo nuclei, these types of nuclei that are super exotic in

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00:14:41,651 --> 00:14:47,711
that they have like a core and then there's neutrons hanging around like in a halo.

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00:14:47,711 --> 00:14:53,021
So it's a very exotic structure. I've done a lot of work in relation to that.

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00:14:53,021 --> 00:14:59,591
Anyway those are some of the type of phenomena, intriguing phenomena that we grapple with.

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00:14:59,591 --> 00:15:03,101
No that sounds super interesting I can't wait to learn more about these things.

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00:15:03,101 --> 00:15:09,241
…I actually had a question and we're swerving back into research, which is fine.

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00:15:09,241 --> 00:15:13,049
I like to hear about it…So…I have heard about

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00:15:13,049 --> 00:15:17,024
this island of stability that's has really heavy isotopes.

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00:15:17,024 --> 00:15:22,799
I guess my question is what what order of magnitude of lifetimes are we talking about instability?

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00:15:22,799 --> 00:15:28,264
…There is quite a variability in the various models.

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00:15:28,264 --> 00:15:35,054
And so…They are already seeing that some isotopes as you start to move

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00:15:35,054 --> 00:15:41,849
up the ladder of mass, some isotopes increase their lifetime, but all the

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00:15:41,849 --> 00:15:48,502
isotopes that have been produced, the superheavy isotopes that have been produced,

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00:15:48,502 --> 00:15:54,194
have only lived small amounts of time, like well below a second, right?

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00:15:54,194 --> 00:15:58,079
So they're not long lived yet.

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00:15:58,079 --> 00:16:01,285
I think it is hard for us to say for

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00:16:01,285 --> 00:16:05,209
sure how long lived these things are going to be.

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00:16:05,209 --> 00:16:08,266
Because, as I said the models are not precise.

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00:16:08,266 --> 00:16:13,396
There's some variability; there's a lot of parameter dependence and there's some more variability.

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00:16:13,396 --> 00:16:18,046
But what is unequivocal is that there's some island of stability.

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00:16:18,046 --> 00:16:22,066
And so…going out there and trying to search for it and

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00:16:22,066 --> 00:16:26,236
trying to find the properties, will answer your question.

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00:16:26,236 --> 00:16:29,671
are we talking months? are we talking years?

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00:16:29,671 --> 00:16:33,856
or are we just talking days, right?

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00:16:33,856 --> 00:16:37,246
I don't know the answer to that question … That's really interesting.

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00:16:37,246 --> 00:16:41,956
Yeah, I hadn't thought about that question before and I asked it and I guess, yeah it makes

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00:16:41,956 --> 00:16:48,541
sense there's no answer right now but…that now I really think that just clicked with me how exciting this is.

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00:16:48,541 --> 00:16:53,671
Yeah. We could find something out there that actually could be used for something.

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00:16:53,671 --> 00:16:57,391
we just don't know because we haven't produced it.

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00:16:57,391 --> 00:17:01,651
Absolutely. Okay. The next question is what obstacles,

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00:17:01,651 --> 00:17:05,941
if any, did you face along your way of becoming a physicist?

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00:17:05,941 --> 00:17:11,371
I think everyone faces obstacles right? That this is part of life in general you know life

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00:17:11,371 --> 00:17:15,211
throws at you all sort of things and, you just deal with it.

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00:17:15,211 --> 00:17:19,235
But I think there are things that are specific to women

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00:17:19,235 --> 00:17:23,532
in science that deserve to be mentioned.

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00:17:23,532 --> 00:17:27,192
I think we should mention them. So certainly I have

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00:17:27,192 --> 00:17:31,092
learned to co-exist with my male colleagues.

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00:17:31,092 --> 00:17:36,297
But I have missed tremendously the interaction with women in my workplace.

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00:17:36,297 --> 00:17:42,792
So I've tried very hard to build networks that include women so that I can sort of compliment that.

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00:17:42,792 --> 00:17:48,102
But at the end of the day you spent such a large amount of time at your workplace that it can be

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00:17:48,102 --> 00:17:52,182
a less inclusive experience, just by the sheer fact that we

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00:17:52,182 --> 00:17:56,367

don't share necessarily the same interests as the people that surround us.

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00:17:56,367 --> 00:18:01,842
So that's one aspect that is perhaps subtle and not talked about so much because it's usually

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00:18:01,842 --> 00:18:05,862
the sort of discrimination big words that, that are talked about.

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00:18:05,862 --> 00:18:12,522
But I think there is a cumulative effect that is experienced by minority groups in other

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00:18:12,522 --> 00:18:18,752
environments in which they're not well-represented: that is your own culture's kind of gone right?

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00:18:18,752 --> 00:18:24,182
You want to go knitting; you want to hang out with some people to go to knit and share some

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00:18:24,182 --> 00:18:29,552
knitting things and there's really nobody that you can do that with in your environment.

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00:18:29,552 --> 00:18:32,582
That's just a silly example, but it's that sort of thing right?

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00:18:32,582 --> 00:18:35,972
You want to go for lunch with people but all people are discussing is

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00:18:35,972 --> 00:18:39,467
about the last football match and you really have no interest in that.

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00:18:39,467 --> 00:18:46,007
So that can create an invisible, I would call that sort of an invisible but very

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00:18:46,007 --> 00:18:49,230

impactful obstacle to feeling like this is it.

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00:18:49,230 --> 00:18:52,387
This is a place where I want to be. so I don't know, perhaps you

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00:18:52,387 --> 00:18:55,837
want to ask me about other things but That's what comes to mind.

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00:18:55,837 --> 00:19:01,177
Yeah that's interesting. Like obviously I've heard about you know, Physics is like a field

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00:19:01,177 --> 00:19:05,617
that's not specifically well representing them and are not really represented in that field.

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00:19:05,617 --> 00:19:10,167
But I never really thought about it this way. Do you think that the work place or the work

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00:19:10,167 --> 00:19:15,204
culture is changing and women are being represented gradually like more as compared to before?

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00:19:15,204 --> 00:19:21,272
Do you think it's getting better in any way? So clearly if we have a larger representation than

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00:19:21,272 --> 00:19:26,042
the problem that this obstacle that I mentioned kind of goes away right?

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00:19:26,042 --> 00:19:29,837
Because it just by the fact that you got a larger diversity of

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00:19:29,837 --> 00:19:34,172
interests and then…you're going to find people that share your own interests.

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00:19:34,172 --> 00:19:40,292
But the statistics actually show that with completely flat the number of women in physics is just not changing.

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00:19:40,292 --> 00:19:45,002
The percentage of women in physics is not changing over the last decade or something.

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00:19:45,002 --> 00:19:50,027
It's not changing. So the answer to your question is we can continue to make efforts but

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00:19:50,027 --> 00:19:54,437
currently overall numbers do not show that there's been that much progress.

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00:19:54,437 --> 00:20:00,947
We're stuck at about 20%. That's very sad to hear. Yeah And I wanted to, you know, put in my

256
00:20:00,947 --> 00:20:07,452
perspective with my obvious identities but yeah It took me a really long time to

257
00:20:07,452 --> 00:20:13,622
really click and I can't fully understand it but I've started to realize like how [discouraging]

258
00:20:13,622 --> 00:20:17,102
it can be to have no one like you around in the field.

259
00:20:17,102 --> 00:20:23,087
And I want to say I see that and I hope more of the men in the field can really hope to

260
00:20:23,087 --> 00:20:28,217
understand that and see that as a reason to keep pushing these initiatives and hopefully

261
00:20:28,217 --> 00:20:31,697
actually get something done about that stuck at 20%, you know?

262
00:20:31,697 --> 00:20:38,615
Yeah, and I mean in comparison is still 20% Like in my case when I joined for example Michigan

263
00:20:38,615 --> 00:20:45,800
State the group here I was the first woman to join the laboratory as a sort of regular academic faculty.

264
00:20:45,800 --> 00:20:49,490
And so it was very common for me to be the only woman in the room.

265
00:20:49,490 --> 00:20:52,850
It was very common. And so I really sympathize with

266
00:20:52,850 --> 00:20:56,585
my black colleagues that are in that role now.

267
00:20:56,585 --> 00:21:00,731
Right. I mean we have more than one woman in this laboratory now.

268
00:21:00,731 --> 00:21:05,390
We have several, but we have one black physicist in the laboratory here.

269
00:21:05,390 --> 00:21:08,840
And I really really do feel like it's similar.

270
00:21:08,840 --> 00:21:13,820
he's going through the same things, let's say; it's just a different identity but it's similar.

271
00:21:13,820 --> 00:21:19,400
Definitely I guess now is as good a time as ever to mention that I think there as a grad student

272
00:21:19,400 --> 00:21:25,970

I've…started participating in some of the student organizations and there is a national society of black physicists.

273
00:21:25,970 --> 00:21:29,165
And I encourage those listening, to look into that.

274
00:21:29,165 --> 00:21:32,465
And if you can you know try and start a chapter of your own.

275
00:21:32,465 --> 00:21:39,365
I'm not a part of this of course but MSU just started their chapter of NSBP, like last year.

276
00:21:39,365 --> 00:21:43,205
So, and we had the president come to speak like last week.

277
00:21:43,205 --> 00:21:47,315
the president of the NSBP nationally So I'm just

278
00:21:47,315 --> 00:21:51,515
trying helping, trying to help here by encouraging that.

279
00:21:51,515 --> 00:21:55,685
I actually do have a follow-up question. What do you think that would be that we as physicists

280
00:21:55,685 --> 00:22:01,445
Can do to encourage more diversity in this field, like encourage the students or the high

281
00:22:01,445 --> 00:22:05,075
school students or young women to come into this field?

282
00:22:05,075 --> 00:22:10,475
Are there any initiatives that we can take? Or…Oh, there are so many.

283

00:22:10,475 --> 00:22:13,605
It's just, you know, it doesn't end.

284
00:22:13,605 --> 00:22:17,175
You can do so much. I mean every single person can do so much

285
00:22:17,175 --> 00:22:23,235
…We need to get the message to the youngsters right?

286
00:22:23,235 --> 00:22:29,940
We need to get science in the minds and hearts of those youngsters

287
00:22:29,940 --> 00:22:36,735
that are still in middle school and are still trying to ponder what they want to be when they grow up.

288
00:22:36,735 --> 00:22:41,115
but we also have a lot to do in retaining right?

289
00:22:41,115 --> 00:22:48,075
Once we do recruit, making sure that these people feel welcomed that these people

290
00:22:48,075 --> 00:22:54,600
are treated equitably, you know, that often means doing something that some physicists feel

291
00:22:54,600 --> 00:22:58,440
uncomfortable about And that is self-reflection about on actions right?

292
00:22:58,440 --> 00:23:01,515
Because we all have biases.

293
00:23:01,515 --> 00:23:04,785
We all have been formatted

294
00:23:04,785 --> 00:23:09,165
by our cultures and the society surrounding us.

295
00:23:09,165 --> 00:23:16,035
And so, in many ways we can contribute to the problem instead of being…a

296
00:23:16,035 --> 00:23:21,585
helping hand…So I think there is no end to what you can do.

297
00:23:21,585 --> 00:23:25,195
It's just, how much do you want to do…Thank you!

298
00:23:25,195 --> 00:23:28,885
I think that's very interesting because usually when I hear people talk about this.

299
00:23:28,885 --> 00:23:34,105
I hear how can we promote. There are people of different groups to enter this field But I never

300
00:23:34,105 --> 00:23:39,175
really hear discussions on how we can retain those people in this field and…make a difference

301
00:23:39,175 --> 00:23:42,745
but then this field to help them.

302
00:23:42,745 --> 00:23:48,340
Okay. I wanted to ask one more question about the obstacles that you overcame.

303
00:23:48,340 --> 00:23:53,620
you said you are a mother... I was wondering if you wanted to talk about how that is and how it

304
00:23:53,620 --> 00:24:00,479
is being a mother as a physicist…Well being a mother, you get to, guide or

305
00:24:00,479 --> 00:24:07,454
help this human being grow and become their own person and just go out in the world and do wonderful things.

306
00:24:07,454 --> 00:24:14,129
So being a mother is wonderful. Is it always easy to be in an academia, be a professor, and

307
00:24:14,129 --> 00:24:19,019
try to do your research, run your group do all the service, do all the teaching and be a mother?

308
00:24:19,019 --> 00:24:25,679
No it's not always easy, of course. I think if anyone tells you that it's easy, probably lying.

309
00:24:25,679 --> 00:24:29,549
it's super hard. It's super hard. But is it worth it?

310
00:24:29,549 --> 00:24:33,494
Absolutely…Absolutely. Thank you for sharing that.

311
00:24:33,494 --> 00:24:38,879
Yeah I just wanted to promote that you said that earlier make sure to put it out there and yeah

312
00:24:38,879 --> 00:24:44,909
, I don't think I've ever heard someone saying it's easy to be, a mother, let alone a parent

313
00:24:44,909 --> 00:24:48,609
as in academic and so…So what do you do to relax?

314
00:24:48,609 --> 00:24:54,199
You have a special hobby or something that you do when you're not doing research?

315
00:24:54,199 --> 00:25:00,499
Yeah So I do really try, to keep some balance.

316
00:25:00,499 --> 00:25:07,183
So I'm going to share something…I suffer from chronic migraines and it

317
00:25:07,183 --> 00:25:13,108
turns out that if I don't keep a reasonable balance, it just goes completely out of whack.

318
00:25:13,108 --> 00:25:17,323
And then I just cannot work because This is very debilitating.

319
00:25:17,323 --> 00:25:20,413
So it's really not a choice for me.

320
00:25:20,413 --> 00:25:26,053
It's a matter of my health. and so I really try very hard to keep a balance.

321
00:25:26,053 --> 00:25:29,143
And I am an avid Yogi.

322
00:25:29,143 --> 00:25:36,073
I do a lot of yoga. I really enjoy reading: literature and you know, not

323
00:25:36,073 --> 00:25:42,433
just fiction and nonfiction, but also poetry I really enjoy poetry a lot.

324
00:25:42,433 --> 00:25:46,026
I enjoy writing. I enjoy walking.

325
00:25:46,026 --> 00:25:52,033
I enjoy, if I get a chance to go to the beach, and just swim and be in the sun.

326
00:25:52,033 --> 00:25:56,413
I just do that. So, yeah I enjoy lots of things.

327
00:25:56,413 --> 00:26:02,953
And I think It is a disservice actually to the physicist profession when people

328
00:26:02,953 --> 00:26:06,448
present things as you can't do anything but work, right?

329
00:26:06,448 --> 00:26:13,138
I don't think that's true. And I don't think that actually needs to be true for anybody because

330
00:26:13,138 --> 00:26:19,723
we all humans and we all got all these interests and…it's good to be well-rounded…you

331
00:26:19,723 --> 00:26:26,228
come the person you bring to work is a happier person when you're well-rounded…I

332
00:26:26,228 --> 00:26:31,003
absolutely agree … At the the conference that I was at this week there was definitely, there

333
00:26:31,003 --> 00:26:35,638
was a plenary talk actually relating to workforce development and everything within that field.

334
00:26:35,638 --> 00:26:38,668
And one part of that was we need to make it a better

335
00:26:38,668 --> 00:26:42,898
environment in general for people to have a better work-life balance.

336
00:26:42,898 --> 00:26:48,688
So, yeah I'm glad to see that it can be done but yeah I think it needs to be improved upon.

337
00:26:48,688 --> 00:26:53,533
And one other addition was I was interested to hear that you suffered from chronic migraines.

338
00:26:53,533 --> 00:26:56,578
My mom actually suffers from those as well.

339
00:26:56,578 --> 00:27:03,253
And I have them sometimes. I'm hoping it doesn't increase in frequency but that is debilitating

340
00:27:03,253 --> 00:27:08,503
some days, and I'm looking for a word and I completely lost it but I'm glad to see that you can

341
00:27:08,503 --> 00:27:12,713
get through it and that you're doing great…All right.

342
00:27:12,713 --> 00:27:16,073
In that case I'll also add some speed round questions. What's your favorite

343
00:27:16,073 --> 00:27:19,988
book If you can name one and what's your favorite poem?

344
00:27:19,988 --> 00:27:23,182
Or poet, maybe … Oh my goodness.

345
00:27:23,182 --> 00:27:30,180
I did not prepare for that. I like quite a lot of books…This is a hard thing.

346
00:27:30,180 --> 00:27:33,420
I didn't, I really didn't expect this.

347
00:27:33,420 --> 00:27:39,300
And because, you see, the way I'm thinking... So you can totally see I'm a theorist.

348
00:27:39,300 --> 00:27:43,260
I'm going through the classifications. Am I going to say a Portuguese author?

349
00:27:43,260 --> 00:27:47,340
Am I going to say a US author? Am I gonna say a lot of American author?

350
00:27:47,340 --> 00:27:53,940
Am I going to say an African author?…There's all these categories and I don't even know where to start.

351
00:27:53,940 --> 00:27:56,940
Okay. Let's stick it with a US.

352
00:27:56,940 --> 00:28:00,330
Whitman. Okay Whitman. I love Whitman.

353
00:28:00,330 --> 00:28:03,450
I think he's a great poet. It's a very positive very

354
00:28:03,450 --> 00:28:08,200
energetic very forward thinking kind of poetry and I love it.

355
00:28:08,200 --> 00:28:11,800
So I think Walt Whitman is perhaps the one

356
00:28:11,800 --> 00:28:15,610
that comes to mind within the US of poetry.

357
00:28:15,610 --> 00:28:18,610
That's good to know I'll look more into that. I like poetry myself.

358
00:28:18,610 --> 00:28:24,560
but it's it's hard for me to convince myself to sit down and read some, you know…But there's

359
00:28:24,560 --> 00:28:28,340

plenty of contemporaries as well, so, but I'm just going to

360
00:28:28,340 --> 00:28:32,840
mention that there's a podcast called "The Slow Down".

361
00:28:32,840 --> 00:28:37,400
That is just a poem a day…And they all contemporary.

362
00:28:37,400 --> 00:28:41,660
And it's really a delight you know? it's five minutes and you're just, it's like savoring a

363
00:28:41,660 --> 00:28:44,678
little chocolate everyday…Yeah.

364
00:28:44,678 --> 00:28:51,080
I absolutely love that podcast cause I used to write poetry in high school and I am also really interested in that.

365
00:28:51,080 --> 00:28:56,820
And I used to listen to that podcast. And yeah I agree, it's very refreshing…Truly poetry

366
00:28:56,820 --> 00:29:01,118
sometimes is the only way that you can express something.

367
00:29:01,118 --> 00:29:07,852
it sometimes, you know, like obviously you know now this is a parenthesis: you are MSU students right?

368
00:29:07,852 --> 00:29:11,722
You know what we went through? we went through a horrible shooting here.

369
00:29:11,722 --> 00:29:17,814
And that's what came to me also I mean a poem just came to me because when you've got such

370
00:29:17,814 --> 00:29:24,759
intense emotions, it seems like it's the right way of just putting it out for me.

371
00:29:24,759 --> 00:29:29,784
I mean, perhaps painters would just paint something. but for me, it's really poetry.

372
00:29:29,784 --> 00:29:36,178
Absolutely. Is it taking kind of an interesting turn but yeah I agree…Okay, to sum up, do

373
00:29:36,178 --> 00:29:41,704
you have any advice for young physicists or young researchers?

374
00:29:41,704 --> 00:29:44,944
Yeah actually I have so much advice that I even developed a

375
00:29:44,944 --> 00:29:50,264
course… But there was so much stuff that I wish someone would have told me this.

376
00:29:50,264 --> 00:29:53,684
that I developed a course. It's called "the tools for women in STEM".

377
00:29:53,684 --> 00:29:59,669
I would say okay for the purpose of this podcast, I think that it's really

378
00:29:59,669 --> 00:30:06,319
important to identify your passions, cause it's that passion that will keep you

379
00:30:06,319 --> 00:30:09,539
moving forward in the hard times.

380
00:30:09,539 --> 00:30:16,319
It's really important to try to connect to your tribe, you know, whoever you identify as your tribe.

381
00:30:16,319 --> 00:30:21,149
And and having those trusting relationships that you can lean on.

382
00:30:21,149 --> 00:30:26,635
And then I don't know just be brave. You know just, I know fear will come.

383
00:30:26,635 --> 00:30:29,714
There'll be moments where you say: I can't do this. I can't do this.

384
00:30:29,714 --> 00:30:35,744
Or I'm scared. But just try to take that step, be brave, because you don't know where it's going to take you.

385
00:30:35,744 --> 00:30:39,164
And most often you can do great things.

386
00:30:39,164 --> 00:30:43,734
You can do greater things than you think…Thank you so much for sharing that.

387
00:30:43,734 --> 00:30:47,154
I appreciate that. One last follow-up question.

388
00:30:47,154 --> 00:30:50,544
I didn't know You were the person who put together "The tools for women in STEM" course.

389
00:30:50,544 --> 00:30:56,034
I've seen that around. Are any of those materials online available for people other than MSU?

390
00:30:56,034 --> 00:30:59,154
I have not maybe a hint hint nudge nudge

391
00:30:59,154 --> 00:31:04,014

…Yeah so, so the materials are all in D2L.

392
00:31:04,014 --> 00:31:08,934
It is sort of an experiential course. So you have to sort of go through it.

393
00:31:08,934 --> 00:31:15,744
I have actually been playing with the idea of perhaps doing this widely, like for anybody

394
00:31:15,744 --> 00:31:19,194
that wants to take it, like on zoom or something.

395
00:31:19,194 --> 00:31:23,424
But it's not the sort of course that is just like read this book.

396
00:31:23,424 --> 00:31:28,884
It's more of a experiential course and, one of the main benefits, if not the main benefit, is

397
00:31:28,884 --> 00:31:32,664
for people to come together and have those conversations with each other.

398
00:31:32,664 --> 00:31:38,064
and so that's a little bit harder to do, just putting materials out there.

399
00:31:38,064 --> 00:31:44,154
So I don't think it is a course that lends itself to just putting materials out there.

400
00:31:44,154 --> 00:31:50,514
I've been actually contacted by a publisher that wanted me to produce a book based on the course.

401
00:31:50,514 --> 00:31:55,323
And I have refused to do that because I think…that is not the value of the course.

402

00:31:55,323 --> 00:32:01,584
The value of the courses: it's the students that tell me this all the time is it's the interactions.

403
00:32:01,584 --> 00:32:08,364
It's those conversations. It's those exercises. It's a lot of active discussion that is taking

404
00:32:08,364 --> 00:32:12,144
place in the classroom…Wow.

405
00:32:12,144 --> 00:32:17,724
I have a lot of respect for you for saying: a publisher contacted you, and you said, "No, thanks".

406
00:32:17,724 --> 00:32:23,184
that doesn't do the job you know? That's a lot of integrity That's that's cool.

407
00:32:23,184 --> 00:32:29,634
Well I mean, I would be very happy to write a book and in fact I have written an academic book

408
00:32:29,634 --> 00:32:33,444
but I think that it just doesn't lend itself to that format.

409
00:32:33,444 --> 00:32:40,179
The type of course that was developed.. It just so that you have an idea is, all based on how

410
00:32:40,179 --> 00:32:43,359
about you watch this Ted talk and now you discuss this?

411
00:32:43,359 --> 00:32:46,944
How about you think about this topic? What about this case study?

412
00:32:46,944 --> 00:32:51,429
Now look at this case study what would you do? it's a lot of that active thinking and

413

00:32:51,429 --> 00:32:56,034
reflecting and so it's much harder to achieve if you just have like

414
00:32:56,034 --> 00:33:00,774
this sort of stagnant book.

415
00:33:00,774 --> 00:33:05,906
Yeah. Absolutely. I think it'd be a good idea Maybe to put that information out there for like

416
00:33:05,906 --> 00:33:12,714
instructors, maybe to take that in other institutions but yeah I agreed that you can't get that

417
00:33:12,714 --> 00:33:19,134
from just reading something…Thank you so much for all your inputs, Filomena.

418
00:33:19,134 --> 00:33:21,939
It was very interesting.. Well thank you! Thank you for

419
00:33:21,939 --> 00:33:24,982
inviting me. And it was very very nice to talk to you.

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…