Transcript of Dr. Karletta Chief Interviewing Dr. Rebekah Waller

Karletta Chief: Our final graduate that we want to celebrate and acknowledge as Dr. Rebekah Waller.

Karletta Chief: Rebekah, Bekah we call her just actually defended two days ago, and so I was proud to be on her committee as a PhD minor and she received her PhD in agricultural biosystems engineering and I know a little bit about her personal story, but um, I would like to have her advisor share that because he's here with us today Thank you so much, Dr. Kacira for joining us today.

And we'd like you to share about Bekah with the viewers out there, thank you.

Murat Kacira: That will be a pleasure, thank you, thank you Karletta I really appreciate it. Hello, everyone is so nice to see you here in person, not on the zoom and thank you, Dr. Chief and Cara as well as Torran for arranging this event for us and for our graduate students to be together and celebrate their achievements.

I just want to say that Indige-FEWSS project is one of the most exciting projects that I've been involved in my academic career. Because of the objective, it has because of the expected impact it has with and for the communities that we're working with also the educational opportunities that is providing to our students and also.

For faculty as you know the learning and rewarding experiences that we are enjoying so I'm... I feel very fortunate for that, and congratulations to our graduates Manuelito, Adrianna and also my student Rebekah.

It's been a challenging year it took a lot of effort on your side, a lot of challenges that you had to deal with, but also your families your friends around you committed to your success so congratulations to them as well. As well as congratulations to you.

And we are proud of all the students, we have in the in the cohort.

Rebekah’s research really focused on the evaluation of organic photovoltaic films for greenhouse systems integration. So our interest with that technology is because of its ability to tune the spectrum the light quality for plant production and also with energy production capabilities. It's a new technology, not like a traditional silicon photovoltaic systems that we know of. It's not commercially ready for greenhouse systems integration, but it brings a lot of opportunities so that's what her interest was so she constructed a an experiment and research with a pilot study that developed a methodology to evaluate solar radiation availability on a greenhouse roof, on a point by point basis on a tilted surface, so you can consider that, for the performance of the organic photovoltaic film so power generation. And that methodology can be translated or scaled up to any other types of structures, like greenhouses or other types of our cultural production system so that’s very unique.

Another part of her research work evaluated the shading element or pb us as a shading element, as well as power generating technology for crop production and evaluated have the crop is was actually responding to that environment created under the photovoltaic system integration. At scale, which was a greenhouse and the literature, does not have such information, so it is unique in a sense that.
We were... she was able to generate meaningful information for those who are interested in learning about what are the capabilities, but also on the other hand, what are the limitations of this technology and what needs to be improved.

So the last part of her dissertation focused on an analytical study that suggests makes recommendations in terms of this technology integration at the cell scale the module scale at the system scale at the regional scale. And what the researchers should pay attention to consider or May will also the manufacturers should consider in terms of the manufacturing, as well as offering this technology.

So, um, I felt really, once again, fortunate to work with a student of her caliber and I, it was a pleasure working with you Rebecca during your graduate program. I hope that it was a fruitful as it was for me and educational and you have some good experience not only working in our lab but also working with your friends and your fellow friends, as well as other faculty members.

So with that I feel that I feel very confident that her future is bright and wherever she will be she will be a star again in the works that she is doing and performing and hopefully we'll be in touch plus. So congratulations again, and thanks to Dr.Chief for your leadership for our students and Cara and also Torran. I think your support was instrumental for their success as well, thank you.

**Karletta Chief:** So come up here (Rebekah) and we're doing a round table so what I asked you some questions as well, very similar to Manuelito.

So Dr. Waller, wow that's amazing how do you feel that you have the doctor title?

**Rebekah Waller:** Um, the same. Yeah but special experience wanted it to be in person for the defense but pandemic circumstances, it was virtual and still you know, was a successful event experience so yeah good.

**Karletta Chief:** All right, well um could you tell us a little bit more about how it was for you, being a trainee in Indige-FEWSS and what are the kinds of what kinds of things that you participated and how did that impact to your education towards your PhD.

**Rebekah Waller:** Yeah, hearing Manuelito talk about the importance of just the Transdisciplinary opportunities that are available within Indige-FEWSS guess.

I'll start with my undergraduate experience was quite trans disciplinary although wasn’t STEM related explicitly studied international relations and Arabic and environmental science, when I was an undergrad so I was already dabbling and a lot of things and coming into graduate school and hearing about this Indige-FEWSS opportunity from Dr. Kacira offering a lot of transdisciplinary research collaboration that made a lot of sense to me coming from like a multi-disciplinary undergraduate education, so it was very easy to convince me that this is something that I wanted to do and.

It, you know, didn’t disappoint I had so many opportunities to work with water people, PV people, materials people in meaningful ways both like hands on projects, outreach in Navajo nation, as well as research projects, and I think you really have to talk to a person to a grad student who's not in Indige-FEWSS or a program like Indige-FEWSS in order to realize how rare have a organization and collaborative environment, this is.
Yeah so for you to appreciate all the opportunities Indige-FEWSS brings to its trainees and the people involved in the Program.

**Karletta Chief:** So you are actually one of the trainings that went on the Spring break immersion trip to the Navajo nation and you stayed in a hogan and slept on the floor, could you talk about your experience there and and was it new, for I know you also traveled around the world to other developing communities, but could you share, about that experience and how it impacted you and maybe some things you learned from that.

**Rebekah Waller:** I was born and raised in Tucson. So Arizona, is my home state and, like you said I I've traveled to other countries in which communities are also resource limited, and I saw that but seeing it here in Arizona was an entirely unexpected experience, and I think that's both my fault for not being aware earlier but I'm also just it's not advertised, I guess, unless you're directly related to issues going on in communities like Navajo nation, in which you are challenged by access to food, energy, water, infrastructure, so the immersion experience was actually my second trip to Navajo nation after our TCUP 2018 program which was super eye opening and then the immersion experience, having the opportunity to sit down and talk to community members more in, I think, authentic ways and getting the opportunity to stay with Nikki's family will forever be appreciative of that sharing them with us.

It was really an immersion experience and came away with a new understanding of issues that, that residents of Navajo nation and similar communities face in just living their normal daily lives, and it really makes you appreciate as a STEM person working in food, energy, water, really makes you appreciate your work and want it to have a bigger impact for people living in those situations.

So yeah very, very special experience and I'm appreciative for everyone who hosted us, while we were there.

**Karletta Chief:** Could you explain where you slept in the hogan and describe the hogan?

**Rebekah Waller:** I think I was in between Karletta (Chief) and Michael (Anderson) in a sleeping bag spread out but um yeah I think that was not the most comfortable night of sleep. Yeah, I don't think I slept actually.

So Nikki’s Nana is definitely, kudos to her for living in in those circumstances by her own choice, I think, but still, it was a completely novel home experience I hope to have it again someday and, yeah, again, it just makes you appreciate the resources that I have access to very conveniently but also appreciate another way of life in which they, you know, have been living that way for many, many, many years and it's beautiful yeah to witness and to be a part of.

**Karletta Chief:** So I know that if your project that you did 514 but the hogan which, if those of you who don't know the hogan is a traditional.

**Karletta Chief:** dwelling on the Navajo Nation it has eight sides and it's typically has a log frame that has installation with mud and anyways that structure influences your project and designing a greenhouse could you talk a little bit about that?
Rebekah Waller: Yeah I worked with Michael (Anderson) and Nikki (Tulley). Did we have one more on that team or was it just us three? Us three put our brains together and looked at. We were tasked with creating a culturally relevant food, energy, water, integrated system for citing on Navajo nation and decided that school would be a great site location in which you could build a system that demonstrated the capacity of integrated food, energy, water technologies to, you know, co-located food production, electricity production and not necessarily water but anyway, we designed this cool hogan greenhouse the solar hogan teaching greenhouse inspired by the architecture of the hogan and use that in a passive solar greenhouse design, with a transparent glazing on the southern hemisphere, of the hogan and then an insulated northern wall which you know we'll have to build it, actually, in order to see how it would perform, but the hogan, I thought translated really well into a conventional greenhouse design and it also was metaphorical and being able to use a feature of Navajo culture in a new food, energy, water, technological solution to address challenges, you know in resource access there, and so we developed this system, developed kind of a curriculum that they could use to teach students about how to grow crops in different hydroponics or soil based systems within the hogan teaching greenhouse.

We integrated PV into the system and then presented this design idea to the indigenous tribal education program and got very positive feedback from everyone, which was not unexpected, because as like through all my experiences and Navajo nation, people are just so interested in coming up with new ways to solve resource access issues there. So yeah good reception and just continued on the theme of Navajo nation residents, Community Members being really excited about Indige-FEWSS solutions.

Karletta Chief: Well, I think that project, I hope, will continue on and maybe come to fruition through Dr. Kacira’s work, so thank you for your contributions on that.

And one of the things I remember about you, being a trainee is how well your teaching skills and your communication science skills are excellent. So Bekah did a training for the intertribal environmental professionals on greenhouses and she also really has a real approachable way about her in connecting with tribal college students so she led the hands on activity and the greenhouse and those are very memorable for me, so thank you for all your hard work in Indige-FEWSS. So what’s next for you?

Rebekah Waller: Um, largely to be determined. I have yeah I mentioned this in the review that we did with Jen last week, I was offered a position in Saudi Arabia at this Center for desert agriculture, similar to the controlled environment, agriculture Center here in Tucson are similar goals. But throughout the interview process it’s clear that they’re not just wanting a researcher a greenhouse researcher they’re wanting someone who has skills and expertise in a lot of different things, and also a person who can talk to people and go out into the Community, and do you know, like hands on outreach programs for students and Community members.

And I mentioned Indige-FEWSS throughout my application process as an example of a multicultural, community outreach teaching experience that I was able to have in Grad school and could translate well into the requirements for that position so Indige-FEWSS is very you know beneficial in the interview process but yeah TBD still surveying my options and we’ll see what happens

Karletta Chief: wow that’s exciting well it’s like a bright future for you in in anything that you choose. So I wish you all the best, and thank you so much, and congratulations enjoy the commencement and all the activities with your family because graduations Dr. Waller.