Announcer: Welcome to Hancock Conversations, an Allan Hancock College podcast. Join President Dr. Kevin G. Walthers and members of the Hancock community as they explore the stories behind the people and places that make Allan Hancock College the unique hub for learning that it is today. You're sure to learn something new, and even have a little fun along the way.

Dr. Kevin G. Walthers: Welcome to Hancock Conversations, your podcast for all things Allan Hancock College. I'm Kevin Walthers, the Superintendent/President of Allan Hancock College. Today we have with us, some special guests, Dr. Anjali Misra, who's a plant molecular biologist and professor in our industrial hemp research program. And then, Leticia Segoviano, who's a student participating in that hemp research program, recently earned an associate degree in environmental health and safety. And then Joey Kehoe, a Hancock student who's finished the hemp program. He is now a sampling technician at Veda Scientific in Lompoc. And so, we're excited to have you here to talk about the Allan Hancock College hemp program. Welcome, everybody.

All: Thank you.

KW : Dr. Misra, let's start with you. Tell us … I mean this is obviously, you know, people think hemp and the first thing they think is cannabis. So, tell us the difference in hemp and cannabis.

Dr. Anjali Misra: Sure. So, hemp fits under the umbrella of cannabis sativa. That's the technical name for cannabis. However, there is one major difference between marijuana and hemp. Marijuana is a form of cannabis sativa that contains Delta-9 THC, or tetrahydrocannabinol, which is responsible for the psychoactive function. However, hemp is the same, is an alternative version of cannabis sativa that does not contain Delta-9 THC at the same level as marijuana. In fact, it was very, very little THC. And you can essentially try and smoke a soccer field of industrial hemp, and you will not get high, all it will do is give you a headache. So that's the major difference between industrial hemp and marijuana.

KW: So, we're calling it industrial hemp, we don't call it that. Department of Agriculture calls it industrial hemp. What are the uses for industrial hemp?

AM: Yes, so it's a very interesting crop. And interestingly, there was a lot of research going on until it was classified as illegal back in 1940. So, the biggest important product was dropping CBD oil. So, CBD is another fine form of cannabinoid that is produced by hemp. And it was, has a multitude of medical properties. It is also used for fiber production, and has a lot of protein and omega-3 and Omega-6 fatty acid. So, it is a wide variety of economic importance, and it could either potential for being a good cash crop.

KW: Right. And so here in the Santa Maria Valley in particular, we were approached by farmers who wanted to do some of the research, and part of the rules around this are either your local county government can set up rules for industrial hemp, or you can partner with an institution of higher education to do a research project, and that's the road that the local farmers wanted to go down. And so, we agreed to partner with them. The farmers actually pay the cost of the program, we're not actually making any money on the deal, but they are providing the cost of the program, and we help them with some of their testing. So, Anjali, tell us a little bit about the testing, and then we're going to talk to your students about what they learned from that test, and what the program does for students.

AM: So, you know I'm so thrilled to have this opportunity to offer services through our hemp course, and what it has blossomed into is kind of like a contract service program. And under the services that we

offer, we offer services that allow them to test the genetics of the material that they bought from a vendor. And we also offer field-based services, which are also important in the economic sense. So, I'll briefly touch upon the lab study. So, in the lab what we do is we kind of like, do testing like what somebody would go send their DNA to ancestry.com or something, and then try to figure out what is the heritage. And in this case, what we're really trying to distinguish with the graph is marijuana or hemp. So, there are genetic markers that can help us identify if the crop is marijuana or hemp. And the other important thing that the growers are interested in, is if the seed that they have on hand is female seed. And the reason for that is that because the product of importance, the CBD oil, primarily comes from the hairs that are present on the female flowers, and they want to make sure that we are growing female plants in the field, so that they can have the most revenue coming from the crop. And increasingly this plant produces, male and female flowers on two separate plants, so you will have male plants and female plants. And if you are a hemp or marijuana grower, you don't want to have any male plants in the field. So those are some of the genetic tests that we offer, that can help address this problem of the female versus male plant, and a THC-dominant or CBD-dominant plant.

KW: Awesome.

AM: Yeah, and the field work is looking at pesticide drift study, performance of the crop, and how vigorous the crop is, and there are some other interesting studies that are going on, which I can talk about maybe later at some other time.

KW: Okay. So Leticia, you've been working on the program, give us a little sense of your experience. If you could pick like the best thing you've learned, what would that be?

Leticia Segoviano: Working with Anjali in the Hemp Research Club, it's helped expose me to a lot of the lab equipment that's used at the lab here in Lompoc. And so just learning the proper use of the lab equipment, learning how to do extractions how Anjali was describing, and also being able to gain the exposure of being out in the actual hemp farms within the community. And also, I've been able to gain an internship through the Hemp Research Club, so I'm currently working it now and just that exposure and experience, along with the education, it's going to go a long way, once I finished my education and earned my bachelor's degree.

KW: Awesome. So, where's your internship?

LS: Currently it's a local hemp farm, Solid Sphere. So I started there in October as a quality assurance and packaging specialist. So, I work very hands-on with the crop and prepare it for potential buyers, and just the quality control about it and just the whole process of the trimming and the cultivation. So it's very interesting and I was able to get that opportunity through the Hemp Research Club.

KW: Awesome, that’s cool. And you said you’re going to get your bachelor’s degree. Where are you going for that?

LS: I'm actually transferring this fall to CSU Channel Islands. I'm going to be studying environmental science and resource management with an earth system emphasis. So, hopefully after earning that, to be able to become full time in some type of hemp environment.

KW: Great, great. Joey, you're actually working now as a sampling technician at Veda Scientific in Lompoc. What do you guys do down there?

Joey Kehoe: Well, it's really an amazing setup we have down here. It's a startup cannabis testing lab. We are in the process of getting ISO 17025 certified, as well as in the process of getting our BCC license, the Bureau of Cannabis Control. And with that license, we will be able to test all kinds of different cannabis products for conformity so that they can hit the market. So right now, most of what we're doing is validating our test methods, getting our equipment up and running, and making sure that we can comply with all of the government regulations that surround cannabis testing.

KW: So that and I only know enough about this to be dangerous, but if, when you're doing that testing it has to be precise, maybe even beyond what we would expect for medical grade type drugs or pills or anything like that. Is that accurate?

JK: Well, I don't know if it is beyond, but it is very rigorous. You know there are extremely low thresholds for what kind of foreign matter to be in your cannabis – from heavy metals to biological impurities, to pesticides, to things like hair and feces, all of that is checked for. It is very thorough, there is really no messing around.

KW: And I don't know if you know this – one of the growers talked to us about a challenge with hemp is getting consistent testing for the hemp products. Have you, have you experienced any of that or is that a topic for another show?

JK: Well, you know, there's a couple problems when it comes to consistency. The first one is from plant to plant the chemical makeup changes wildly, and even from the top of the plant to the bottom of the plant, you can see significant difference in cannabinoid content and terpene content, as well as the ratio of CBD to THC. That changes dramatically over the lifetime of the cannabis plants, so whether or not you can sell your hemp as containing under the threshold of THC, it also depends a lot on when you harvest it and when it's sampled.

KW: So part of that testing program and what you were learning at the college was making sure it gets sampled, so that they're removing it from the ground before that THC crosses the threshold.

JK: Exactly, exactly. That's one of the things we're hoping to research here in the future is how to get the most consistent harvest time, so that growers can maximize the amount of material they can sell.

KW: So, when you were in the program, what do you think was one of your favorite activities to do?

JK: Oh boy. My favorite activity was probably the field trials we did. This was on the land owned by the company that Leticia is working for right now. And it was a variety trial, so we have a plot of 15 four-foot rows, four foot of crop at a 100 feet long, and there were eight or 10 different strains of hemp cannabis planted, and we watch them grow and took data on the height, of the girth, the overall vigor of the plant. And this is going to be really valuable in the future because there are so many cultivars of hemp cannabis that will be able to pick what varieties are really suited to the climate here on the Central Coast, whether that's the cooler temperatures we experience, the intense fog we get overnight and in the morning. Growers are really interested to find out what cultivars are going to grow best here.

KW: When I was out there, it was absolutely fascinating, and Anjali, let's talk more about the program specifically, because you've worked in research universities before. And, as a community college president, I'm just so excited by this program, because this is the kind of stuff that normally you would

have at least upper division students doing if not graduate students at a research university, is that is that fair to say?

AM: Yeah, absolutely. So, you know, I'm sure Dr. Walthers that you are aware that higher education is undergoing a lot of reform, and we have been talking about how we can retain our students that come to community colleges who are trying to pursue a degree in STEM. And one of the critical confidence of students' persistence in STEM is giving them early research experiences, early authentic lab experiences. And this program has afforded an opportunity to both our students. And Leticia and Joey are great examples of that, because they were able to experience firsthand what it is like to work in a lab and address the problem, and learn the tools and all the science. So, you know here in the valley, many of the students that come to Hancock come from farmworker families, and most of them envision going into the field-based careers, but this program has afforded the opportunity to do this to experience what it is like to work in the lab, and how important the labs skills are, and they are directly applicable to finding solutions in the field. And what a great way to study, by using hemp as a tool. So, I envision it as a great research tool and a teaching tool for undergraduate research, and my vision is that if we can engage most of them in a program like this, that will be awesome.

KW: And this is the skills – I mean our two students today happen to be working in the hemp industry, or Joey's more in the cannabis industry – but these skills transfer to other parts of agriculture, is that correct?

AM: Yes, definitely. So, the last two students will require for example, DNA testing, chemical testing, and basic attention to lab data collection, data management, and problem solving. These are transferable skills for any discipline. Education is broad, so you have both plants and animals, so if somebody wants to be a vet technician, or if they want to be working in the cattle, or working with another system. Those skills are transferrable.

KW: From the program perspective, what's the output? I mean you're giving the growers data back and in reports, what kind of reports will we be providing back to the farmers?

AM: So, as an example of the report, if we analyze 100 plants or 200 plants for DNA testing, then we provide them with a spreadsheet of data. And out of the 100 plants we sampled, this many were male or female, or tested positive for CBD or THC. For economic trials, we collect a lot of raw data, which is further analyzed using Microsoft Excel, or even SAS analysis software. And then we provide them that data, the different strains that we analyze, which one performs the best compared to others. And recently I have also collaborated with Veda Scientific to provide them the chemical testing. So, these growers are more interested in the content of CBD and THC. And for the last, when you started the program initially we were not equipped to do that, and I reached out to my private partners locally and around the state to afford those testing opportunities, and we provide those reports to the growers.

KW: And you guys have a pretty good lab down there that was fully funded by the fees paid by the growers, right?

AM: Yes, yes, and we have basic lab equipment to do DNA testing. And we recently were donated equipment to do some chemical testing by one of our co-partners at Vandy Farms, which is owned by Abel Maldonado. So, we're very excited about, you know, how the infrastructure is developing for this lab. And I hope the current support from the growers continues.

KW: And my conversations with them, they're all very happy about it. A couple of things about, you mentioned Abel Maldonado and I visited out at his research site there. And one of the things I got from that meeting that I thought was interesting, because I'm not a scientist, is that when you talk about the male/female plants, that the plants are very sticky, right, especially the female plants, they have a lot of sticky. And they were saying that that's because historically, evolutionarily designed to catch pollen, as it floats across, and if you have a male plant in your field, it can throw off pollen spores. It's not impregnate, I guess in the plant world, that you would end up that those pollen spores can travel for miles, right, I mean, or at least you know, very long distances.

JK: Can I address this question? So, cannabis is a wind-pollinated plant, as opposed to insect-pollinated mostly. So, when you have one plant that has mostly male pollen-producing flowers, and it is in your field of female flower-producing plants, one male plant can fertilize an entire field. And what that does is when the flower, the female flowers fertilize, the energy that would have gone into making those sticky hairs that you mentioned, which contain the target substances that we want, when it puts his energy into producing its seed, the amount of cannabinoids it can produce really suffers, as well as you then have to separate the seed out during processing. So, it's critical that there are no males in your field.

KW: So, as you look forward, let's talk about the students a little bit. And Leticia, if you didn't end up going into, you know kind of the hemp/cannabis industry you anticipate, you'll still stay in some sort of agricultural production?

LS: And yes, I do plan on eventually getting my environmental health specialist certificate. So, assisting with like water control, other environmental engineering processes that could be used in agriculture. Hopefully you know, I still remain in the hemp industry, but those types of resources are needed in all agriculture environments.

KW: Great. Alright, and Joe, you're in the industry and looks like there's a career path for you to stay in that for a while.

JK: Absolutely, and you know I think one of the remarkable things about this program is that I was able to land this research job with a two-year degree. That's pretty uncommon and it's really special.

KW: Great. Dr. Misra, anything else that you want to want to add to our conversation here?

AM: Sure, I just want to extend what Joey said, to be able to find jobs in this industry, especially into entry-level technician jobs, you can have an associate degree or a certificate that offers you the training and the skill set that is required for this industry. And, the hemp program that we have going on right now is able to offer all those technical skills, the career technical skills that are required to find a job in this industry. And Joey and Leticia are a great testament of that. So, my vision is just to be able to create a certificate-based program in hemp for the college, where we can offer similar opportunities.

KW: Well, you know, it's been a great program, and of course you know, anytime you start talking about cannabis-type products then, you know, people's ears perked up right away and certainly that happened with this hemp program. And, we spent a lot of time working on messaging to the community what it is that's happening with the college of this, I think this is a great example. Dr. Misra, the work that you've done with the other faculty in our agricultural programs and the dean of that area, really shows the ability of the college to train students for the jobs of the future and to respond to our local industry

needs. We pivoted and put this together in a pretty quick timeframe that would have never happened about at a large university, and there’s paying benefits for our local economy and for our students, so it's been a great program and we look forward to seeing that certificate and getting some of the work done. With that, I'll say thank you to all three of you, Dr. Anjali Misra, with Leticia Segoviano and Joey Kehoe thank you for joining us today. This has been Hancock Conversations, your podcast for all things Allan Hancock College. We'll look forward to seeing you in our next episode.