

EPISODE 59 OF "ARMED WITH SCIENCE: RESEARCH APPLICATIONS FOR THE MODERN MILITARY," A DEPARTMENT OF DEFENSE WEBCAST HOST: DR. JOHN OHAB GUEST: DR. LYNN SMITH, DIRECTOR OF THE EUROPEAN REGIONAL JSHS TIME: 2:00 P.M. EDT DATE: WEDNESDAY, MARCH 17, 2010

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MR. OHAB: Good afternoon and welcome to episode number 59 of Armed with Science: Research and Applications for the Modern Military.

Today is Wednesday, March 17, 2010. Happy St. Patrick's Day. I am Dr. John Ohab at the Office of the Assistant Secretary of Defense for Public Affairs. I will be facilitating the conversation today.

We're going to turn our attention to a Defense Department program specifically designed to challenge teenage students in original research in science, technology, engineering and mathematics, STEM fields, you're going to hear a lot about that today. The program is the Junior Science and Humanities Symposium or JSHS. We're joined by Dr. Lynn Smith, director of the European Regional JSHS. We're also joined by several students and mentors taking part in the program. Together we'll explore the major goals of the Junior Science and Humanities Symposium, how it's working to widen the pool of trained talent that's ultimately going to conduct research and development vital to our nation. We'll also get some firsthand experiences from the students and mentors in the program.

Dr. Smith, all of our students and mentors, thanks so much for being here today.

MS. SMITH: Okay. I'm going to begin and give you a little bit a background about the JSHS Program so we all know what we're talking about. A Nobel laureate named Julius Axelrod once said 99 percent of discovery is made by one percent of scientists. It's exactly these type of students we are trying to nurture with the JSHS Junior Science and Humanities Symposium Program. JSHS is a high school level program and it promotes original research and experimentation in the STEM fields. STEM is science, technology, engineering and mathematics and it seeks out talented youth and encourages and supports them in an effort to attract more people into the STEM areas.

In a recent report entitled, "Rising Above the Gathering Storm," by the National Academy of Sciences, a large committee of varied experts

conferred to discuss the future of America's prosperity. During this conference, it became clear that the assumption that America was a world leader in science and technology may not really be true shortly in the future.

The report featured some recommendations that highlight areas, where it's absolutely essential that we do better as a nation, mainly to increase the availability and quality of research and innovation talent. This is not a challenge to be taken lightly, nor is it an easy goal. Building talent in STEM areas requires the seeds of inquiry and wonder and the requisite skills to conduct original research. This develops over a long time through practice, thought and deliberate opportunities to practice these skills.

Unfortunately, schools are often forced to focus on many other things like testing and grades and it takes a lot of time to develop inquiry and laboratory research skills. So sometimes these things fall by the wayside. That's why the JSBS program is an essential partner for the development of our future researchers. We call JSBS a pipeline program and it's supported and funded by the Tri-Service Research Offices and they aim to widen as Dr. Ohab said the pool of trained talent to conduct research that is vital to our nation.

A little bit about our schools, the Department of Defense Education Activity has schools in the United States, Europe and Pacific. All of the participants that will be speaking on the webcast today are from DOD's Europe schools. We're teaching students of federal workers and military members in overseas locations, so we have basically American schools located overseas. DOD Europe holds a regional symposium and the five top placing students from this regional event travel to the United States to compete in a national symposium. For all students, this opportunity is unequalled in terms of connections, motivation and understanding. But the students will get to tell you that in their very own words as we move through the webcast.

MR. OHAB: And I'd like to get your opinions first Dr. Lynn and we'll get some of the student and mentor perspective, but in terms of participating in the symposium, what are the big advantages for the students?

MS. SMITH: Okay. Our students want to get into college and they want to get scholarships and the way, what we know about this right now is that college admissions often what they're telling us that they're looking for students not just with good grades, but student who can exhibit a dedication and commitment to something over a long term.

Research of the depths that these students are required to conduct for JSBS clearly demonstrates that commitment. Further, these students that colleges are looking for need to show the ability to articulate in speaking and writing, and this is also a part of the JSBS program. They're required to do both.

The U.S. Army, Navy and Air Force also offers many opportunities for students to deepen their knowledge and skills through varied research

opportunities, scholarships, fellowships and internships, et cetera. They have lots of information about this on their research office website.

MR. OHAB: Let's get some student perspectives then. And just a reminders to our listeners, we do have a lot of students on the phone and I'm not sure if they all had a chance to actually call in. So I'm going to prompt the first question to Alfreda and if you're here, would you tell us where you go to school and give us your thoughts on what your advantages of the participation have been for you?

ALFREDA: Yeah, I'm currently a sophomore at a college in Massachusetts called Worcester Polytech Institute and it's a tech school. And completing and presenting my project really gave me an edge over everyone else because not only did it show that I had the motivation and intelligence to complete a research project, but it also comes with the implied knowledge that you know how to present your work and yourself to a big crowd of people which is a skill that not many people have.

MR. OHAB: That's great. How about Geri, are you here?

GERI: Yes, I'm Geri Antiverous (ph), I'm currently a junior at Aviano High School in Italy. JSBS -- I started participating in JSBS when I was in the seventh grade and the whole process of conducting a project and researching and collecting data and also presenting regional JSBS really helped, especially in school when you have to present projects as well. It was a real confidence booster to be able to present data that you collected yourself to a big room of people. MR. OHAB: How about Nigel?

NIGEL: For me, the advantages of JSBS because I'm still participating in it --

MR. OHAB: Can you tell us where you go to school real quick?

NIGEL: Oh, sorry, yeah. I go to Kauresform (ph) High School over in Germany and I'm a freshman there. For me the advantages of JSBS because I'm still participating in it, it helped me to learn how to present my research and talk more efficiently and just, you know, presentation's a big thing and enforcing the scientific methods.

MR. OHAB: Let's try Erin, how about you, can you tell us where you're from and what advantages have you had from the participation? Looks like Erin is not with us.

How about Jonathan?

JONATHAN: Yes. Hello. My name is Jonathan Grant; I am from Minwasil (ph) in England. And I feel that through JSBS, I have learned how to apply the scientific process through trial and error and I feel I have increased my ability to write scientific papers.

MR. OHAB: Do we have any mentors with us?

MS. LABBS: Yes Anne Labbs (ph) from Lodges Elementary School/High School.

MR. OHAB: Anne, would you give us your thoughts and tell us where you're from.

MS. LABBS: Yes, I'm a mentor from Lodges, which is in Azores, Portugal. And I've been involved in JSBS -- teacher in the Pacific but it's been about nine years. And I would have to say that participation is -- opportunities for students who are critical thinkers, who are responsible, for good writers, talents, these skills, develop public speaking skills and to be applauded for these efforts. MR. OHAB: And is Ray here, one of the other mentors? All right.

Well, let's talk about the actual symposium, I mean why would you want to end and were there any memorable moments that you experienced? I'll start off with Alex.

ALEX: Hi my name is Alex Goddy (ph) and I'm currently a senior at Onbach High School (ph) and I've actually never been to a symposium, but I'm really excited about going and attending. And I feel like students would want to attend because they would want to meet other people and to sit in the same subject that they have and be able to compete on something that is important to them.

MR. OHAB: And Nigel, are you in the symposium right now?

NIGEL: Yes, and I went to the symposium last year and I find it really nice because one of the things we can connect with people who kind of share interests with us and also the scientists and like last year, there was the keynote speaker Dr. Parmentola and he gave a nice speech about like emerging technologies and things and it's nice to also to be able to do research and then share it with someone who seems to care more than like a school science fair.

MR. OHAB: And Dr. Parmentola is actually on our program over a year ago, he was wonderful.

NIGEL: Yeah, yeah.

MR. OHAB: How about you Shamia (ph)? Have you had any experiences, any memorable experiences at your symposium?

SHAMIA: Yes, actually I have. I went last year and it was a wonderful experience going. It was very nice; it was well behaved and intelligent. And I expanded my knowledge of science.

MR. OHAB: And Geri what about you? Any memorable moments?

GERI: I've been to the regional symposium four times and I really enjoyed my experiences there because I got to meet people with the same interests as me, as well as expand the knowledge that I already had. And something memorable was when we went on a field trip to Domschtat

University (ph) and we got to see some of the scientists there perform their experiments for us.

MR. OHAB: That's really great.

And what about the mentor's perspective? Anne, did you have any memorable moments?

MS. LABBS: Yes, as an example I can talk about a very special student I had in Japan. His father was enlisted Navy and this student asked his dad, knowing that the science symposium is supported and sponsored by the branches of the military, asked his father who was in the Navy what was the problem that he could work and experiment around to the build on.

So my student decided he was going to find out a way to slow down the processes of rusting on metals used on warships and aircraft carriers. And he won the region in Japan and went to nationals and it was just completely awesome to be there to see what students are doing.

And just students just graduated from the Naval Academy and I think the symposium had something to do with his confidence.

MR. OHAB: Now Dr. Lynn I have a question for you. Talk about why the Department of Defense dependent schools in Europe are participating in the Junior Science and Humanities Symposium.

MS. SMITH: Okay. Well first of all, DODEA as a system has a set of science standards and they guide our instruction, they utilize inquiry, laboratory skills, critical thinking et cetera and we cover science content by using those underlying pieces that are embedded within that content.

These standards focus on basically or try to focus on a future that really hasn't even been determined yet. What we're trying to do is train students to cope in a world that we're really not even sure what it's going to look like in the future, the way we've had exponential gains in technology and science, it's very difficult to predict that. But we try to do that through giving them these underlying skills that go way beyond content.

JSBS is actually the exemplary output of high school science. It gives that special kind of student an avenue to go further with their talent in these STEM areas. I can give you an example, although I could give you a lot of examples, but Nigel is the one who came as a middle school student who developed an engineering project. He was interested in making electricity by driving the path and he developed something, he developed a kind of machine that he could do that with. And he's only getting better at it over the last year.

So he learned something there. It's just there aren't avenues always for students like this in their schools. It's just, it's sometimes logistically impossible. JSBS really allows students to focus

on futuristic ideas and 21st century challenges. It prepares our students for their futures but it also assures America's future.

JSHS students, it gives students who are interested in these STEM areas an opportunity to just go much further, to conduct genuine research, to present their work to peers, to receive scholarship money and to assist them with their future goals. And it also fulfills a lot of the goals of the military, which is to really increase the number of students who go into the area of research and science or technology or engineering. MR. OHAB: Now Nige, I I'm going to have to put you on the spot and can you describe for us the project that Dr. Lynn mentioned?

NIGEL: Yes, my project that I've been working on for over two years now is I've been working towards creating a machine that sits in your car and whenever you go over like a bump like a speed bump or you know, because we live on a military base, you know, we have to go over bumps and we have spike shift and things so. So the project is designed in such a way that whenever you go over a bump it tries to create electricity.

I'm still working on it because it's very hard to do, but it's a good way to learn about how like production of like products is done.

MR. OHAB: And I understand we might be getting some feedback from one of the phones. If anybody has a computer program that is also live streaming the audio, you can just close your program or the web browser that might eliminate the echo.

Now Dr. Lynn, what are the processes that students have to go through to compete at the regional or the national symposium?

MS. SMITH: If we could just go back a moment to why we might participate in this, hang on. Why the students want to participate in the JSJS regional, that would be, we would start with Alex because Nigel's already talked about his project, could we do that?

MR. OHAB: Yeah, that's fine.

MS. SMITH: Okay.

ALEX: Hello. I wanted to participate in JSJS and I feel it's important because I want to expand my own knowledge about the topic that I like which is science. And I feel it's important because it gives us opportunities to get scholarships for college. And compete in something that usually some schools don't have like the United States has.

MR. OHAB: And that was Alex.

MS. SMITH: Nigel?

NIGEL: Oh, oh, there is the, well it's, hum, you know, it's a good way to relate to people and so I can't think of much right now on this one.

MR. OHAB: What about you, Shamia?

SHAMIA: JSHS is -- (inaudible) -- knowledge of science to just bring all the other students together -- (inaudible).

MR. OHAB: Any thoughts for you Geri? GERI: When I was in seventh grade, I wanted to participate in JSHS because it was my first year actually living overseas and I wanted to meet other people who were like me and were interested in science. So I conducted my experiment and I went, I mean I had a wonderful time actually and I went for three more years after that. So it's just an amazing experience.

MR. OHAB: That's wonderful. And what about one of the mentors, Ray, how about you?

So is Ray not here?

MS. SMITH: No, no.

MR. OHAB: How about Anne?

MS. LABBS: Well, I would say DOT Europe participates in JSHS simply first of all because it just makes sense. It's an academic possibility and kids don't have that many exceptional academic extra-curriculars to begin with. I also would say that JSHS demystifies the STEM areas for students and for girls and although we've come a long way I think -- supported in the areas and --

MR. OHAB: To get back to the question I had just started to ask. Dr. Lynn, can you tell us a little bit about the process that students have to go through to compete and present at the regional or national symposium?

MS. SMITH: Sure. As I said earlier, original research is very developmental and incremental. DOD students work on their projects with teachers at their local schools. There are several levels of submission. I take five submissions from them every year and they again they get more complex as the submission process goes on. Originally, it's what are you thinking, what might be your hypothesis and then it goes further each time. What is your research design? They get feedback each time. And that feedback is designed again to help them.

This is a lot for one person to manage in terms of giving students feedback, but at least each student gets consistent feedback. What most students do is they work with their projects, on their projects with teachers at their local schools. And sometimes the project kind of outdistances the teacher's level of expertise and they're stretched by the choice of a student's project direction.

So since project development takes place over several months and sometimes years, this building of skills and knowledge, we try to do it through a website with training documents because of our geographical challenges. We have students in many countries across Europe.

So a content scientist engineer or expert mentor could really assist students in going further or deeper. So we're looking to kind of build those relationships with local scientists or scientists who are willing to communicate with students through the Internet, through the web, through e-mail, whatever, and help them to go further because it's that level of expertise that we're at for a lot of students. And we just don't have the resources being in non-English speaking countries. We don't have local universities that we can access.

So putting in a pitch for people who are interested in helping out, and students.

MR. OHAB: Now Jonathan, why don't you tell us about the process that you went through to complete?

JONATHAN: Well you have to search and inquire for ideas. Like from ideas once I found them, I experimented to see if I actually had something that I could try and explain and find supporting data for explanation to support the explanation. And also as I went through the experiment, I revised my trials to control the variables better and finally I loaded up and had to start articulating it. So I'm ready for the JSBS.

MR. OHAB: That's great. What about you, Nigel?

NIGEL: A lot of what Jonathan said, the same things, it's finding an idea or somewhere that we need and you have to find a way to meet the challenge so you know finding a problem and then figuring out how you can solve it and test it and those kind of things.

MR. OHAB: What are your thoughts, Alfreda?

ALFREDA: Basically that once you get past regionals, it's all about taking what you learned from presenting there and revising your presentation and practicing it over and over and over.

MR. OHAB: Yeah, and that process never really ends.

Now one of the mentors, Anne, what is your experience here?

MS. LABBS: My experience is that the process begins with the student and the student's area of scientific interest. What does the student perceive as a problem that a hypothesis could be developed on and an experiment could be developed that could test the hypothesis? But it is ongoing and it really does depend on one, does the school, it depends on the faculty, if you need help, any process -- (inaudible) -- and also receive help from Dr. Smith and from scientists who kindly send us facts on our progress.

MR. OHAB: Now for the students and mentors who have attended the national JSBS talk a little bit about your experience there. Geri, how about you?

GERI: When I went to national JSHS, I didn't actually get to present there but I did get to go and see all the amazing projects that were being presented. I remember that there was one about rockets and it was just amazing, like the girl had talked to people who worked at NASA to get help on her project, and I just thought that that was so amazing that she could do something like that.

MR. OHAB: That's really neat. Rockets will never stop being cool.

GERI: Exactly.

MR. OHAB: What about you Alfreda?

ALFREDA: Yeah, I mean, the biggest thing is the student projects, like it's unbelievable some of the stuff that people do. Like when I went, one student worked with MIT and developed in rats basically a surgical implant that would dissolve so you wouldn't have to go back in for another surgery to get it removed. And it was just an amazing experience. The speakers were interesting, presenting was awesome and I loved it, it was amazing.

MR. OHAB: Now Alfreda for any students who might be in interested in participating JSHS, do you have any advice for them?

ALFREDA: Absolutely. Don't give up. Many students start and never finish because it's just so hard to meet the deadlines but just keep working at it, it's completely worth it and you'll definitely be proud of yourself once you get through it.

MR. OHAB: Thanks. And Geri, what about you?

GERI: Well my dad gave me this advice and I took it to heart. Collect, collect, collect, practice, practice, practice. Collect all the data that you can because it's very important and practice what you're going to say so when you get out there you don't lose it.

MR. OHAB: That's great advice.

How about you, Nigel?

NIGEL: Oh, mine is you know try your hardest and don't procrastinate because I've done that and I almost didn't get into JSHS one year because I procrastinated so much. So yeah, don't procrastinate.

MR. OHAB: That's some very good advice.

How about you, Shamia?

SHAMIA: Just to make sure that you have all your resources necessary to help your project. And that you know your project well enough. I went there last year and had a poster, but I didn't really describe everything that I really wanted it to. So I -- (inaudible) --

but I should have like -- (inaudible) -- before I got there. That was like the only advice I have.

MR. OHAB: That's great. Alex, what about you? Any advice for students interested in participating?

ALEX: My advice is to definitely work hard because it will pay off and don't be scared to ask for help because it really is to your favor.

MR. OHAB: And from a mentor's perspective. Anne, any thoughts?

MS. LABBS: Well, first, I'd like to say that all this is excellent advice that I think the student interested in participating in the science symposium should listen to. I also would like to say from my own perspective that you don't have to be a champ in science class to be successful in scientific research. You can be a champ as soon as you decide you are interested, as soon as you commit yourself and you need to remember that if you are a wiz in English class and you can prove an author's use of language or the tone of the piece by using evidence from the piece, then that's scientific, that's a scientific method. You're backing up your ideas with evidence -- (inaudible) -- so forth and that's my advice. It's a wonderful, wonderful program.

MR. OHAB: Boy, I really appreciate all of your advice. I think that that's some very valuable insight.

Now Dr. Smith we're just about out of time. I wanted to see if you had any final thoughts before we end today's program.

MS. SMITH: Well my final thoughts are that we just have, we are very gifted to have so many wonderful students. And like all of them said, they all have different perspectives, they all have different talents, they all have different interests but somehow, when they get together at the regional and at the nationals, they find other people with the same kind of enthusiasm and drive that they have. And I just hope that many students will want to be a part of this and that scientist and engineers who are listening will want to build a partnership with some of our students who are having projects that they need some additional expertise on.

And thank you very much Dr. Ohab for giving us this opportunity.

MR. OHAB: Oh, it's been an absolute pleasure. Dr. Smith, Dr. Lynn Smith, and all of our students and mentors, I really do appreciate your time here today and we're expecting great things from you, so we'll be checking back down the road.

MS. SMITH: Thank you. MR. OHAB: Please tune in next week, Wednesday, March 24, when we are exploring the Marine Corps Environmental Science Specialty with U.S. Marine Corps Master Sergeant Kerry Hublick (ph).

Thank you again everyone for listening. Please have a very happy and safe St. Patrick's Day. I'm Dr. John Ohab, Armed with Science.

END.