2017 Evaluation Report

April 2017

INTRODUCTION

The Ohio Junior Science and Humanities Symposium (hereafter referred to as OJSHS) is an annual event in which Ohio students in grades 7 to 12 "compete for scholarships and recognition by presenting the results of their original research efforts before a panel of judges and an audience of their peers"[1]. The OJSHS is part of the national Junior Science and Humanities Symposia Program, which is jointly sponsored by the United States Departments of the Army, Navy, and Air Force, in cooperation with leading research universities throughout the nation.

The 54th annual OJSHS took place on March 15 – 17, 2017 at Bowling Green State University, who hosted and sponsored the event along with the NWO Center for Excellence in STEM Education. The purpose of this report is to present the findings of the 2017 OJSHS evaluation. The report begins with a description of evaluation methods, followed by a description of the 2017 OJSHS participants. The report then summarizes the perceptions of the 2017 OJSHS participants before concluding with recommendations for future Ohio Junior Science and Humanities Symposia.

[1] Cited from the national Junior Science and Humanities website – www.jshs.org

EVALUATION METHODS

The 2017 OJSHS was evaluated using an online survey that was made available to the participants at the end of the last day of the event. The link to the survey was included in the program distributed to all participants. The link was also e-mailed to the participants on the last day of the event and a reminder email sent one week later.

The evaluation survey included several items that asked participants to rate the quality of several aspects of the 2017 OJSHS, including the keynote presentation, the poster and paper judges, the organization of poster presentation space, and the awards ceremony. The survey also asked participating students to rate how effective the OJSHS was at increasing their interest in STEM research and careers. The survey included several closed-ended multiple-choice items and several open-ended items that asked participants to write about their perceptions of the 2017 OJSHS and give suggestions regarding how it could be improved.

See Appendix A for the 2017 OJSHS Evaluation Survey.

2017 OJSHS PARTICIPANTS

A total of 105 students and 94 non-students participated in the 2017 OJSHS. Students could participate in the OJSHS as paper presenters, poster presenters, or delegates (who did not present any research). This year also featured the inclusion of 42 students from Toledo Public Schools presenting posters as part of the Army Education Outreach Program (AEOP). These students are not included in the attendance data below and did not complete the OJSHS evaluation but instead completed grant specific evaluation. Non-students included teachers, parents, paper and poster judges, OJSHS staff/volunteers (e.g., session presiders), and other guests. The attendance numbers are displayed in the table below.

Participant	2017 Attendance	2016 Attendance	2015 Attendance	2014 Attendance	2013 Attendance
Student Presenting a Paper	25	24	24	24	24
Student Presenting a Poster	62	83	64	71	53
Student Delegate	18	8	4	6	7
Parent of a Participating Student	11	22	23	22	16
Teacher of a Participating Student	19	13	12	13	11
Paper Judge	4	5	6	6	6
Poster Judge	36	36	26	26	19
OJSHS Staff and Volunteers	15	12	13	13	25
Other Guests	9	8	3	14	8
Total	**199**	**211**	**175**	**195**	**169**

Attendance has remained mostly consistent over the past five years, with the major variable being the number of students presenting a poster.

Demographic information was collected from the participating students via the 2017 OJSHS registration and evaluation. Most of the students were participating in the OJSHS for the first time in 2017, and a majority of the students were female and white. The student demographic information is displayed in the table below.

Demographic Variable	Values	N	%
Number of years (including 2017) participating in the OJSHS *(n=52)*	One	35	67.3%
	Two	13	25%
	Three	1	1.9%
	Four	3	5.8%
Gender *(n=105)*	Female	61	58%
	Male	44	42%
Racial/Ethnic Background *(n=105)*	Asian	13	12%
	Black or African American	1	1%
	Hispanic or Latino	5	5%
	White or Caucasian	74	70%
	Other – Not Specified	8	8%
	Chose Not to Report	4	4%
School Location *(n=105)*	Rural	25	24%
	Suburban	76	72%
	Urban	4	4%

Note: Not all students completed each demographic item. The number in parentheses indicates the total number of responses for that particular item.

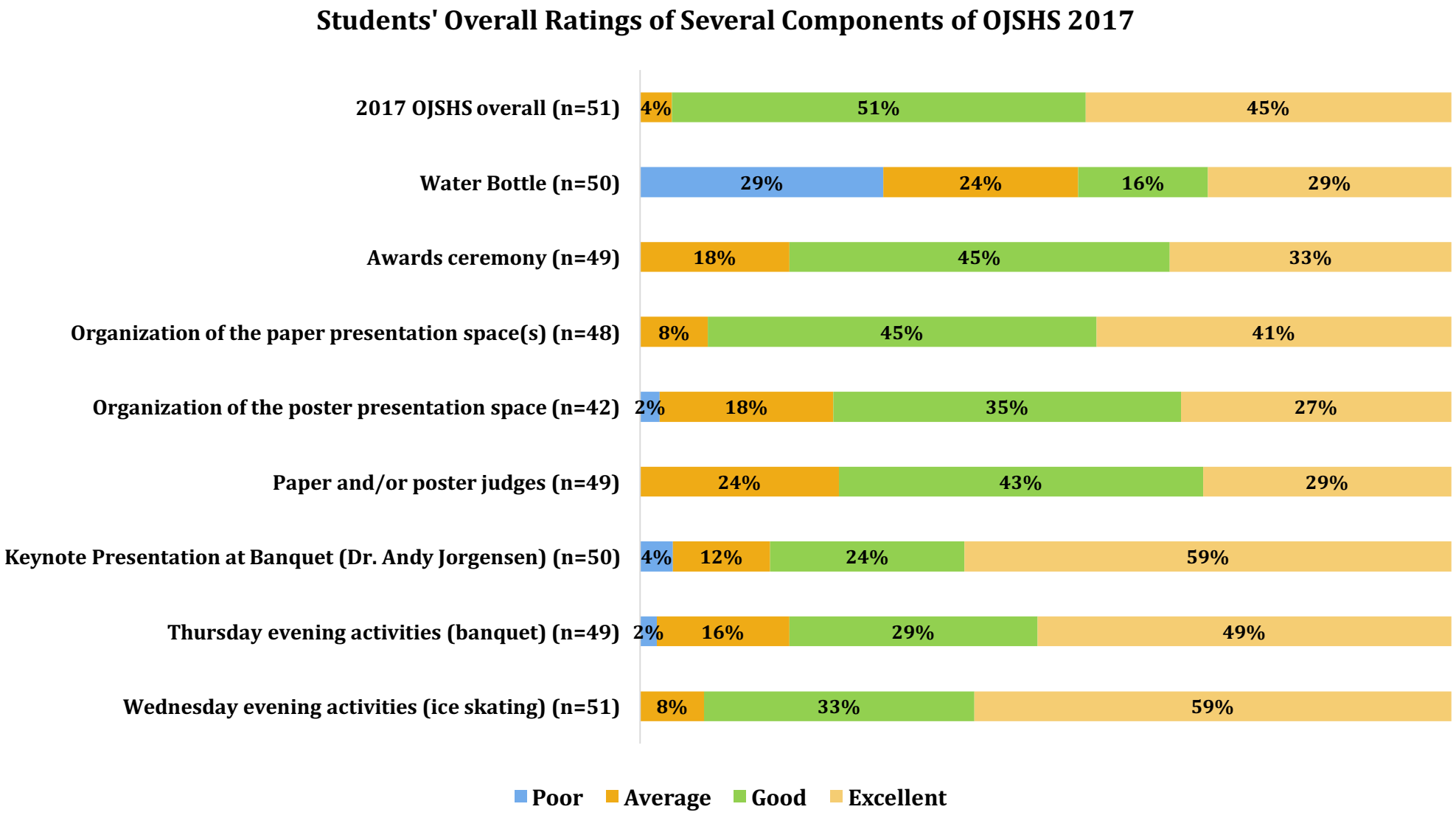
PERCEPTIONS OF THE 2017 OJSHS

Student Perceptions

A total of 54 students completed the evaluation survey. The overall response rate to the evaluation survey was 51%. This is much higher than last year (32% in 2016) but lower than previous years (55-60% in 2012-2015). This is likely due to the addition of a National JSHS survey that started being required for students in 2016.

The students were asked to rate the quality of several components of the 2017 OJSHS. The 2017 OJSHS included several daytime and evening events throughout its three-day duration. However, some of the participating students only attended the second day of the OJSHS, which was the day on which the students presented their papers and posters. For this reason, a "this does not apply to me" option was included on the evaluation survey. Therefore, the number of responses (n) for each item reflects only those students who actually participated in or interacted with the OJSHS component in question. The figure on the next page illustrates the distribution of the students' responses.

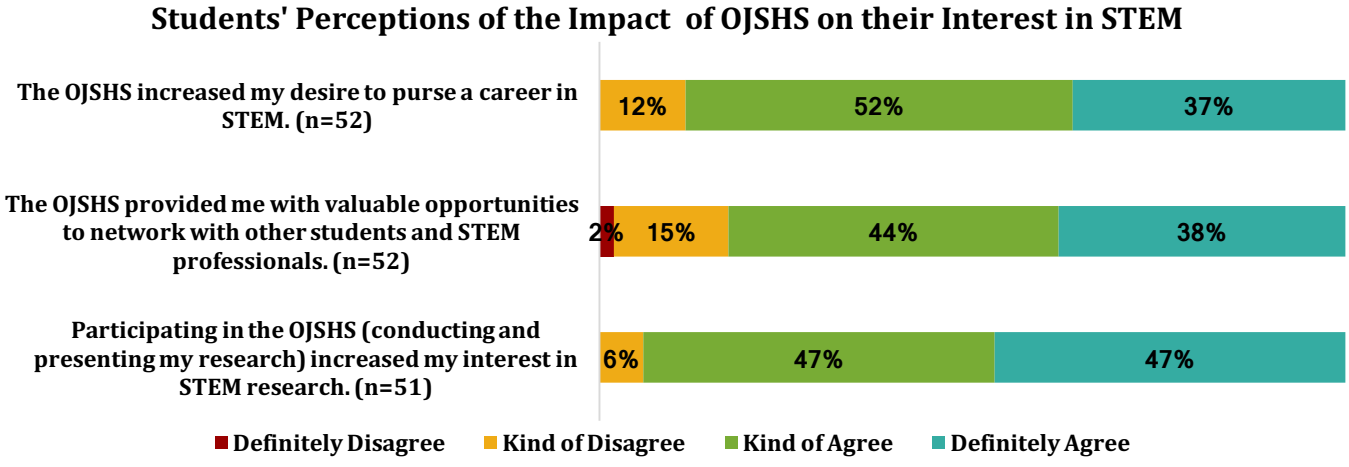
Students' overall ratings of the 2017 OJSHS were positive



Students were asked to write comments to explain their responses to the previous questions. The majority of the students' comments were positive, indicating that the students had a positive experience at the 2017 OJSHS. However, most of the negative comments focused on the water bottles. The bottles were given to all student participants and replaced the shirt given out in previous years. Several students complained that the bottles did not work properly or were broken and made them unusable. There were mixed reviews of the banquet keynote. Some loved it and others felt it was not engaging and too long. There were a few comments about the length of the day and having more time to engage with students. Some of the constructive criticism comments from the students are below.

- *I love the program overall. I think it's a great experience and it's a lot of fun. However, there were times when I'd be so exhausted because of how early we'd have to wake up and paper presentations we had to listen to. I think maybe more activities and less sitting around.*
- *There needs to be more time for socializing. More activities that get everyone involved. I also thought the speaker was better last year. It was more audience interaction and this year it was just another poster presentation.*
- *It would have been nice to talk to people from other schools more.*
- *I thought the keynote speaker in 2016 was much better because this year seemed like just another paper presenter and got a little long. It also would've been nice to have more time to talk to people from other schools.*

In addition to rating the quality of the 2017 OJSHS, students were also asked to rate the impact of the 2017 OJSHS on their interest in STEM (science, technology, engineering, and mathematics) research careers. The figure below illustrates the distribution of responses for each item.



The students were asked to describe their experience at the 2017 OJSHS in their own words. One of the main themes that emerged from the students' responses was the opportunity for student-student interaction. Many students wrote about meeting new people at the 2017 OJSHS. Some of the students wrote:

- *OJSHS was a great place to learn about new studies in STEM with interesting and comprehensive projects and findings in Ohio.*
- *I greatly enjoyed listening to others present about their work in the STEM field. It was incredibly interesting.*
- *Having the opportunity to listen to other peer paper presenters was worth all the time in gold!*
- *I had a great time, it was fun, there were a lot of cool people and presentations there and it was an overall great experience.*
- *It was a lot of fun. I liked meeting new people and seeing everyone else's projects.*
- *Overall, I thoroughly enjoyed the experience. Listening to all the presentations was extremely stimulating and fascinating.*

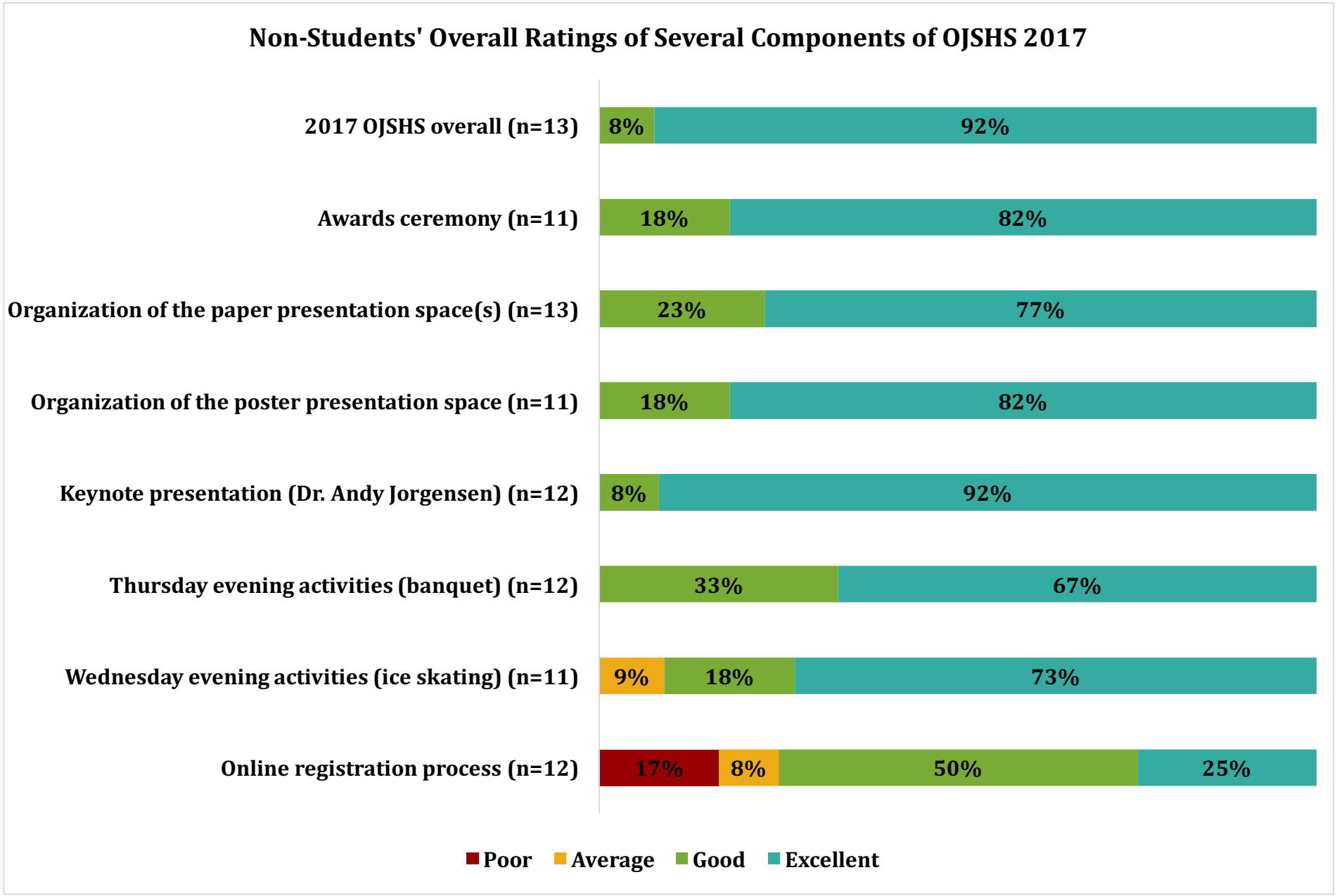
The majority of student participants stated that they were "very likely" or "moderately likely" to participate in OJSHS next year.

Non-Student Perceptions

A total of 13 non-students completed the evaluation survey. The overall response rate to the evaluation survey was 14%, which is much lower than previous years. This may be due in part to the additional AEOP survey required for adult participants.

Like the students, the non-student participants were asked to rate several components of the 2017 OJSHS. Some of the non-student participants (e.g., poster and paper judges) only participated in the second day of OJSHS. Therefore, the responses to "online registration process," "Wednesday and Thursday evening activities," "keynote presentation," and "awards ceremony" mostly represent teachers and parents of participating students. The figure on the next page illustrates the non-students' distribution of responses for each item.

Non-students' overall ratings of the 2017 OJSHS were positive



In addition to rating the quality of the 2017 OJSHS, the non-student participants were also asked to describe the impact of OJSHS on students' interest in and understanding of STEM. Although it is likely that most of the participating students were already interested in STEM, many non-student participants suggested that the OJSHS provided students with motivation to continue learning and conducting research about STEM. Some of the participants wrote:

- *It highly motivated students to take their projects to a higher level.*
- *It helps them to see the various aspects of STEM. They work hard to try to get back to the symposium.*
- *The OJSHS has great impact on student interest, desire, and understanding of STEM. Student's learn to take risks and learn for the sake of learning. This event fuels their desire to continue working in the STEM area.*
- *It has a very positive impact on their understanding. Not only do they get to see all the other great research being done, which broadens their knowledge of the fields, but it also validates all the hard work and time they put into their own research. Can't say enough goods things about OJSHS!*
- *OJSHS provides an additional motivation for students to seek out projects and allows them the opportunity to organize and present their work.*
- *OJSHS provides the environment that allows students to literally eat, breathe, swim, and experience the world of STEM, just as professional's do!*
- *I have seen incredible growth in my students that have attended OJSHS. They can't wait to come back next year and have come away with lots of great ideas for projects to work on in the future. They have learned a lot about other fields of science that they were previously unaware of. They have also seen how much room they have to grow compared to other students of their age and it has motivated them to do better for next year.*

The non-student participants' comments about their experience at the OJSHS were positive. Many specifically commented about the high level of organization, and others echoed the comments of the students, emphasizing the role of OJSHS in fostering positive student-student interactions. The majority of non-student participants stated that they were "very likely" or "moderately likely" to participate in OJSHS next year.

SUGGESTIONS FOR FUTURE OJSHS

The findings from the 2017 OJSHS evaluation survey indicate that the 2017 OJSHS was perceived to be a high-quality and impactful event by student and non-student participants alike. The findings demonstrate that the 2017 OJSHS provided many opportunities for students to interact with and learn from other students and STEM professionals, and helped stimulate more interest in students to learn about and conduct STEM research.

The following suggestions should be considered in the planning of future events:

- Several students complained about the quality of the water bottle. It would be beneficial to look for a higher quality bottle for next year or explore other options, perhaps even going back to the t-shirt idea from previous years. One suggestion was to keep the bottle (but better quality) but add chap stick as an additional item.
- Several students expressed a desire for more time to interact with students from other schools. The organizers should think about specific events that encourage/force cross school communication.
- Several students expressed a desire for the scheduled events for the day to end at 8:00pm so they have more time at the hotel to rest. Additionally, students specifically mentioned having fewer paper presentations and longer breaks between sessions. Organizers should review the schedule and determine if changes could be/should be made for next year.
- A few students requested a peer review/judging time for the high school students similar to what is done for the junior high students. This could be added on Friday morning.
- Eliminate junior high students from participating in OJSHS. This was raised with the advisory board and the teachers agreed that it should be grades 9-12 only starting in 2018. This will simply the schedule and registration process.
- Several students and teachers mentioned the cumbersome registration process. While this cannot be changed as it is mandated by the funding agency and consistent across all 48 regional symposia; it may be worth creating a brief guide with screenshots to help students through the process next year.
- One comment (below) about teacher coordinators is especially interesting and should be examined by the NWO coordinators as this has been raised in the past as well.
    - *For next years, OJSHS I really would encourage teachers of participating high schools to not be so heavily involved in the OJSHS organization process, because it really gives other students an advantage since they have much more inside information. Additionally, I have heard from people that many teachers were upset at the 2016 OJSHS since their students did not win prizes and that "outside schools were increasing in population." Having coordinators that are not affiliated with the school results in a less biased and more fair selection.*

APPENDIX A:

THE 2017 OJSHS EVALUATION SURVEY

OJSHS Evaluation Survey

We Hope You Enjoyed the 2017 Ohio Junior Science and Humanities Symposium!

Members of the Ohio Junior Science and Humanities Symposium Program Evaluation Committee are always seeking ways to improve future Symposia. The best way to do this is to find out what participants think of the Symposium, and use their comments and suggestions to make future Symposia better.

Please take a few minutes to complete the following evaluation survey and tell us what you thought about the 2017 Ohio Junior Science and Humanities Symposium. We appreciate your cooperation!

Thank you for your assistance in improving the Ohio JSHS.

Which of the following describes you and your participation at OJSHS?

- ○ Student - presented a paper
- ○ Student - presented a poster
- ○ Student delegate - did not present a paper or poster
- ○ Parent of a participating student
- ○ Teacher of a participating student
- ○ Paper judge
- ○ Poster judge
- ○ OJSHS staff member/volunteer
- ○ Other (please specify)

OJSHS Evaluation Survey

Students, Tell Us What You Think!

How many years (counting this one) have you participated in the OJSHS?

- ( ) One (this is my first year)
- ( ) Two
- ( ) Three
- ( ) Four
- ( ) Five
- ( ) Six
- ( ) More than six

I identify my gender as…

- ( ) Man
- ( ) Woman
- ( ) Trans
- ( ) Other (please specify)

Which of following best describes the way you define your racial/ethnic background?

- [ ] American Indian or Alaskan Native
- [ ] Asian
- [ ] Black or African American
- [ ] Hispanic
- [ ] Middle Eastern
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] White, non Hispanic
- [ ] Multiracial

Please rate the following aspects of the 2017 OJSHS.

	Poor	Average	Good	Excellent	This doesn't apply to me
Wednesday evening activities (ice skating)	◯	◯	◯	◯	◯
Thursday evening activities (banquet)	◯	◯	◯	◯	◯
Keynote Presentation at Banquet (Dr. Andy Jorgensen)	◯	◯	◯	◯	◯
Paper and/or poster judges	◯	◯	◯	◯	◯
Organization of the poster presentation space	◯	◯	◯	◯	◯
Organization of the paper presentation space(s)	◯	◯	◯	◯	◯
Awards ceremony	◯	◯	◯	◯	◯
Water Bottle	◯	◯	◯	◯	◯
2017 OJSHS overall	◯	◯	◯	◯	◯

Please provide some comments to futher explain your above ratings.

Please rate your level of agreement/disagreement with the following statements.

Participating in the OJSHS (conducting and presenting my research) increased my interest in STEM (science, technology, engineering, and/or mathematics) research.

	Definitely Disagree	Kind of Disagree	Kind of Agree	Definitely Agree
Please select your choice.	◯	◯	◯	◯

The OJSHS provided me with valuable opportunities to network with other students and STEM professionals.

	Definitely Disagree	Kind of Disagree	Kind of Agree	Definitely Agree
Please select your choice.	◯	◯	◯	◯

The OJSHS increased my desire to purse a career in STEM.

	Definitely Disagree	Kind of Disagree	Kind of Agree	Definitely Agree
Please select your choice.	◯	◯	◯	◯

OJSHS Evaluation Survey

Please Tell Us What You Think

How many years (counting this one) have you been involved with the OJSHS?

- ○ One (this is my first year)
- ○ Two
- ○ Three
- ○ Four
- ○ Five
- ○ Six or more

Please rate the following aspects of the 2017 OJSHS.

	Poor	Average	Good	Excellent	This doesn't apply to me
Online registration process	○	○	○	○	○
Wednesday evening activities (ice skating)	○	○	○	○	○
Thursday evening activities (banquet)	○	○	○	○	○
Keynote presentation (Dr. Andy Jorgensen)	○	○	○	○	○
Organization of the poster presentation space	○	○	○	○	○
Organization of the paper presentation space(s)	○	○	○	○	○
Awards ceremony	○	○	○	○	○
2017 OJSHS overall	○	○	○	○	○

Please provide some comments to futher explain your above ratings.

As a [Q1], what is your perception of the 2017 OJSHS's impact on students' interest in and understanding of STEM (science, technology, engineering, and mathematics)?

OJSHS Evaluation Survey

We Want to Know About Your 2017 OJSHS Experience

Please describe your experience at the 2017 OJSHS in your own words. Include the aspects of your experience that you liked as well as those that you didn't like.

What suggestions do you have for next year's OJSHS? Is there is anything that you would want to see kept or removed? Is there anything you would change or add?

How likely is it that you will participate in/be involved with the OJSHS next year?
Students in the 12th grade, please select "This does not apply to me".

- ○ Not at all likely
- ○ Very slightly likely
- ○ Moderately likely
- ○ Very likely
- ○ This does not apply to me

THANK YOU VERY MUCH FOR YOUR COOPERATION!

Having trouble viewing this email? Click here

24 hours left to register!!

Registration closes at 11:59 PM on Feb. 19, 2017.

Join us for the 54th Ohio Junior Science and Humanities Symposium.

March 15-17, 2017
at Bowling Green State University

Important Dates for the 2017 Regional JSHS!

Registration is open until Sunday, February 19, 2017 @ 5:00pm. Please use the link below to register. The registration link is for all participation levels:

- Student Presenters
- Student Delegates
- Parents
- Teachers
- Guests

No registrations for any of the above groups can be accepted after **February 19, 2017.**

Click here to register: http://www.cvent.com/d/kvql37

- Notification to students to confirm participation in oral presentations will take place the **week of February 27, 2017**

- All students, teachers, guests, parents, and STEM professionals/volunteers must complete registration to attend the Regional JSHS by **February 19, 2017.**

More information on the 2017 Ohio JSHS can be found at http://cosmos.bgsu.edu/nwo_ojshs/

Questions should be directed to NWO (nwo@bgsu.edu).

Print

Dear JSHS participant,

Evaluators from Purdue University are conducting a study to learn about student experiences in Junior Science & Humanities Symposium (JSHS). We are asking you to fill out this survey because you participated in JSHS. Your feedback will be used to help us improve JSHS for students in the future and provide important information about your experiences. The sponsor of JSHS, the Army Educational Outreach Program (AEOP), is paying for this study. In 2016, more than 7000 students and 1000 adults will participate in JSHS and evaluators from Purdue University want to hear from you and your research mentor.

Here's how you can help:

1) Complete the JSHS Regional Survey using the hyperlink below. Your parent or guardian has already provided permission for us to ask you to participate in the survey. Now, it is up to you to decide whether you want to participate or not. The survey takes 25-30 minutes to complete on average.

JSHS Regional Student Survey Link:

Sent invitation

DATE: Friday, March 17, 2017 3:00 PM

SENT TO: 117 recipients

SUBJECT: We want your opinion

MESSAGE:

OJSHS Evaluation Survey 2017

Thank you for attending OJSHS 2017.

To help us continue to improve OJSHS we are asking for your feedback about the 2017 event.

Please complete the survey by March 31, 2017.

Begin Survey

THE 54TH ANNUAL OHIO JUNIOR SCIENCE & HUMANITIES SYMPOSIUM

March 15-17, 2017

Bowen-Thompson Student Union
Bowling Green State University

Sponsored by the Northwest Ohio Center for Excellence in STEM Education (NWO) and Bowling Green State University

In cooperation with The Academy of Applied Science and with the support of the Departments of the Army, Navy, and Air Force

imagine.design.create

www.ojshs.org

The National Association of Secondary School Principals has placed this program on the NASSP National Advisory List of Student Contests and Activities for 2016-2017

BOWLING GREEN STATE UNIVERSITY

2016 OHIO JSHS AWARD WINNERS

Top Row (L to R): Savannah Cofer, Rama Balasubramaniam, Dhweeja Dasarthy, & Jordan Skates

Bottom Row (L to R): Alan Fong, Chinmay Bakshi, Graham Lane, & Jacob Dennis

2016 Ohio JSHS Participants

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@NWOSTEM

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The Ohio JSHS online evaluation can be found at:
https://www.surveymonkey.com/r/OJSHS_2017

Let's get trending!
Include #NWOohioJSHS on all of your posts!

Northwest Ohio Center for Excellence in STEM Education

BGSU School of Teaching and Learning

WELCOME TO BOWLING GREEN STATE UNIVERSITY (BGSU)

We are delighted to welcome you to the 54th Annual Ohio Junior Science and Humanities Symposium. The symposium is hosted by the Northwest Ohio Center for Excellence in STEM Education (NWO) and the School of Teaching and Learning at BGSU with the financial support of the U.S. Army Research Office, U.S. Office of Naval Research, and U.S. Air Force Research Office.

This event offers a valuable opportunity for young scientists and scholars to share their impressive achievements with their peers and parents and with professional scientists and scholars. The Ohio JSHS provides public recognition and certificates, honoring achievement and interest in research pursuits. This program also helps students attain a sense of achievement and self-confidence resulting from interaction with students from other schools and regions and with professional researchers and educators.

The JSHS program was started by an Ohio native, Colonel George F. Leist, who graduated from West Point in 1937 and was commissioned as a 2nd Lieutenant in the United States Army. Colonel Leist had a long and distinguished military career and was awarded the Bronze Star and Army Commendation medals. His post-war duty and research experiences included the fields of engineering and metallurgy at MIT.

Following the 1958 launch of the Russian satellite Sputnik, Colonel Leist, then the Commanding Officer of the Office of Ordinance Research in North Carolina, initiated the Junior Science and Humanities Symposium (JSHS) for secondary school science students. The first symposium took place at Duke University in 1958 and spread throughout the United States to many universities during the next four years. In 1962, the National JSHS was created; the Ohio JSHS was initiated the following year in 1963.

The JSHS Program has been sponsored by the United States Department of the Army since its inception. The Departments of the Navy and Air Force joined this initiative after 1995 to increase and encourage student interest in science, technology, engineering, and mathematics (STEM). This sponsorship and the cooperative efforts of universities throughout the nation have expanded the JSHS. This program now encompasses forty-eight regional symposia reaching students throughout the United States, Puerto Rico, and DOD Schools in Europe and the Pacific.

Two student finalists and three delegates from the each regional JSHS program will be chosen (all expenses paid) to attend the National JSHS that takes place in San Diego, CA April 26 – 30, 2017. In recent years, two winners of the Ohio symposium, Aaditya Shidham (2008) and Keith Hawkins (2009), have won the top national award. In 2014 the top award winner at the Ohio JSHS, Bluyé DeMessie, also won the 3rd place award in the Environmental Science division at the National JSHS. Clearly Ohio has many high-achieving young people, and we are proud to be able to highlight some of their success with this event.

We are grateful for your participation in this year's event and we hope that you find the 2017 Ohio Junior Science and Humanities Symposium to be a very beneficial and educational experience. Thank you for joining us!

Dr. Emilio Duran
Ohio JSHS Director

Dr. W. Robert Midden
NWO Director

Colonel George F. Leist, U. S. Army
Founder, Junior Science & Humanities Symposium
Recognized by The Academy of Applied Science for Pioneering Effects and Vision

Wednesday, March 15

4:00 PM – 6:00 PM	Check In	*Hampton Inn, Bowling Green*
6:15 PM	Mandatory Meeting for ALL Participants	*Great Room, Hampton Inn*
7:00 PM – 7:30 PM	Pizza Snack	*Great Room, Hampton Inn*
7:30 PM	Board Buses to *Ice Arena, BGSU*	
8:00 PM – 9:20 PM	Ice Skating	*Ice Arena, BGSU*
9:30 PM	Board Buses to *Hampton Inn*	
11:00 PM	Students Report to Assigned Rooms	

Thursday, March 16

6:30 AM – 7:45 AM	Breakfast	*Great Room, Hampton Inn*
7:50 AM	Board Buses to *BGSU*	
8:30 AM	Opening Session	*BTSU Ballroom 202A*
8:45 AM – 9:45 AM	**First Paper Session**	*BTSU Ballroom 202A*
Break (15 minutes)		
10:00 AM – 11:00 AM	**Second Paper Session**	BTSU Ballroom 202A
10:00 AM – 3:30 PM	Concurrent Poster Judging	*BTSU Ballroom 202B*
Break (15 minutes)		
11:15 AM – 12:15 PM	**Third Paper Session**	*BTSU Ballroom 202A*
12:20 PM	Group Photograph	*Center Stairwell, Student Union*
12:25 PM – 1:20 PM	Lunch	*The Oaks Dining Hall*
1:30 PM	JH Students to Planetarium & Lab Tours	
1:30 PM – 2:30 PM	**Fourth Paper Session**	*BTSU Ballroom 202A*
Break (15 minutes)		
2:45 PM – 3:45 PM	**Fifth Paper Session**	*BTSU Ballroom 202A*
4:00 PM – 4:45 PM	Laboratory Research Tours	
4:55 PM	Board Buses to *Hampton Inn*	
6:10 PM	Board Buses to *BGSU*	
6:30 PM – 8:45 PM	**Banquet/Keynote Presentation**	*BTSU Ballroom 202A*
9:00 PM	Board Buses to *Hampton Inn*	
9:00 PM – 11:00 PM	Open Activities/Adult Reception	*Pool; Great Room, Hampton Inn*
9:00 PM – 9:30 PM	Mentor/Teacher Focus Group	*Great Room, Hampton Inn*
11:00 PM	Students Report to Assigned Rooms	

Friday, March 17

6:30 AM – 7:45 AM	Breakfast	*Great Room, Hampton Inn*
8:00 AM	Board Buses to *BGSU*	
8:40 AM	Announcements	*BTSU Ballroom 202A*
8:45 AM – 9:45 AM	**Sixth Paper Session**	*BTSU Ballroom 202A*
	Concurrent Poster Viewing	*BTSU Ballroom 202B*
8:45 AM – 9:15 AM	Student Focus Group #1	*BTSU Room 208*
Break (15 minutes)		
10:00 AM – 12:00 PM	Peer Poster Judging, Junior High Students	*BTSU Ballroom 202B*
10:00 AM – 11:00 AM	**Seventh Paper Session**	*BTSU Ballroom 202A*
10:00 AM – 10:30 AM	Student Focus Group #2	*BTSU Room 208*
Break (15 minutes)		
11:15 AM – 12:35 PM	**Eighth Paper Session**	*BTSU Ballroom 202A*
	Concurrent Poster Viewing	*BTSU Ballroom 202B*
12:40 PM – 1:40 PM	Lunch	*The Oaks Dining Hall*
	Judges Meeting/ Luncheon	*BTSU Room 208/The Oaks Dining Hall*
	Advisory Board Luncheon	*The Oaks Dining Hall*
	Student Advisory Board Meeting	*The Oaks Dining Hall*
1:45 PM	Students Dismantle Posters	*BTSU Ballroom 202B*
2:00 PM	JSHS Evaluation	*BTSU Ballroom 202A*
2:15 PM	Awards Ceremony	*BTSU Ballroom 202A*
2:45 PM	Adjournment	

SCHEDULE OF EVENTS

Wednesday, March 15

4:00 PM - 6:00 PM	Check In	*Hampton Inn, Bowling Green*
6:15 PM	Mandatory Meeting for ALL Participants	*Great Room, Hampton Inn*
7:00 PM - 7:30 PM	Pizza Snack	*Great Room, Hampton Inn*
7:30 PM	Board Buses to *Ice Arena, BGSU*	
8:00 PM - 9:20 PM	Ice Skating	*Ice Arena, BGSU*
9:30 PM	Board Buses to *Hampton Inn*	
11:00 PM	Students Report to Assigned Rooms	

Thursday, March 16

6:30 AM - 7:45 AM	Breakfast	*Great Room, Hampton Inn*
7:50 AM	Board Buses to *Olscamp Hall, BGSU*	
8:30 AM	Opening Session	*BTSU Ballroom 202A*

Presentation of Colors: **Pershing Rifles Color Guard, Army ROTC, Bowling Green State University**

Opening Remarks

Dr. Rodney Rogers, Provost and Senior Vice President, Bowling Green State University

LTC Steven T. Hopingardner, U.S. Army, Commander / Professor, Military Science, Bowling Green State University

Ms. Blythe Tipping, Ohio JSHS Co-Coordinator, Science Teacher, Sylvania Southview High School

8:45 AM - 9:45 AM **First Paper Session** - *Session Presider: Josie Luthman*
Session Moderator: Tyler Bruns *BTSU Ballroom 202A*

8:45 AM

Colleen Bell, Hilltop High School

"Biocide vs. Bacteriophages: Biological Control in Metalworking Fluids"

The purpose was to see whether bacteriophages eliminate more bacteria in metalworking fluids compared to biocide. Samples of contaminated metalworking fluid were obtained through Zimmark. Samples were treated with either biocide, bacteriophages with varying dose rates of 10 5 cfu, 10 6 cfu, 10 7 cfu. The samples were measured for refractive index, total alkalinity, and pH after one week. Bacterial content was measured after twenty-four hours and one week. The biocide eliminated more bacteria after twenty-four hours than bacteriophages; one hundredpercent of the time the biocide destroyed more bacteria than bacteriophages (p-value .0001). After twenty-four hours, the bacteria levels dropped in all of the bacteriophage samples. Bacteriophages destroyed more bacteria than the control sample (p-value .0001). Bacteriophages did not eliminate more bacteria than the biocide after one week; the biocide killed more bacteria than the bacteriophages after one week (p-value .0001). The total alkalinity and refractive index were inconclusive. However, the pH did drop in five samples by at least 0.1 units. On average, the biocide had higher levels in refractive index, total alkalinity, and pH. The dose rate of the bacteriophages did not affect their performance of killing bacteria (p-value .0001). Bacteriophages show promise for the metalworking fluid industry.

Thursday, March 16 (Cont.)

9:05 AM

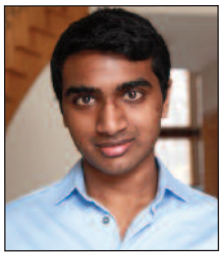
Graham Lane, University School

"Prostatic Acid Phosphatase is a Non-Selective Ectonucleotidase in RIP 1 deficient Human Jurkat T Cell Leukemia and EG7 Murine Thymoma Tumor Cells"

Chemotherapies are used to induce cell death on a select number of tumor cells and initiate an anti-tumor immune response. Signaling for this response is characterized by pannexin 1 mediated release of apoptotic adenosine triphosphate (ATP). ATP causes purinergic g-protein P2X7 receptor signaled chemotaxis of macrophages and dendritic cells. Macrophages and dendritic cells then phagocytize the dying tumor cell and produce tumor antigen to activate cytotoxic T-cells. In RIP1 deficient Jurkat Human T-cell leukemia and EG7 murine thymoma cells, apoptotic extracellular ATP accumulation is degraded by plasma membrane ectonucleotidases. Prostatic acid phosphatase (PAP) is a known plasma membrane protein in prostate cancer. It is currently used as a biomarker for prostate cancer. PAP was recently shown to be a nonselective phosphatase and to hydrolyze the nucleotide thymine monophospate (TMP) into thymine. Through e-AMP and e-ATP hydrolysis assays I measured AMPase and ATPase activity of PAP in Jurkat control, Jurkat RIP 1 deficient- and EG7 cells. 2x106 cells/mL were re-suspended in basal salt solution (BSS) media + 10mM glucose + .1%BSA. 10mM l-tartrate was added as a PAP inhibitor. 10uM e-AMP and 10uM e-ATP were added. Cells were incubated for one hour and supernatants were collected and evaluated using high performance liquid chromatography. Results show that the presence of l-tartrate inhibits AMP hydrolysis and inhibits ATP hydrolysis in Jurkat RIP 1 deficient and EG7 cells. These results plus western blot analysis of PAP suggest that PAP is a non-selective ectonucleotidase present in not only prostate cancer, but also certain strands of leukemia and lymphoma. This is significant because the PAP inhibitor, l-tartrate, stops the degradation of ATP and thus can potentially be used as a co-treatment with chemotherapy to improve signaling for the anti-tumor immune response.

9:25 AM

Ashwin Veeramani, University School



"The Role of Hair Bundle Protein 7(HBP7) In the Auditory Hair Cell of Zebrafish in Mediating Hearing Function"

Hair cells in the inner ear detect sounds through deflection of their stereocilia, which activate transduction channels in vertebrates, including zebrafish. It is hypothesized, from protein sequence similarity and expression profiling using RNA in situ hybridization, that HBP7 (hair bundle protein 7) is necessary for hair bundle function of inner ear hair cells. To test HBP7 role in hearing using mutagenesis, CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) mediated gene editing was used to generate a loss-of-function mutation. First, an enzyme, Cas9, cuts the two strands of target DNA at a specific gene location guided by a pre-designed RNA: single guide RNA (sgRNA). Cas9 was injected into zebrafish embryos for sgRNA to activate the Cas9 endonuclease for HBP7 mutation. Then, it was confirmed if HBP7 was mutated. Genomic DNA was extracted from the embryos and amplified using PCR. PCR products were sequenced to confirm the mutation. Specifically, the PCR products were transferred onto host bacteria through vectors and the hosts incubated. The HBP7 gene amplicons were then extracted and sequenced. The first step of confirming the hypothesis was completed when it was established that the CRISPR method successfully mutated HBP7 by comparing the sequence of the wild-type HBP7 gene to the gene fragment in the vector. Next, hearing will be examined in the homozygous HBP7 mutant population using microphonic potential recordings that determine the value of HBP7 to sound perception. Recordings detect electrical responses to mechanical stimuli. If HBP7 is important in hair cell function, then HBP7 mutant zebrafish would have a different response to stimuli than a wild-type fish.

Announcements and Break (15 minutes)

10:00 AM - 3:30 PM	**Concurrent Poster Judging**	*BTSU Ballroom 202B*
10:00 AM - 11:00 AM	**Second Paper Session** - *Session Presider: Madison Pittman* *Session Moderator: Matt Wallschlaeger*	*BTSU Ballroom 202A*

Thursday, March 16 (Cont.)

10:00 AM

Arukshita Goel, Sylvania Southview High School

"Platelet-Dependent Killing of C. albicans in Whole Blood"

Over the past decade, there has been a great deal of interest in the properties of platelets. Rather than focusing on the property of platelets clotting blood, researchers have been looking at the immunological properties of the blood cells. Multiple studies have shown that platelets contain properties that assist in phagocytosis of infectious cells. Two studies done with E. coli and S. aureus showed that platelets lead directly to the killing of these bacterial cells. Another study found that when mice, with and without platelets, were infected with oropharyngeal candidiasis, the Candida albcians, or C. albicans, had reached the kidney of the mice, significantly more so in the mice lacking platelets. From these studies, the question arose if the presence of platelets in whole blood decreased the number of C. albicans colonies created. Therefore, the hypothesis tested was that platelets participate in host defense against C. albicans in whole blood. The results showed that there was a significant decrease of C. albicans colonies when faced with blood that contained platelets.

10:20 AM

Srinath Seshadri, Village Academy

"Genetic Engineering of Saccharomyces cerevisiae for the Single Step Conversion of Biomass into Bioethanol"

Cellulose is the most abundant biopolymer in the environment, existing within all plant material, and thus its utilization as a feedstock for industrial products such as bioethanol is an attractive prospect. However, within the cell wall of plants, cellulose and hemicellulose are linked with a recalcitrant polymer called lignin, forming the lignocellulosic matrix. The selective degradation of lignin is a difficult task that is currently extremely inefficient. Recent research has pointed to fungal enzymes as ways to selectively oxidize lignin polymers and hydrolyze plant polysaccharides- specifically fungal laccases and cellobiohydrolases . The *lacc2* gene and the *cbhl* gene from *Pleuro tus ostreatus* were cloned into *Saccharomyc es cerevisiae* forming a recombinant yeast capable of selective degradation of lignocellulosic biomass. Spectrophotometric enzyme activity assays were performed on the recombinant yeast cultures revealing that the concentrations of expressed laccase and cellobiohydrolase were 89.5 U/mL and 151.3 U/mL, respectively. Compositional analysis of fermented biomass showed that the recombinant yeast hydrolyzed 4% of lignin, 4% of hemicellulose, and 6% of cellulose. This yielded 0.8 mL per gram of lignocellulosic substrate, which outperforms the two most popular industrial methods, biological pretreatment and acid hydrolysis, by 2- fold and by 17-fold, respectively.

10:40 AM

Sukhmani Kaur, Hathaway Brown

"Umbilical Cord Tissue Derived Mesenchymal Stem Cells: Therapeutic Development for Cystic Fibrosis."

Stem cells have the ability to divide indefinitely and to differentiate into specialized cells such as heart, muscle, or skin cells. Human mesenchymal stem cells (hMSCs) have been derived from a variety of tissues including bone marrow. However, this method of procuring stems cells is invasive, generates a low yield, and is costly. hMSCs can also be derived from Umbilical Cord tissue, which is discarded post-delivery. The primary cause for morbidity and mortality in pulmonary diseases is infection and inflammation. The objective of this project was to investigate if hMSCs have anti-microbial and/or anti-inflammatory properties. hMSCs were cultured with and without stimulants and the supernatants analyzed for secreted cytokines using Luminex technology and for gene expression. hMSCs functional activity against Staphylococcus aureus (SA) and Pseudomonas aeruginosa (PA) was also measured. hMSCs secreted cytokines, augmented by pathogen agonists. The gene expression for the cytokines was confirmed by RT-PCR. hMSCs supernatants showed cellular activation as evidenced by ATP production, which was enhanced by lipopolysaccharide. hMSCs supernatants also had anti-microbial potency against SA and PA. Thus, hMSCs have potential as anti-microbial and anti-inflammatory therapeutics in pulmonary diseases like cystic fibrosis.

Thursday, March 16 (Cont.)

Announcements and Break (15 minutes)

11:15 AM - 12:15 PM **Third Paper Session** - *Session Presider: Kate McClelland*
Session Moderator: Deborah Bogard *BTSU Ballroom 202A*

11:15 AM

Mukund Seshadri, Dublin Coffman High School

"Is Your Water Safe to Drink? : A Home Test Kit to Detect Lead in Water Using Colorimetric Analysis"

Lead contamination in drinking water is a public health problem. The most common source of lead in drinking water is from water flowing through pipes made of lead or with lead solder. Even low levels of lead can cause multiple health issues, particularly in children. The current EPA limit is less than 15 ppb. There is currently not an inexpensive way to quantitatively test water for lead. The purpose of this research was to develop a quick, accurate, affordable, and quantitative test for lead in household water. Sodium rhodizonate is a chemical compound used in forensic science to test samples for lead residue from bullets. The sample will turn a reddish color if lead is present. Colorimetric analysis of a solution can be used to determine the unknown concentration of a chemical compound in a solution with the aid of a color reagent. The hypothesis for this research is that colorimetric analysis of water, using sodium rhodizonate as a reagent, will be a quick, accurate, affordable, and quantitative method to test for lead in water. Eleven solutions were created, with lead concentrations ranging from 15 to 610 ppb. Each solution was colorimetrically analyzed using an iPhone app. The colorimetric analysis was used to calculate absorbance. A calibration curve was derived. The calibration curve was split into three linear segments. Seven samples with unknown levels of lead were tested. The hypothesis was proven, as the concentration determined for each unknown by using the calibration curve was within five percent of the actual concentration.

11:35 AM

Gretchen Lee, Pettisville High School

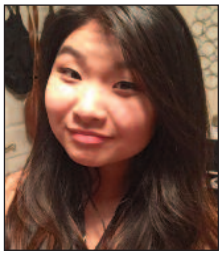
"The Effectiveness of Oregano Oil in Treating Ostertagia ostertagi"

The objective of this experiment was to study and compare oregano oil as a method of treating Ostertagia ostertagi, a type of roundworm parasite. The hypothesis was the essential oil oregano would be more effective than cattle de-wormers in eliminating parasites in llamas. There is no current dewormer created specifically for llamas and alpacas, and the parasites are developing resistance to the cattle dewormers that tend to be standard protocol for farmers to use. Before testing the oil, baseline trials were conducted to test how effective it is to use the typical dewormer, Fenbendazole. Oregano oil was tested as an alternative treatment for roundworm parasites. The oil was given in 0, 0.1, 1, 5, 10, 15, 30, 100, and 500 mg/mL doses. Two trials were conducted. The oregano did kill more parasites as the dosages got stronger; the 100 and 500 dosages were the most effective, killing between 87.5-100% of the roundworms. Oregano proved to have the potential to be a more effective dewormer. Further testing needs to be conducted in vitro and in vivo to expand upon this initial research.

Thursday, March 16 (Cont.)

11:55 AM

Karen Pan, Sylvania Northview High School



"The Endogenous Negative Regulators: Potential Drug Targets"

In preliminary studies at Dr. Papadimos' lab – using total RNA sequence technology – they found a group of negative regulator genes, including MKP-1 (a MAP kinase phosphatase), that were highly expressed in resolution phase animals, challenged with LPS. Published data also indicates MKP-1-deficient mice exhibit markedly higher mortality than wild type mice upon bacterial challenge. Therefore, the question becomes: Does increasing the expression of an endogenous negative regulator, such as MKP-1, treat some inflammatory diseases? The technical strategy of my project is to screen 1,200 FDA-approved drugs to see whether any could up-regulate MKP-1 by using a MKP-1 promoter-luciferase stable transfection cell line (Raw264.7). Then we will examine the "hit" drug for their efficacy by measuring inflammatory cytokine gene expression in macrophage cells (Raw264.7). Our working hypothesis is this: in inflammatory disorders, increasing the expression of endogenous negative regulators could re-balance the inflammatory cytokine expression and treat many inflammatory diseases.

We now present evidence that: 1) rolipram, a FDA-approved drug for COPD, actives MKP-1 gene expression in a dose-dependent manner; and 2) treatment of rolipram inhibits inflammatory cytokine gene expression (IL-1b, IL-6 and TNF-a). Overall, this study will provide novel insights into the role of negative regulators underlying the tight regulation of inflammation and may lead to the identification of novel therapeutic targets to minimize host injury following inflammation.

12:20 PM	Group Photograph	*Center Stairwell, Student Union*
12:25 PM - 1:20 PM	**Lunch**	*The Oaks Dining Hall*
1:30 PM	JH Students to Planetarium & Lab Tours	
1:30 PM - 2:30 PM	**Fourth Paper Session** - *Session Presider: Kait Gullette* *Session Moderator: Melissa Kowalski*	*BTSU Ballroom 202A*

1:30 PM

Madison Aleshire, Big Walnut High School

"Aquaponics: Monitoring Growth of Perca flavescens, Oreochromis aureus and Lactuca sativa"

Aquaponics is the combination of hydroponics and aquaculture where the symbiotic relationship between fish and plants maintain optimum water chemistry to grow both organisms. Aquaponic systems have been implemented into malnourished communities to produce needed nutrients and have been successful due to their sustainability and lack of water chemistry maintenance. During phase I of the experiment, the growth of juvenile Yellow Perch, Perca flavescens, in an aquaponics system with Iceberg Lettuce, Lactuca sativa, was monitored by measuring the mass, length, girth, and standard length once a week. In phase II, the growth of Blue Tilapia fingerlings, Oreochromis aureus, in an aquaponics system with Iceberg Lettuce, Lactuca sativa, was also monitored and measured twice a week. Both phases were compared to a control aquaculture tank with their species of fish. The results indicated that there were no significant differences between the aquaponic and aquaculture tanks for both Blue Tilapia and Yellow Perch, and the mass, girth, length, and standard length has little correlation to the week that the data was collected. By implementing aquaponics tanks into underdeveloped countries, the same yield of fish will be produced as aquaculture tanks, but can simultaneously grow plant life and vegetation.

Thursday, March 16 (Cont.)

1:50 PM

David Buchinsky, University School

"How Does KLF2 Regulate Inflammasome Activation?"

Macrophage cells are sentinels of both human and animal immune systems. They are responsible for both detecting and killing pathogens, clearing the debris in various tissues and organs, and maintenance of homeostasis in our body. Though inflammation is required for homeostasis, uncontrolled inflammation leads to tissue damage and potentially various inflammatory diseases. Previous studies have shown that KLF2 is an important regulator of macrophage mediated inflammation. Because KLF2 regulates inflammation, we expect that KLF2 also regulates the activity of inflammasomes. Therefore, we hypothesize that KLF2 regulates inflammasome function as well. Using bone marrow derived macrophages from a mouse, we show that the absence of KLF2 leads to increased expression of the inflammasome components and its activation. Macrophage cells from KLF2 knockout mice were cultured and evaluated by PCR for the presence of NLRP3 expression. Next, we measured Caspase-1 activation in KLF2 macrophage cells and regular macrophage cells using Western blot. Specifically, Lipopolysaccharide stimulation resulted in increased expression of NLRP3 at the transcript and protein level. In addition, there was a higher quantity of caspase1 activation in macrophages without KLF2 presence. Our research suggests that inflammasome function is regulated with KLF2, which may have profound implications in curing inflammatory diseases.

2:10 PM

Margaret Bohmer, Sylvania Southview High School

"Solubility of MOMIPP in Varying Organic Solvents and Properties of Gelling Substances For Targeted Delivery"

In this experiment, the solubility properties of novel chemotherapy drug MOMIPP were tested, along with the properties of gelling substances for delivery. MOMIPP triggers methuosis, a type of cell death that causes vacuolization and membrane rupture. However, MOMIPP is also poorly soluble, and has a short half-life. First, a study of the solubility of MOMIPP in different organic solvents was completed, and then five different gels were tested, in which their delivery of MOMIPP to the brains of rats was tested. All of this experimentation is laying the groundwork for an experiment involving bolaamphiphiles for MOMIPP delivery across the blood-brain barrier. Bolaamphiphiles are surfactants that can make monolayer micelles that might be able to deliver MOMIPP to glioblastoma tumors. Results are ongoing, data has been collected for the solubility of MOMIPP in various organic solvents, and theproperties of different hydrogels with a rheometer are currently being tested. These results will be compared with the results that we get for the bolaamphiphiles. If continued research suggests that bolaamphiphiles are viable for drug delivery, then they can be used clinically in cancer patients.

Announcements and Break (15 minutes)

2:45 PM - 3:45 PM **Fifth Paper Session** - *Session Presider: Morgan Knight*
Session Moderator: Kathryn Nelson *BTSU Ballroom 202A*

Thursday, March 16 (Cont.)

2:45 PM

Portia Baratta, Gahanna Lincoln High School

"Investigating the Trends of Changing ChemicalCompostion of Biodegradable, Edible Water Bottle"

The purpose of this experiment was to observe how changing the chemical composition of an alginate-based hydrogel capsule affects the thickness of the gel membrane, and then use this information to develop the optimal biodegradable edible water bottle in the form of hydrogel capsules with liquid inner-cores. Direct spherification was used: using a teaspoon to drop an alginate solution into a calcium bath. The calcium solution enveloped the alginate drop resulting in a gel membrane surrounding liquid inner-core. In order to identify trends related to changing the chemical components, several experimental groups consisting of a singular concentration change from the control were compared and analyzed. From each experimental group, six capsules were cut open, cleared, cleaned, and measured on four sides using a 0.001 mm caliper. T-tests produced P-values of p=0.001377, p=0.000027, and p=0.252287 between the control and Group A, the control and Group B, and Group A and Group B respectively. P-values of p=0.051967, p=0.227116, and p=0.008189 were calculated for T-tests between the control and Group C, the control and Group D, and Group C and Group D respectively. In conclusion, data showed a statistically significant direct relationship with thickness and alginate concentration and a direct relationship with calcium content and thickness.

Keywords: Spherification, calcium lactate, alginate, hydrogel

3:05 PM

Akanksha Malhotra, Dublin Coffman High school

"ME2 Expression is Associated with Epilepsy"

Idiopathic Generalized Epilepsy (IGE) is classified as a category of epilepsy that is believed to have a strong genetic cause. Epilepsy is diagnosed when there are spontaneous "electric storms," caused by an abnormally high amount of brain activity. These effects can be counteracted with GABA, the brain's primary inhibitory neurotransmitter. Since IGE is believed to have an underlying genetic factor, single nucleotide polymorphisms (SNP) genotypes were used to determine the association between IGE and Malic Enzyme 2 (ME2). ME2 is a gene that is involved in the production of GABA. SNP genotypes for ME2 affect ME2 expression levels and ME2 aids in the production of GABA. Therefore, it was hypothesized that ME2 expression must somehow be related to IGE. Data that included ME2 expression levels (from the dorsolateral prefrontal cortex) and SNP genotypes of subjects with and without IGE was obtained. In order to determine association, R and linear regression were used. The control group's ME2 expression was regressed onto their SNP genotypes and a linear equation was created. This equation was then used to predict ME2 expression in the cases, or living subjects. After the prediction and comparison of ME2 levels among the two groups, ME2 was found to be differentially expressed with a p-value of less than .0007. The control group had a ME2 level of .4 or higher, whereas the cases had a ME2 level of .4 or lower, displaying that IGE patients produce less ME2. This concludes ME2 to be an excellent candidate gene for IGE, both statistically and biologically. Future work includes haplotyping in order to pinpoint a single SNP and investigating what characteristics of ME2 lead to IGE.

3:25 PM

Jacob Dennis, Pettisville High School

"The Effect of 10-34-00 Starter Fertilizer on Glycine max Yields and Oil and Protein Content"

The objective was to compare the yield and protein and oil content of Glycine max planted with a 2x2 application of 10-34-00 starter fertilizer and without starter fertilizer, and to compare the quality of water discharge from field drainage tile before and after fertilizer application. Three replications were planted. Each contained a plot planted with 10-34-00 starter fertilizer and a control plot without fertilizer. A field drainage tile water discharge sample was taken before and after application of the fertilizer and was analyzed for orthophosphates and nitrates. At maturity, the Glycine max were harvested. Yield was calculated for each plot. A sample was collected from each plot for nutrient, protein, and oil content analysis. The fertilized plots averaged 146.75 kg/hectare more than the non-fertilized plots. This was not quite statistically significant. There was no significant difference in the protein or oil content between the fertilized and non-fertilized plots. The water quality analysis did not show a significant increase in either nitrate or orthophosphate levels after the fertilizer was applied. The outcome may have been different if the soil was cooler and wetter at planting. Additional research is needed to determine if Glycine max can benefit from starter fertilizer applications.

Thursday, March 16 (Cont.)

4:00 PM - 4:45 PM	Laboratory Research Tours	
4:55 PM	Board Buses to *Hampton Inn*	
6:10 PM	Board Buses to B*GSU*	
6:30 PM - 8:45 PM	**Banquet/Keynote Presentation**	*BTSU Ballroom 202A*
Keynote Presentation	**Dr. Andrew Jorgensen**, Associate Professor Chemistry & Environmental Sciences, University of Toledo	
9:00 PM	Board Buses to *Hampton Inn*	
9:00 PM - 11:00 PM	Open Activities/Adult Reception	*Pool; Great Room, Hampton Inn*
9:00 PM – 9:30 PM	Mentor/Teacher Focus Group	*Great Room, Hampton Inn*
11:00 PM	Students Report to Assigned Rooms	

Friday, March 17

6:30 AM - 7:45 AM	Room Checkout/Breakfast	*Great Room, Hampton Inn*
8:00 AM	Board Buses to *Olscamp Hall, BGSU*	
8:40 AM	Announcements	*BTSU Ballroom 202A*
8:45 AM - 9:45 AM	**Sixth Paper Session** - *Session Presider: Don Johnson*	
	Session Moderator: Rebekah Rice	*BTSU Ballroom 202A*
	Concurrent Poster Viewing	*BTSU Ballroom 202B*
8:45 AM – 9:15 AM	Student Focus Group #1	*BTSU Room 208*

8:45 AM

Jordan Skates, Pettisville High School

"Survey of Three Different Wetlands and their Ability to Remove Excess Pollutants"

Three wetlands were compared to determine how age of wetland affects the ability of the wetland to remove access farm nutrients like phosphorus. Other wetland characteristics such as; water quality, soil types, and a detailed plant survey were also conducted. The hypothesis was Pettisville School wetland (5 years old) would filter out more parts per million (ppm) of the phosphorus pollutant than the Nofziger's wetland (20 years old) and Goll Woods Nature Preserve (300 years old) because the younger the age of the ecosystem the more diversity it has in plant species to filter out the pollutants and excess nutrients. A detailed plant survey was conducted to identify the plants present in each of the three wetlands tested. Water samples were taken to determine the water quality at each wetland. Factors tested were nitrates, phosphates, turbidity and pH. Soil surveys were taken from the middle ring (wet 50% of the time) and the outer ring (wet 5% of the time). The soil types of the middle and outer rings were tested to determine what types of soil are present in the wetland. 15.24 cm of soil and 16.91 fl oz of water were taken from the inner ring of each wetland which stays wet near to 100% of the time and put into nine ecotubes and allowed to sit with a closed lid to encourage plant growth from wetland seeds and plants transferred over. Tap water with DAP (diammonium phosphate, +4 ppm) added to replicate extremely nutrient rich water, was placed in ecotubes and allowed to drain through the wetland soil samples. After the water drained through the ecotubes, phosphorus was retested for amount of phosphorus present. The hypothesis was not supported. Averages for the different ages of wetlands phosphorus count was 0.3ppm away from each other after the ecotube.

Friday, March 17 (Cont.)

9:05 AM

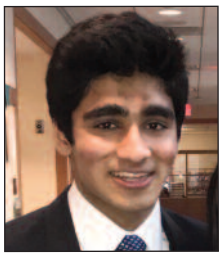
Elizabeth White, Hayes High School

"The Effects of Ionizing Radiation on the Short-Term Growth of Soybean Plants"

The purpose of this research was to discover how irradiating soybean seeds would affect the short term growth of the soybean plant. It was hypothesized that as the dosage of ionizing radiation increased the short-term growth of the plants would decrease.To test the hypothesis, soybean seeds were irradiated in an irradiator at the OSU Nuclear Research Facility and the seeds were grown over a period of 20 days. The resulting plants were then dried in a drying oven and then the total plant, the root, and the shoot dry weight masses were taken. The results of the testing showed that as the dosage of ionizing radiation increased, the short-term growth of the soybean plants decreased, but not by equal increments. Also, the amount of ionizing radiation did not seem to affect the germination times of the plants in an obvious pattern. And finally, the root to shoot ratios were less than the control plants' root to shoot ratios, which means that the plants with higher dosages were unhealthy. From the data that was obtained, it is concluded that the hypothesis was supported. The data leads to this conclusion because the final masses of the plants decreased as the dosage of ionizing radiation increased, and the root to shoot ratios decreased. To further study this topic, other plants could be used for the same experiment, and the plant that is chosen could be grown until maturity to discover if the effects of the radiation continues into adulthood of the plant.

9:25 AM

Rahul Jagetia, University School



"Designing of T-tail Horizontal Airfoil through Analysis of Aircraft Stability and Efficiency"

In this experiment, I examined the stability, control, and efficiency of subsonic aircraft airfoils to determine the best design for a T-tail vertical tail. I hypothesized that a low camber airfoil with a reflex trailing edge would provide the greatest efficiency due to a sharp leading edge, which would allow for pressure differentiation and shallow thickness, preventing major shifting of the center of pressure. First, I examined variations of the HT08 airfoil in thickness, length, camber, and trailing edge. To determine the control and stability of the airfoil, I analyzed the shift in center of pressure (XCP), coefficient of drag (CD) and the coefficient of lift (CL) versus alpha, or angle of attack and the pitching moment (CM). Through experimentation, I determined that a low camber symmetrical aircraft with a sharp leading and reflex trailing edge was the most efficient airfoil. This airfoil kept the XCP within 2.0 and the CM had a negative slope, along with minimal CD between 0.01 and 0.02, but a large CL between -0.4 to over 1.6. Minimal CP movement, a sharp CM slope, and a high L/D ratio helped conclude that this airfoil would the most effective airfoil for a T-tail vertical tail.

Announcements and Break (15 minutes)

10:00 AM - 12:00 PM	Peer Poster Judging, Junior High Students	*BTSU Ballroom 202B*
10:00 AM – 10:30 AM	Student Focus Group #2	*BTSU Room 208*
10:00 AM - 11:00 AM	**Seventh Paper Session** - *Session Presider: Ryleigh Hufgard* *Session Moderator: Cristin Hagans*	*BTSU Ballroom 202A*

Friday, March 17 (Cont.)

10:00 AM

Valentina Carr, Sylvania Southview High School

"The Viability of N-Acetylcysteine Supplement on Cervical Mucus"

The health of the cervical mucus is important in fertility. If it becomes too thick during times where it is supposed to be thin, this can prevent the sperm reaching the egg for fertilization. The purpose was to evaluate and verify the claims made by the PrepPrep company to thin cervical mucus through the use of a model. Water, proteins, and gelling solution was made for 18 dishes, separated into three groups of one pill, two pills, and none, and observed for 30 days for changes in height and diameter. There was a statistical significance found between all three groups for height and diameter indicating a change in the height and diameter of the modeled cervical mucus (diameter $p< 0.01$, height $p< 0.01$), but between groups there was only one without significance. Overall, the supplement in vitro shows significant change in the cervical mucus, but may not show in vivo.

10:20 AM

Claudia Hamilton, Hawken School

"Study of the Polycaprolactone/Poly(lactic acid) Polymer Solution Blend to Improve Flexibility and Durability of an Artificial Blood Vessel Using the Plasma-enhanced Chemical Vapor Deposition Method"

Transplanting blood vessels frequently fails because the recipient rejects the donor arteries due to their genetic properties. The main aim of this research work is the study of polymer blend solution process, and the influence of different combinations of Poly(lactic acid) (PLA) and Polycaprolactone (PCL) combined with O2-plasma treatment to create a scaffold of an artificial blood vessel capable of all functionalities of an artery. The results showed the best blend ratio for polymer solutions of PCL/PLA of 25/75, which resulted in a scaffold with strength of 37.36 mPa and elasticity of 35.14%. O2-plasma polymerization was used to reduce high degree of crosslinking and cracking in the polymers. This method was used to increase the anti-clot characteristics of the scaffold that could survive in the human body. The polymer gels were imaged under Rat aortic smooth muscle cells and were seeded on the gels at a count of 50,000 cells per 10 cm2 of gel in a CO2 incubator at 37° C. The use of unique polymer blends of PLA/PCL with O2-plasma treatment had an exceptionally positive effect on both mechanical and surface properties of the scaffold which can be used in various artificial cardiovascular products.

10:40 AM

Justin Gifford, Gahanna Lincoln High School

"Development of Starch-Based Bioplastics Using Natural Latex and Glycerol"

While bioplastics are an increasingly researched alternative to conventional plastics, concerns about their properties keep them from being used extensively. To best understand how these plastics could be used, this project tested the strength, elasticity, and water absorption properties of four different types of bioplastics comprised of different combinations of natural latex extracted from Maclura pomifera (hedge apples), russet potato starch, and white sweet potato starch. All bioplastics contained glycerol, hydrochloric acid (HCl), and sodium hydroxide (NaOH). Elasticity was measured by suspending a plastic strip from a ring stand and measuring how much the sample stretched as weight, in grams, was added. Strength was measured by how many samples broke during testing. Water absorption was calculated by a formula recommended by the ASTM Standard for plastic water absorption. The t-tests performed on the data showed significantly higher water absorption in the plastics containing latex, and also significantly higher elasticity in RP plastics. Therefore, the latex plastics would be be best used in applications in which the plastic or product needs to be highly water absorbent, while the RP plastics may be used in applications in which plastics need to be highly stretchable.

Announcements and Break (15 minutes)

11:15 AM - 12:35 PM **Eighth Paper Session** - *Session Presider: Jaret Johnson* *Session Moderator: Sara Laux* *BTSU Ballroom 202A*

Concurrent Viewing *BTSU Ballroom 202B*

Friday, March 17 (Cont.)

11:15 AM

Kathy Cordova, Gahanna Lincoln High School

"Hypothesis-Driven Transcriptomics Analysis Illuminates Warburg-Type Metabolic Shift in Placenta of Women with Severe Preeclampsia"

Preeclampsia is a pregnancy related condition characterized by new onset of hypertension and proteinuria after 20 weeks of pregnancy. The role of the placenta in pathogenesis of preeclampsia is underscored by the observation that the only effective treatment for preeclampsia so far is the early delivery of the fetus and the placenta. The purpose of this study is to illuminate bioenergetics metabolic pathways that are altered in preeclampsia placenta as opposed to other pregnancy conditions. Four enzymes, LDHA, LDHB, PDK1, and GOT1, were tested due to their importance of allowing the cell to continue to anaerobic glycolysis or switch to aerobic glycolysis. An immunohistochemistry [IHC] and a polymerase chain reaction [PCR] were performed for each enzyme amongst various pregnancy conditions. The IHC test suggest that a high level of expression of LDHA exists in severe preeclamptic placenta, in comparison to idiopathic preterm birth tissue and severe preeclampsia with intrauterine growth restriction placenta tissue, due to the concentrated staining. The PCR test verifies that a high level of expression of LDHA and PDK1 occurs in severe preeclamptic placenta tissue; whereas, the PCR data of the other pregnancy conditions had a low level of expression. Using a threshold of .05, LDHA and PDK1's PCR is statistically significant, but GOT1 an.d LDHB's PCR is not statistically significant. This data concludes that preeclamptic placenta tissue undergoes a metabolic shift different from other pregnancy conditions.

11:35 AM

Arman (Alexander) Serpen, Sylvania Southview High School

"KIAA1026 is Upregulated in Three Neurodegenerative Diseases"

PNeurodegenerative diseases are incurable conditions that occur in the central nervous system and are characterized by a progressive death of neural cells with multiple known and unknown causes. The three that were analyzed in this study were Alzheimer's disease, Parkinson's disease, and Amyotrophic Lateral Sclerosis. Gene expression data from 59 post-mortem brain samples out of an extensive cohort of 113 patients from the NCBI GEO Database provided the basis for this gene expression comparison across all three neurodegenerative diseases. The NCBI GEO2R tool was used to find the commonly dysregulated genes and accordingly identified 19 such genes at $p<0.05$, with 4 of them being commonly upregulated. The 4 commonly upregulated genes were KAZN, PLA2G7, ALOX15B, and PLEKHM1. StringTM, an online gene interaction database on the public domain, was used to map out any possible connections between them. Although no straightforward interactions/connections were found, KAZN was identified in previous studies to have an interaction with an ataxia-causing protein. This gene may provide further insight into the pathogenesis of neurodegenerative diseases and act as a potential therapeutic target due to its role in the protein-protein interaction network of ataxia-causing diseases.

11:55 AM

Chelsea Ker, Gahanna Lincoln High School

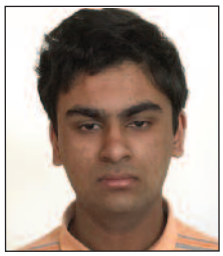
"An Investigation into the Toxicity of Artificial Turf"

The purpose of this project was to investigate if chemicals released from crumb rubber in artificial turf fields were hazardous to humans and the environment. During this study, a Plantorium was used to replicate the temperature conditions for the month of August. The goal was to collect and analyze water samples that had run through the turf; the samples were analyzed for metals and polycyclic aromatic hydrocarbons (PAHs). The next step was placing two container with glass tubes attached to them in the Plantorium. Then, a sample of turf was placed in each container, along with 1/4th inch layer of crumb rubber. The Plantorium ran for two eight-hour periods every day, and each eight-hour period represented one day of sunlight. The water samples were analyzed at Alloway Labs. The samples contained no heavy metals However, the four metals samples contained .1206 mg/L, .1021 mg/L, .1792 mg/L, and .0906 mg/L of zinc. The zinc water was tested on planaria that were sliced in half. Overall, the planaria living in normal spring water had better regeneration rates. However, because this data was qualitative it is impossible to know if this is a result due to chance or not. *Keywords*: Plantorium, crumb rubber, planaria

Friday, March 17 (Cont.)

12:15 PM

Nipun Jayatissa, Maumee Valley Country Day School



"A Novel Study to Evaluate Osteoblasts Cultured 3D Printed Porous Polymer Scaffolds for Bone Regeneration"

The replacement of bone defects caused by trauma, fracture, and disease is a significant clinical challenge for military and civilian patients. The ideal scaffolds for bone tissue repair should provide biocompatibility, pore architecture, biodegradability, and mechanical support. Conventional scaffolds are still unable to make ideal scaffolds for bone repair. In this study, relatively new 3D printing technology was used to print porous polycaprolactone (PCL) scaffolds. The hypothesis of this study is that 3D printed porous PCL scaffolds can mimic several properties of human bone such as porosity, pore morphology, pore interconnectivity, mechanical properties, and cell attachment sites. This paper focuses on design, printing, and evaluation of 3D scaffolds with three different pore sizes (200 mm, 400 mm, and 800 mm). The percent porosity of these scaffolds (n=7) has significantly increased from 13.31 to 61.66 ($p<0.001$) with the increase of pore sizes. The average compressive modulus of scaffolds (n=7) significantly decreased with the increase of pore sizes ($p<0.001$). The averaged compressive modulus of scaffolds with 200, 400, and 800 μm pores is 82.98 ± 2.02, 61.60 ± 2.59, and 47.16 ± 1.73 MPa, respectively. In addition, PCL scaffolds show biocompatibility as determined by in vitro cell culture studies.

12:40 PM - 1:40 PM	**Lunch**	*The Oaks Dining Hall*
	Judges Meeting/Luncheon	*BTSU Room 208/The Oaks Dining Hall*
	Advisory Board Luncheon	*The Oaks Dining Hall*
	Student Advisory Board Meeting	*The Oaks Dining Hall*
1:45 PM	Students Dismantle Posters	*BTSU Ballroom 202B*
2:00 PM	JSHS – AEOP Evaluation	*BTSU Ballroom 202A*
2:15 PM	Awards Ceremony	*BTSU Ballroom 202A*

Closing Remarks and Award Presentation

Ms. Blythe Tipping, Ohio JSHS Co-Coordinator, Science Teacher, Sylvania Southview High School
Dr. Emilio Duran, OJSHS Director / Associate Professor, School of Teaching & Learning, Bowling Green State University
LTC Jason Wood, U.S. Air Force, Professor of Aerospace Studies / Commander, AFROTC Detachment 620

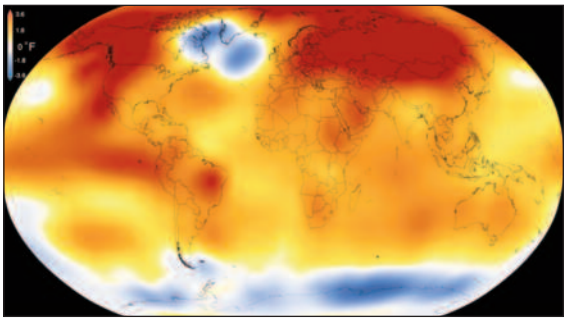
2:45 PM Adjournment

Dr. Andy Jorgensen

Associate Professor of Chemistry & Environmental Sciences,
University of Toledo

Senior Fellow, National Council for Science and the Environment

How Do We Know? What Can We Do?



Climate change is a very intense topic in our country which finds its way into political, business and social conversations, often with vocal disagreement among participants. This presentation will give background information about the phenomenon and methods which have been used to characterize these changes. The human dimension of the problem will be emphasized. We will then consider solutions to the problem. Participants will be able to share their views using personal response devices and to compare their replies to those of more than 3,000 members of previous audiences.

Dr. Jorgensen spent a sabbatical leave as Senior Fellow at the National Council for Science and the Environment (NCSE). He developed climate change curricular materials which has been developed into a web-based repository with over 800 resources for students and educators (**http://www.camelclimatechange.org/**). His work on climate change education has been supported by NASA and NSF.

He earned a Ph.D. in Physical Chemistry from the University of Illinois at Chicago and a B.S. in Chemistry from Quincy University. He completed a postdoctoral appointment in chemical education at the University of Illinois at Urbana-Champaign. He served as chair of the American Chemical Society's (ACS) Committee on Education (2013-4) and is the councilor of the Toledo Local Section of ACS.

He was selected as a 2012 American Chemical Society Fellow. In 2013 he received an American Chemical Society-Committee on Environmental Improvement Award for Incorporating Sustainability into Chemistry Education. He has received a University of Toledo Outstanding Teaching Award and was twice appointed as a Master Teacher in the College of Arts and Sciences.

Jenin Abu-Hummos, The Bounty Collegiun
Animal Based Vs. Vegan Make up

Noor Alexandria Abukaram, The Bounty Collegium
Restrictions of Protection Braces

Synene Maria Abukaram, The Bounty Collegium
Which type of Material in a Shin Guard reduces bacterial infection?

Sadaqat Ali, Gahanna Lincoln High School
Developing the Prototype of an Inexpensive Amphibious ROV

Aman Andemichael, Gahanna Lincoln High School
Investigating the Effects of Mobile Games on the Brain

Parker Bachmann, Sylvania Northview High School
Effects of Gaming on Visual Memory

Natalie Barcus, Rutherford B. Hayes High School
Classroom vs. Cellphones

Tyler Beattie, Sylvania Northview High School
Effect of Temperature Insides Automotive Intakes

Tayler Bleikamp, Hilltop High School
How Music Affects Heart Rate

Dylan Bush, Sylvania Northview High School
Arm Angle Effects on Curveball Movement

Maximilian Carr, Sylvania Southview High School
The Effect of Personality Type on Media Preference

Erin Chambers, Sylvania Northview High School
Coloring The Stress Away

Graeme Classen, Gahanna Lincoln High School
Developing An Environmentally Friendly Fuel Cell Capable of Generating Electricity Using Benthic Creek Mud

Madison Conrad, Delaware City Schools
Is a Collapsible Speed Bump Worth the Safety?

Fernando Dapino, Upper Arlington High School
SMA-Actuated Morphing Wing with Carbon Fiber Reinforced Laminated Composites

Noura Dari, The Bounty Collegium
Fight or Flight

Kaylea Dillon, Gahanna Lincoln High School
The Effect of a Nitrogen Inoculate and Fertilizer on Soybean Root Growth and Development

Ian Donahue, Sylvania Northview High School
How Water Temperature Affects the Activity of Largemouth Bass

Alexandria Dunne, Sylvania Northview High School
Testing Nutrient Loading Within the Ten Mile Creek in Relation to Percolation Due to Rainfall

James Duwve, Sylvania Northview High School
Increasing Legroom In Commercial Airplanes

Glenn Earhart, Sylvania Northview High School
Testing Sugar Percentages in Conventional vs. Organic Apples

Lamees Elhady, The Bounty Collegium
Scared 110

Jessica Findsen, Gahanna Lincoln High School
Determining The Efficacy of Essential Oils' Bacterial Inhibition versus Commercial Deodorant

Anish Ganesh, University School
A Study of the Synergistic Activity of CDK5 and TGF – Inhibitors in Pediatric Solid Tumors

Marisa Gill, Sylvania Northview High School
Does clothing color have an impact on a job interview

William Gulker, Gahanna Lincoln High School
A Study on Water Quality in Various Central Ohio Streams

Khalid Hamdan, The Bounty Collegium
Everyday Apps vs Processor

Jeremy Jones, Gahanna Lincoln High School
An Investigation of the Speed and Efficiency of the Degradation Process of Different Biodegradable Materials

Alexandra Knauer, Put-in-Bay High School
Changing the Atmosphere on Mars

Ashley Knight, Sylvania Northview High School
The Study of Golf Ball Performance at Various Price Points

Tatyana Kowalski, Put-in-Bay High School
Delving into Desalination Developments

Kayla Kucway, Sylvania Northview High School
Redefining Molecular Structures in Chocolates

Muhammad Maolood, Toledo Islamic Academy
Are Essential Oils More Effective Than Antibiotics at Inhibiting Bacterial Growth?

2017 POSTER PRESENTERS

Madalyn Marsengill, Sylvania Southview High School
The Use of Essential Oils on Fruit Preservation

Jessica McWatters, Pettisville High School
Survey of Female Athletes Knowledge and Choices of "Dairy" Beverages

Thomas McWatters, Pettisville Local Schools
The Effect of Weight Location on a Pinewood derby Car

Kathryn Mertens, Sylvania Northview High School
How Perception of a Teenager's Lifestyle Affects Strangers' Willingness to Help Them

Rayanne Mustapha, The Bounty Collegium
The Effects of UV Light on Algal Blooms

Sundus Mustapha, The Bounty Collegium
The Effect of REM Disturbance on Reaction Timeon Time

Dalton Myers, Pettisville High School
A Comparison of Various Conductive Tubing Used in a Solar Water

Rena Ouyang, Dempsey Middle School
What Are Lichens Liking? A Study of Lichens and Their Tree Preferences

Megan Peng, Sylvania Southview High School
The Use of Essential Oils to Decrease Produce-Based Pathogens

Camryn Pillar, Sylvania Northview High School
The Effects of Memory Due to Brain Games

Farah Rahal, The Bounty Collegium
The Photocage

Yazda Ramadan, The Bounty Collegium
The Power of Visual and Auditory learning

Samuel Richards, Sylvania Northview High School
Color Psychology in Relation to Cognition

Hannah Riley, Hilltop Junior High School
Which mouthwash kills the most oral bacteria?

Mackenzi Rivera, Pettisville Local Schools
Which mouthwash kills the most oral bacteria

Sydni Rivera, Hilltop High School
Testing Student Engagement in Learning process in Real vs. Virtual Dissection

Johnnie Roth, Hilltop High School
The Best Solutions For Melting Ice

Aaron Rupp, Pettisville Local Schools
How Different Materials Effect the Strength of Particleboard

Matthew Rupp, Pettisville High School
A Comparison of Aluminum to 3D Printed Shear Keys

Zachary Ryan, Gahanna Lincoln High School
Developing a Low-Cost Headset for Augmenter Reality

Dennis Santos, Gahanna Lincoln High School
The Development of Swarm Robots with the use of EV3s

Sophia Schroeder, Put-in-Bay High School
The Effects of Polyester Microfibers on Aquatic Invertebrate Organisms

Piper Seaton, Gahanna Lincoln High School
A Study on the Effects of Music on Short-term Memory

Gabriel Shaw, Gahanna Lincoln High School
Finding the Most Eficient Way to Generate Electricity from Biking

Madeline Shumaker, Pettisville Local Schools
Effect of Phosphates on Water's Oxygen Levels

Quinn Smith, Hilltop High School
Production Rate of Gain Under Various Wavelength Lighting Systems

Tyler Suboski, Hilltop High School
The Sudden Absence of Caffeine Causes Hadaches

Kayla Thielen, Sylvania Northview High School
The Influence of Geographical Location on Teenage Dating Preferences

Arleigh VanArsdalen, Millcreek-West Unity School
How Does Stretching Affect Heart Rate

Casson VanDervoort, Sylvania Northview High School
Cyber Security and Hacking Prevention

Heath Waidelich, Pettisville Local Schools
Effect of Microwave Appliances on the Growth of Plants

Chase Williams, Hilltop High School
Factors Determining Sense of Smell

Tommy Xie, Gahanna Lincoln High School
Developing A High Performance Motorized Claw With Three-Dimensional Printed Parts

1st Place Winner – **Graham Lane**, University School
- $2,000 College Scholarship sponsored by the United States Army, Navy, and Air Force
- Presented his research paper at the 2016 National JSHS held in Dayton, OH
- Competed for a $12,000, $8,000, or $4,000 scholarship

2nd Place Winner – **Savannah Cofer**, Columbus Academy
- $1,500 College Scholarship sponsored by the United States Army, Navy, and Air Force

3rd Place Winner – **Dhweeja Dasarthy**, Hawken School
- $1,000 College Scholarship sponsored by the United States Army, Navy, and Air Force

4th Place Winner – **Rama Balasubramaniam**, Dublin Coffman High School
- $500 Award sponsored by the College of Arts and Sciences, BGSU
- Presented her research paper at the 2016 National JSHS held in Dayton, OH
- Competed for a $12,000, $8,000, or $4,000 scholarship

5th Place Winner – **Chinmay Bakshi**, William Mason High School
- $250 Award sponsored by the Department of Chemistry, BGSU

1st Alternate – **Alan Fong**, Sylvania Southview High School
- $150 Award sponsored by College of Education and Human Development, BGSU
- Presented his research poster at the 2016 National JSHS held in Dayton, OH

2nd Alternate – **Jacob Dennis**, Pettisville High School
- $100 Award sponsored by the Department of Physics and Astronomy, BGSU
- Presented his research poster at the 2016 National JSHS held in Dayton, OH

Thomas Alva Edison Award – **Jordan Skates**, Pettisville High School
- $250 Award sponsored by the Department of Biological Sciences, BGSU

Jordan Skates, Pettisville High School
Thomas Alva Edison Award Winner

RESEARCH POSTER AWARDEES: 2016

High School Division

9th – 12th Grade Overall Award

"Best in Show" Award: Arukshita Goel, Sylvania Southview High

11th – 12th Grade Awards

1st Place: Sarah Yu, Gahanna Lincoln High School
2nd Place: Veronica Roth, Hilltop High School
Honorable Mention: Kameron Clinton, Sylvania Southview High School

9th – 10th Grade Awards

1st Place: Gretchen Lee, Pettisville High School
2nd Place: Daniel Wolfe, Louisville High School
Honorable Mention: Alexander Serpen, Sylvania Southview High School

Junior High School Division

"Best in Show" Award: Katelynn Smith, Hilltop Junior High School
People's Choice Award: Aspen Schneller, Buckeye Valley Middle School

TEACHER AWARDEE: 2016

Colonel George F. Leist Distinguished Teacher Award

– **Deborah Bogard**, Delaware City Schools
  • $500 School Award sponsored by the United States Army, Navy, and Air Force

Deborah Bogard, Delaware City Schools

1st Place Winner

$2,000 College Scholarship sponsored by the United States Army, Navy, and Air Force

- Presents research paper at the 2017 National JSHS in San Diego, CA, with expenses paid

2nd Place Winner

$1,500 College Scholarship sponsored by the United States Army, Navy, and Air Force

- Presents research paper at the2017 National JSHS in San Diego, CA, with expenses paid

The 1st and 2nd place winners have an opportunity to win the following awards at the National JSHS:

- Six $12,000 undergraduate tuition scholarships, awarded to each of the 1st place finalists in the the National research paper competition
- Six $8,000 undergraduate tuition scholarships, awarded to each of the 2nd place finalists in the the National research paper competition
- Six $4,000 undergraduate tuition scholarships, awarded to each of the 3rd place finalists in the the National research paper competition

3rd Place Winner

$1,000 College Scholarship sponsored by the United States Army, Navy, and Air Force

- Presents poster at the 2017 National JSHS in San Diego, CA, with expenses paid

4th Place Winner

$500 Award sponsored by the College of Arts and Sciences, BGSU

- Expenses paid trip to the 2017 National JSHS in San Diego, CA

5th Place Winner

$250 Award sponsored by the Department of Chemistry, BGSU

- Expenses paid trip to the 2017 National JSHS in San Diego, CA

1st Alternate

$150 Award sponsored by the College of Education and Human Development, BGSU

2nd Alternate

$100 Award sponsored by the Department of Physics and Astronomy, BGSU

Thomas Alva Edison Award

$250 Award sponsored by the Department of Biological Sciences, BGSU

RESEARCH POSTER AWARDS: 2017

High School Division

9th – 12th Grade Overall Award

"Best in Show": $100 Gift Certificate

11th – 12th Grade Awards

1st Place: $50 Gift Certificate
2nd Place: $25 Gift Certificate

9th – 10th Grade Awards

1st Place: $50 Gift Certificate
2nd Place: $25 Gift Certificate

Junior High School Division

"Best in Show" Award
People's Choice Award

TEACHER AWARDEE: 2017

Colonel George F. Leist Distinguished Teacher Award

$500 Teacher Award for Classroom Materials sponsored by the United States Army, Navy, and Air Force

2017 Ohio Junior Science & Humanities Symposium

Paper Judges

Dr. Anjali Gray	Biology & Health Sciences, Lourdes University
Dr. Jon Bjorkman	Physics & Astronomy, The University of Toledo
Dr. Stephania Messersmith	Chemistry, Bowling Green State University
Dr. Joanne Rebbeck	United States Department of Agriculture, Forest Service
Mr. Daniel Yaussy	United States Department of Agriculture, Forest Service

Poster Judges

Vern Bingman	Psychology, BGSU
Nisakorn Boonsena	School of Teaching and Learning, BGSU
Jonathan Bostic	School of Teaching and Learning, BGSU
George Clemans	Chemistry, BGSU
Sheryl Coombs	Biological Sciences, BGSU
Andrea Cripps	Human Movement, Sport & Leisure Movement, BGSU
Kate Dellenbusch	Physics and Astronomy, BGSU
Heath Diehl	Honors College, BGSU
Colleen Fitzgerald	Communications Sciences & Disorders, BGSU
Carrie Marna Hamady	Food & Nutrition, BGSU
Lynne Hewitt	Communications Sciences & Disorders, BGSU
Tracy Huziak-Clark	School of Teaching and Learning, BGSU
Sudershan Jetley	College of Technology Architecture & Applied Engineering, BGSU
Dale Klopfer	Psychology, BGSU
Jeremy Klosterman	Chemistry, BGSU
Christopher Kluse	College of Technology Architecture & Applied Engineering, BGSU
Resmi Krishnankuttyrema	College of Technology Architecture & Applied Engineering, BGSU
John Laird	Physics and Astronomy, BGSU
Andrew Layden	Physics and Astronomy, BGSU
Eric Mandell	Physics & Astronomy, BGSU
Gabrie Matney	School of Teaching and Learning, BGSU
Mohammad Mayyas	College of Technology Architecture & Applied Engineering, BGSU
Mike McKay	Biological Sciences, BGSU
Cordula Mora	Psychology, BGSU
Kei Nomaguchi	Sociology, BGSU
Kurt Panter	Geology, BGSU
Jerry Schnepp	Visual Communication Technology, BGSU
Glenn Tiede	Physics & Astronomy, BGSU
Donna Trautman	Visual Communication Technology, BGSU
Eileen Underwood	Biological Sciences, BGSU
Hans Wildschutte	Biological Sciences, BGSU
Julia Halo Wildschutte	Biological Sciences, BGSU
Rick Worch	School of Teaching and Learning, BGSU
Haowen Xi	Physics & Astronomy, BGSU
Zhaohui Xu	Biological Sciences, BGSU
Alexey Zayak	Physics & Astronomy, BGSU

ACKNOWLEDGMENTS

2017 Ohio Junior Science & Humanities Symposium

Dr. Emilio Duran, Ohio JSHS Director, School of Teaching and Learning, BGSU
Dr. W. Robert Midden, NWO Director, Department of Chemistry, BGSU
LTC Steven T. Hopingardner, U.S. Army, Commander / Professor, Military Science, BGSU
Ms. Jessica Belcher, Ohio JSHS Co-Coordinator, NWO Associate Director, BGSU
Ms. Donna Meller, Ohio JSHS Co-Coordinator, Science Teacher, Pettisville Local Schools
Ms. Blythe Tipping, Ohio JSHS Co-Coordinator, Science Teacher, Sylvania Southview High School

Session Moderators

Deborah Bogard	Delaware City Schools	Sara Laux	University School
Tyler Bruns	Gahanna Lincoln High School	Kathryn Nelson	Sylvania Northview High School
Cristin Hagans	Hilltop High School	Rebekah Rice	Gahanna Lincoln High School
Melissa Kowalski	Put-in-Bay High School	Matt Wallschlaeger	Big Walnut High School

Support Staff

Lisa Addis	NWO, Graphic Design/Web Support	Jenna Pollock	NWO, Organizational Support
Susan Stearns	NWO, Organizational Support	Beth Ash	NWO, Organizational Support

Session Presiders

BGSU Undergraduate Students

Thursday:

1st Session: Josie Luthman
2nd Session: Madison Pittman
3rd Session: Kate McClelland
4th Session: Kait Gullette
5th Session: Morgan Knight

Friday

6th Session: Don Johnson
7th Session: Ryleigh Hufgard
8th Session: Jaret Johnson

Bowling Green State University Laboratory Research Tours

Dr. John Cable, BGSU Department of Chemistry
Dr. William Mathis, BGSU College of Musical Arts
Dr. Matthew Partin, BGSU Department of Biological Sciences Marine Biology Lab
Dr. Dale Smith, BGSU Planetarium
Dr. Eileen Underwood, BGSU Department of Biological Sciences Herpetarium
Dr. Michael Zickar, BGSU Department of Psychology

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School of Teaching and Learning

Special Thanks

Ice Arena, BGSU
The Oaks Dining Hall, BGSU
Hampton Inn, Bowling Green

THOMAS ALVA EDISON AWARD

The Thomas Alva Edison Award is presented each year to the student who has independently constructed research equipment and carried out a successful research investigation. The recent history of award winners is listed below; a full list of winners is available at: http://www.bgsu.edu/nwo/programs/ohio-junior-science-and-humanities-symposium/about-ojshs/thomas-alva-edison-award.html

Year	Name	School
2010	Russell Kittel	Gahanna Lincoln HS
2011	Sulaiman Mustapha	Toledo Islamic Academy
2012	Chrysta Beck	Pettisville HS
2012	Bluyé DeMessie	William Mason HS
2013	Mitchell Pallaki	Saint Ignatius HS
2014	Emily Merickel	Gahanna Lincoln HS
2015	Hannah Meller	Pettisville HS
2016	Jordan Skates	Pettisville HS

THE COLONEL GEORGE F. LEIST DISTINGUISHED TEACHER AWARD

Each year, an Ohio teacher is selected to receive The Colonel George F. Leist Distinguished Teacher Award. The United States Army, Navy, and Air Force sponsor this award of $500 to purchase books, supplies, and equipment for the school. The recent history of award winners is listed below; a full list of winners is available at: http://www.bgsu.edu/nwo/programs/ohio-junior-science-and-humanities-symposium/about-ojshs/the-colonel-george-f--leist-distinguished-teacher-award.html

Year	Name	School
2010	Blythe Tipping	Sylvania Southview HS
2011	Robert Sudomir	Louisville HS
2012	Fred Donelson	Gahanna Lincoln HS
2013	Abbie Smith	Hilltop Junior HS
2013	Abbie Smith	Hilltop Junior HS
2014	Blythe Tipping	Sylvania Southview HS
2015	Matt Wallschlaeger	Big Walnut HS
2016	Deborah Bogard	Delaware City Schools

CUMULATIVE RECORD OF THE STATE OF OHIO STUDENT PRESENTERS TO THE NATIONAL JSHS

The recent history of award winners is listed below; a full list of winners is available at: http://www.bgsu.edu/nwo/programs/ohio-junior-science-and-humanities-symposium/about-ojshs/ojshs-presenters-advancing-to-national-jshs-and-liysf.html

Year	Name	School
2010	Karen Kruzer	West Geauga HS
	Dennis Tseng	William Mason HS
2011	Austen Mance	Sylvania Southview HS
	Himanshu Savardekar	Dublin Coffman HS
2012	Christopher Ellis	Sylvania Southview HS
	Brian Haidet	Sylvania Southview HS
2013	Bluyé DeMessie	William Mason HS
	Peeyush Shrivastava	William Mason HS
2014	Bluyé DeMessie	William Mason HS
	Aditya Jog	William Mason HS
2015	Pallavi Lanka	Sylvania Southview HS
	Srinath Seshardi	Village Academy, Powell
2016	Graham Lane	University School, Gates Mills
	Rama Balasubramaniam	Dublin Coffman HS

OJSHS INFORMATION DESK & IMPORTANT PHONE NUMBERS

24 Hour Emergency Contact: Jessica Belcher (517-902-1177)

An OJSHS staff member is available 24 hours/day during OJSHS. During the OJSHS program, a staff member will be located at the registration/information table located outside the BGSU Bowen-Thompson Student Union (BTSU) Ballroom (room 202A). While at the Hampton Inn, you can contact Jessica Belcher, OJSHS Coordinator, by calling or texting her at 517-902-1177.

If you or anyone in your group needs medical attention or have an incident to report, please contact your chaperone. Chaperones must immediately relay any medical emergencies or other incidents to JSHS staff. Chaperones must be able to account for their student/group at all times, in case of emergency. For immediate assistance and in case of life-threatening emergency, dial 911.

MEAL INFORMATION

Wednesday Evening: Pizza snack provided for all students, chaperones, and guests at the Hampton Inn.

Thursday and Friday Breakfast and Lunch:

- Breakfast provided by Hampton Inn for hotel guests only.
- Lunch provided for all students, teachers, judges, and paid guests and parents at the **Oaks Dining Hall*** (time specific to the OJSHS schedule for each day).

Thursday Evening: A banquet with a buffet meal and keynote speaker is provided for all students, teachers, judges, and paid guests and parents. The banquet will be held in the BTSU Ballroom (student union 202A).

**You must be wearing your OJSHS nametag to receive entry into The Oaks Dining Hall. The Oaks is an "all you care to eat" buffet. If you leave the dining hall, you are not able to re-enter without paying for another meal at your own expense. Meals are provided for all paid guests of OJSHS.*

TRANSPORTATION WHILE AT THE SYMPOSIUM

Buses will be provided to transport hotel guests from the Hampton Inn to Bowling Green State University. Please check the schedule in your program for departure times. If you plan to park a personal vehicle at BGSU during the symposium, please contact Jessica Belcher at the OJSHS information desk for a parking pass.

SYMPOSIUM EVALUATION

Please remember to complete the online evaluation for the 2017 Ohio JSHS. Your input is highly valued and necessary for the continuing success of the Ohio JSHS. The survey will open on March 17 at 3:00 pm; at that time you will receive an email reminding you to take the survey. You will also receive an email regarding a survey request for the National JSHS program office. Please be sure to complete both the OJSHS evaluation and the National JSHS evaluation. Thank you in advance for your cooperation!

AEOP WELCOME

The OJSHS would like to welcome 44 students and their 5 teachers from Toledo Public Schools. The Army Educational Outreach Program, as supported by Battelle Memorial Institute, provided the opportunity through a grant project for students to participate in a non-competitive poster showcase of the Ohio Junior Science and Humanities Symposium. One of the goals of the grant project is to further the reach of students exposed to scientific research in the setting of the Ohio Junior Science and Humanities Symposium. These students and their Poster presentation titles are listed on the page 28.

AEOP STUDENT SCHEDULE "AT A GLANCE"

Thursday, March 16

8:30 AM	Opening Session	*BTSU Ballroom 202A*
8:45 AM – 9:00 AM	**First Paper Session** *Attend for only one presentation*	*BTSU Ballroom 202A*
9:00 AM – 9:15 AM	Set-Up Posters	*BTSU Multi-Purpose Room 228*
9:15 AM – 11:00 AM	Poster Judging	*BTSU Multi-Purpose Room 228*
9:15 AM – 11:00 AM	Poster Viewing *(students will have the opportunity to view posters of other participants concurrently during judging session)*	*BTSU Ballroom 202A/ Multi-Purpose Room 228*
11:10 AM – 12:10 PM	Lab Tours/Campus Activity	*Math and Life Science Buildings*
12:20 PM – 12:25 PM	Group Photos	*Center Stairwell, Student Union*
12:25 PM - 1:20 PM	Lunch	*The Oaks Dining Hall*
1:30 PM – 2:25 PM	Imagination Station	*BTSU Multi-Purpose Room 228*
2:30 PM	Adjournment	

AEOP JUDGES

Enrique Gomezdelcampo	Department of Environment and Sustainability
Andrew Gregory	Department of Environment and Sustainability
Jodi Haney	Department of Environment and Sustainability (retired) & Xcite Learning
Nathan Hensley	Department of Environment and Sustainability
Holly Myers	Department of Environment and Sustainability

ARMY EDUCATIONAL OUTREACH PROGRAM

AEOP POSTER PRESENTERS

ROGERS HIGH SCHOOL (Advisor - Jeanette Utter)

Myranda Johnson, William Liggons, & Min Liu
Chemical Pollution In The Water

Justin Garcia-Fike, Jewel Rhymes, Kylia Simpson, Kacie Smith, Lauren Smith, Amya Stron, & Malil Welch
Why Is The Water Green?

Stephany Lozano, Janae' Scott, & Deanna Solis
How Hard Is Your Water?

Adrionna Spencer & Symphony Taylor
Effects of Chemical and Thermal Pollution

Dillon Wertz
The Effect of Chemical and Thermal Pollution

TOLEDO NATURAL SCIENCE TECHNOLOGY CENTER (Advisors - Bryan Ellis, Stephen Oswanski, & Laura Schetter)

Chelsea Brogan
Ideal Lighting Scenario to Provide Best UVB for Captive Green Iguana

Catherine Brogan-Grove & Robert Christoff
Measure Food Preferences in Multiple Cockroach Species

Deosjah Brown & Tashayla Hunter
Alternatives to the Fur Trade: Testing Synthetic and Non-synthetic Furs for Performance

Ted Cole
Drones in agriculture, making informed decisions from aerial observations.

Jazzary Drake
A Comparison of Bacteria Levels Between Restored and Non-Restored Waterways

Martha Emanuel & Rose Wright
Assessing Guinea Pig Aggression in Different Enclosure Settings

Jayonna Hart & Jenna Lofgren
Rate of Quail Growth Using Varied Protein Levels

Charlette Hornyak
The Sweetest Lettuce, Aquaponics, Hydroponics, or Vermiponics

Audrie Hunt & Toyseana Stewart
Comparative Water Quality Index in Restored Waterways

Ronica Jones & Destiny Turner
Surface Temperature Comparison Between Man-Made and Natural Areas

Ian Lamb
Measuring Domestic Bird Behavior in Captive and Wild-type Enclosures

Brionna Pratt
Nutrient thieves? An examination of plant available nutrients under invasive and native plants.

Mary Rethmel
Urban rabbits, a delight or delicacy?

Melissa Sembly
The Efficiency of Goats, Natures Grass Powered Lawnmowers

Devin Schultz & Teague Tafelski
Food Production through Solar powered aquaponics

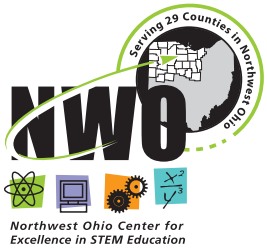
Bailee Sours & Jon Woida
Optimizing Natural Behavior and Minimizing Stress in Captive Crayfish Exhibits

Ashley Widmer
Testing Aerosols in Animal Environment

TOLEDO TECHNOLOGY ACADEMY (Advisor - Patrick Farley)

Jeren Kutcher & Elizabeth Skowronski
NASA Acoustical Dampening

Sponsored by:



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