The 46th Annual Ohio Junior Science & Humanities Symposium

March 25-27, 2009

Sponsored by

Northwest Ohio Center of Excellence in Science and Mathematics 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

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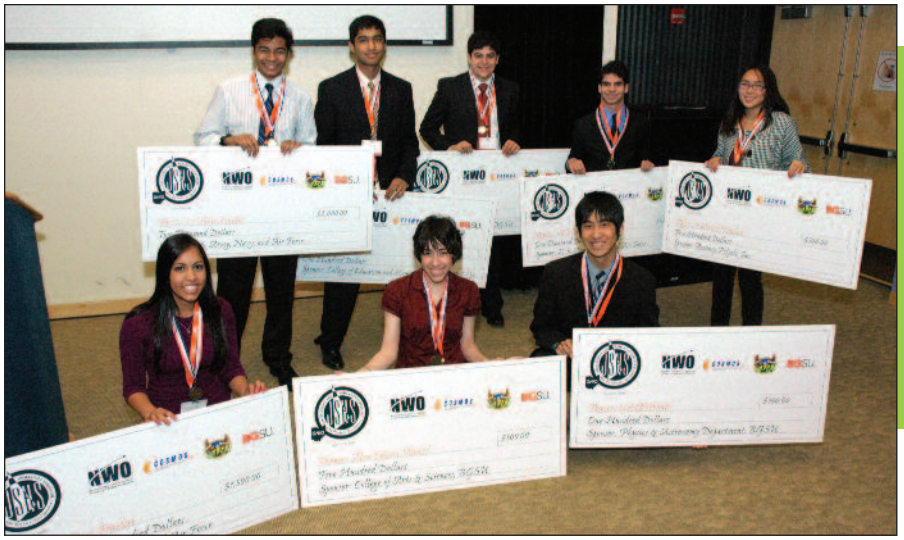
2008 Ohio JSHS Award Winners



Top Row (L to R)
Aaditya Shidham, Jyotiraditya Sinha, David Esber, David B. Litt, & Grace Miner

Bottom Row (L to R)
Maya Ratnam, Elizabeth Engoren, & Justin Yang

2008 Ohio JSHS Participants

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NWO
Northwest Ohio Center of Excellence in Science and Mathematics Education

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BGSU

Schedule "At a Glance"

2009 Ohio Junior Science and Humanities Symposium
March 25-27, 2009

Wednesday, March 25

4:00 p.m.-6:00 p.m.	Check In	*Hampton Inn, Bowling Green*
6:30 p.m.	Mandatory Meeting for ALL Participants	*Hampton Inn, Great Room*
7:15 p.m.	Board Buses to BGSU Ice Arena	
7:30 p.m.-8:00 p.m.	Pizza Buffet	*Conference Room, Ice Arena*
8:00 p.m.-9:30 p.m.	Ice Skating	*Ice Arena*
9:35 p.m.	Board Buses for Return to Hampton Inn	

Thursday, March 26

6:00 a.m.-7:20 a.m.	Breakfast	*Hampton Inn, Great Room*
7:30 a.m.	Board Buses to BGSU Student Union/ Poster Set-Up	*Student Union 206/228*
8:30 a.m.	Opening Session	*Student Union 206*
8:45 a.m.-9:45 a.m.	**First Paper Session**	*Student Union 206*
Break (15 minutes)		
10:00 a.m.-11:00 a.m.	**Second Paper Session**	*Student Union 206*
10:30 a.m.-12:00 p.m.	**Concurrent Poster Judging**	*Student Union 228*
11:15 a.m.-12:15 p.m.	**Third Paper Session**	*Student Union 206*
12:15 p.m.-1:20 p.m.	Lunch	*Student Union, Falcon's Nest*
1:30 p.m.-2:30 p.m.	**Fourth Paper Session** Concurrent Poster Viewing: Session 1	*Student Union 206* *Student Union 228*
2:45 p.m.-3:45 p.m.	**Fifth Paper Session** Concurrent Poster Viewing: Session 2	*Student Union 206* *Student Union 228*
4:00 p.m.-5:15 p.m.	Planned Activities	*Student Union 201*

Schedule "At a Glance"

2009 Ohio Junior Science and Humanities Symposium
March 25-27, 2009

Thursday, March 26 (cont.)

5:30 p.m.-7:00 p.m.	Banquet/Keynote Presentation	*Student Union 228*
8:00 p.m.-10:00 p.m.	Planned Activities/Open Activities/Pool Adult Reception	*Hampton Inn, Meeting Room* *Hampton Inn, Great Room*

Friday, March 27

6:30 a.m.-8:00 a.m.	Room Checkout/Breakfast	*Hampton Inn, Great Room*
8:10 a.m.	Board Buses to BGSU Student Union	
8:40 a.m.	Announcements	
8:45 a.m.-9:45 a.m.	**Sixth Paper Session** Concurrent Poster Viewing: Session 3	*Student Union 206* *Student Union 228*
Break (15 minutes)		
10:00 a.m.-11:00 a.m.	**Seventh Paper Session** Concurrent Poster Viewing: Session 4	*Student Union 206* *Student Union 228*
11:30 a.m.	Lunch	*Student Union, Falcon's Nest*
	Judges Luncheon	*Student Union 306*
	Advisory Board Luncheon	*Student Union 316*
	Student Advisory Board Meeting	*Student Union 307*
12:15 p.m.	Dismantle Posters	*Student Union 228*
12:50 p.m.	Group Photograph	*Student Union, Center Stairwell*
1:15 p.m.	Toledo Zoo Presentation	*Student Union 206*
2:00 p.m.	Awards Ceremony	*Student Union 206*
2:30 p.m.	Adjournment	

OHIO JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM JSHS Army, Navy and Air Force Sponsored

General Information

2009 Ohio Junior Science and Humanities Symposium

Place: The Hampton Inn, Bowling Green, Ohio
Student Union, Bowling Green State University

Time: Registration begins at 4:00 p.m., Wednesday, March 25, 2009. The program ends at approximately 3:00 p.m., Friday, March 27, 2009.
Please plan to stay for the entire program.

Fees: There will be a registration fee of $30 for each student delegate (non-presenting student). For all students presenting papers and posters, the $30 registration fee will be paid by the Symposium. This fee will go into the general operating fund and will pay for a small percentage of the costs incurred to run the program. The students are not expected to pay the $30 themselves. Students should solicit a local sponsor, such as the Kiwanis or the Rotary Club, to help pay the fee.

Room & Meals: Wednesday and Thursday evening room costs and meals for all participants (student delegates, student presenters, and teachers) attending the Ohio JSHS are paid by the Symposium. Accompanying parents and guests will need to pay for their hotel rooms and meals.

Money: Students may desire to have some extra money for other items at the students' discretion.

Dress: Everyone is expected to dress appropriately for the Symposium. Bring sportswear for the BGSU Ice Rink and for swimming at the hotel. A banquet will be held on Thursday evening. Please be prepared to dress appropriately for this special occasion.

Paper & Poster Sessions: Students are expected to attend **all** paper and poster sessions presented during the Symposium. The success of the Symposium rests upon the desire to participate. Judging committees will select the winners. These winners will be announced at the Awards Ceremony on Friday.

Conduct: The purpose of the Symposium is to learn about the scientific process and to meet and network with new students interested in science. Proper behavior is requested during the Symposium and at The Hampton Inn. Stay with a friend or chaperone at all times. Please avoid disturbing your colleagues and other guests.

Schedule of Events

2009 Ohio Junior Science and Humanities Symposium

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Thursday, March 26

6:00 a.m.-7:20 a.m.	Breakfast	*Hampton Inn, Great Room*
7:30 a.m.	Board Buses to BGSU Student Union/ Poster Set-Up	*Student Union 228*
8:30 a.m.	Opening Session	*Student Union 206*

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

Opening Remarks

Dr. Emilio Duran, School of Teaching and Learning and Ohio JSHS Director, Bowling Green State University

Dr. Carol A. Cartwright, President, Bowling Green State University

Major Steven J. Letzring, U.S. Army, Commander/Professor, Military Science, Bowling Green State University

Ms. Iris Szelagowski, Ohio JSHS Coordinator, Springfield High School

Schedule of Events

Thursday, March 26 (Cont.)

8:45 a.m.-9:45 a.m. **First Paper Session** *Student Union 206*

8:45 a.m.

Grace Miner, Bowling Green High School

"Utilization of Organic Phosphorus by Cyanobacteria"

In freshwater systems, phosphorus (P) is often the primary factor in limiting cyanobacterial growth. As an adaptive strategy to combat P deficiency, cyanobacteria may have evolved mechanisms to utilize phosphonates like glyphosate (Roundup®), which has a stable carbon-to-phosphorus bond (C-P). Water samples were collected from the Western Basin of Lake Erie, and 2 µM of P in the form of glyphosate or potassium phosphate (inorganic) were added to assess relative growth. It is hypothesized that cyanobacteria can activate the mechanisms allowing the bacteria to utilize phosphonates when in a P limited environment. Experimentation revealed that cyanobacteria within the algal population of Lake Erie have the ability to utilize glyphosate as the sole phosphorus source. The water samples treated with glyphosate had significantly greater growth than the control (repeated measure ANOVA, and Tukey's HSD test $p<0.05$). Glyphosate-augmented samples grew 19% more (i.e., optical density) than control samples. These data suggest that when inorganic phosphorus is limiting in Lake Erie, some cyanobacteria can utilize organic sources and this may cause shifts in phytoplankton community assemblage.

9:05 a.m.

Aaditya Shidham, Upper Arlington High School

"Ship as a Target of *miR155*: A New Model for Leukemiogenesis"

A previous publication demonstrated the growth of a colony of Eμ-*miR155* transgenic mice that develop acute lymphoblastic leukemia/high grade lymphoma[1]. The present study uses the *miR155* transgenic mice colony to characterize a new model of miR155-induced leukemiogenesis. Here, it is shown that *miR155* transgene has higher expression in the precursor B cells than in the mature population, and that pre-B cells are at the origin of these leukemias. *Ship* (Src homology 2 domain–containing inositol-5-phosphatase), an important regulator of the IL-6 (Interleukin-6) signaling pathway, is a direct target of *miR155* and is gradually more downregulated in the leukemic than in the preleukemic mice. It is proposed that *miR155*, by down-modulating Ship, initiates a chain of events that acts exclusively in the domain of immature B cells and eventually arrests the growth of pre-B cell populations. This leads to the accumulation and preferential proliferation of large pre-B cells, leading in turn to acute lymphoblastic leukemia/high grade lymphoma.

1. Costinean, S. et al. (2006) Pre-B cell proliferation and lymphoblastic leukemia/high-grade lymphoma in Eμ-miR155 transgenic mice. *Proc Natl Acad Sci* U S A 103,7024-9.

Schedule of Events

Thursday, March 26 (Cont.)

9:25 a.m.

Keith Hawkins, GlenOak High School

"A Time-Dependent Impact Parameter Model Sheds Light on the Evolution of Galaxy Morphology in Compact Clusters of Galaxies"

In modern astronomy, the fundamental theories of galaxy evolution are very obscure due our inability to view galaxies evolving in real-time. This investigation tests a new competitive theory of galaxy evolution. This fundamentally new theory states the probability of a central, low-impact parameter collision decreases as a cluster evolves. The impact parameter has been determined by numerous studies to be inversely proportional to the production of hot gas halos responsible for active star formation. Therefore, the time-dependent impact parameter predicts the probability of active star formation should decrease as a cluster evolves. This prediction was compared to observations of galaxy morphology in 99 galaxies across 23 Hickson Compact Groups of galaxies. Data sets were complied from the Hickson Compact Group Catalogue. Results show the average spiral galaxy fraction, which contains intermediate to high active star formation rates, is inversely proportional to the dynamical age with a very high correlation (r=0.99). This relationship is consentient with the time- dependent impact parameter model of galaxy collisions. The proposed model is also consistent with the evolution of super massive black holes and intergalactic light. The results of this investigation support the time-dependent impact parameter model and show that it may be a vital piece of understanding the evolution of galaxies in clusters.

9:45 a.m.	Break and Announcements	
10:00 a.m.-11:00 a.m.	**Second Paper Session**	*Student Union 206*
10:30 a.m.-12:15 a.m.	**Concurrent Poster Judging**	*Student Union 228*

10:00 a.m.

Chris Jennings, Sylvania Southview High School

"The Effects of Varying Cortisol Secretion on Insulin and Blood Sugar Regulation in a Type I Diabetes Patient: A Case Study"

When the body is stressed, it releases a hormone called cortisol to relieve the body. Too much cortisol, however, can result in negative effects on the body, such as decreased insulin production, an immune system response. Little research has been published on the relationship between cortisol levels and glucose regulation in type I diabetes, the focus of this study. In this experiment, the cortisol was measured through the subject's saliva and the glucose was measured by a glucose monitor provided by the subject. The hypothesis of this experiment was increased cortisol would result in decreased insulin and blood sugar regulation and vice versa. The test subject in this case study was a Caucasian 18 year old male, from a middle class, suburban family. He was a senior in high school and a type I diabetes patient. In the study, there was a month of control testing, and a month of reducing cortisol through journal writing. In the month of control, the subject provided saliva samples twice a day, before and after school, without participating in any stress relieving activity. He also provided his glucose levels at the same time using a glucose reader. The hypothesis that journal writing would reduce the cortisol levels of the subject, and that the glucose levels would normalize, was supported. In terms of the glucose and cortisol-binding enzyme levels having a negative correlation, the hypothesis was supported as well, with a p-value of 0.0.

Schedule of Events

Thursday, March 26 (Cont.)

10:20 a.m.

Abigail Styron, Hilltop High School

"An Analysis of Crude Protein on the Growth Rate & Carcass Weight of *Gallus domesticus*"

The purpose of this project was to find out if a certain level of crude protein would affect a chicken's growth rate and final carcass weight. Due to the fact that protein is essential in the growth of all organisms, the more protein an organism receives, the quicker it will grow. It was hypothesized that the chickens that received the 24% crude protein would grow the fastest, have a higher average growth rate gain, and have a lower percentage of final carcass waste. The results could be used to compare the price of feed to the time it takes a chicken to reach full meat capacity. A better balance of these two factors could hopefully increase profit for the poultry farmer. The project began by weighing thirty-one chickens on the very first day of testing, and every three days afterwards for the experiment duration. All thirty-one chickens were fed a Dumor 24% crude protein chick starter for the first 19 days. Then the 26 remaining chickens were divided into three different groups according to original weights and fed 2000 gram of either a 16% crude protein, 20% crude protein, or 24% crude protein for 31 days. The hypothesis was not proven true. The group that received the 24% crude protein level had an average of 73 grams gained per day compared to the medium crude protein level of 20% which grew an average of 77 grams per day. While the lowest crude protein percentage of only 16% gained an average of only 53 grams per day. The 16% crude protein chickens had the highest average carcass waste of 39% compared to the 24% crude protein group that had an average of 37% carcass waste and the 20% crude protein had the lowest carcass waste of 32%. Overall, the 20% crude protein had the lowest carcass waste yet a higher average of grams gained per day. T-tests showed statistical differences between each of these rates.

10:40 a.m.

Dylan Byers, Sylvania Southview High School

"The Effects of Presence or Absence of Lyrics in Music on Performance on Reasoning Tests"

Different types of auditory distraction have been shown to affect cognition differently, but the effect of presence of lyrics in music has not yet been adequately explored. Thus, the purpose of this experiment was to determine the effect of music and the effect of a lyricless version of the same music on performance on verbal, mathematical, and spatial reasoning tasks. The hypotheses were:

A) Both types of music would adversely affect performance as compared to the control group, due to general distracting effects.

B) The verbal test would be affected more adversely by the lyrical music, due to the left-hemisphere-processed verbal information.

C) The spatial task would be effected equally by both types, due to equal presence of right-hemisphere-processed melodic stimulus

The subjects were 49 students of mixed genders, ethnicities, and ages from three high-school psychology classes. The students were divided into three groups and given timed reasoning tests while listening to rock songs, karaoke versions of the same songs, or silence. The procedure was repeated with a different version of the test and the groups were rotated to different conditions, giving two points of data for each subject. None of the hypotheses were supported, with no significant difference observed between the control and experimental groups.

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Thursday, March 26 (Cont.)

11:00 a.m. Break and Announcements

11:15 a.m.-12:15 a.m. **Third Paper Session** *Student Union 206*

11:15 a.m.

Ashley Hoehn, Ottoville High School

"Spice Up Your Life"

Millions of Americans have to go through expensive and painful treatments to control their blood sugar. The goal of this experiment was to see if cinnamon is a cheaper and less painful way to help pre-diabetics lower their blood sugar, as reported in several news articles. This researcher hypothesized if pre-diabetic subjects check their blood sugar levels for two months, then only the subjects taking the cinnamon pills will have statistically significant decreases. There were three groups in this experiment. The first group, the control group, just checked their blood sugar every morning. The second group, the placebo group, took a placebo pill and checked their blood sugar in the morning. The last group, the cinnamon group, took a cinnamon pill and checked their blood sugar in the morning. All of the groups kept a food log. After all of the data was collected, the subjects' blood sugar levels were averaged by month, and the percent change in their blood sugar levels was computed. The experiment showed that taking one cinnamon pill (1,000 mg) every morning for two months did, in fact, decrease the blood sugar levels of the six subjects taking the cinnamon pills by an average of 13.41%. The placebo group's blood sugar levels increased by an average of 0.53%. The control group's blood sugar levels increased by an average of 4.92%. The results from the experiment do support the hypothesis that the subjects taking the cinnamon pills will have the only statistically significant decreases. This experiment showed that cinnamon would be a cheap and painless way for diabetic and pre-diabetic individuals to keep their blood sugar levels under control.

11:35 a.m.

Karen Kruzer, West Geauga High School

"Identification and Prevention of MRSA Transferred Between Community and Medical Settings on Mobile Phones."

The growth of community acquired methicillin resistant *Staphylococcus aureus* (CA-MRSA) presents a striking public health challenge. Prevalence in community and healthcare settings is rising and antibiotic resistance is increasing. It is hypothesized that if medical staff use mobile phones throughout shifts and phones are not properly disinfected, then MRSA can be transferred between the community and healthcare facilities. Sterile swabs were taken from phones of 30 patient-care nursing home staff pre-shift and cultured to identify pathogens brought into the facility. The phones were then disinfected with alcohol wipes. Plates were incubated and bacteria identified through gram stains and Staphaurex. Results indicated that 33.3% of phones carried pathogens into the nursing facility, with 13% positive for CA-MSSA and 20% positive for CA-MRSA. Swabs from the same 30 phones were cultured post-shift to identify pathogens acquired within the nursing home. These results indicated that 23.3% carried pathogens back into

Schedule of Events

Thursday, March 26 (Cont.)

the community, with 10% positive for hospital-acquired MSSA (HA-MSSA) and 13.3% positive for HA-MRSA. A *Staphylococcus* education program was presented to 519 high school students, with effectiveness assessed through 10-question pre/post-tests. Following education, 76.1% of students understood SA effects, 69.9% understood superbugs, 91.5% understood prevalence, and 69.2% felt they could identify SA infections. Disinfecting mobile phones and implementing *Staphylococcus* education proved effective. Effective hand hygiene, including disinfecting frequently handled objects is crucial, especially near vulnerable populations. Prevention practices involving community education combined with effective hygiene practices will reduce the number of staphylococcus infections.

11:55 a.m.

Chad Liber, Sylvania Southview High School

"Stop Sign Modification for Motor Vehicle Accident Prevention at Stop Sign Controlled Intersections"

Stop sign violations are the main cause for motor vehicle accidents at stop sign controlled intersections. It was hypothesized that current methods of stop indication could be enhanced by using a stop sign design that included a high-visibility, yellow-green color. A simulation was created in which subjects were exposed to unmodified stop signs and stop signs modified with yellow-green in order to increase their conspicuity. Four signs, a red and white colored sign (control), a sign with the yellow-green color used as a replacement for the standard red color (yellow), a sign with the yellow-green color placed where white is present in a standard stop sign (Red/yellow), and a sign with a red and yellow-green checkerboard (checkered) were used in the simulation. Twenty-six subjects were tested for the time taken to react to each stop sign. They were exposed to each sign twice, and their reactions were compared against an arbitrary normal. The medians for each of the eight sets of data were compared using a Kruskal-Wallis statistical test. In terms of the fastest reaction times, the control signs groups ranked 1st (Trial 2) and 3rd (Trial 1), the yellow sign ranked 2nd (Trial 2) and 8th (Trial 1), the checkered sign ranked 4th (Trial 2) and 7th (Trial 1), the Red/Yellow sign ranked 5th (Trial 2) and 6th (Trial 1) where k= 72.565, p = 0.00. The data showed greater variability among responses to nonstandard stop signs, causing standard signs to perform best in this experiment.

12:15 p.m.-1:20 p.m.	Lunch	*Student Union, Falcon's Nest*
1:30 p.m.-2:30 p.m.	**Fourth Paper Session**	*Student Union 206*
	Poster Viewing: Session 1	*Student Union 228*

Schedule of Events

Thursday, March 26 (Cont.)

1:30 p.m.

Alice Ou, Sylvania Southview High School

"The Effects of pH on the Light Absorption Spectra of Anthocyanins and Anthoxanthins in the Dye-sensitized Solar Cell"

Depletion of fossil fuels may result in an energy crisis and has spurred research in renewable energy sources, such as solar energy. The dye-sensitized solar cell (DSC) is a new photovoltaic device that is less expensive and more aesthetically versatile than silicon photovoltaics. Sensitizer, or dye, molecules within the cell undergo photoexcitation to create currents. Sensitizer molecules can be organic pigment molecules, such as anthocyanins. Some anthoxanthins, molecularly similar to anthocyanins, are also chemically capable of being sensitizers. These specific molecules vary in color depending on pH. The purpose of the experiment was to determine the effect of pH on the light absorption of anthocyanins and anthoxanthins in the DSC and to test pH as a possible tool for manipulating the light absorption characteristics of organic sensitizers. The hypothesis was that, in comparison to the sensitizers in their natural states, acidic anthocyanin-sensitized cells would absorb mostly lower wavelengths of light; basic anthocyanin cells would absorb mostly higher wavelengths; acidic anthoxanthin cells would absorb less light in all parts of the spectrum; and basic anthoxanthin cells would absorb mostly lower wavelengths. A kit from the Institute of Chemical Education was used for materials and instructions. The cells were constructed according to these directions. Sensitizers were produced by crushing organic material with distilled water and altering pH with NaOH or HCl. Cells were tested with a solar simulator and spectrometer at the University of Toledo. Only the basic anthocyanin condition showed the predicted shift in light absorption characteristics, and most of the hypothesis was unsupported. This research indicates that pH may not be an effective general tool for the manipulation of the absorption spectra of organic sensitizers.

1:50 p.m.

Michael Baker, Louisville High School

"Analysis of Net Potential Methane Fluxes in Vernal Pool Ecosystems: Revealing Biogeochemical Greenhouse Gas Production and Emission"

Methane (CH4) is a major greenhouse gas and contributor to climate change, and wetlands have been proven to contribute 15-45% of atmospheric CH4. Vernal pools, unique wetland habitats, have remained relatively unstudied in their contribution to production of this gas on a biogeochemical basis. Thus, the purpose of this study was to understand the underlying processes that drive methane production in varying conditions. It was hypothesized that methane emissions would change in the later trial with the growth of methanogens and that the microbial populations would produce higher rates in the vernal areas. Three vernal and nonvernal sites were chosen from disturbed, riparian, and upland habitats and brought to ideal anaerobic or aerobic conditions for the study of net potential gas flux. These ideal conditions allowed for the understanding of the microbial processes, and reduced analytical variability. Each sample's gas emissions were extracted at fixed time intervals from field sampling, and were analyzed on a Gas Chromatograph for CH4, CO2, and N2O. The concentrations that were given in the GC Solution Software were then converted to rates of production/emission in nmol/g soil/ hr. In an ANOVA test with the above mentioned fixed effects, it was found that, in trial one, more methane was produced in the vernal areas. It was also proven that there were higher rates of production in trial two, while habitat served as an interaction effect. Thus, it was found that methanogens produced more CH4 in the vernal areas, reflecting the underlying biogeochemical processes that drive the greenhouse gas production in these unique ecosystems.

Schedule of Events

Thursday, March 26 (Cont.)

2:10 p.m.

Seth Miller, Hilltop High School

"Effects of Moisture Enhancement on Sensory Attributes and Tenderness of Beef Steaks"

It has been proven that consumers will pay a premium for beef that is guaranteed to be tender and palatable. The objective of this project was to determine the effects of high moisture enhancement on tenderness and water retention as measured on low choice *gluteus medius* beef steaks. The second objective was to help the meat industry better understand how to package and prepare meat that will be most suitable to the consumer. The hypotheses were that the addition of a brine solution would positively impact tenderness and water retention (reduction of cook loss), and also that the trained sensory panel would prefer the brine injected steaks over the control steaks. One half of the low choice treated *gluteus medius* steaks were brine injected and the other half were needle tenderized, which were the control steaks. Each steak was set out for 24 hours. Drip loss, Warner Bratzler Shear Force, cook loss, and slice shear force tests were done. One steak was retained from the BI and NT treatments and a trained sensory panel evaluated each for initial tenderness, sustained tenderness, initial juiciness, sustained juiciness, beef flavor intensity, and overall acceptability. Statistical analysis was done on all results. In this study, the hypotheses were proven correct. It was shown that the brine injected steaks had a lower drip loss because the NT steaks were 3.89% and the BI steaks were 1.25%. The BI steaks also had a lower cook loss because they were 16.82% compared to the NT steaks that were 22.18%. It was also shown that there was a high positive correlation to steaks that were brine injected. The sensory panel preferred the brine injected steaks over the needle tenderized steaks in each of the panel attributes.

2:30 p.m.	Break and Announcements	
2:45 p.m.-3:45 p.m.	**Fifth Paper Session**	*Student Union 206*
	Poster Viewing: Session 2	*Student Union 228*

2:45 p.m.

Uma Mohan, Hathaway Brown School

"The Study of Neuronal Activity on the Subcellular Localization of FoxO in *Drosophila melanogaster* Motorneurons"

Currently, little is known about the more complex interactions that change motorneuron differentiation and cell fate determination in the developing nervous system. Only a few transcriptional factors and their downstream effectors have been identified as potential regulators. The FoxO (forkhead box containing protein, O sub-family) transcription factor was identified in a gene misexpression screen as a potential regulator of motorneuron differentiation in the *Drosophila* embryo. The BMP (bone morphogenetic protein) signaling pathway regulates many developmental processes. Also, the misexpression of a truncated version of eag (eagΔ932) results in neural hyperexcitability. The ventral nerve cords (VNC) of two BMP loss-of-function (LOF) mutants and a hyperexcitable mutant, elav>eagΔ932, were stained for FoxO expression and compared to the FoxO wild type phenotype. BMP LOF mutants as well as the hyperexcitable mutant displays decreased levels of nuclear FoxO. Therefore, BMP signaling regulates FoxO. Since the hyperexcitable mutant has decreased nuclear FoxO levels at the midline, the presence of neuronal activity negatively regulates FoxO. These results clarify the role of BMP signaling and neuronal activity in the regulation of FoxO, which in turn changes motorneuron differentiation. However, they also create many possibilities for how these different pathways interact to regulate FoxO.

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Thursday, March 26 (Cont.)

3:05 p.m.

Saurav Daniel Haldar, Orange High School

"MicroRNA-16 Modulates the Chemosensitivity of Pancreatic Cancer Cells to Benzyl Isothiocyanate"

MicroRNAs (miRNAs) comprising of 19-25 nucleotides, are highly-conserved, small non-coding RNAs that can regulate normal gene expression during development, cell proliferation, and apoptosis by targeting mRNAs of protein-coding genes at the post-transcriptional level. The overall objective of this research project was to assess if miRNAs are involved in the regulation of critical genes that control the sensitivity of pancreatic cancer cells to the chemopreventive agent benzyl isothiocyanate (BITC), a major ingredient found in many cruciferous vegetables. miRNA profiling assays of pancreatic cancer cells treated with BITC revealed differential expression of a small number of miRNAs, including miR-16, when compared to the untreated control. BITC mediated up regulation of miR-16 was confirmed in both pancreatic adenocarcinoma and metastatic pancreatic cancer. Interestingly, the enforced expression and silencing of miR-16 in cultured pancreatic cancer cells affected their sensitivity to BITC by modulating pathways involving cell proliferation and apoptosis. Furthermore, over-expression of miR-16 alone in pancreatic cancer cells impaired cell proliferation by down regulating the anti-apoptotic protein Bcl-2 and proangiogenic molecule basic fibroblast growth factor-2 (FGF-2). This novel observation implicating miR-16 with the antitumor efficacy of BITC, thus, can provide new insight into treating pancreatic cancer, one of the deadliest of all malignancies.

3:25 p.m.

Robert Ellis, Sylvania Southview High School

"The Effect of Solution Concentration on Crystal Growth in Magnesium and Calcium Carbonate"

Solution composition has a major effect on shape, growth, and size of crystals. The wide use of calcium carbonate and magnesium carbonate demands an investigation of the microcrystals that are formed for each of these compounds to benefit the manufacturers and consumers of business and patients of the medical and industrial fields. Atomic variance in crystals can determine whether a carbon compound is graphite or diamond. Solution composition may change this atomic structure and affect the important crystallization process. The purpose of this experiment was to determine the effect of solution composition on crystal growth in magnesium and calcium carbonate. Based on the observed implications in past projects, solution composition was expected to affect what phase of calcium carbonate crystallizes (Aragonite, Calcite, or Vaterite). Particle shape should also change with the phase. In terms of shape and size, the calcium carbonate samples showed a significant change in shape. Magnesium Carbonate was used as the control in this experiment because it shared one form of carbonate with calcium carbonate and has similar properties. In terms of shape and size, magnesium carbonate yielded consistent shapes throughout all samples. The original hypothesis that solution concentration would affect what phase of calcium carbonate crystallizes (Aragonite, Calcite, or Vaterite), and that particle shape would also change with the phase was supported in this experiment.

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Thursday, March 26 (Cont.)

3:45 p.m.	Break and Announcements	
4:00 p.m.-5:15 p.m.	Planned Activities	*Student Union 201*
5:30 p.m.-7:00 p.m.	Banquet	*Student Union 228*
Keynote Presentation	"Communication & Evolution: Adventures at the Species Boundary" **Moira van Staaden**, Ph.D., Associate Professor, Biological Sciences, Bowling Green State University & JP Scott Center for Neuroscience, Mind & Behavior	
8:00 p.m.-10:00 p.m.	Planned Activities/Open Activities/Pool	*Hampton Inn, Meeting Room*
	Adult Reception	*Hampton Inn, Great Room*

Schedule of Events

2009 Ohio Junior Science and Humanities Symposium

Friday, March 27

6:30 a.m.-7:45 a.m.	Room Checkout/Breakfast	*Hampton Inn, Great Room,*
8:10 a.m.	Board Buses to BGSU Student Union	
8:40 a.m.	Announcements	*Student Union 206*
8:45 a.m.-9:45 a.m.	**Sixth Paper Session** **Poster Viewing: Session 3**	*Student Union 206* *Student Union 228*

8:45 a.m.

Justin Yang, Sylvania Southview High School

"A Life Cycle Assessment of the Toledo Zoo's Nature's Neighborhood Visitor Center Construction: Modeling with Economic Input-Output"

Environmental sustainability practices have made significant progress in the last few years to pursue the goal of prolonging and maintaining necessities in human life and development without compromising future generations. Utilizing renewable resources and limiting non-renewable energy use has become a primary objective for corporate and non-profit organizations in order to increase cost efficiency. One of these organizations is the Toledo Zoo, known for its environmental conservation. Toledo Zoo's 2009 launch of Nature's Neighborhood, a children's exhibit, will feature increased sustainable construction. The purpose of the study is to determine the effect of the Neighborhood's visitor center construction on greenhouse gases, energy consumption, and toxicity release. The research also aims to evaluate alternative building materials that might improve sustainability. The hypothesis is that the cement material will most negatively affect greenhouse gases and energy consumption and steel would affect toxicity release the most. The specific data on materials used to construct intermediate floors, exterior walls, windows, interior walls, and the roof were collected and the costs were inputted into the Economic Input-Output Life Cycle Assessment model. Results confirmed that concrete caused the most global warming potential and energy consumption, but slag could not individually solve this issue as a replacement.

9:05 a.m.

Brittany Schroeder, Miller City- New Cleveland High School

"Comparative Analysis of Water Quality in the Blanchard and Auglaize Rivers"

Water quality can be tested by measuring values including temperature, pH, dissolved oxygen, and turbidity. These can then be used to calculate a water quality index. Experimental testing involved the comparison of these water qualities in the Blanchard and Auglaize Rivers in Putnam County, OH. Water samples were collected from each of three points along both rivers on the same date in Putnam County (n=18). The water was then tested by temperature probe, dissolved oxygen kit, pH paper and turbidity stick. Four hypotheses were made prior to collection of the samples. Hypothesis 1: There is a difference in the water temperature of the Blanchard and Auglaize Rivers. Hypothesis 2: There is a difference in the water dissolved oxygen levels of the Blanchard and Auglaize Rivers.

Schedule of Events

Friday, March 27 (Cont.)

Hypothesis 3: There is a difference in the water turbidity of the Blanchard and Auglaize Rivers. Hypothesis 4: There is a difference in the water quality index of the Blanchard and Auglaize Rivers. Temperature ranged from 17.15 to 18.36 degrees C in the Blanchard and 18.36 to 19.88 degrees C in the Auglaize. Blanchard dissolved oxygen levels ranged from 5 to 8 whereas in the Auglaize they ranged from 8 to 9. Turbidity measurements in the Blanchard were from 7.6 to 14, whereas in the Auglaize they were from 11.5 to 20.25. Water quality values for the Blanchard went from 49.38 to 67.13, whereas in the Auglaize the range was from 66.67 to 71.84. Statistical analysis was done using a two sample t test. Hypothesis 1 was accepted with there being a difference in water temperature between the Blanchard and Auglaize Rivers (T=5.2417, df=8, P=0.0008). Hypothesis 2 was accepted with there being a difference in the dissolved oxygen levels of Blanchard and Auglaize Rivers (T=4.8112, df=8, P=0.0013). Hypothesis 3 was accepted with there being a difference in the turbidity of the Blanchard and Auglaize Rivers (T=3.7600, df=8, P=0.0054). Hypothesis 4 was accepted with there being a difference in the water quality index of the Blanchard and Auglaize Rivers (T=5.4263, df=8, P=0.0006). Further testing of additional water quality values is indicated along the Blanchard and Auglaize Rivers. Future sampling may assist in directing cleanup efforts along these bodies of water.

9:25 a.m.

Dora Huang , Hathaway Brown School

"One Dimensional Polymeric Photonic Crystal Lasers: Fabrication & Characterization"

Because photonic crystals contain bandgaps, regions with high reflectivity for light, they can be used as cavity reflectors in lasers. One-dimensional, multilayered photonic crystals were fabricated to create all-polymer, micro-resonator lasers to examine lasing modes, light penetration depth, and cavity size to broaden the understanding of polymer laser behavior. To create the films, spin-coating, stacking, and co-extrusion techniques were employed and compared; the co-extruded films, found to be the best, were used in the formation of plastic lasers. The lasing modes within these structures were measured to find penetration depth of light and cavity size, and a linear relationship between cavity length and the wavelength separation of the emitted modes was found ($y= 2.37(x +14.3)$) and related to $T_{cavity} = 2(Lp) + T_{core}$ layer, where T = thickness and Lp =light penetration depth. From this equation, a 7.2 µm penetration depth measurement was obtained and found to vary from the theoretical depth (0.84 µm) because of layer thickness variation. It is anticipated that these small, plastic lasers can be used in applications for tunable lasers such as spectroscopy and remote sensing.

9:45 a.m. Break and Announcements

Schedule of Events

Friday, March 27 (Cont.)

10:00 a.m.-11:00 a.m.	**Seventh Paper Session**	*Student Union 206*
	Poster Viewing: Session 4	*Student Union 228*

10:00 a.m.

Ankit Prasad, Sylvania Southview High School

"The Air Pressure Resistance, Fluid Pressure Resistance, Heat Resistance, and Chemical Resistance of Ultra-Tensile Wire Reinforcement Recycled Plastics"

The purpose of this project was to determine the air pressure, fluid pressure, heat, and chemical resistance of ultra tensile wire reinforcement recycled plastics. Ultra tensile wire is a strong type of carbon steel that is ideal for reinforcement of materials. Previous research showed that ultra tensile and recycled plastic composites were strong and had possible commercial applications. However, before the composite can be put on the commercial market, it must be tested in real world conditions. The hypothesis was that the ultra tensile wire reinforced recycled composite would have a higher air pressure, fluid pressure, heat, and chemical resistance than fiberglass reinforced epoxy. After cutting the ultra-tensile wire composite into sample sizes, the sample was placed in an air compression and fluid compression chamber for testing. It was subjected to increasing levels of heat and submerged in chemical oxides for the remainder of the tests. The results supported the hypothesis. The sample sizes performed significantly better in all four tests in comparison to the control. The data showed that the composite is cheaper but stronger and therefore has a substantial commercial value.

10:20 a.m.

Kevin Hawkins, GlenOak High School

"microRNA Expression Patterns in Normal Mouse Lung Development and Cancer"

This novel study analyzed the expression patterns of microRNAs in normal lung development and in lung cancer to compare the results to transcriptional profiles of genes during lung development and lung cancer. MicroRNAs (miRNAs) are a novel class of highly conserved small non-coding regulatory RNA. These molecules have been found to exert transcript-level control over the expression genes that contribute to diverse cellular processes including cell fate commitment and differentiation. In addition to their role in normal biology, the inappropriate expression of miRNAs has been implicated in cancer. With lung cancer being the leading cancer killer and with little progress made in the last 30 years, the push for a better understanding of lung cancer and the pathways it involves are critical. In this study, we compared the expression of microRNAs during mouse lung development and used this information as a framework for evaluating the expression of microRNAs in human and mouse lung tumors. miRNA expression data were collected for 5 time points across lung development (E11.5, E13.5, E14.5, E16.5, P5) in C57BL/6J mice. The study identified 21 miRNAs that with significantly different expression levels in normal human lung versus human lung tumors that were also expressed during normal mouse lung development. The study also suggests a more complicated process for miRNA regulation of genes. Further analysis could lead to more precise miRNA target predictions and understanding for miRNAs role in lung development and carcinogenesis

Schedule of Events

Friday, March 27 (Cont.)

10:40 a.m.

Julia Hu, Sylvania Southview High School

"Exploring the Molecular Link between Obesity and Cancer: Loss of CEACAM1 Accelerates Endometrial Tumorigenesis"

Epidemiological studies have revealed a strong correlation between obesity and cancer. In particular, women with obesity have 6.25 times greater relative risk of endometrial cancer mortality. The underlying molecular mechanisms for this link remain largely unexplored. Based on the lab's previous findings that the protein Carcino Embryonic Antigen-Related Cell Adhesion Molecule 1 (CEACAM1) and its mRNA levels are reduced by high fat diet, it was hypothesized that CEACAM1 mediates the connection between obesity and cancer. CEACAM1 acts both as a tumor suppressor, by reducing cell proliferation and mitogenesis, and as a mediator of metabolism, by regulating insulin action and visceral obesity. This underscores the relationship between metabolism and cancer. The hypothesis was confirmed through two venues: high fat diet and genetic deletion. Heterozygous deletion of the well characterized tumor suppressor, Phosphotase and Tensin Homolog (PTEN), served as a model for human predisposition for cancer. *Pten*+/- Cc1+/+ mice were fed either high fat (45% calories from fat) or regular diet (13% calories from fat) for 3 months. It was discovered that high fat diet, which induces loss of CEACAM1, advanced endometrial tumorigenesis. To specifically pinpoint the role of CEACAM1, the *Ceacam1* gene was deleted to produce *Pten*+/- Cc1+/+, *Pten*+/- Cc1+/-, and Pten+/- Cc1-/- mice. As expected, homozygous deletion of Ceacam1 induced the most complex stages of endometrial hyperplasia and carcinoma. Thus, this work suggests loss of CEACAM1 as a specific casual link between high fat diet, obesity, and endometrial tumorigenesis.

11:30 a.m.	Lunch	*Student Union, Falcon's Nest*
	Judges Luncheon	*Student Union 306*
	Advisory Board Luncheon	*Student Union 316*
	Student Advisory Board Meeting	*Student Union 307*
12:15 p.m.	Dismantle Posters	*Student Union 228*
12:50 p.m.	Group Photograph	*Student Union, Center Stairwell*
1:15 p.m.	Toledo Zoo Presentation	*Student Union 206*
2:00 p.m.	Awards Ceremony Hans Glandorff, Science Teacher Bowling Green High School	*Student Union 206*
2:30 p.m.	Adjournment	

Keynote Speaker

2009 Ohio Junior Science and Humanities Symposium

Moira J. van Staaden, Ph.D., Department of Biological Sciences, and JP Scott Center for Neuroscience, Mind & Behavior, Bowling Green State University

Dr. van Staaden earned her Bachelor of Science and Master of Science degrees from the University of Natal, South Africa, working in the area of ethology. Following a Ph.D. in evolutionary population genetics from Texas Tech University, she was a Post-doctoral Fellow in the Department of Chemical Pathology at the University of Cape Town Medical School and in Organismic and Evolutionary Biology at Harvard University. She taught at the University of Graz, Austria for several years before accepting a faculty position at the Department of Biology at Bowling Green State University in 1998.

Her research interests are wide-ranging, including neuroethology, evolution, and population genetics where she focuses on the mechanisms of sensory biology and its interface with population biology. She employs a variety of approaches to investigate the evolution of sensory organs and communication systems, and their significance at both the population and species level. These investigations include comparative and functional morphology, behavioral analysis, acoustic transmission in natural habitats, construction of molecular phylogenies, and spatial genetic analyses of populations. She has authored or coauthored numerous publications and has received substantial support from such organizations as the National Science Foundation and the Austrian Science Foundation.

She is actively involved with both undergraduate and graduate education at BGSU and encourages undergraduates to get involved in research at the earliest possible stage in their academic careers. Along with service on the 'Advising Network' to coordinate university-wide activities and as an academic advisor for students with a neuroscience major, she is Director of the SETGO program – 'Science, Engineering & Technology Gateway Ohio'. SETGO is a partnership of BGSU, Owens Community College, and local community-based organizations to increase the number of students graduating in the STEM disciplines - science, technology, engineering and math. SETGO scholars get to experience the real-world of research each summer as integral members of teams across BGSU's campus. Over the past six years, Dr. van Staaden has mentored eighteen high school and undergraduate researchers, all of whom have gone on to graduate school, veterinary/medical school, or have become high school science teachers. As a mentor, she encourages her students to present their work at local and national conferences and to publish in peer-reviewed literature where they gain experience in all critical aspects of the scientific process, from hypothesis generation to final publication.

2009 Poster Presenters

Zach Baesman, Buckeye Valley Middle School
"Fuel Cell Efficiency at Different Temperatures"

Evan Baker, Hilltop High School
"Categorization Rates in Implicit Association Testing"

Taylor Batt, Millcreek-West Unity School
"Do Athletic Students Have a Lower Heart Rate than Non-Athletic Students?"

Becca Bauserman, Buckeye Valley Middle School
"Catapult"

Mitch Beem, Buckeye Valley Middle School
"The Buoyancy of an Object : Fresh to Salt Water"

Westyn Bennington, Buckeye Valley Middle School
"Electric Guitar Strings: Steel, Nickel-Plated Steel or Nickel"

John Boykin, St. Peter Chanel High School
"Recycled Plastics and Rubbers-Which are more resistant when exposed to environmental and chemical conditions?"

Haylee Carroll, Millcreek-West Unity School
"Does the Type of Container in which Orange Juice is Stored Affect the Amount of Vitamin C?"

Ocean Casey, Buckeye Valley Middle School
"9-11: The Conspiracy Theory"

Will Crecelius, Buckeye Valley Middle School
"Trash Reinforced Concrete"

Chelsea Donelson, Gahanna Lincoln High School
"Investigating a Possible Link Between BPA and Autism: The Possible Role of Estrogen-like Pollutants on the Brain of *Colinus virginianus*"

Kevin Fenk, Louisville High School
"The Effects of Salts at Different Concentrations on the Microwave Absorption of Water"

Mark Firkins, Buckeye Valley Middle School
"Best Conditions for Amylase to Break Down Starch"

2009 Poster Presenters

Bryan French, Buckeye Valley Middle School
"What Effect Does Deterrence Have on Behavior"

Matt Hard, Buckeye Valley Middle School
"Projectiles and Their Distances"

Will Harsh, Buckeye Valley Middle School
"What is Arthrogryposis Multiplex?"

Austin Hilt, Buckeye Valley Middle School
"Paintballs and Accuracy"

Devin Hilt, Buckeye Valley Middle School
"Pepsi vs. Orange Juice: The Blood Decides"

Ali James, Hilltop High School
"Is Colored or Black Text More Easily Remembered?"

Artea Kenney, Buckeye Valley Middle School
"Rock Solid"

Lane Kleilein, Buckeye Valley Middle School
"Does Air Pressure Impact the Distance Traveled by a Kicked Football?"

Neil Klinger, Hilltop High School
"Dissolving Rate of Acetaminophen"

Brooks Kuney, Millcreek-West Unity School
"Penetration and Impact Effects of BB Pellets"

Caleb Liechty, Pettisville Junior High School
"The Effect of Various Types of Music on How Children Play"

Victor Lin, Sylvania Southview High School
"The Effect of Curcumin on *Escherichia coli*"

Alex Lu, Sylvania Southview High School
"The Effect of Visual Subliminal Messages on the Emotional Subconscious Mind"

2009 Poster Presenters

Morgan McCandless, Millcreek-West Unity School
"Does Color Treated Shampoo Actually Help Color Last Longer?"

Lauren McCane, Anderson High School
"Tracking Geomagnetic Storms using a G.P.S. Receiver"

Rebekah Meller, Pettisville High School
"The Effect of Gastric Juice on Probiotic Foods"

Allie Mirka, Buckeye Valley Middle School
"Plop, Plop, Fizz, Fizz"

Kali Munday, Buckeye Valley Middle School
"Taste Buds"

Tanisha Murphy, Buckeye Valley Middle School
"Plant Pollution"

Jacob Oet, University School
"The Effect of Sound on *Hippodamia convergens* and *Drosophila hydei*"

Rahul Prasad, Bellefontaine High School
"Isolating the Bt Crystal Toxin Gene"

Gregory Raber, Louisville High School
"The Effects of Whale Tubercle Placement on the Aerodynamics and Electrical Output of Windmills"

Patrick Roden, Buckeye Valley Middle School
"Net Gain or Net Loss"

Alex Roth, Pettisville Junior High School
"The Effect of Temperature on the Power Output of a Solar Cell"

Kamran Salari, Sylvania Southview High School
"A Comparison of Double Data Rate Double Inline Memory Module Random Access Memory and Rambus Inline Memory Module Random Access Memory on the Performance of a Modern Computer System"

2009 Poster Presenters

Ajleeta Sangtani, Sylvania Southview High School
"The Effect of the Olfactory Sense and Handedness on Memory"

Himanshu Savardekar, John Sells Middle School
"Exposure to High Glucose Kills Heart Cells"

Morgan Shea, Buckeye Valley Middle School
"Music and Your Mood"

Nick Sheehan, Buckeye Valley Middle School
"How a Monster Energy Drink Affects Reaction Time"

Nathan Spotts, Pettisville Junior High School
"The Effect of Various Airfoil Shapes on the Flight Time and Distance of an Airplane"

Matthew Stewart, Buckeye Valley Middle School
"Heat Retention in Meat"

Collin Stipe, Millcreek-West Unity School
"What Combination of Variables Affects Foul Shots?"

Sushil Sudershan, Sylvania Southview High School
"The Effect of Method of Presentation of Reading Material on Academic Achievement"

Michael Thomas, Louisville High School
"The Effects of Age, Weight, and Progesterone Levels at the Time of Artificial Insemination of the Canine on its Litter Size"

Ethan Varner, Miller City High School
"Multiple Intelligences in the Development of Specific Cognitive Abilities"

Judges Score Sheet for Paper Presenters

Name of Student _____ Name of Judge: _____

The Ohio JSHS recognizes students for original research achievements in the sciences, technology, engineering, or mathematics (STEM). The overall requirement for a paper presentation is that students demonstrate valid investigation and experimentation aimed at discovery of knowledge. The judging criteria and scoring for the Ohio JSHS are presented in the following chart. This scale has a total score of 30 points and serves as the basis for discussions among the judging team. The decisions of the judging team are final.

5 = Superior 4 = Excellent 3 = Good 2 = Satisfactory 1= Fair

Judging Criteria	Suggested Weight
Statement and identification of research problem • Is the problem clearly stated? • Does the presenter demonstrate understanding of existing knowledge about the research problem?	**5 4 3 2 1**
Scientific thought, creativity/originality • Process skills demonstrated by the student in the solution to the research problem and/or the research design • Student demonstrates his or her individual contributions to and understanding of the research problem • Level of effort	**5 4 3 2 1**
Research design, procedures (materials & methods), results **1. Science** • Appropriateness of research design and procedures • Identification and control of variables • Reproducibility **2. Engineering, computer science, technology** • Workable solution that is acceptable to a potential user • Recognition of economic feasibility of solution • Recognition of relationship between design and end product • Tested for performance under conditions of use • Results offer an improvement over previous alternatives	**5 4 3 2 1**
Discussion/conclusions • Clarity in stating conclusion • Logical conclusion that is relevant to the research problem and the results of experimentation or testing • Recognizes limits and significance of results • Evidence of student's understanding of the scientific or technological principles • Theoretical or practical implications recognized • What was learned?	**5 4 3 2 1**
Skill in communicating research results–oral presentation and written report • Clarity in communicating research results to non-specialized audience and to judges • Definition of terms as necessary • Appropriate use of audio-visuals • Response to questions from audience and judges	**5 4 3 2 1**
Acknowledgment of sources and major assistance received	**5 4 3 2 1**
TOTAL SCORE	

Judges Score Sheet for Poster Presenters

Student Name _____

A. Quality of Research Design: (60 pts)

_____ 1. Clarity and delineation of problem (10 pts)

_____ 2. Identification of variables (10 pts)

_____ 3. Suitability of research equipment (10 pts)

_____ 4. Recognition of limitations in the data (10 pts)

_____ 5. Degree to which the data support the conclusions (10 pts)

_____ 6. Uniqueness of, or originality, in the research topic (10 pts)

B. Quality of Presentation: (40 pts)

_____ 7. Abstract (10 pts)

_____ 8. Organization of the presentation (10 pts)

_____ 9. Clarity of expression of graphs and tables (10 pts)

_____ 10. Handling of questions from the viewers (10 pts)

C. _____ **Total**

D. Judges' Comments

Research Paper Awardees: 2008

1st Place Winner – **Aaditya Shidham**, Upper Arlington High School

- $2,000 Ohio JSHS College Scholarship sponsored by the Army, Navy, and Air Force
- Presented Research Paper at the National JSHS with expenses paid
- Won First Place Award at the National JSHS and a $16,000 Scholarship
- Awarded a trip to the 2008 London International Youth Science Forum (LIYSF)

2nd Place Winner – **Maya Ratnam**, Sylvania Southview High School

- 1,500 Ohio JSHS College Scholarship sponsored by the Army, Navy, and Air Force
- Invited to present Research Paper at the National JSHS with expenses paid and an opportunity to compete for a $16,000 Scholarship and the LIYSF trip

3rd Place Winner – **David B. Litt**, Orange High School

- $1,000 College Scholarship sponsored by the United States Army, Navy, and Air Force
- Delegate to the National JSHS with expenses paid
- Competed at the National JSHS; won a Third Place Award and a $2,000 Scholarship

4th Place Winner – **Grace Miner**, Bowling Green High School

- $500 Award sponsored by Perstorp Polyols, Inc.
- Delegate to the National JSHS with expenses paid

5th Place Winner – **David Esber**, Hoover High School

- $250 Award sponsored by the Chemistry Department, Bowling Green State University
- Delegate to the National JSHS with expenses paid

Research Paper Awardees: 2008

1st Alternate – **Jyotiraditya Sinha**, Hoover High School

- $100 Award sponsored by College of Education and Human Development, Bowling Green State University

2nd Alternate – **Justin Yang**, Sylvania Southview High School

- $100 Award sponsored by the Physcis & Astronomy Department , Bowling Green State University

2008 Thomas Alva Edison Award

– **Elizabeth Engoren**, Sylvania Southview High School

- $500 Award sponsored by the College of Arts & Sciences, Bowling Green State University

Research Poster Awardees: 2008

"Best in Show" Award

- **Keith Hawkins**, GlenOak High School
  - Delegate to the National JSHS with expenses paid; sponsored by Perstorp Polyols, Inc.

Won the First Place Award for **Best Poster Presentation at the National JSHS**

Outstanding Poster: 1st Place - 9th and 10th Grade Award

- **Robert Detchon**, Hoover High School, North Canton
  - $50 Award sponsored by COSMOS, Bowling Green State University

Outstanding Poster: 1st Place - 11th and 12th Grade Award

- **Ankit Prasad**, Sylvania Southview High School
  - $50 Award sponsored by COSMOS, Bowling Green State University

Outstanding Poster: 2nd Place - 9th and 10th Grade Award

- **Alex Lu**, Sylvania Southview High School
  - $25 Award sponsored by COSMOS, Bowling Green State University

Outstanding Poster: 2nd Place - 11th and 12th Grade Award

- **Angela Ou**, Sylvania Southview High School
  - $25 Award sponsored by COSMOS, Bowling Green State University

Outstanding Poster: Honorable Mention - 9th and 10th Grade

- **Greg Raber**, Louisville High School

Outstanding Poster: Honorable Mention - 11th and 12th Grade

- **Jeffry Karduck**, Nordonia High School
- **Colten Kuney**, Hilltop High School

Research Poster Awardees: 2008

Outstanding Poster: 8th Grade

All Eighth Grade Presenters were declared 2008 Ohio JSHS Winners.

Colonel George F. Leist Distinguished Teacher Award

– **Donna Meller**, Pettisville High School
  • $500 School Award
  • Sponsored by the U. S. Army, Navy and Air Force

Research Paper Awards: 2009

1st Place Winner

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

- Presents research paper at National JSHS with expenses paid
- Chance to compete for an expenses paid trip to the London International Youth Science Forum (LIYSF)

2nd Place Winner

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

- Presents research paper at National JSHS with expenses paid
- Chance to compete for an expenses paid trip to the London International Youth Science Forum (LIYSF)

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

- Six $16,000 undergraduate tuition scholarships awarded to each of the 1st place finalists in the National research paper competition
- Six $6,000 undergraduate tuition scholarships awarded to each of the 2nd place finalists in the National research paper competition
- Six $2,000 undergraduate tuition scholarships awarded to each of the 3rd place finalists in the National research paper competition
- An expenses paid trip to the London International Youth Science Forum, an exchange program bringing together over 400 participants from 60 nations. The London trip is awarded to each of the 1st place National JSHS finalists; the runner-ups are alternate winners.

3rd Place Winner

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

- Expenses paid trip to the National JSHS

Research Paper Awards: 2009

4th Place Winner

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

- Expenses paid trip to the National JSHS

5th Place Winner

$250 Award sponsored by the Department of Chemistry, BGSU

- Expenses paid trip to the National JSHS

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

Research Poster Awards: 2009

"Best in Show" Award

Presents poster at National JSHS with expenses paid; sponsored by COSMOS, BGSU

Outstanding Poster: 1st Place - 9th and 10th Grade Award

$50 Award sponsored by COSMOS, BGSU

Outstanding Poster: 1st Place - 11th and 12th Grade Award

$50 Award sponsored by COSMOS, BGSU

Outstanding Poster: 2nd Place - 9th and 10th Grade Award

$25 Award sponsored by COSMOS, BGSU

Outstanding Poster: 2nd Place - 11th and 12th Grade Award

$25 Award sponsored by COSMOS, BGSU

Best Physics Paper Award

$50 Award sponsored by the Ohio-Region Section of the American Physical Society (OSAPS)

Thomas Alva Edison Award

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

Colonel George F. Leist Distinguished Teacher Award

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

Acknowledgments

2009 Ohio Junior Science and Humanities Symposium

Dr. Emilio Duran, Director, Ohio JSHS, School of Teaching and Learning, BGSU

Major Steven J. Letzring, U.S. Army, Commander/Professor, Military Science, BGSU

Ms. Iris Szelagowski, Ohio JSHS Coordinator, Springfield High School

Judging Teams

Paper Judges

Dr. Stephania Jo Messersmith	Chemistry, Bowling Green State University
Dr. Anjali Gray	Biology & Health Sciences, Lourdes College
Dr. Jon Secaur	Physics, Kent State University
Mr. Jerry Szelagowski	Geologist, Industrial Chemist, Retired
Mr. Daniel Yaussy	United States Department of Agriculture, Forest Service

Poster Judges

Dr. Jodi Haney	School Teaching and Learning/Environmental Health, BGSU
Dr. John Laird	Physics and Astronomy, BGSU
Dr. Chris Keil	Environmental Health, BGSU
Dr. Kamau Mbuthia	Biological Sciences, BGSU
Dr. David Meel	Math and Statistics Department, BGSU
Dr. Bob Midden	Chemistry Department, BGSU
Dr. Matt Partin	Biological Sciences, BGSU
Dr. Jeff Miner	Biological Sciences, BGSU
Dr. Jeff Snyder	Geology Department, BGSU
Dr. Eileen Underwood	Biological Sciences, BGSU
Dr. Rick Worch	School Teaching and Learning, BGSU
Dr. Karl Schwenk	Tuscarawas High School, Retired
Ms. Elizabeth Snyder	Nordonia High School
Dr. Vipa Phuntumart	Biological Sciences, BGSU
Dr. Dale Klopfer	Psychology Department, BGSU

Session Presiders

1st Paper Session:	Jim DiNardo, BGSU Student
2nd Paper Session:	Joe Carstensen, BGSU Student
3rd Paper Session:	Wayne Oswald, BGSU Student
4th Paper Session:	Jody Twining, BGSU Student
5th Paper Session:	Rebecca Cull, BGSU Student
6th Paper Session:	Patrick Williams, BGSU Student
7th Paper Session:	Auna Rickman, BGSU Student

Judging Teams cont.

2009 Ohio Junior Science and Humanities Symposium

Session Moderators

Kristen Frizzell	Elmwood High School, Teacher
Donna Meller	Pettisville Local Schools, Teacher
Abbie Smith	Millcreek-West Unity High School, Teacher
Ann Burkam	Buckeye Valley Middle School, Teacher
Elizabeth Snyder	Nordonia High School, Teacher
Fred Donelson	Gahanna Lincoln High School, Teacher
Cristin Hagans	Hilltop High School, Teacher

Staff

Angie Bucher	BGSU Graduate Student
Nancy Hoose	BGSU/COSMOS Support Staff
Lisa Addis	Graphic Design/Web Support
Kristen Frizzell	Assistant Ohio JSHS Coordinator
Iris Szelagowski	Ohio JSHS Coordinator
Emilio Duran	Ohio JSHS Director
Patricia Ball	Photographer

Helpers/Chaperons

Mitch Neal	BGSU Undergraduate Student
Valerie Davis	BGSU Undergraduate Student
Katie Barlak	BGSU Undergraduate Student
Courtney Steinman	BGSU Undergraduate Student
Leslie Yaussy	Poster Exhibit and Game Coordinator

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College of Arts and Sciences
College of Education and Human Development

Community Sponsors

Linda Lower, Perstorp Polyols, Inc.

Special Thanks

Hampton Inn, Bowling Green
Ice Arena, BGSU
Toledo Zoo

Advisory Board

2009 Ohio Junior Science and Humanities Symposium

Dr. Emilio Duran, Director
School of Teaching and Learning
Bowling Green State University

Major Steven J. Letzring
U.S. Army, Commander
Professor, Military Science
Bowling Green State University

Ms. Kristen Frizzell
Elmwood High School
Assistant Ohio JSHS Coordinator

Mr. Hans Glandorff
Bowling Green High School

Dr. Jon Secaur
Kent State University

Ms. Ann Burkam
Buckeye Valley Middle School

Mr. Tim Bollin
Toledo Public Schools
Early College High School

Ms. Abbie Smith
Millcreek-West Unity School

Mr. Daniel Yaussy
U.S. Dept. of Agriculture

Ms. Linda Lower
Perstorp Polyols, Inc.

Ms. Iris Szelagowski, Coordinator
Springfield High School

Dr. Lena Ballone-Duran
School of Teaching and Learning
Bowling Green State University

Ms. Leslie Yaussy, RN, BSN
Public Health Nurse,
Advanced Professional, Delaware

Ms. Blythe Tipping
Sylvania Southview High School

Ms. Donna Meller
Pettisville High School

Ms. Connie Hubbard
Hoover High School, Retired

Ms. Beth Snyder
Nordonia High School

Ms. Cristin Hagans
Hilltop High School

Mr. Gerald Szelagowski
Geologist, Retired

Dr. Karl Schwenk
Tuscarawas High School, Retired

History of the Junior Science and Humanities Symposium

In 1958, Colonel George F. Leist, together with the U.S. Army Research Office, initiated the Junior Science and Humanities Symposium (JSHS) for secondary school science students. Today, the U.S. Army Research Office continues to support the Symposium in an effort to encourage young people to pursue careers in various fields of science and engineering. The Departments of the Navy and Air Force now help to sponsor this endeavor.

In 2009, over forty-eight JSHS symposia will be held throughout the United States with additional symposia held in Europe and Asia. The Ohio JSHS is sponsored by Bowling Green State University and The Northwest Ohio Center of Excellence with continued support of the U.S. Army Research Office, U.S. Office of Naval Research, and U.S. Air Force Research Office.

At the Ohio JSHS, first and second place finalists will be chosen to present their research papers at the National JSHS. This year, the symposium will be held in Colorado Springs, Colorado, on April 29 to May 3, 2009. These two Ohio JSHS finalists will compete at the National JSHS for a $16,000 scholarship and one of six opportunities to represent the United States at the London International Youth Science Fortnight (LIYSF) during the summer of 2009. In addition, three other presenters will win an all expenses paid trip to the National JSHS as part of their award. These five Ohio JSHS awardees will have the opportunity to interact with over 400 participants in a program of networking and scientific exchange.

Since 1966, forty-six Ohio JSHS winners have presented papers at the National JSHS. Fifteen of these students have subsequently presented their papers at the LIYSF in London, England.

Cumulative Awards

American Nuclear Society-Northern Ohio Section

Presented each year to the student with a project that best explores the utilization of nuclear science or technology.

Year	Name	City	School
1995	Brian R. Dulin	Chillichothe	Zane Trace High School
1996	Rachel Rutherford	Kent	Theodore Roosevelt High School
1997-2008	No Award		

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 following students are past winners of this award:

Year	Name	City	School
1979	Diana Lauck	Ravenna	Ravenna High School
1981	James Kasner	Millersburg	West Holmes High School
1982	Cindy Raymond	Kent	Roosevelt High School
1983	Eric Wertz	Stow	Lakeview High School
1984	Lyle Reusser	Millersburg	West Holmes High School
1985	David Roberts	Westerville	Westerville North High School
1986	Eric Germann	Van Wert Co.	Lincolnview High School
1987	Rodney Hartman	Carroll	Bloom-Carroll High School
1988	Matthew Fuerst	Wickliffe	Wickliffe Senior High School
1989	Michael McGrath	Ashland	Ashland City High School
1990	Mathew Heston	Carrollton	Carrollton High School
1991	Michael Ruthemeyer	Cincinnati	St. Xavier High School
1992	Gregory Lohman	Medina	Highland High School
1993	Aimee Springowski	Sheffield Lake	Brookside High School
1994	Jeff Smith	Sylvania	Sylvania Southview High School
1995	Stephan M. Gogola	Kent	Theodore Roosevelt High School
1996	Adreanna Decker	Barnesville	Barnesville High School
1997	Lev Horodyskyj	North Royalton	Padua Franciscan High School
1998	Lev Horodyskyj	North Royalton	Padua Franciscan High School
1999	Andrew Sauer	Cincinnati	St. Xavier High School
2000	Margaret Engoren	Sylvania	Sylvania Southview High School
2001	Lindsey Heine	Sylvania	Sylvania Southview High School
2002	James Ristow	Kent	Theodore Roosevelt High School
2003	Jared Steed	Delaware	Buckeye Valley High School
2004	Jared Steed	Delaware	Buckeye Valley High School
2005	Robbie Christian	North Canton	Hoover High School
2006	Alex Liber	Sylvania	Sylvania Southview High School
2007	Ruth Chang	Sylvania	Sylvania Southview High School
	Victoria Ellis	Sylvania	Sylvania Southview High School
2008	Elizabeth Engoren	Sylvania	Sylvania Southview High School

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. Bowling Green State University and the U.S. Army Research Center sponsor this award of $500 to purchase books, supplies, and equipment for the school. The following teachers have been honored as past winners of the Colonel George F. Leist Distinguished Teacher Award:

Year	Name	City	School
1978	Father Charles S. Sweeney	Toledo	St. John's High School
1989	Father James Lotze	Toledo	St. John's High School
1980	Earl Shafer	Bowling Green	Bowling Green High School
1981	Jerry Jividen	Hudson	Hudson High School
1982	Jon Secaur	Kent	Roosevelt High School
1983	Sister Mary Blandina	Toledo	Cardinal Stritch High School
1984	Rebecca Stricklin	Cincinnati	Oak Hills High School
1985	Kay Ballantine	Thornville	Sheridan High School
1986	Iris Szelagowski	Toledo	Woodward High School
1987	Diane Gabriel	Carroll	Bloom-Carroll High School
1988	Spencer E. Reams	Zanesfield	Benjamin Logan High School
1989	Father Charles S. Sweeney	Toledo	St. John's High School
1990	Jon Secaur	Kent	Roosevelt High School
1991	John A. Blakeman	Sandusky	Perkins High School
1992	Penny Karabedian Cobau	Sylvania	Sylvania Southview High School
1993	Vaughn D. Leigh	Hudson	Hudson High School
1994	Penny Karabedian Cobau	Sylvania	Sylvania Southview High School.
1995	Kathleen Keller	Dayton	Carroll High School
1996	John Jameson	Cincinnati	Cincinnati Country Day
1997	Evelyn Davidson	Cincinnati	Ursuline Academy
1998	Paula Butler	Cincinnati	Cincinnati Country Day
1999	Barbara Kraemer	North Royalton	Padua Franciscan High School
2000	Susan Sanders	North Royalton	Padua Franciscan High School
2001	Tim Giulivg	Parma	Padua Franciscan High School
2002	Darla Warnecke	Miller City	Miller City High School
2003	Peggy Sheets	Upper Arlington	Upper Arlington High School
2004	Connie Hubbard	North Canton	Hoover High School
2005	Ann Burkam	Delaware	Buckeye Valley Middle School
2006	Hans Glandorff	Bowling Green	Bowling Green High School
2007	Connie Hubbard	North Canton	Hoover High School
2008	Donna Meller	Wauseon	Pettisville Local Schools

Cumulative Record of the State of Ohio Student Presenters to the National JSHS 1966-2008

Year	Name	City	School
1966-L	Patricia Fraser	Mayfield Heights	Regina High School
1967-L	Mark Meuty	Toledo	Woodward High School
1968-L	Katharine Lowenhaupt	Cincinnati	Walnut Hills High School
1969-L	Susan Krueger	North Olmsted	Magnificant High School
1970-L	Bruce Arthur	Westerville	Westerville High School
1971-L	Robert Butcher	Wapakoneta	Wapakoneta High School
1972-L	Jon Alexander	Maumee	St. John's High School
1973-L	William Steers	Toledo	St. John's High School
1974-L	Francis Sydnor	Toledo	St. John's High School
1975-L	Jane Stoffregen	Toledo	St. Ursula Academy
1976	Harlan Krumholz	Dayton	Meadowdale High School
1977	Paul Cahill	Akron	East High School
1978	Kevin Anderson	Toledo	St. John's High School
1979-L	Eric Evans	Stow	Stow High School
1980	Carl Von Patterson	Ravenna	Ravenna High School
1981	Kelly McAleese	Medina	Black River High School
1982	Robert Sturgill	Toledo	St. John's High School
1983	Shirley Bodi	Toledo	Cardinal Stritch High School
1984	Douglas Gorman	Cincinnati	Oak Hills High School
1985	Robert Freeman	Thornville	Sheridan High School
1986	Jill Thomley	Toledo	Woodward High School
1987	Kenneth Clubok	Athens	Athens High School
1988	Ron Birnbaum	Toledo	Maumee Valley Country Day School
1989	Aaron P. Garcia	Toledo	St. John's High School
1990	Simon Solotko	Kent	Roosevelt High School
1991	Joann Elizabeth Roy	Sandusky	Perkins High School
1992	Andrew Gano	Sylvania	Sylvania Southview High School
1993	Daniel Stevenson	Hudson	Hudson High School
1994-L	Scott Damrauer	Sylvania	Sylvania Southview High School
1995	Amy Caudy	Sunbury	Big Walnut High School
1996	Paul Gemin	Dayton	Carroll High School
1997	Smita De	Cincinnati	Cincinnati Country Day School
1998	Stephanie Meyers	Cincinnati	Ursuline Academy
1999	Jason Lee Douglas	Cincinnati	Cincinnati Country Day School
2000-L	Ulyana Horodyskyj	North Royalton	Padua Franciscan High School
2001	Ulyana Horodyskyj	North Royalton	Padua Franciscan High School
2002	Ulyana Horodyskyj	North Royalton	Padua Franciscan High School
2003-L	James Zhou	Upper Arlington	Upper Arlington High School
2004	Paul Hoffman	Upper Arlington	Upper Arlington High School
2005	Paul Scheid	Gates Mills	Gilmour Academy
	Laura Johnson	Upper Arlington	Upper Arlington High School
2006	Daniel Litt	Pepper Pike	Orange High School
	Madhav Chopra	North Canton	Hoover High School
2007	Jyotiraditya Sinha	North Canton	Hoover High School
	Saumitra Thakur	Sylvania	Sylvania Southview High School
2008-L	Aaditya Shidham	Upper Arlington	Upper Arlington High School
	David Litt	Pepper Pike	Orange High School

L = Winners of National JSHS who presented papers at the London International Youth Science Fortnight (LIYSF).

Ohio JSHS Winners of Outstading Poster Presentation

Year	Name	City	School
1989	Mike Shaw	Wickliffe	Wickliffe Senior High School
1990	JoAnn Beck	Hamilton	Hamilton High School
1991	1st Michael A. Lake	Toledo	St. John's High School
	2nd Thomas J. Mills	West Liberty	West Liberty Salem High School
1992	1st Scott Damrauer	Sylvania	Sylvania Southview High School
	2nd Trista Schrickel	Carrollton	Carrollton High School
1993	1st Kristie Esterly	Sylvania	Sylvania Southview High School
	2nd Malissa Mackey	Sylvania	Sylvania Southview High School
1994	1st Sara Creque	Sylvania	Sylvania Southview High School
	2nd Sarah Bork	Sylvania	Sylvania Southview High School
1995	1st Marta Kamburowski	Sylvania	Sylvania Southview High School
	2nd Sara Creque	Sylvania	Sylvania Southview High School
	2nd Amy C. Lee	Sylvania	Sylvania Southview High School
1996	1st Carolyn Goh	Sylvania	Sylvania Southview High School
	2nd Patricia Lee	Sylvania	Sylvania Southview High School
1997	**9th/10th Grade**		
	1st Kate Jahnke	Sylvania	Sylvania Southview High School
	2nd Kristen Humbach	Cincinnati	Seven Hills Upper School
	11th/12th Grade		
	1st Evan Russell	Sylvania	Sylvania Southview High School
	2nd Luke Skidmore	Bellefontaine	Benjamin Logan High School
1998	**9th/10th Grade**		
	1st David Burgas	Sylvania	Sylvania Southview High School
	2nd Florence Loo	Sylvania	Sylvania Southview High School
	11th/12th Grade		
	1st Katie Adelsberger	Bellefontaine	Benjamin Logan High School
	2nd Evan Margelefsky	Sylvania	Sylvania Southview High School

1999	**9th/10th Grade**		
	1st Florence Loo	Sylvania	Sylvania Southview High School
	2nd Arika Kerns	Bellefontaine	Benjamin Logan High School
	11th/12th Grade		
	1st Katie Adelsberger	Bellefontaine	Benjamin Logan High School
	2nd Sumon Dantiki	Sylvania	Sylvania Southview High School
2000	**9th/10th Grade**		
	1st Erin Sauer	Cincinnati	Ursuline Academy
	2nd Ross Margelefsky	Sylvania	Sylvania Southview High School
	11th/12th Grade		
	1st Lindsey Heine	Sylvania	Sylvania Southview High School
	2nd Stephanie Meyers	Cincinnati	Ursuline Academy
2001	**9th/10th Grade**		
	1st Andrew Smith	Sylvania	Sylvania Southview High School
	2nd Ericka Johnson	Bellefontaine	Benjamin Logan High School
	11th/12th Grade		
	1st Sean Scully	Sylvania	Sylvania Southview High School
	2nd Mathew Beck	Huber Heights	Wayne High School
2002	**9th/10th Grade**		
	1st Henry Foo	Sylvania	Sylvania Southview High School
	2nd William Cheng	Sylvania	Sylvania Southview High School
	(HM) Sara Salari	Sylvania	Sylvania Southview High School
	11th/12th Grade		
	1st Ericka Johnson & Anna Stormer	Bellefontaine	Benjamin Logan High School
	2nd Laura Butz	Sylvania	Sylvania Southview High School
	(HM) Ben Hayman	Sylvania	Sylvania Southview High School
2003	**9th/10th Grade**		
	1st Jennifer Tawes	Sylvania	Sylvania Southview High School
	2nd Matt Jennings	Sylvania	Sylvania Southview High School
	(HM) Raji Reddy	Sylvania	Sylvania Southview High School
	11th/12th Grade		
	1st Sara Salari	Sylvania	Sylvania Southview High School
	2nd Ember Johns	Bellefontaine	Benjamin Logan High School
	(HM) Krystal Roop	Toledo	Woodward High School
	(HM) Ben Hayman	Sylvania	Sylvania Southview High School

2004	**9th/10th Grade**		
	1st Michael Chou	Sylvania	Sylvania Southview High School
	2nd Kim Haynam	Sylvania	Sylvania Southview High School
	(HM) Nehama Rogozen	Shaker Heights	Hathaway Brown High School
	11th/12th Grade		
	1st Matt Ricciardi	North Canton	Hoover High School
	2nd Kristen Bury	Sylvania	Sylvania Southview High School
	(HM) Dezary Reed	Bellefontaine	Benjamin Logan High School
2005	**9th/10th Grade**		
	1st Yifei Feng	Sylvania	Sylvania Southview High School
	2nd Drew Bayer	North Canton	Hoover High School
	11th/12th Grade		
	1st Siwen Dong	Sylvania	Sylvania Southview High School
	2nd Jennifer Haag	Cleveland Heights	Beaumont High School
	Poster "Best in Show" Award		
	Siwen Dong	Sylvania	Sylvania Southview High School
2006	**8th Grade**		
	1st Dustin Lewis	Delaware	Buckeye Valley Middle School
	2nd Amanda Roden	Delaware	Buckeye Valley Middle School
	(HM) Leesha Clevenger	Delaware	Buckeye Valley Middle School
	9th/10th Grade		
	1st Holly Choi	Sylvania	Sylvania Southview High School
	2nd Isabel Pereira de Almeida	Bowling Green	Bowling Green High School
	(HM) Ruth Chang	Sylvania	Sylvania Southview High School
	11th/12th Grade		
	1st Yifei Feng Sylvania	Sylvania	Sylvania Southview High School
	2nd Lindsey Jorlando	Sylvania	Sylvania Southview High School
	(HM) Jiayun Lu	Sylvania	Sylvania Southview High School
	Poster "Best in Show" Award		
	Yifei Feng	Sylvania	Sylvania Southview High School
	Siwen Dong	Sylvania	Sylvania Southview High School

2007

8th Grade

1st Nigel Wilson	Delaware	Buckeye Valley Midddle School
2nd Ellen McDermitt-Stredney	Delaware	Buckeye Valley Midddle School
(HM) Evan Long	Delaware	Buckeye Valley Midddle School

9th/10th Grade

1st Justin Yang	Sylvania	Sylvania Southview High School
2nd Ankit Prasad	Sylvania	Sylvania Southview High School

11th/12th Grade

1st Sophia Shaddy	Sylvania	Sylvania Southview High School
2nd Maya Ratnam	Sylvania	Sylvania Southview High School
(HM) Bijan Salari	Sylvania	Sylvania Southview High School

Poster "Best in Show" Award

Sophia Shaddy	Sylvania	Sylvania Southview High School

2008

8th Grade

All Eighth Grade Presenters were declared 2008 Ohio JSHS Winners.

9th/10th Grade

1st Robert Detchon	North Canton	Hoover High School
2nd Alex Lu	Sylvania	Southview High School
(HM) Greg Raber	Louisville	Louisville High School

11th/12th Grade

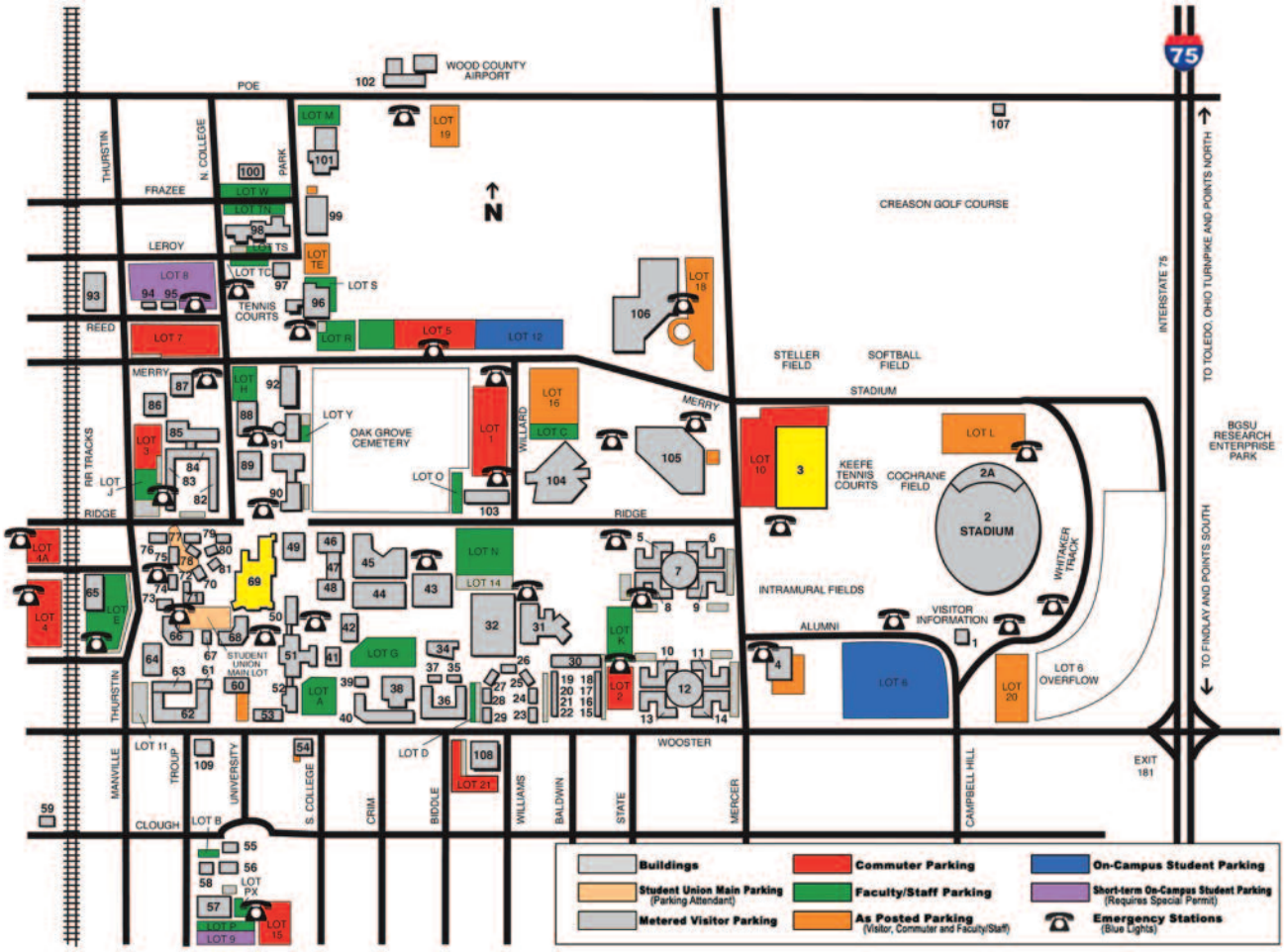
1st Ankit Prasad	Sylvania	Southview High School
2nd Angela Ou	Sylvania	Southview High School
(HM) Jeffry Karduck	Macedonia	Nordonia High School
Colten Kuney	West Unity	Hilltop High School

Poster "Best in Show" Award

Keith Hawkins	Canton	GlenOak High School

- Won the First Place Award for **Best Poster Presentation at the National JSHS**

BGSU Campus Map



Alphabetical Building Index

The 46th Annual Ohio Junior Science & Humanities Symposium

March 25-27, 2009

Sponsored by:

NWO
Northwest Ohio Center of Excellence in Science and Mathematics Education

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Center Of excellence in Science and Mathematics education: Opportunities for Success

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