



NewsLetter

The New Jersey Academy of Science

Kean University, Center for Science, Technology & Math Education
1000 Morris Ave. T-117, Union, NJ 07083

Volume 39, Number 2

Spring Issue 2007

The NJAS Mission Statement is published here. It summarizes the views of the Executive Committee and the membership and will be the general focus of NJAS for years to come. We, again, thank all members who participated in the survey last winter that has led to this statement of future mission for the NJAS. The NJAS expects that its membership will embrace these objectives in the coming years.

NEW JERSEY ACADEMY OF SCIENCE **MISSION STATEMENT**

The New Jersey Academy of Science seeks to advance science through research, education and public service, with a membership drawn from academia, industry, government and the public at large.

In order to accomplish its mission the following broad objectives have been established:

- Complement and participate in educational activities involving science and technology at all levels.
- Foster research and communication through scientific forums, mentorship and publications.
- Form collaborative relationships between scientific, educational, governmental and industrial organizations.
- Offer impartial technical expertise and advice, when possible, to institutions and organizations involved in public policy.
- Participate in and encourage workforce development and infrastructure programs in all areas of science.
- Help identify, interpret and evaluate future science disciplines, new technologies and areas of opportunities.
- Establish the organizational structure and necessary operations, which are conducive to meeting the relevant 21st century science and technology issues, in the public interest.
- Enhance the public understanding of science and promote a positive perception of scientists in New Jersey.

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NJDEP
gcartographer@yahoo.com

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Kean University
llorentzen@hotmail.com

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njacademyscience@aol.com

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Rutgers University
antoine@aesop.rutgers.edu

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Dr. Paul Benzing (2008)
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pbenzing@fd.edu

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kennish@imcs.rutgers.edu

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Dr. Stephen J. Moorman
Robert Wood Johnson Medical School
stephen.moorman@umdnj.edu

Junior Academy Director:

Dr. John Rollino
Rutgers University
jrollino@andromeda.rutgers.edu

Grant-In-Aid Chairwoman:

Dr. Takeyee Whittingham
Kean University
twhittin@kean.edu

Science Program, Annual Meeting Chairman:

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Kean University
llorentzen@hotmail.com

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Montclair University
bolognap@mail.montclair.edu

Membership/Finance:

Gail P. Carter (See President above)

Program Development Coordinator:

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Rutgers University
miller@imcs.rutgers.edu

High School Liason:

Dr. Graham Cleaves
Ridge High School

Web Manager:

Dr. Louise Wootton
Georgian Court University
woottonl@georgian.edu

Office Manager:

Sabera M. Munshi
njacadsc@rci.rutgers.edu
Office: NJAS, Rutgers University
Beck Hall, Room 215
99 Avenue E, Piscataway, NJ 08854-8040
Phone / Fax: 732-463-0511
njacadsc@rci.rutgers.edu
<http://www.njas.org>

AmJAS 2007 - One NJ school's perspective

Michael T. Roche

High Technology High School, Monmouth County Vocational School District

Despite the complications involved with traveling to Newark Liberty International Airport on the morning of the 2007 Valentine's Day ice storm, a number of High Technology High School students were able to fly to the AmJAS/AAAS annual meeting in San Francisco this past February. HTHS students Kevin Hou, Amanda Ng, Chris Piccoli, Franz Sauer and Brian Shell share some of their highlights in the following quotes:

"In addition to loving the weather, I greatly enjoyed that fact that I was able to convene with various kids from all over the country that shared a common interest. I also valued the advice from the scientists and researchers present on the AAAS convention floor. Overall, it was an amazing experience."

-Chris

"I really appreciated the feedback that I got from professionals during the poster session. Their suggestions have proven valuable as I presented the second phase of my research this spring. The ability to visit the expo floor and attend AAAS sessions was a great experience as well."

-Brian

"AmJAS held a great conference, but the students and scientists who attended made the trip incredible."

-Amanda

"AmJAS gave me an opportunity to visit Berkeley Labs and to see first hand the cyclotron (simply amazing!!!). Also visiting the exhibition floor of the conference allowed me to talk to scientists from all over the world and to gather information about science journals and organizations. It was an unforgettable experience, the



Chris, Kevin, Andrew and Franz (from left to right) were proud to take on the role of Jersey Boys at the San Francisco gathering of the American Junior Academy of Science.

tours, the meetings, the dances, and the fun shared with my fellow students.”

-Franz

“I highly enjoyed going to fisherman's wharf, but my favorite event was the Berkeley lab tour, because I met a lot of interesting people. The professionals that they arranged to speak to us were all absolutely brilliant....so many Nobel laureates... Quite an experience.”

-Kevin

From a faculty perspective, having attended a number of prior AmJAS gatherings, I'd like to suggest that fellow high school science teachers / research advisors consider encouraging their students to elect to participate in the new presentation option. A “*Creativity and Innovation*” format was available for

students this year, as opposed to the traditional formal PowerPoint based presentation. Delegates were strictly limited to a few slides that featured their work/research environment, their most significant results, the question they wanted to address (in not more than 20 words), and what they learned (again, with a 20 word limit). Sitting in on the organized roundtable discussions, I witnessed how the format allowed for students to share perspectives, not only about their research findings, but also about how their project changed their thinking about science and the process of science. The interactions and dialogs that took place were a most noteworthy and valued enhancement from gatherings of past years.

52ND ANNUAL MEETING

The 52nd Annual Meeting of the Junior and Senior Academies of the New Jersey Academy of Science was held on April 21, 2007 at Kean University.

KEYNOTE ADDRESS - DARREN HALINIEWSKI, M.S.

"Bringing Them Home: The Armed Forces DNA Identification Laboratory"

The Armed Forces DNA Identification Laboratory (AFDIL), located in Rockville, MD, was created in 1991 to assist in providing the fullest possible accounting for missing U.S. service members. AFDIL's role in this vital mission consists primarily of the use of DNA analysis for the identification of the recovered remains of American soldiers. Analysis by the nuclear DNA section (nucDNA) of AFDIL plays an important role in the identification of the remains of military personnel lost in Operation Iraqi Freedom and Operation Enduring Freedom, especially in situations where identification by fingerprints and/or dental records is not possible. The mitochondrial DNA (mtDNA) section of AFDIL works closely with anthropologists at the Joint POW/MIA Accounting Command- Central Identification Laboratory (JPAC-CIL) to identify the repatriated remains of service members lost in previous conflicts around the world, primarily Vietnam, Korea and WWII. AFDIL has become a global leader in the identification of human remains, processing approximately 800 degraded skeletal samples annually in addition to providing support to the

Armed Forces Medical Examiner System in our current engagements. Our goal, along with those who share our mission, is to never have another American soldier buried as an unknown, and to return to their families the remains of those who have made the ultimate sacrifice for their country.

Darren Haliniewski grew up in Union, NJ and is a graduate of Union High School. He received his degree in Biology from the University of Miami in Coral Gables, FL before returning to NJ. As a research scientist at the Schering-Plough Research Institute, Darren contributed to research focused on the discovery of new drugs for the treatment of Hepatitis C. During this time, Darren also continued his education at Kean University and received a Masters degree in Biotechnology. This degree enabled Darren to pursue his ongoing interest in forensic science and accept a position as a DNA Technician at the Armed Forces DNA Identification Laboratory (AFDIL) in Rockville, MD. Currently a DNA Analyst at AFDIL, Darren works to identify the remains of soldiers lost primarily in WWII and the Korean and Vietnam wars and return them to their families.

2007 NJAS JUNIOR ACADEMY OUTSTANDING RESEARCH PRESENTATION AWARDS:

Laura Toth, John F. Kennedy Memorial High School, Iselin, NJ. \$50 Award for her Presentation in Cell Biology.
Jeffery A. Hart, High Technology High School, Lincroft, NJ. \$50 Award for his Presentation in Chemistry.

The following are the abstracts for the award-winning oral presentations given by members of the Junior Academy at the Annual Meeting

ANIMAL BEHAVIOR

THE EFFECT OF NUMBER OF TANK COMPANIONS ON THE SCHOOLING BEHAVIOR OF ZEBRAFISH (*Danio rerio*)

Katy Dynarski (student), High Technology High School

It is known that many types fish live and travel together in large groups called schools. The purpose of this experiment was to determine whether this impulse to swim near other fish is an instinctive behavior or a behavior that is learned from being housed with companions. Thirty Zebrafish (*Danio rerio*) were housed in groups of ten, groups of five, and in solitary tanks. After three weeks of living under these conditions, the schooling behavior of the fish was tested. For the purpose of this project, schooling behavior was defined as the percent of time the fish being tested spent on the side of the testing tank containing another fish in a beaker. There were three research hypotheses: that there would be a significant difference between the schooling behavior of fish raised alone and fish raised in groups of five, that there would be a significant difference between fish raised alone and fish raised in groups of ten, and that there would be significant difference between fish raised in groups of five and fish raised in groups of ten. The null hypotheses stated that there would not be any significant differences. Statistical analysis of the data using an independent two-tailed t-test resulted in a p-value of 0.006 for the second research hypothesis. Using an alpha value of 0.05, the research hypothesis that there was a significant difference in the schooling behavior of fish raised alone and fish raised in groups of ten was supported and the null hypothesis was rejected. The data did not support that there was a significant difference between the schooling behavior of fish raised alone and fish raised in groups of five or a significant difference between the schooling behavior of fish raised in groups of five and fish raised in groups of ten.

BOTANY (3 SESSIONS SO 3 WINNERS)

STRESS TOLERANCE LEVELS OF PLANTS TREATED WITH ACETYLSALICYLIC ACID (ASPIRIN)

Aisha Hasan (student), John F. Kennedy Memorial High School

Plants generally have a low tolerance of stress. Stress in plants, is an environmental condition that

has a profound effect on a plant's growth, reproduction, and survival. Stress tolerance levels are the levels at which these stresses are bearable. Previous studies conducted with acetyl-salicylic acid (aspirin) have found that aspirin increases heat tolerance in bean and tomato plants. It was hypothesized that sweet potatoes will exhibit increased stress tolerance when exposed to different stresses after being treated with aqueous solutions of acetyl-salicylic acid. The most tolerance will be exhibited by those that are treated with the aspirin directly after being planted. Three different groups were created, a control group, and two experimental groups. The control group wasn't treated with the acetyl-salicylic acid but was exposed to the stresses. One of the experimental groups was treated with acetyl-salicylic acid as soon as it was planted and then exposed to the stresses. The other experimental group was treated with aspirin one week after planting, and then it was exposed to stresses. It was expected that the plants that were treated with the aspirin upon planting exhibited better tolerance to stresses than the plants that were treated with the aspirin upon the onset of the emergence of a stem and the control group. A t-test was conducted to calculate statistical significance. Aspirin can be used as an essential tool when growing seasonal plants, out of season.

THE EFFECT OF GREEN TEA EXTRACT ON SUNFLOWER LEAVES INDUCED WITH *Alternaria alternata*

Charmi Shah (student), Kathleen Piccinich, John F. Kennedy Memorial High School

The purpose of the experiment was to observe the effect of Green Tea Extract on Sunflower Leaves induced with *Alternaria alternata*. Green Tea is an antibacterial and a cancer prevention agent; contains Epigallocatechin gallate, which suppresses cancer cell production, deactivating the nuclear transcription factor- κ B (NF- κ B). Tea polyphenols have the potential to interrupt the cell cycle of damaged cells in humans and plants, suppressing damaged cell production. *Alternaria alternata* is a fungus, which produces and releases mycotoxins on plants, such as sunflowers. *A. alternata*'s tumorigenicity was found in an area with high incidence of esophageal cancer. Moreover, an over expression of cyclooxygenase-2 (Cox-2) exerts anti-apoptotic effects in esophageal cancer. Decrease in NF- κ B cells prevents its

interaction with Cox-2 promoter, increasing apoptosis (Benoit and et al., 2006). 20 sunflower seeds were planted and grown for three weeks; control consisted of sunflowers that were sprayed with distilled water, while experimental consisted of plants sprayed with 10% green tea extract. Sunflower leaves were then infected with *A. alternata*. To evaluate the effect of Green Tea Extract, the growth of *Alternaria alternata* was analyzed. Data indicated that Green Tea Extract suppressed the growth of *Alternaria alternata* on Sunflower Leaves; thus, beneficial in suppressing esophageal cancer.

THE EFFECT OF VARIOUS AMOUNTS OF BORON ON SUNFLOWER PLANTS

Amtul Mansoor (student), John F. Kennedy Memorial High School

Boron is, of all micronutrients, the least understood. Boron is neither an enzyme component nor does it affect enzyme activities in the plant. Boron plays a huge role in the building of cell wall structure. In the absence of external Boron, the plant may have abnormal swelling in the tip region and even cell wall structure. It was hypothesized that the plants with the medium amount of boron would have the most functioning cell wall in the leaves and stems rather than the plants that were given small or large amount of boron. The population of sunflower plants were given the three different amounts of boron and the control was only given distilled water. Data was collected and analyzed using ANOVA. Preliminary results suggest that the plant with the medium amount of boron would have the most functioning and structured cell walls.

CELL BIOLOGY

(also winner of the NJAS Most Outstanding Junior Academy Oral Presentation)

MUTANTS OF THE INSULIN-LIKE SIGNALING PATHWAY OF *C. elegans* EXHIBIT INCREASED SUSCEPTIBILITY TO THE PATHOGEN *A. faecalis*

Laura Toth (student), John F. Kennedy Memorial High School

The nematode *Caenorhabditis elegans* has different metabolic pathways that affect lifespan. The most prominent pathway is the insulin-like signaling pathway (ILSP), also called the DAF-2/IGF-1 pathway, which has its counterpart in humans and has been known to mediate lifespan, tissue deterioration, and metabolism. Mutants of *C. elegans* in both upstream and downstream parts of the ILSP were exposed to the opportunistic pathogen

A. faecalis as a food source and lifespan was measured. The mutants upstream in the ILSP [*age-1(hx546)*, *daf-2(e1370)*, and *daf-28(sa191)*], which have increased lifespans presumably through decreased insulin-like signaling, had a severely reduced lifespan compared to the wild type. Mutants downstream in the ILSP [*akt-1(mg144)*, *pdk-1(mg142)*, and *daf-18(e1375)*], which have increased insulin-like signaling and decreased lifespans, also displayed a reduced lifespan; however, the effect was not as severe when compared to the upstream mutants. These results suggest that growth on *A. faecalis* altered insulin-like signaling and nematode lifespan. An unlinked recessive suppressor mutant was isolated that reversed the “*A. faecalis* effect” on the *age-1(hx546)* mutant by increasing median lifespan by 2-fold. Investigating genes that alter this “*A. faecalis* effect” may provide insights into the treatment of human pathologies such as diabetes and obesity.

CHEMISTRY

THE EFFECT OF ELECTRODE MATERIAL ON HYDROGEN YIELD IN ELECTROLYSIS

Jeffrey A. Hart (student), High Technology High School

This experiment was designed to explore the efficiency of certain electrode materials in their production of hydrogen, a promising alternative fuel, via electrolysis of water. It was hypothesized that there would be a significant difference in the volume of hydrogen produced when using flexible graphite electrodes versus copper electrodes. To test this claim, the hydrogen yield of copper and flexible graphite electrodes under identical conditions was measured and compared. Hydrogen was collected in pipettes while the electrolytic process was running. It was then measured by volume after a one hour period. A t-test was used to analyze the data that was collected. The p-value acquired from the t-test was then compared to an alpha level of 0.05 to determine the data's significance. The data collected from these trials produced a p-value of 0.033886. This p-value demonstrated that there was a significant difference between the volume of hydrogen produced by copper electrodes and flexible graphite electrodes.

COMPUTER SCIENCE

THE EFFECT OF ANISOTROPIC DIFFUSION AND GVF SNAKE MODEL ON ACCURACY, CLARITY, AND NOISE REDUCTION OF X-RAYS

Chintan Rajput (student), Michael J. Corcoran, Science Department, Dickinson High School

The purpose of this experiment was to develop a new method of enhancing x-rays to increase the accuracy of skeletal age estimation. The proposed method of using anisotropic diffusion and GVF snake models to improve x-ray quality is tested. GVF snake and anisotropic diffusion was applied to twenty x-rays (ages 9-12) each with 20 iterations each with a threshold of 1.5. They were then scored on a scale (1-5) based on their final outcome after the effects of the appropriate image enhancing application. They were scored on accuracy, clarity and noise reduction. The Raw x-rays group had an overall score of 1, anisotropic diffusion group had an overall score of 1.5, and the GVF group received a score of 2. The group that was influenced by both methods received a score of 4. The resulting scores from all criteria showed that Applying anisotropic diffusion and GVF snake models had an impact on skeletal age estimation as the enhanced x-rays was easier to read and interpret, regardless of the skeletal age estimation method used (TW2 or GP).

ENGINEERING

TOWARDS MAKING THE SMALLEST TOOL MACHINE FOR NANOTECHNOLOGY: ENGINEERING AN ABERRATION CORRECTOR FOR FOCUSED ION BEAM (FIB) MICROSCOPES
Franz Sauer (student), High Technology High School

A corrector was designed to reduce spherical aberration in FIB microscopes by condensing the ion beam with a positively charged funnel shaped cylinder before entering the final objective lens. It was hypothesized that spherical aberration in FIB microscopes can be significantly reduced by placing a beam-condensing device before the final lens. The effects of the corrector were studied on a realistic FIB scenario. The 3D simulation program SIMION was used to simulate ion trajectories and qualitatively confirm spherical aberration reduction. The data showed that reducing beam size by $\frac{1}{2}$ would result in a minimum waist radius $\frac{1}{10}$ its normal size (reduced by 90%), and a reduction by $\frac{3}{4}$ would result in $\frac{1}{100}$ its normal size (reduced by 99%). Spherical aberration reduction within the corrector and its optimum shape was further determined mathematically by balancing the force magnitudes and directions of ions passing through at various radii. A funnel shaped design with a funnel angle of 45° produces the best paths for the ions passing through the corrector. The null hypothesis was rejected and the research hypothesis was supported.

This corrector can significantly reduce the size of the ion beam "tool tip" and greatly improve microscope imaging capabilities for nanotechnology.

ENVIRONMENTAL OR MARINE SCIENCE

(2 SESSIONS SO 2 WINNERS)

THE PHYTOACCUMULATION OF CHROMIUM BY COMMON WETLAND PLANTS

Manthan Pandya (student), Laura Pannaman, Biology Department, NJCU

The objective of this study was to determine which plant species (Narrow-leaved Cattails, River Bulrush and Pickerelweed) phytoaccumulates the most chromium at two different concentrations (10mg/l and 20mg/l). Eight containers were filled with gravel and water. In six containers, six plants of each species were placed (3 plants per container). The two remaining containers were left as control with no plants in them. In 4 containers, 0.0960g of chrome alum (10mg/l chromium) was added. Samples of water were taken every 2 hrs for 8 hrs and a final sample of water was taken after 24 hrs of experimentation. Also, after 24 hrs of experimentation, plant samples and gravel samples were taken. The water, plant and gravel samples were then tested under Atomic Absorption Spectrophotometer to determine chromium concentrations in them. The same procedure was then repeated with the 4 remaining containers where 0.192g (20mg/l chromium) chrome alum was added. The results suggested that among the different species of plant, Narrow-leaved Cattails performed the best. In the Narrow-leaved Cattails system, 0.6mg/l chromium (10mg/l initial concentration) and 1.2 mg/l chromium (20mg/l initial concentration) was left in the water. In conclusion, Narrow-leaved Cattails must be used in constructed wetlands to phytoaccumulate chromium.

ENHANCING BIOREMEDIATION OF CONTAMINATED SEDIMENTS

Brian Shell (student), High Technology High School

The primary objective of this study was to determine the feasibility of various bioremediation enhancing agents to increase the rate of organic pollutant degradation. It was hypothesized that there would not be a significant increase in degradation rate when a bioremediation enhancer is used. Sediment samples, obtained from Kearny Marsh, exhibit historical polychlorinated biphenyl (PCB) contamination. Microcosms were constructed to test the effectiveness of bioremediation enhancers on the contaminated sediments. The two enhancers were

S200 and sunflower oil. S200 is thought to accelerate the rate at which natural microbial biodegradation occurs through nutrient augmentation. Sunflower oil is part of a novel method to potentially increase the rate of degradation using a “sorption-desorption” method. Three control groups were utilized in this study. In addition to a sterile control, a natural control was used to simulate existing environmental conditions by using non-enhanced sediments. The positive control is a repeat of a study conducted by the researcher on earlier samples to prove that the pollutant degrading microbes observed still exist in Kearny Marsh. Sets of microcosms from each level were frozen at several time intervals. The rate of degradation of the microcosms was analyzed using gas chromatography-mass spectroscopy with internal and external standards. There was not a statistically significant difference ($p = 0.1661$, $\alpha = 0.05$) when comparing the sunflower oil to the natural control. It was found that there was a statistically significant ($p = 0.01850$, $\alpha = 0.05$) difference in rate of bioremediation when the commercial enhancing product was used. However, this is actually revealing significant detrimental effect on natural bioremediation. Commercial bioremediation enhancing products are not effective in increasing the rate of PAH degradation when compared to the natural means that are already active in the environments.

MATH OR PHYSICS

THE EFFECT OF SPEED AND A FRACTAL ESTIMATE OF WRINKLINESS ON THE DETERMINATION OF HANDWRITING FORGERY

Ahmar Hashmi (student), Michael Corcoran, Science Research Department, William L. Dickinson High School

Handwriting experts are frequently required to distinguish between authentic and forged signatures. In this study an objective system to identify handwriting forgeries is being created comprising of two determinants, speed and wrinkliness. A forger carefully copies and traces an authentic writing sample to create an acceptable imitation. This justifies the hypothesis; the time needed to forge a signature will be significantly greater than the time needed to create an authentic signature. Forgers produce writing samples where the writing is less smooth and more jagged. The second hypothesis states forgeries will have significantly greater wrinkliness than authentic handwriting samples. Twenty volunteers participated in this experiment in

which they were required to provide their authentic signatures as well as to forge a writing sample different from their own. The time needed to create the authentic signatures and forgeries was recorded. The writing samples were scanned at two different resolutions (300 DPI and 600 DPI) and the pixel count on the boundary of the handwriting was recorded. This number was entered in a formula, to find the wrinkliness value. After performing statistical tests the data obtained from this experiment supported both hypotheses and confirmed it was possible to determine forgeries from scanned documents.

MICROBIOLOGY (2 SESSIONS SO 2 WINNERS)

BIODELIGNIFICATION OF BIOMASS FOR APPLICATION IN BIOENERGY AND BIOFUELS GENERATION

Ashton Gooding (student), High Technology High School

This experiment was designed to screen selected fungi for their ability to secrete enzymes needed for degrading the biopolymers in biomass and make them amenable to further processing into bio-fuels and bio-energy. Selected fungi *Grifola frondosa*, *G. umbellate*, and *Polyporous squamosus* (strains 1165 and 456) were tested to determine lignocellulose degrading enzyme production and amount of organic matter loss over a period of 60 days. Dye decolorization, which involves cultivation of selected fungi on agar plates impregnated with bromophenol blue and congo red dyes indicated that the selected fungi produced lignin degrading enzymes. Solid state fermentation (SSF) of wheat straw followed by assay for lignin, hemicellulose and cellulose degrading enzymes showed positive correlation between enzyme activities and loss of organic matter (LOM). The best performing fungi was *Polyporous squamosus* strain 1165, followed by strain 456, causing 36 and 34% LOM respectively. Continued research will examine the optimal conditions for SSF that will further enhance enzyme production and the biodegradation of waste paper into starter material for processing into bio-energy.

THE ROLE OF *OCIMUM SANCTUM* EXTRACT AS A NATURAL PRESERVATIVE

Manalika Ringshia

Ocimum sanctum, also known as Holy Basil or Tulsi, is an herb that is used in Ayurvedic Medicine for curing and preventing diseases ranging from digestive problems to cancer. Recently, studies have shown that *Ocimum sanctum* also has an anti-fungal

property. This study was conducted to determine a possible role of *Ocimum sanctum* as a natural food preservative. Two batches of bread were made: the experimental set contained the herb extract while the control set didn't. Mold was allowed to grow undisturbed for three weeks, after which the growth of the fungi on the breads was measured. The mean of the control group was 22.20 cm² while the mean of the experimental group was 6.50 cm². The P value was 0.0001, thus determining that the results were extremely statistically significant. They supported the hypothesis with a 95% confidence level. Therefore, *Ocimum sanctum* was proven to be a potent natural preservative that can possibly replace the harmful chemical additives used in manufactured foods today. Not only will this alternative be cheaper for the manufacturers, but the additional healthy qualities of the herb present in almost all processed foods might possibly add to the general wholesomeness of the consumers.

PHYSIOLOGY CORRELATION BETWEEN ADOLESCENT FLEXIBILITY LEVELS AND BODY MASS INDEX

Anthony Bakshi (student) High Technology High School

The purpose of the project was to determine if there is any correlation between flexibility levels and BMI ratings of high school students. The hypothesis stated that there is a correlation between a person's BMI and his or her flexibility level. Thirty-two human subjects were tested for this project. Height and weight measurements were recorded for all subjects, and were then used to calculate the BMI of each. The "Sit and Reach test", a common assessment of flexibility, was administered to obtain flexibility levels. A best-fit line was plotted to determine the correlation coefficient of the collected data. The value of the correlation coefficient was approximately 0.15. This coefficient result does not support the original hypothesis; the data supports the claim that there appears to be little correlation between BMI and flexibility levels among adolescents. Additionally, a t-test ($p = 0.3691$ at $\alpha = 0.05$) supports the claim that there is no significant difference between the flexibility test results of subjects with high BMI and ideal BMI levels. A second t-test ($p = 0.0789$ at $\alpha = 0.05$) supports the claim that there is no significant difference between the flexibility test results of male and female subjects. The results of this project bring about the possibility of further studies. Extracurricular activities, such as

participation in athletics, might affect flexibility levels of subjects more than their BMI rating. The project's conclusion could also lead to future findings regarding correlation between BMI and other physical tasks.

PSYCHOLOGY (2 SESSIONS SO 2 WINNERS) THE EFFECT OF VIDEO GAME PLAYING ON VISUAL ATTENTION SKILLS

Steven Castellano (student), High Technology High School

Video games are growing in popularity in modern society, and there is an increasing need to understand the potential damage or benefits that result from this leisure. In particular, it is advantageous to consider how they may affect the visual attention skills of teenagers because teenagers depend on visual attention skills as their brains develop during puberty. The objective of this experiment was to determine if there was a significant difference between the visual attention skills of teenage video game players and teenage non-video game players from scores on an enumeration task. Enumeration tasks are used to determine the number of a certain object that a subject can identify rapidly. In this case, one to ten white squares were flashed in a random order on a black computer monitor. Each of the ten flashes was followed by a ten second pause, during which the twelve video game players and twelve non-video game players recorded the number of squares that they saw. The mean scores of the video game players (9.0) and the non-video game players (7.5) were significantly different based on statistics utilizing a two-tailed, unpaired t-test ($p = 0.005$, $\alpha = 0.05$). These results supported the research hypothesis.

THE EFFECT OF THE REPRODUCTIVE STATUS OF ADULT FEMALE MICE ON COGNITIVE AND BEHAVIORAL PERFORMANCE DURING THE POSTPARTUM WEEKS

Sonika Tyagi (student), Michael Corcoran, Science Department, William Dickinson High School

This project sought to ascertain whether significant differences in cognitive and behavioral performances exist between primiparous and virgin female domestic mice during the late postpartum weeks. The 1st experiment initiated on postpartum day 4 and tested reference memory after time intervals, through an object recognition task. Testing on reference memory of late postpartum weeks began on postpartum day 38 as the mice recollected the locations of baits during 4 perceptual stimuli-specific

test phases. From postpartum days 69-78, reference and working memories were tested compositely as errors made in retrieving baits from the 10-arm radial maze were recorded. Boldness was assessed using the fear-evoking open arms of the elevated plus maze from postpartum days 79-88. The null hypotheses for all experiments were rejected through t-Tests. The primiparous mice displayed enhanced reference and working memories and more boldness in the late postpartum weeks, suggesting that primiparity and its effects on cognition are long-lasting, and contributing to the improved quality of care portrayed by nonhuman mammalian mothers towards subsequent offspring. Fluctuating reproductive hormones of postpartum are noted to enlarge neuronal cell bodies, and encourage synapse formation in brain regions involved in maternal responses. Offspring are factors also responsible for reinforcing maternal behavior.

2006 ANNUAL MEETING SENIOR ACADEMY AWARDS

Best Graduate/Undergraduate Oral Presentation in Biology/Biochemistry Awarded to Jonelle Coleman, Graduate Student, Advisor Dr. Daniel Shain, Department of Biology, Rutgers University, Camden.

Best Graduate/Undergraduate Oral Presentation in Marine Science Awarded to Taryn Townsend, Undergraduate Student, Advisor Dr. Paul Bologna, Department of Biology and Molecular Biology, Montclair State University, Montclair.

Best Graduate/Undergraduate Oral Presentation in Microbiology Awarded to Rushil Kalola and J. A. Riley, Undergraduate Students, Advisor Dr. William Saidel, Department of Biology, Rutgers University, Camden.

Best NJAS Overall Graduate Oral Presentation Awarded to Arigil Biswas, Advisor Dr. Joseph Martin, Department of Biology, Rutgers University, Camden.

Best NJAS Overall Undergraduate Oral Presentation Awarded to Rushil Kalola and J. A. Riley, Advisor Dr. William Saidel, Department of Biology, Rutgers University, Camden.

Nominated for AAAS Award for Best Overall Graduate Presentation was Arigil Biswas, Rutgers University, Camden.

Nominated for AAAS Award for Best overall Undergraduate Presentation was Rushil Kalola and J. A. Riley, Rutgers University, Camden.

2007 ANNUAL MEETING SENIOR ACADEMY AWARDS

NJAS Most Outstanding Research Presentation Award:

Eric B. Rosenzweig, Montclair State University, Biology Department, Montclair, NJ. \$100 Award.

AAAS Outstanding Undergraduate Research Presentation Award:

Jonathan Robinson, New Jersey Center for Science & Technology Education, Kean University, Union, NJ. One-year Student Membership in AAAS.

AAAS Outstanding Graduate Research Presentation Award:

Eric B. Rosenzweig, Montclair State University, Biology Department, Montclair, NJ. One-year Student Membership in AAAS.

2006 EXECUTIVE COMMITTEE ELECTION RESULTS

Dr. Laura Lorentzen, President Elect for 2-year term

Dr. Paul Benzing, Secretary for 2-year term

Dr. Paul Bologna, Member-at-Large for 1-year term

NJAS SECRETARY

The NJAS Executive committee is soliciting nominations for the position of NJAS Secretary. Nominations should be sent to Gail P. Carter, NJAS President at gcartographer@yahoo.com or to the NJAS directly at Kean University, CSTME, Townsend Hall, T117, 1000 Morris Ave, Union, NJ 07083

THE BULLETIN: CALL FOR MANUSCRIPTS

Individuals seeking publication of their work are urged to consider submitting their manuscripts to *The Bulletin*, The peer-reviewed journal of the New Jersey Academy of Science. We are currently on a twice-yearly publication schedule, which consists of a spring and a fall issue.

Original papers and reviews in any field of science are considered for publication. Manuscripts should be submitted to Dr. Michael Kennish, Editor, Institute for Marine & Coastal Sciences, Rutgers University, 71 Dudley Rd. New Brunswick, NJ 08901. Instructions for contributors are printed on the inside back cover of each issue of *The Bulletin* and are now available on the NJAS website (www.NJAS.org), in the Bulletin section. Anyone having questions about the review and/or publication process should contact the editor at (732) 932-6555, ext. 240 or kennish@imcs.rutgers.edu.

NEEDED: NJAS EXECUTIVE SECRETARY

NJAS is recruiting a new Executive Secretary. For responsibilities of the position contact Dr. Alan D. Antoine, NJAS Executive Secretary at antoine@AESOP.Rutgers.edu

If interested in the position, contact the NJAS at: 732-463-0511 or njacadsc@rci.rutgers.edu

NEEDED: SCIENCE FOR BREAKFAST COORDINATOR

NJAS is recruiting a new coordinator for the Science For Breakfast Program. For responsibilities of the position contact Gail Carter, NJAS President, gcartographer@yahoo.com

If interested in the position, contact the NJAS at: 732-463-0511 or njacadsc@rci.rutgers.edu

NJAS, Rutgers University
Beck Hall, Room 215
99 Avenue E
Piscataway, NJ 08854-8040