

- Nanoscience Laboratory
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Welcome Note from the Chair

It is again my pleasure to share with you the excitement of last year's activities in the Department of Physics and Astronomy. We have added Dr. Sanju Gupta to the faculty this year; she brings a wealth of experience in the condensed matter, materials science areas with the development of a new nanoscience laboratory. We have seen a growth in the Hardin Planetarium, an expansion at the Applied Physics Institute, and a focused ion beam facility added to the Nova Center. During the Fall 2013 semester we hosted the special joint meeting of the South East Section of the American Physical Society with the National Society of Black Physicists. This event attracted several hundred scientists to the area to share with us the excitement of their research and new developments from their students. The Depart-

ment of Physics and Astronomy had over 20 presentations and posters and Ogden College of Science and Engineering had research contributions from Chemistry, Computer Science, Engineering, Biology, Architecture and Manufacturing Sciences, and Geology as well

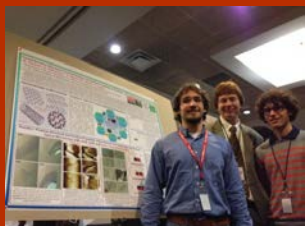


Dr. Keith Andrew, Department Head of Physics and Astronomy

as our new college department of Psychological Sciences. There is considerable change on campus this year with the closing of the Thompson Complex North Wing. An interview with emeritus professor Dr. Doug Humphrey helped us to fill in some of the lost history from the time

when we were in the building— if you have any recollections or insights from that era we could certainly improve our records from those early days. The department was located there from about 1960-1972 before moving in to the Central Wing facility. The current plan is to have the North Wing demolished. After a renovation of the Central Wing along with Hardin Planetarium will be completed, the Central Wing will receive addition to its north side. Our students continue to excel and produce exciting results in teaching, research, and numerous learning activities. A record number of high school students were here for the Physics Olympics— over 100, and we are seeing our seniors leave with graduate school and job offers. Take a minute to visit with us or just say hello, it is always good to

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Undergraduate Physics majors and Gatton Academy Sr. students presenting at the 80th Annual SESAPS 13 Meeting. L to R: Maxwell Dierken, Eli Heintzman, Harry Heyworth.



Students' active participate at SESAPS'13 while they explain their poster to the Conference Chair and poster judge.



Dr. Gupta with students at the poster session during the SESAPS'13 meeting at WKU.

Nanoscience and Nanotechnology at WKU

The WKU Physics and Astronomy department continued to expand their activity in the area of materials science with an emphasis on nanoscience and nanotechnology through research at home and active collaborations abroad. In addition to her own research, Dr. Sanju Gupta, a new

faculty member, enjoys actively involving undergraduate students and mentoring them in hands-on experiments by conducting state-of-the-art research on novel advanced multifunctional nanoscale carbon-based materials. She is also mentoring a Gatton Academy senior high school stu-

dent who is interested in nanocomposite materials for aerospace applications. The students' active participation at the 80th Annual Meeting of the Southeastern Section of the American Physical Society meeting hosted by Western Kentucky University, November 20-23, Bowling Green,

Nano-materials Lab Expanding Raman Spectroscopy and Graphene

Kentucky, is one of the examples. Dr. Gupta's students presented a poster entitled "Comprehensive structural characterization and surface properties of graphene – 21st Century wonder material", under her supervision where each of the students played a role to characterize this revolutionary low-dimensional carbon (2D graphene) material with state-of-the-art complementary analytical characterization tools including optical

and electron microscopy, atomic force microscopy and Raman spectroscopy. This regional scientific conference activity participation brought them an excitement and a great experience in the real-world while communicating with other participants. While she continued to build her laboratory focused on a gamut of nanoscale materials for a range of technologies, there will be many more

presentations yet to come in near future. The department expects to expand its curriculum and research offerings in the materials area over the next few years to include undergraduate and graduate areas of study. For details, please contact Dr. Sanju Gupta at sanju.gupta@wku.edu

Developing of Radioisotopic Battery Leads to Business Effort

Within the last two academic years, Dr. Eric Steinfelds has been a visiting assistant professor and a research professor at the Department of Physics and Astronomy. His background includes nuclear physics, nuclear engineering, computational physics, phenomenology in elementary particle physics, and expert solving of the Maxwell-Boltzmann transport equation. He has publications on radioisotopic batteries, computational methods in physics, computations in sub-

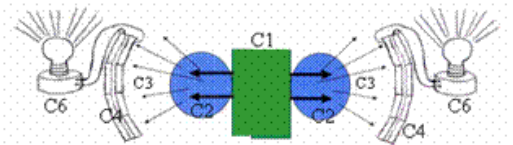
atomic physics, and is currently working on at developing novel radioisotopic batteries using the unexplored isotopes of Sm. In the October of 2013, he gave a colloquium on radioisotopic batteries in the Dept. of Physics and Astronomy titled: "Nuclear Batteries at the Small and Intermediate Scales, beyond RTG's and Sensitive Betavoltaics." In the capacity of research professor and in collaboration with other professors, he has been pursuing governmental grants on radioisotopic batteries.

Part of this work has been with Electronic Warfare Associates and the Army Research Laboratory where sustainable long term energy sources are of great interest. Dr. Steinfelds has also been involved in a novel transport equation solution. He has been refining a transport method applicable to radiation shielding in which radiation physicists can potentially use for large scale shielding problems.



A safe sustainable energy source that can be scaled to 250 microns.

This battery will run for over 30 years

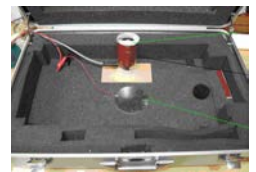


The schematic above shows the basic design of a radioisotopic battery. In figure we see components of a typical betavoltaic cell being tested as a stand alone battery. The battery contains following elements:

- **C1:** a radioisotope source;
- **C2:** a mediating fluorescent gas or phosphorant which readily absorb energy from

- the beta or alpha particles and subsequently emits UV or "green" photons;
- **C3:** visibly transparent layer to stop beta particles; e.g. glass or fused quartz;
- **C4:** photovoltaic cells to convert the UV or "green" photons into electrical energy seen at C(6).

- **C6:** electrical circuitry, also including power load;
- a layer of shielding is not shown in the figure.



Experimental test bed for the radioisotopic battery.

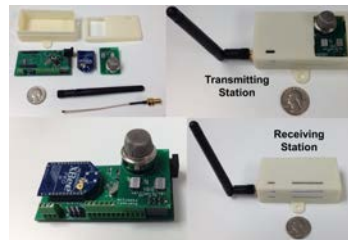
API Research Update: Dr. Dobrokhotov

The research group of Dr. Dobrokhotov from the Applied Physics Institute (API) received two awards from Northeast Gas Association (NGA) and Halton Group in total amount of \$1.5 million. The API is working with NGA on the development of novel integrated nano-sensors for analysis of chemical compounds in natural gas applications and with Halton Group

on development of an intelligent sensor for detection of gaseous analyses for commercial kitchens. The API is pleased to announce a new staff member Adam Emberton.

Developed at the API wireless artificial olfactory system is shown in figure on the right. The module is designed to recognize the signatures of hazardous gases and measure their concentrations in the ambient air. This is

the first of a kind commercializable device that combines the recent advancements of nanotechnology, artificial intelligence and wireless data transmission.



Dr. Vladimir Dobrokhotov, director of the API.

Institute for Astrophysics and Space Science Faculty, Student and Alumni Shine at the AAS Meeting



Orion rising over Bell
Astrophysical Observ-
atory

*Dr. McGruder
organized a
special session on
the development
of Astronomy
Across Africa.*

The astronomy faculty, students and alumni were heavily engaged at the 223rd meeting of the American Astronomical Society in Washington DC, January 5-9, 2014. They presented results of their research efforts, engaged in research meetings, and helped organize special sessions at the meeting. The department of Physics and Astronomy, the Institute for Astrophysics and Space Science, the Gatton Academy and external research grants all helped fund faculty and student travel to the meeting.

Dr. Charles H. McGruder III, along with Drs. Strolger, Gelderman and Carini, presented a paper describing the astrometric and photometric accuracy of the Robotically Controlled Telescope (RCT). The RCT is a 1.3m telescope at Kitt Peak National Observatory, operated by a consortium of institutions led by WKU. This group also met with representatives from the other consortium institutions (South Carolina State University and Villanova University) at the annual RCT board of directors meeting. In addition, Dr. McGruder was a co-organizer of a special session at the meeting entitled, "Astronomy Across Africa: A New Dawn."

Dr. Steven Gibson, along with current WKU student and Gatton Academy alumnus Mary Spraggs, Physics and Astronomy alumnus Jonathan Newton (currently a graduate student at McMaster University in Canada), and other international collaborators, presented results of their search for dark hydrogen gas in the galaxy using data obtained with the Arecibo radio telescope. Dr. Gibson's students also presented results of their research utilizing data from the Arecibo telescope, the Dominion Radio Astrophysical Observatory in Canada, the Five College Radio Astronomy Observatory, and NASA's Planck and IRAS satellites. Physics and Astronomy undergraduate Mary Spraggs presented her work on cold interstellar gas clouds and Gatton Academy student James Hughes presented results of his work on molecular clouds in the galaxy.

In addition to his participation in the RCT meeting, Dr. Carini, along with his international collaborators, presented the results of a study of blazer candidates they identified in the field of view of NASA's Kepler spacecraft, utilizing data obtained with the RCT and the Himalayan Chandra Telescope in India. Dr. Carini's student, Physics and Astronomy undergraduate Josh Williams, presented a paper in a special session entitled "Developing Our Own Future: Undergraduate Research and Enrichment Through Peer Led Programs." Josh presented the results of his study of a bright Seyfert 1 galaxy using data obtained with the RCT and NASA's Kepler spacecraft.

Dr. Ting-Hui Lee, a visiting professor in the department, presented the results of her study of the chemical abundance of compact planetary nebula found in the disk of the galaxy. Dr. Jason Boyles, also a visiting professor in the department, co-authored a presentation on the discovery of a pulsar in a triple star system with a millisecond period. This discovery was the subject of a press release at the meeting!

Physics and Astronomy alumnus Dr. Tala Monroe presented one paper and co-authored a second paper describing results of her research on stars similar to our sun, known as solar twins. Dr. Monroe is currently a post-doctoral research associate at Universidad de Sao Paulo in Brazil. Schuyler Wolff, a Gatton Academy and Physics and Astronomy alumnus who is now a graduate student at Johns Hopkins University, co-authored an amazing eight presentations on her work with proto-planetary disks around stars. All three current undergraduate students competed for the American Astronomical Society's Chambliss Astronomy Achievement Award and are anxiously awaiting the results.



Dr. Laney
with his
research
poster at
SESAPS

2013 MS Graduate Students Theses on WKU TopScholar

Five of our graduate students in Physics and Astronomy finished their theses and graduated this year. Our program in Homeland Security Sciences deals with all aspects of national security with a focus on the scientific detection and remediation of chemical, biological, nuclear, radioactive and cyber threats in the national public and private sectors. The research focused program requires a thesis that includes a bound copy of the thesis in the Physics and Astronomy library and an electronic version available to the public at the WKU TopScholar website as part of the Digital Commons. The theses, students and advisors for 2013 are:

[Forensic Investigation of Stamped Markings Using a Large-Chamber Scanning Electron Microscope and Computer Analysis for Depth Determination](#), Eric Douglas Jones, Thesis Advisor: Dr. Philip C. Womble, Physics and Astronomy, with Drs. Andrew and Kintzel,

[Interactive Wireless Sensor for Remote Trace Detection and Recognition of Hazardous Gases](#), Audrey Lama. Thesis Advisor: Dr. Vladimir Dobrokhotov, Physics and Astronomy, with Drs. Andrew and Harper,

[Food Defense Among Meat Processing and Food Service Establishments in Kentucky](#), Morgan Webb-Yeates, Thesis Advisor Dr. Vijay Gola, Public Health via Physics and Astronomy, with Drs. DeGraves and Kim,

[Solar Energy Conversion and Control Using Organic Photovoltaic Cells](#), Kurt Wade Woods, Thesis Advisor: Dr. Farhad Ashrafzadeh, Engineering via Physics and Astronomy, with Drs. Andrew, Rathnayake and Dobrokhotov,

[Novel Materials for Use in Homeland Security Research](#), Jason Osgood Ewen Young, Dr. Chad Snyder, Chemistry via Physics and Astronomy, with Drs. Webb and Dobrokhotov. The web site for all undergraduate Honors theses and MS theses in the department of Physics and Astronomy is: <http://digitalcommons.wku.edu/>



A number of outreach activities taking place in Franklin, KY with Dr. Laney and several students.

KY Science Leadership Network

Rico Tyler, former KAPT President, is currently serving as a content consultant with the Kentucky Science Leadership Networks. Network monthly meetings help teachers transition to the Next Generation Science Standards, Rico has highlighted some of the changes the standards will bring. The new standards combine Disciplinary Core Ideas, Science and Engineering Practices and

Crosscutting Concepts to create challenging performance expectations such as “Plan an investigation to determine the relationships among the energy transferred, the type of new matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample,” “Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic

field and that a changing magnetic field can produce an electric current,” or “Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.” The Governor has approved the new science standards for the state paving the way for implantation next year.



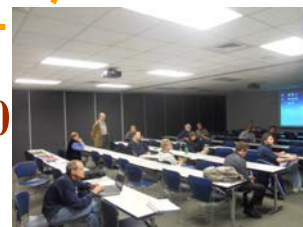
Rico Tyler working with the next generation science standards.

Summary of KAPT Agenda Meeting at Elizabethtown Co

The March Kentucky Association of Physics Teachers was hosted by Elizabethtown Community College. WKU and physics and Astronomy students Kolton Jones, Daniel Jones, Timothy Bucklew, Owen Gaul, Mariel Shumate, presented on

the progress of the NASA Undergraduate Student launch Initiative and insights on physics demonstrations. Richard Gelderman gave the Section Report and coordinated elections of officers. Robert Arts, from Pikeville University was elected treasurer/president elect, and

Keith Andrew from WKU was elected President, Kenny Lee from Central High School in Bowling Green is the High School representative.



KAPT Meeting with Jean Oostens giving a presentation on nuclear radiation detection.

Dr. Humphrey recalls historical events of when Physics and Astronomy was in TCNW before moving to TCCW.



President Ransdell talking with faculty about the future of the TCNW location.



Students lines up at the Sigma Pi Sigma Banquet.

TCNW the Old Home of Physics and Astronomy Closes



When the TCNW building was completed Physics and Astronomy moved off the hill into the first floor of TCNW. By 1960 the department had a suite of faculty offices centered on rooms 101-116 with the university and college physics classes down the hall in the south side and several labs on the north side. Dr. Humphrey

arrived in 1965, Dr. Frank Six was preparing to be the Department Head as Dr. Marvin Russell was leaving the Department Head position to become the Dean of the college.

Dr. Humphrey recalls that in addition to Dr. Six and Dr. Russell there were faculty offices for Dr. Bob Dalston, Dr. Curtis Longstan, Dr. George Moore, Dr. Floyd

Conte, Dr. Barnett, Dr. William G. Buckman and Max Robinson. At the time he had some students he still remembers: Doug and Don Jenkins were both studying physics prior to joining the Night Vision Lab, Doug Jenkins would return to Bowling Green as the inspiring physics teacher at Warren Central High School and as a member of the faculty at WKU.

Dr. Humphrey recalls the Early Physics and Astronomy Program in 1965

Roger Scott was also a student who would go on to get his PhD in astronomy and return to WKU after teaching in California and Indiana. A farewell ceremony was held where President Ransdell, Dean Cheryl Stevens, and Associate Vice president Blaine Ferrell described some accomplishments and success while the building was being used. At the end

of the ceremony a large scale photo of the building was used as special signing memento that everyone left a message on and will be in the Dean's Office. Several faculty spoke about their time in the building and future plans were discussed with an eye on potential new buildings in the not too distant future. One possibility being looked at is adding a wing onto the TCCW



building to add some new space. So our new neighbors in TCCW are really our old neighbors from 1965.

2013 Meet the Seniors in P&A at WKU During the Annual Sigma Pi Sigma Banquet

The Annual Sigma Pi Sigma banquet in April provided the perfect venue for the Society of Physics Students, Sigma Pi Sigma, physics majors and friends to gather for a minute of reflection and change as we prepared to recognize the 2013 graduating

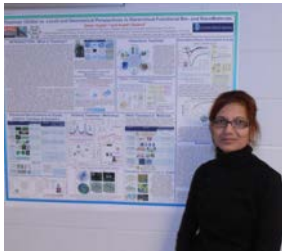
class off seniors and new d SPS Officers. The banquet was well attended with Dr. Karen Hackney, Dr. Roger Scott and Provost Gordon Emslie all sharing their insights and experiences with students and colleagues.

Here we see from left to right: Courtney Mor-

row, Joshua Williams, Andrew Staggs, Jessica Hall, Jamey Yadon, Owen Gault, Daniel Jones, Jason Leszczewicz, and Kolton Jones .

New Faculty Member Dr. Sanju Gupta

The Department of Physics and Astronomy has a new faculty member in the area of condensed matter and nano-material's: Dr. Sanju Gupta. She did her doctoral work in Chemical Physics in the Department of Physics at the Institute for Functional nanomaterials at UPR, she has an ME in Laser Technology



Dr. Sanju Gupta by her poster on topological properties of materials.

from the IITK and an MS in Physics from IITD, and a BS in Physics from DU, India. She did post doctoral research at the University of Cambridge, UK, in the Department of Physics at North Carolina State University, she has been an assistant professor in the Department of Physics and Materials Science at the

University of Missouri and has been an NIH Fellow at UPenn and faculty member at Drexel University prior to joining WKU. She is now building a materials laboratory centered on synthesis and characterization of new materials and precision Raman spectroscopy. We look forward to her success and growth as a faculty member at WKU.



KAS Poster Session at Morehead University

WKU P&A Students presented at the Kentucky Academy of Sciences meeting at Moorhead University in November 2013.

WKU presentations included:

- **Determination of Fiegebaum Invariant for a Nonlinear Field Representation of Blazer Optical**
- **The Classroom Astronomer Spectrum Viewer**, Richard Gelderman
- **A Survey of Hidden Molecular Clouds in the Milky Way**, James M

Hughes and Steven J Gibson

- **Next Generation Science Standards: What Every Physics Teacher Should Know**, Scott Bonham.



KAPT at KAS Meeting at Morehead

The Kentucky Association of Physics Teachers met in conjunction with the Kentucky Academy of Sciences at Moorhead University in November. The sessions allowed for students, faculty and mentors to present research progress and developments, discuss teaching innovations and ideas and to look over changes related to the new science standards.



Left: Dr. Gelderman leading a session with WKU Gatton student Andrew Brown and Dr. Bonham in the audience.

Dr. Marilyn Akins, Bluegrass Community and Technical College took over the Community College Representative position.

Right: Members of the KAPT meeting viewing spectra with test gratings. With Robert Arts nearby



**DR. GEORGE V.
AND SADIE
SKILES PAGE
AWARD FOR EX-
CELLENCE IN
SCHOLARSHIP**

*Awarded to the gradu-
ating Physics major
with the highest aca-
demic standing.*

**Mr. Owen Thomas
Gaulle**

**DR. RANDALL
HARPER AWARD
FOR
OUTSTANDING
RESEARCH IN
PHYSICS AND
ASTRONOMY***

*Awarded to the junior or
senior student with
research exhibiting
significance, effort,
originality, and creativity.*

Mr. Jason John Leszczewicz

**DR. DOUGLAS
HUMPHREY AWARD
FOR OUTSTANDING
SERVICE**

*Awarded to the junior or senior
student with a record of service
within the department and to
science outreach to the commu-
nity.*

Ms. Jessica Catharine Hall

2013 Departmental Award Winners

Each year the WKU Department of Physics and Astronomy recognizes three students who have excelled in areas of scholarship, research, and service. The recipients of these awards for the 2011-2012 academic year are Owen Gaulle, Jason Leszczewicz, and Jessica Hall. These students will be recognized at the annual Ogden Student Awards ceremony on Sunday, April 21, at 2:00 PM at the Carroll Knicely Center. Please take a moment to congratulate these students.

Owen Thomas Gaulle

Owen, a senior physics major, has excelled in the classroom while also being very active in research. He worked with Dr. Louis Strolger on the WKU High Altitude Research Platform designing, constructing, and launching scientific payloads for high altitude ballooning. Owen has received the Louis Stokes Alliances for Minority Participation (LSAMP) stipend for 3 consecutive

years. He was accepted for two consecutive summers at the University of Alabama at Huntsville REU program where he worked with different researchers at the Center for Space Plasma and Aeronomic Research. He was awarded the best undergraduate poster in Natural Sciences at the 41st Annual WKU Student Research Conference and received a Faculty-Undergraduate Student Engagement (FUSE) grant.

Outstanding Scholarship, Research and Service

Owen is a member of the WKU Society of Physics Students, the National Society of Black Physicists, and serves as the Chief Payload Engineer for the WKU Rocket Team.

Jason John Leszczewicz

Jason, a senior physics major with minors in astronomy and mathematics, works with Dr. Ed Kintzel as an undergraduate research assistant at the NOVA Center. Jason receives this award for work that

he performed involving the creation and analysis of ultrathin molecular films of copper phthalocyanin. Jason also serves as President for the Society of Physics Students and active in the Hilltopper Astronomy Club. He recently organized a student trip to the U.S. Space & Rocket Center in Huntsville, Alabama and spent his spring break doing research at Marshall Space Flight Center. Two sum-

mers ago, Jason worked to design, construct, and test a trebuchet that he demonstrated at Physics Public Night and high school visits. Jason also has played a major role in the Physics Olympics, Science Olympiad, and Girls in Science events and is a member of the WKU Rocket Team.

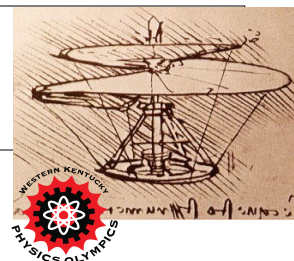
Jessica Catharine Hall

Jessica, a junior with majors in Physics and Chemistry, receives the Humphrey service award because of the overall good citizenship she portrays in her interactions with faculty and students in the department. She has been very active in the WKU Chapter of the Society of Physics Students, serving terms as secretary, pres-

ident-elect, and next year as president. Jessica routinely assists with departmental outreach events such as Physics Olympics and the Science Olympiad. In addition, Jessica has performed research in both Physics and Chemistry, working on development of nanotechnology-based sensors for asymmetric explosive threat

prevention with Dr. Vladimir Dobrokhov and with Dr. Matthew Nee of Chemistry.

2014 WESTERN KENTUCKY PHYSICS OLYMPICS – SATURDAY, FEBRUARY 22



THE WKU DEPARTMENT OF PHYSICS & ASTRONOMY INVITES HIGH SCHOOLS TO SEND TEAMS OF FOUR TO COMPETE IN THE 2014 WESTERN KENTUCKY PHYSICS OLYMPICS. THIS HALF-DAY COMPETITION CONSISTS OF A PENTATHLON OF CHALLENGING PROBLEM-SOLVING ACTIVITIES THAT REWARD TEAMWORK, COMMUNICATION AND CREATIVITY. THE 2014 EVENT WILL BE HELD SATURDAY, FEBRUARY 22 FROM 8:30 TO 2:00 IN THOMPSON CENTER, CENTRAL WING ON WKU'S BOWLING GREEN CAMPUS. TEAMS MUST REGISTER ONLINE BEFORE 9 A.M., MONDAY, FEBRUARY 17 AT [HTTP://PHYSICS.WKU.EDU/OLYMPICS/REGISTRATION.HTML](http://physics.wku.edu/olympics/registration.html).

The 2014 Physics Olympics competition will commence with two activities that involve competitors arriving at the event ready to compete with devices they have designed, constructed, and tested. The **Roto Drop** event requires each team to design and construct a helicopter type device to safely lower an egg when dropped from a fixed height. For **Balloon Rockets** each team constructs a balloon powered vehicle to complete three race courses. This year's "Calculation/ Communication Challenge" is titled **Instrumental Navigation** and will require each team to divide into pairs and cooperatively direct a flight to its desired destination. The "On-the-Spot Activity" and "Order-of-Magnitude Quiz" will remain cloaked in secrecy until the day of the event.

Time	Activity	Location
8:00	Mandatory check-in for all teams	Snell 2113
8:30	Testing commences for <i>Roto Drop</i>	Snell 2113
9:45	Competition begins for <i>Balloon Rockets</i>	Snell 1108
11:00	Order-of-Magnitude Quiz begins	Snell 1108
11:30	Lunch	Snell 2113
12:15	Calculation/Communication Challenge begins	Snell 2113
1:10	Impromptu Team Activity begins	Snell 1108
1:45	Awards Ceremony	Snell 1108

PRIZES: A \$600 SCHOLARSHIP TO ATTEND WESTERN KENTUCKY UNIVERSITY WILL BE PRESENTED TO EACH CONTESTANT ON THE TOP SCORING TEAM. THE SCHOLARSHIP IS TO BE USED DURING THE FRESHMAN YEAR AND IS AWARDED ABOVE AND BEYOND ANY OTHER SCHOLARSHIPS THE STUDENT MIGHT OTHERWISE EARN. MEDALS FOR THE TEAM MEMBERS AND A PLAQUE FOR

In Memoriam: Joe Bastille



Joe Bastille

Born in South Boston, Joseph graduated from Framingham High School and went on to receive a Diploma in Architectural Engineering from Wentworth Institute, a Bachelor of Science degree and a Master of Science degree in Applied Physics from the University of Massachusetts. He was a professor

of Physics at the University of Southern Illinois, and later at Western Kentucky University where he also held the position of the Physics Laboratory coordinator.

Joseph worked with students in the lecture classroom and laboratory setting taking on classes in the summer when there was

demand. He will be remembered for his determination and tenacity, his dedication to his work, his love of knowledge and respect for the value of education and his strength of character.

2013 Physics Olympics



Students at the Physics Olympics showing their Mentos powered soda canons and competing in the Vector Bowling Ball events.



On Saturday, February 23rd, over one hundred high school competitors in the 2013 Western Kentucky Physics Olympics sent their Mentos powered geysers of soda as high as 27 feet into the air. The competition included teams from **Allen County Scottsville, Bowling Green, Franklin-Simpson, Greenwood, South Warren, and Warren Central** high schools. Other events for

this year's theme of "Do-It-Yourself Physics" included shooting a stream of soda into a bucket placed over 13 feet away, creating homemade silly putty balls that could bounce the highest, and using brooms to speed a bowling ball around an obstacle course.

The **overall winning team** of four students from **Bowling Green High School** consists of four sophomores: Emily Penn,



Kate Bigler, Teaghan Chen, and Hannah Lindsey. Coached by teacher Cristen Olson, the **"Purple Chem"** team had the best combined placement in the five Physics Olympics events.

API and CDL directors are recognized for securing significant external research support.

OSP Recognizes Ms. Thomas and Dr. Dobrokhotov

The Office of the Sponsored Programs and Research recognized outstanding performances in their fields for securing and sustaining major research efforts.

Dr. Vladimir Dobrokhotov was recognized for breaking the million dollar barrier in external funds for his groundbreaking work in nanosensors as the Director of the Applied Physics Institute. Melinda Thomas, director of the Cyber Defense Laboratory, was recognized for securing external funds for work with computer information exchange.



NASA USLI in Huntsville, AL

WKU students from Physics and Astronomy, engineering and computer Science entered the NASA Undergraduate Student launch Initiative, a national competition to safely launch a payload to one mile and return it to the Earth.

The WKU Rocket was named Pi-bar in reference to Driac's h-bar notation, weighed 45 pound and was seven feet tall. It flew to an altitude of 4100 ft. and sent back telemetry and images of the flight.



The WKU Rocket Team launches Pi-Bar in Huntsville, AL during the NASA USLI national competition event.

Above, L to R: Kolton Jones, Keith Andrew, Dan Jones, Owen Gaulle, Timothy Bucklew, Jordan Edens, Jason Leszczewicz, Mariel Shumate

SESAPS at WKU 2013

From November 20-23, 2013, WKU hosted the 80th Annual Meeting of SESAPS. The National Society of Black Physicists (NSBP) also joined the event. Attending SESAPS were approximately 300 attendees from a diverse cross-section of institutions from across the Southeastern USA. Over 100 poster presentations from Faculty, Graduate, and Undergraduate

students were presented with WKU representing about 25%. The event was great exposure for WKU, Ogden College, and in particular the Department of Physics and Astronomy. The event was kicked off on Wednesday the 20th at a "Science Pub" that was held at Overtime. Speaking to over 100 attendees at Science Pub was Tom Hill who is the head Quality Manager for Corvette. Key speakers from University, Industry, and National Laboratories highlighted the 3-day event. Next years SESAPS Meeting will be held at the University of South Carolina, Columbia, SC. Dates for this meeting are TBD.



Students and faculty at SEASP 2013 at WKU



Physics and Astronomy Activities 2013

The two SPS picnics fell on perfect days and highlighted great food with a fast paced basketball game where faculty took note of how high ten feet looks these days. There was a fall term softball game where Julie Scott and Sharon Windham helped OCSE play in the Hot Rods stadium. The end of the year was recognized with

the traditional holiday feast and celebration to recognize and reflect for a moment with students, faculty, alumni, friends and workers the success of the year.



Departmental events including softball, SPS picnics and the holiday luncheon throughout the year.



SPS News

The Society of Physics Students chapter at WKU had a fun and productive year. Club members took part in many public outreach and education events, including judging a science fair at Holy Trinity Lutheran school in Bowling Green, physics demonstrations at Lincoln Elementary in Franklin, tutoring students at Bowling Green Technical College, and planning two departmental Physics Public Nights. The club also hosted its own Physics Fun Nights, as well as Spring and Fall picnics for the department in city parks and an SPS Thanksgiving potluck, and it helped with the annual departmental Holiday Lunch.

SPS members presented their research at many conferences, including the Kentucky Academy of Science at Morehead, the WKU-hosted Southeast Section of the American Physical Society in Bowling Green, and the American Astronomical Society in Long Beach, California. In addition, the interdepartmental Vette City Rocketry Club founded by SPS members took part in a year-long design, construction, testing, and launching project, culminating in a national competition in Toney, Alabama, where the team rocket reached a peak altitude of 4100 feet and had a picture-perfect landing.

Lastly, the SPS held its 53rd Anniversary Sigma Pi Sigma banquet, inducting four new members: Owen Gaulle, Jessica Hall, Courtney Morrow, and Jamey Yadon. New SPS officers sworn in for the 2013-2014 academic year



2013 Physics and Astronomy Students at Commencement

In May of 2013 some of our Physics and Astronomy students walked to get their diplomas during an afternoon graduation ceremony in Diddle arena.

Prior to the main undergraduate graduation ceremony is the Gatton graduation ceremony in van Meter Hall. This year the physics and astronomy Gatton graduates included Mary Spraggs, Samuel Dong, Akhil Ghanta, Shane Masuda, and Duncan Woods.

The December 2013 graduation combined the graduate and undergraduate ceremonies and we had Dan Jones finish his undergraduate degree and Kurt Woods complete his MS degree.





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**Physics and Astronomy at WKU: a powerful
career choice with significant impact.**



Left: Kurt Woods, MS, Dr. Harper and Dan Jones, BS



Left—Right: Mary Spraggs, Samuel Dong, Akhil Ghanta, Duncan Woods and Shane Masuda, all May Gatton graduates.



Above: May 2013 Graduation Ceremony: **L to R:** Courtney Morrow, Owen Gaulle, Jason John Leszczewicz and Lance Pauley after graduation in Diddle Arena