



South Carolina Academy of Science

Vol. 33, No. 2

Newsletter

Spring, 2007

04.13.2007 PLEASE NOTE:
Voting for the SCAS
Council ENDS at NOON
Cast your vote for the
SCAS Council and VP
at:
[http://www.erskine.edu/scas/2007
SCASNominees.htm](http://www.erskine.edu/scas/2007SCASNominees.htm)

04.19.2007 SCAS Council Meeting
University of South
Carolina
Columbia, SC

04.20.2007 SCAS/SCJAS
Annual Meeting
Midlands Technical
College,
Airport Campus
Columbia, SC

06.2007 Deadline -- SCAS
Journal Manuscript,
Fall Publication



2007 Annual Meeting to be Held at the Airport Campus of Midlands Technical College

The Eightieth Annual Meeting of the South Carolina Academy of Science (SCAS) will be held in conjunction with the South Carolina Junior Academy of Science (SCJAS) on Friday, April 20, 2007 at the Airport Campus of Midlands Technical College in Columbia, SC. More than 300 research papers and posters will be presented throughout the day in twelve topical sessions. Registration will begin at 7:30 AM in the Academic Center at Midlands Technical College with the first topical sessions beginning at 8:30 AM.

If you have not already registered, we would like to invite you to participate in the SCAS Annual Meeting. The SCAS Annual Meeting presents an outstanding opportunity for graduate and undergraduate students who are going to engage in research during the next few semesters, to observe the presentation process. To encourage greater participation by undergraduate students, the value of the undergraduate research awards have been increased to over \$2,000.00. Almost all of the four year colleges and universities in South Carolina will be represented at the meeting and many of the two year colleges will also have faculty and undergraduate and graduate students presenting papers.

The rooms in which the sessions will be held will all be media equipped classrooms that should support PowerPoint presentations and have computers equipped with USB plugs. But presenters are strongly encouraged to bring either hard copies or transparencies of all relevant materials to be shown in case there is some sort of compatibility problem. All session rooms will have overhead projectors and Elmo or similar projection units available.

Invited Speakers Featured at the 2007 SCAS Annual Meeting

In addition to more than 300 research presentations, the 2007 SCAS Annual Meeting will feature an interesting array of invited speakers. Coming from areas of expertise including medicine, chemistry, and historical science research a common thread will be woven through the presentations concerning the critical need to effectively translate scientific research into public awareness and scientific literacy.

(continued next page)



Dr. Michele Dominick
Bishop

The keynote presentation during the plenary session from 10:30 AM until 11:15 AM will be given by **Dr. Michele Dominick Bishop**, an Assistant Professor of Medicine at the Mayo Medical School in Jacksonville, Florida. Dr. Dominick Bishop is a nationally recognized expert in gastroenterology and hepatology who specializes in pancreatic diseases. Michele is also a graduate of Brookland-Cayce High School in Cayce, S.C. and a former member of both the SCJAS and the SCAS. We are very pleased that Michele has agreed to be our keynote speaker and we welcome her back to South Carolina!

Two other special presentations will be featured during the meeting. **Dr. Bassam Shakhshiri**, a Professor of Chemistry at the University of Wisconsin-Madison and former chief education officer at the National Science Foundation, will present *Science and Scientific Literacy* from 11:15 AM until 12:15 PM. According to Dr. Shakhshiri, "Our democratic society is becoming increasingly dependent on science and technology. It is essential for the well-being of our society that all citizens develop an appreciation of science, the benefits of technology, and the potential risks associated with advances in both. Citizens must gain 'science literacy'. Dr. Shakhshiri has given presentations throughout the world. His presentation at the 2007 SCAS Annual Meeting will illustrate how complicated chemical processes can be explained through many of the fascinating chemical demonstrations that he has developed over the years.



Dr. Bassam
Shakhshiri

From 5:30 PM – 6:30 PM **Mr. Howard Burnham** will present *On the Shoulders of Giants* in which he will portray five famous scientists whose vision and research changed the course of human history including Aristotle, Louis Pasteur, Sir Isaac Newton and Albert Einstein. Mr. Burnham not only has conducted meticulous research concerning the background, research, and lives of these scientists, but also portrays these individuals during his presentation. Born in Bournemouth, England, Mr. Burnham is a gifted scholar who has worked as an educator, museum curator, and actor. His historical characterizations have been presented throughout the United States and have included portrayals of Charles Darwin, Lewis Carroll, Shakespeare, George Bernard Shaw, General Thomas Sumter and many others. We are delighted that Mr. Burnham is developing this new monolog exclusively for the 2007 SCAS Annual Meeting. You will not want to miss this fascinating presentation!

The South Carolina Junior Academy of Science (SCJAS) will also be presenting more than 150 research projects throughout the day. These activities and competitions require more than 25 judges and supervisors who generally are members of the SCAS. If you would like to be more involved as a judge or participate as a session presider or assist in some other capacity, please let us know.

If you have any questions pertaining to the annual meeting, please contact Dr. Tom Reeves, program and schedule coordinator for the 2007 SCAS Annual Meeting at reevest@midlandstech.edu or telephone 803-822-3554. For all questions or information pertaining to the SCJAS please contact either Dr. Karen Fox, Executive Director SCJAS, at kfox@med.sc.edu or telephone 803-733-1529 or Dr. Don Jordan, Director for Center for SCAS at USC, at Jordan@gwm.sc.edu or telephone 803-777-7007.



A Celebration of Science at Midlands Technical College

To draw attention to the 2007 SCAS and SCJAS Annual Meetings, Midlands Technical College will sponsor a *Celebration of Science* during the preceding week featuring special speakers, science activities, and films open to all students and the general public at no charge.

DIRECTIONS AND ACCOMMODATIONS FOR 2007 ANNUAL MEETING



Directions and Accommodations

The Airport Campus of Midlands Technical College is located at 1260 Lexington Drive, West Columbia 29170 near the Columbia Metropolitan Airport. The Airport Campus can be easily accessed from either I-26 or I-20. ***Please note that Midlands Technical College has several campuses in the Columbia vicinity and that the 2007 SCAS Annual Meeting will be held at the Airport Campus of Midlands Technical College.***

The closest motel to the Airport campus is Sleep Inn at 2208 Airport Boulevard. The SCAS and SCJAS are being offered a discounted group rate of \$75.99 per room. To book reservations directly call Sleep Inn at 803-926-9260 and mention that you are either with the SCAS or SCJAS. However, there are a wide range of other accommodations located in Columbia near the general vicinity of the Airport Campus of Midlands Technical College, many of which are offered at reduced group rates. Contact Dr. Tom Reeves prior to March 1, 2007 at reevest@midlandstech.edu or telephone 803-822-3554 for further information pertaining to accommodations.

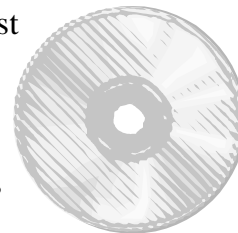
Make plans now to participate in the 2007 SCAS Annual Meeting. Encourage your students to attend as well. We are working diligently to make this an event that you will not want to miss. We hope to see you at the Airport Campus of Midlands Technical College on April 20, 2007!

2007 Annual Meeting Instruction for Abstract Submission and Poster Presentations

All posters are requested to submit an extended abstract (manuscript) in electronic form to the SCAS Journal by May 1st for compilation into a "2007 SCAS Meeting Proceedings" publication. If you have any concerns regarding the publication of your extended abstract in the meeting proceedings, please email me at dkferris@uscupstate.edu.

Presenting at the 2007 Meeting? Important Information!

SCAS session rooms at Midlands Technical College are equipped with computers, PowerPoint software, document cameras, and projectors. Powerpoint files must be on a compact disk. Label your CD clearly with the presenter's name and presentation title. Please give your CD to the session moderator prior to the morning or afternoon session start. Due to time constraints, individual computers cannot be connected to the projection system and video (DVD/VHS) presentations cannot be accommodated.



The only supported CD formats are those read by Windows-based computer systems. Presenters are encouraged to bring printed copies of presentations as a back up in case of computer failure. Remember Murphy's Law? Storage media such as 3.5" floppy disks, "Zip" disks, DVD's, and USB flash drives are not supported. Please follow these guidelines to ensure your presentation goes smoothly!

- David Ferris, SCAS Bulletin Editor

Global Warming by the Numbers -- And a Plug for Solar Energy

Professor Hanno zur Loye
President – SCAS

Global warming is frequently in the news, most recently due to publication of a report by the Intergovernmental Panel on Climate Change (IPCC), that discussed the role of humans in causing global climate change. It is sometimes hard to believe that we could possibly affect the climate of this entire planet – but we can. And here – by the numbers – is how we have been doing it. First, consider how we know that things have changed and how we know that they continue to change. The global temperature rises and falls with rising and falling levels of carbon dioxide (CO₂) in the atmosphere. Over the past 650,000 years, a time period that includes several ice ages and interglacial warming periods, the carbon dioxide level has varied only between 160 and 300 parts per million (ppm), based on careful measurements using arctic ice cores. More recently, however, the CO₂ levels in the atmosphere have been steadily rising, from 280 ppm in the year 1750 to 383 ppm right now. Moreover, the rate of increase has gone from 1.4 ppm per year in 1960 to a rate of 1.9 ppm per year in 1990. This is a meaningful and disturbing trend.

The CO₂ in the atmosphere comes from many sources, an ever increasing one being the burning of fossil fuels. Every time we burn oil, natural gas, coal or gasoline, we generate CO₂ in the combustion process. And we need to burn these fuels in order to generate energy and to provide transportation so that we can live the way we do. This is happening everywhere on the planet – more in some places, less in others – and it amounts to about 25 billion tons of CO₂ per year. We require this level of fossil fuel burning to satisfy our current energy demand of about 13 terawatts (TW) per year. A terawatt is 1000 billion watts or 1 million megawatts. By comparison, a reasonably large power plant generates 1000 megawatts. In other words, we are using the equivalent of 13,000 power plants to meet the energy needs of the people on this planet every year.

If we were to start aggressively conserving energy right now, then by roughly 2050 we would nonetheless need 28 TW of power. That is because our planet's population is projected to grow from the current 6.7 billion to roughly 9 billion inhabitants. AND – here's the kicker – we all want to live

better and have a higher standard of living, and that means we will need more energy. More energy means burning more fossil fuels and, hence, more CO₂ in the atmosphere. You might think that we are about to run out of fossil fuels, but that is not the case. In particular, the world's coal reserves will last for hundreds of years, even taking into account increased consumption. We can put an awful lot of additional CO₂ into the atmosphere during that time period. And what will this do to the global temperature?

Since global temperature and CO₂ levels are linked, we can predict that the global temperature will go up and THAT will cause many unpleasant problems for all of us, including change in rainfall patterns resulting in droughts, more extreme weather events, and rising sea levels, to name a few. So where do we go from here? We need to switch to power sources that do not add CO₂ to the atmosphere. We have all heard talk about conservation as one possible solution; however, conservation alone cannot solve this problem, as our global energy demand will go up in the future. What about renewable energy sources to meet our projected needs? Take biomass, like ethanol from corn. We can plant a lot more corn and other shrubs until we run out of land, and that could generate about 4-5 TW of power worldwide. Consider wind power. It can generate about 1-2 TW of power worldwide. Hydroelectric generates 0.3 TW right now, but we could dam more rivers to get up to about 2 TW worldwide. How about nuclear power? Just to replace our existing fossil fuel based power plants we would have to build roughly one new nuclear power plant per day, each day, for the next 40 years. This is an unlikely and, for many reasons, undesirable solution. The only renewable source of energy that can provide the vast quantities of power we need is solar. The energy in the sunlight that strikes the earth in one hour is equivalent to 14 TW. The solar energy that hits land is enough to provide 60 TW of power, assuming a 10% conversion efficiency. This can do the trick.

So why don't we do that right now? We have the technology – to quote an old TV show, but we still have to make it better, faster and, most importantly, cheaper. Better, because we would like higher conversion efficiency; faster, because we need to produce a lot of it very quickly to meet the enormous worldwide energy demand; and cheaper, because as long as energy from coal costs less, people will burn coal. And we don't want that. Not for us, but especially not for our children and grandchildren.

(‘Global Warming’ continued next page)

There is much we can do with solar energy: directly to generate electricity; directly to split water into hydrogen and oxygen to power fuel cells; passively to warm our homes and to heat our water; and much more. But we need to take full advantage of the possibilities as quickly as we possibly can. What can individuals and organizations do? We can actively support public and private funding of research and development of solar technologies and encourage policies that underwrite the use of solar power wherever possible. This situation requires immediate action on our part. Consider as a final point that there are estimates on how long it will take for CO₂ levels to return to “normal” once we stop generating so much excess CO₂. The estimates vary, but at best it will take 300 to 500 years to be near 300 ppm again. Brief on a geological time scale, but a very long time by human standards.

NEWS RELEASE

The South Carolina Academy of Science (SCAS) sent 5 students and a chaperone to the American Junior Academy of Science (AJAS), meeting in San Francisco February 15-18. Four of the students are from Spring High School in Columbia: Gina Noh, Matthew Nodelman, Graham Van Schaik, and Aurel Lazar. The fifth representative is Graham Gintz from Hilton Head Island. Lisa McAlpine, Director of Magnet Programs at Spring Valley High School, was the chaperone. She was assisted by Don Jordan and John Safko, professors from USC Columbia and officers of SCAS, who are representatives to the National Association of Academies of Science, the parent organization of the AJAS.

The AJAS meeting is held in conjunction with the American Association for the Advancement of Science (AAAS) meeting held at the same time. The students presented non-competitive posters and oral presentations as part of the AJAS meeting. One day of the trip was spend touring the National Research Labs at Berkley. In addition to the AJAS activities, the students attended some sessions of the AAAS.

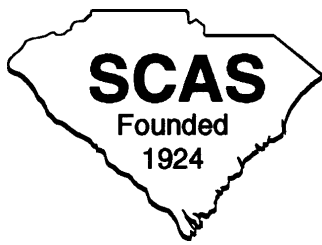
Our students are part of a contingent of over 100 students from around the country. All students attending are chosen by their respective state or regional academies. South Carolina chooses their representatives based upon research papers presented at the annual meeting of the South Carolina Junior Academy of Science, which is the high school portion of the SCAS. In addition the SCAS also has a Middle-Elementary section for younger students. For further information contact John Safko at 803-777-6466.

GOVERNOR’S AWARD WINNERS ANNOUNCED

The South Carolina Academy of Science announces the winners of the 2007 Governor’s Award for Excellence in Science. They are Dr. Daniel Reger, of the University of South Carolina for Excellence in Scientific Research; Dr. Stacey F. Jones of Benedict College for Excellence in Scientific Awareness; and Dr. Varavut Limpasuvan of Coastal Carolina University for the Young Scientist Award for Excellence in Scientific Research. These winners will be awarded with a plaque by Governor Sanford at a date yet to be determined. They also will be recognized by the South Carolina Academy of Science for their achievements at the SCAS’ Annual Meeting April 20th, 2007 at Midlands Technical College, Airport Campus.

The award was established in 1985 by the Drug Science Foundation to honor specifically an individual or team within the state whose achievements and contributions to science in South Carolina merit special recognition and to promote wider awareness of the quality and extent of scientific activity in South Carolina. Since 1989 the award, named the “Governor’s Award for Excellence in Science”, has been under the joint sponsorship of the Governor’s office and the South Carolina Academy of Science. In 1993 these groups were joined by the Dewees Development Corporation and Harbor Watch of Charleston. In 2000 **Roche Carolina Inc.** took the lead, in 2004 **MeadWestvaco** joined and in 2005 **Michelin North America** joined in sponsorship of the Governor’s Awards.

Dr. Don Jordan, professor at USC-Columbia chairs the committee who selected this year’s winners. He can be reached at (803) 777-7007 or email: Jordan @gwm.sc.edu.



South Carolina Academy of Science Officers

President

Hans-Conrad zur Loye
USC Columbia
Department of Chemistry
Columbia, SC 29208
803 777-6916/FAX 803 777-8508
zurloye@sc.edu

Immediate Past President

James Privett
USC Sumter
200 Miller Road
Sumter, SC 29150-2498
803 938-3758/FAX 803 938-3713
jamesp@uscsumter.edu

Vice President

David Gangemi
Clemson University
Microbiology & Molecular
Medicine
Clemson, SC 29634
864 656-6344/FAX 864 656-3808
gangemj@clemson.edu

Undergraduate Research Awards

Chair / N. Dwight Camper,
Clemson University
Entomology, Soils & Plant
Sciences
Clemson, SC 29634
864 656-5743/FAX 864 656-0274
dcamper@clemson.edu

President-Elect

Tom Reeves
Department of Biology
Midlands Technical College
Columbia, SC 29202
803 822-3554

reevest@midlandstech.edu

Secretary

Jane Ellis
Presbyterian College
Department of Biology
Clinton, SC 29325
864 833-8416/FAX 864 833-8993
jellis@presby.edu

Treasurer

John L. Safko / USC-Columbia
Department of Physics & Astronomy
Columbia, SC 29208
803 777-6466/FAX 803 777-3065
safko@sc.edu

Executive Director, SCJAS

Karen Fox
USC Medical School
Department of Pathology,
Microbiology & Immunology
Columbia, SC 29208
803 733-3275/FAX 803 733-3192
kfox@med.sc.edu

AAAS, NAAS & MESAS Director

Don Jordan / USC-Columbia
Center for Science Ed.; CAS
Columbia, SC 29208
803 777-7007/FAX 803 777-4396
jordan@gwm.sc.edu

Bulletin/Journal Editor

David Ferris / USC Upstate
Division of Natural Science and
Engineering
Spartanburg, SC 29303
864 503-5725
dkferris@uscupstate.edu

Newsletter Editor

Mike Farmer
Governor's School
15 University St.
Greenville, SC 29601
864 282-3732/FAX 864 282-3717

farmermh@aol.com

Councilors:

Radman M. Ali, Chair, Morris College
Sharon Gilman, Coastal Carolina Univ.
Cassandra Runyon, College of Charles-
ton
Karin Beaty, Midlands Technical College
Lucia Pirisi-Creek, USC School of Med.
Peter Fichte, Coker College
George Shiflet, Wofford College
Alvin Fox, USC School of Medicine
Val Dunham, Coastal Carolina Univ.
Judith Salley, SC State
Melissa Riley, Clemson Univ.
Donald Castillo, Wofford College

Committee Members:

David McQuillan, USC Columbia
Linda Sinclair, State Dept. of Education
Tina Webb-Browning, State Science Fair
Director
John Inman, Presbyterian College
Val Dunham, Coastal Carolina Univ.
Tom Roop, Francis Marion Univ.
Tom Falvey, SC State Museum

MESAS Directors:

Don Jordan, Midlands MESAS
Mary Whaley, Lowcountry MESAS
Tom Roop, Sandhills MESAS
Paige Ouzts, Western MESAS

Executive Assistance To The Council:

Anthony Kurlychek / USC Columbia
College of Arts and Sciences
Science Education Center
Sumwalt Rm. 321
Columbia, SC 29208
803 777-8759/FAX 803 777-4396



THE SOUTH CAROLINA ACADEMY OF SCIENCE



Mission Statement

HISTORY
GOVERNANCE
MEMBERSHIP
ADVANTAGES
INFORMATION
PUBLICATIONS

ANNUAL MEETING

SCAS NEWLETTERS

- * To promote the creation and dissemination of scientific knowledge within the state of South Carolina by stimulating scientific research and publication.
- * To improve the quality of science education in the state of South Carolina.
- * To foster the interaction of business, industry, government, education and the academic scientific community.
- * To improve public understanding and appreciation of science for its utilization in human progress.
- * To encourage young people to become involved in science through support of the Junior Academy of Science.

SCAS JOURNAL

CALENDAR

ACTIVITIES

AWARDS

SISTER SITES:
SCJAS

MESAS

SCIENCE FAIRS

METRIC



South Carolina Academy of Science
NEWSLETTER
J.L. Safko, Treasurer
Physics and Astronomy
University of South Carolina
Columbia, SC 29208

PRESORTED
FIRST CLASS MAIL
U.S. POSTAGE
PAID
PERMIT # 25
TAYLORS, SC 29687