

# ESA Newsletter

Electrostatics Society of America - The Friendly Society

## President's Message

The Electrostatics Society of America is a group of diverse individuals with broad interests and special skills. This depth makes our annual meetings unique and enjoyable. I am very excited about our Annual Meeting on the University of California at Berkeley campus, June 6-9. This year is special because the 2006 meeting is a Joint Electrostatics conference with 4 sponsoring organizations:

- ✓ The Electrostatics Society of America (ESA)
- ✓ The Institute of Electrostatics Japan (IEJ)
- ✓ The IEEE-IAS Electrostatic Processes Committee (EPC)
- ✓ La Société Française d'Electrostatique (SFE)

Over 100 papers have been accepted for presentation and with active participation from Asia, Europe, Africa, and North America. I expect that our 2006 Joint Conference will be one of the largest electrostatics meetings in ESA history. We have a unique opportunity in June to learn new things, greet old friends, and establish new friendships with people that share your passion for electrostatic technologies and applications. Please review the conference preliminary program and registration information enclosed in the newsletter, or view it on-line at <http://www.electrostatics.org>. I look forward to welcoming you to Berkeley California in June.

Learning new things about ancient electrostatics is one of the greatest benefits of my membership in the ESA. I missed a wonderful opportunity to share this experience when I was invited to prepare a short lesson in electrostatics for first, second and third grade students at my daughter's elementary school. As I pondered electrons, fields and forces, I realized that all of my presentations and seminar had been prepared for practicing engineers or graduate students. Now, I was to face a classroom full of young, curious and energetic students. There is a great space between boundary value problems and the ABC's. Where could I turn for advice, guidance and resources?

The ESA has many members who are professional educators with extensive teaching experience. Who better than us to develop an electrostatics curriculum, lesson plans and demonstrations to ignite the interest of a 6 year old or feed the curiosity of a 9 year old? The ESA could develop an Electrostatics Resource Center on our website where anyone could find designs for demonstrations, suggestions for science fair projects and lessons for kids. We could have links to suppliers of inexpensive kits and to other educational resources. There are a many good resources already available, including,

- ✓ D. Moore, **Electrostatics**, 2nd. ed. 1997 LaPlacian Press, Morgan Hill, CA
- ✓ Robert A. Morse, **Teaching about Electrostatics**, American Association of Physics Teachers (1992), ISBN: 0917853512 (out of print).
- ✓ **Benjamin Franklin and Electrostatics**, Created and Collected by Robert A. Morse, Wright Fellow 2004  
[http://www.tufts.edu/as/wright\\_center/fellows/bob\\_morse\\_04/](http://www.tufts.edu/as/wright_center/fellows/bob_morse_04/)

Today, the ESA is a strong, vibrant organization. We need a few volunteers to help introduce electrostatics to young students. Would you be willing to help? I am excited to work with you to make the Electrostatics Society of America a more valuable resource for our members and for a new generation.

Kelly Robinson  
ESA President  
[Kelly.Robinson@SigmaXi.org](mailto:Kelly.Robinson@SigmaXi.org)

## Current Events

### EDITORIAL DISCLAIMER:

In the last issue I printed excerpts of an article entitled "Evidence Bubbles Over To Support Tabletop Nuclear Fusion Device". I also added the following statements of my own at the end of the article: "I thought this might be of interest given past presentations on sonoluminescence at several ESA conferences. Recent experiments have demonstrated fusion without the use of an external neutron source." These statements have caused some controversy that I regret. I overstated the case by saying the experiments have "demonstrated fusion ..." as this implies a definitive result. As you will see in the response below from ESA member Tom Prevenslik, these experimental results have come into question.

I want to make it clear that articles, or excerpts thereof, appearing in this newsletter, are selected based on their presumed interest to the readership. These selections should in no way be taken as an endorsement of reported results as that is not the function of this newsletter nor its editor. There is no agenda, hidden or otherwise, behind the selection of articles other than that of trying to present topics of interest, typically with some tie-in to electrostatics. The reader is encouraged to pursue these topics to further depths, if so inclined, and is provided some references to do so.

I hope this clarifies the environment in which these articles are selected. Please feel free to help in this process of providing newsletter content and send articles that you feel may be of general interest to me at [mark.zaretsky@kodak.com](mailto:mark.zaretsky@kodak.com).

Mark Zaretsky  
ESA Newsletter Editor

### Questioning Bubble Collapse and Nuclear Fusion Results

Recently, articles have appeared presenting (ed.) the false physics that sonoluminescence, better known as SL, can initiate nuclear fusion because of the high temperatures in bubble collapse based on computer calculations over the past decade of SL researchers Putterman, Lohse, and Taleyarkhan. The false physics may be summarized by: "Researches estimate that temperatures inside the imploding bubbles reach 10 million degrees and pressures comparable to 1,000 million earth atmospheres at sea level." *Id.* Because the SL researchers promoted the notion that a collapsing bubble produces high temperatures initiate fusion, this falsity is now thought correct by the public, the significance of which is that in the manner of sophistry, the truth is now denied by false public opinion. To wit, the bubbles do not collapse at high temperature. This is so, because the collapsing bubbles are only

filled with water vapor that does not increase in temperature and pressure as the volume vanishes, and except for some non-equilibrium effects the vapor condenses without any temperature and pressure change. In contrast, the SL researchers erroneously assumed the water vapor is a non-condensable gas in reaching their high temperature estimates currently, anywhere from 5,000 to 2 million degrees. The problem is their reputations are at risk if their high temperature hoax is exposed, as evidenced by the recent allegations of fraud by Taleyarkhan in the cover-up of bubble fusion experiments at Purdue University. See for example "Purdue Initiates Objective Review Of 'Bubble' Fusion"  
<http://news.uns.purdue.edu/UNS/html3month/2006/060308.Mason.fusion.html> or perform your own web search on bubble fusion.

Tom Prevenslik

### Mysterious Ball Lightning Created in the Lab

By Ker Than, LiveScience Staff Writer

Ball lightning is one of the most mysterious phenomena in nature. Now scientists have created a laboratory version of the eerie floating orbs using technology taken from a common microwave oven.

In the wild, the little bundles of energy are typically only a few centimeters across, although some have been reported to be the size of beach balls or larger. They are closely associated with regular lightning and thunderstorms and have been seen in many different colors. Witnesses report hissing sounds and an acrid ozone odor when the lightning balls appear. The vivid apparitions normally hover or float around for only a few seconds before vanishing suddenly, either silently or with an explosive bang.

Eli Jerby and Vladimir Dikhtyar from the University of Tel Aviv in Israel created a laboratory version of ball lightning using a "microwave drill." The device consists of a 600-watt magnetron taken from a domestic microwave oven and uses a powerful microwave beam to bore through solid objects. The researchers aimed the beam through a pointed rod and into a solid object made from glass, silicon and other materials. The energy from the drill created a molten hot spot in the solid object; when the drill was pulled away, it dragged some of the superheated material along with it, creating a fire column that then collapsed into a bright fireball that floated and bounced across the ceiling of the metal enclosure.

The glowing object measured just slightly over an inch across and lasted only about 10 milliseconds. The work was detailed earlier this month in the journal *Physical Review Letters*. "Our experiment confirms to some extent the theory that ball lightning originates from hot

## Current Events (cont'd.)

spots in the ground created by normal lightning," Jerby told LiveScience.

According to one popular theory, ball lightning forms when lightning strikes the ground and vaporizes mineral grains in the soil. The vaporized nanoparticles could then link together into chains and form a fluffy ball of silicon that floats on the wind. The particles react with oxygen in the air and release light as they burn.

Jerby thinks that his laboratory lightning balls could one day find practical uses in industry. "My imagination leads me to speculate on applications like 'bulb-less' light sources, coating and deposition or energy production," he said.

(Excerpted from [http://www.livescience.com/forcesofnature/060223\\_ball\\_lightning.html](http://www.livescience.com/forcesofnature/060223_ball_lightning.html) )

### Creating biocompatible fibers

Researchers at Virginia Polytechnic Institute and State Univ. (Virginia Tech), Blacksburg, have developed a single-step process for creating nonwoven fibrous mats from a small organic molecule—creating a new nanoscale material with potential applications where biocompatible materials are required. The research was carried out by Matthew McKee, a recent PhD graduate in chemical engineering and chemistry professor Timothy Long.

"Phospholipids, which are the main component of cell membranes in the human body, are exquisite in terms of their ability to self-organize," says Long.

The researchers used a natural mixture of phospholipids and neutral lipids called lecithin. These materials will spontaneously organize into cylindrical or worm-like strands to form membranes. McKee studied this self-assembly and conducted experiments to fundamentally understand the association of small molecules, and determined that once phospholipids form an entangled network, they can be treated similarly to higher weight molecules and electrospun into fibers.

The researchers fabricated lecithin into a sub-micron fiber by using electrospinning, a polymer processing technique. "Clothing fibers, such as polyesters and nylons, are composed of large molecules," explains Long. "Now, we are fabricating fibers from small molecules—ones with low molecular weight."

Under the microscope, the resulting mat shows a porous nonwoven structure. The size of the mat is limited only by the amount of material, such as lecithin.

"This represents the synergy of electrospinning, the use of self-organizing molecules, and fundamental research to understand the behavior of such molecules," says Long.

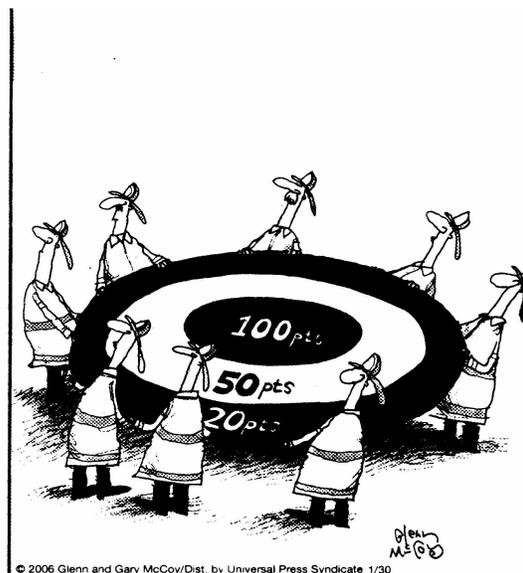
Long says that future opportunities are vast. "Potential applications include drug delivery, that is, a carrier and matrix to control the release of drugs."

"We have not yet tested the specific biocompatibility (cytotoxicity) of our fibers, but we have not changed the chemical structure of the phospholipids," adds Long.

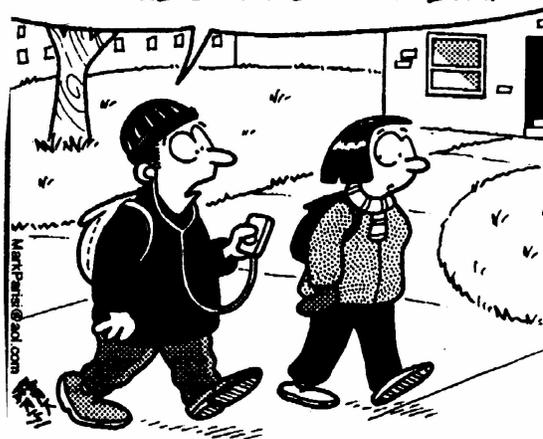
(From <http://www.rdmag.com/ShowPR.aspx?PUB-CODE=014&ACCT=140000100&ISSUE=0603&REL-TYPE=EMT&PRODCODE=00000000&PRODLETT=BW> )

## Random Charges

courtesy of Glenn Schmeig



IT HOLDS TONS OF SONGS, BUT  
IT'S BEEN STUCK ON THE THEME  
TO "THE BRADY BUNCH" ALL DAY...



## ESA OFFICERS

President	Kelly Robinson, Eastman Kodak
Vice President	Sheryl Barringer, Ohio State Univ
Executive Council	John Gagliardi, Rutgers Univ. Steve Cooper, Mystic Tan Nathaniel Green, U. of Bloomsburg

## WANTED: ESA Webmaster

The Electrostatics Society of America is currently seeking a Webmaster to join our leadership team. Our website is one of the most important communication channels for the ESA to reach our members and extend an invitation to all to learn about electrostatics. Our Webmaster position is responsible working closely with the ESA Executive Council to plan the growth of our website, implementing new features, and make necessary revisions to our existing content. Serving as the ESA Webmaster would be excellent experience and would help the ESA better serve our diverse members.

For further information, please contact: Kelly Robinson,  
[Kelly.Robinson@SigmaXi.org](mailto:Kelly.Robinson@SigmaXi.org)

## WANTED: ESA Awards Chair

The Electrostatics Society of America is currently seeking a person to run the awards nomination process. Awards are presented at our yearly June conference and are given for several important reasons including 1) recognition of significant achievements in the advancement of electrostatics, 2) excellence in teaching, and 3) service to the ESA. A complete listing may be found at <http://www.electrostatics.org/awards/index.htm>

For further information, please contact: Kelly Robinson,  
[Kelly.Robinson@SigmaXi.org](mailto:Kelly.Robinson@SigmaXi.org)

## CALENDAR

- ✎ ESA Annual Meeting, Jointly with IEEE-IAS, IEJ and SFE, June 6-9, 2006, Berkeley, California, Contact: Kelly Robinson, Tel: 585-477-4951, [Kelly.Robinson@SigmaXi.org](mailto:Kelly.Robinson@SigmaXi.org), website: <http://www.electrostatics.org>
- ✎ ISEI 2006, IEEE Int'l. Symp. on Elec. Insul., June 11-14, 2006, Toronto, Ontario, Canada, Contact: Dr. Howard Sedding, Tel: +1 416 207 6000, ext. 6172, website: <http://www.deis.nrc.ca/isei2006.htm>
- ✎ SFE 2006, Aug. 30-31, 2006, Grenoble, France, Contact: Prof. Pierre Atten, Tel: 33 476 88 11 71 (or 73), [pierre.atten@grenoble.cnrs.fr](mailto:pierre.atten@grenoble.cnrs.fr)
- ✎ 28th Annual Int'l. EOS/ESD Symposium & Exhibits, Sep. 10-15, 2006, Tucson, Arizona, website:

## Journal of Electrostatics

**Reminder:** The ESA is again offering a reduced price subscription to the Journal of Electrostatics. A lot of ESA members took advantage of this great deal last year. This super-low subscription rate is being offered to ESA members for personal copies of the Journal.

The Journal of Electrostatics is published in three volumes per year (4 issues per volume.) The aim of the Journal is the dissemination of knowledge relating to static electricity and targets a wide audience that includes physicists, electrical, mechanical, chemical, and aeronautical engineers, chemists, biologists, and individuals working in medicine and meteorology. The topics covered in the journal include electrostatic fundamentals, theory, modeling, applications, biotechnology, microengineering, computational methods, and electrostatic hazards. More detailed information about the readership, authors, aims, and scope of the journal can be found at <http://www.elsevier.com/locate/elstat>

If you are interested in receiving the Journal in 2006 please don't delay subscribing. The cost is \$115 US per year for ESA members. (Note that the normal subscription rate for non ESA members is over \$1,000).

To subscribe (or renew your last years subscription) please mail a check for \$115 to Steve Cooper - 540 Morton Road - Athens GA - 30605. Include your name and mailing address. Or you can return the subscription form on the ESA website: <http://www.electrostatics.org/links/jestatlet.html>.

**If you received the Journal last year and wish to receive it again in 2005 you must renew to avoid a disruption in your subscription.**

<http://www.esda.org/symposia.html>

- ✎ IEEE Conf. on Elec. Insul. & Diel. Phen., CEIDP, Oct. 15-18, 2006, Kansas City, Missouri, website: <http://www.ewh.ieee.org/soc/dei/ceidp/>
- ✎ 2006 ISEHD, 2006 Int'l. Symp. on Electrohydrodynamics, Dec. 4-6, 2006, Buenos Aires, Argentina, website: <http://www.fi.uba.ar/isehd2006/2006>
- ✎ Electrostatics 2007, 12th Int'l. Conf. on Electrostatics, IoP, Mar. 25-29, 2007, St. Catherine's College, Oxford, UK, Contact: Jasmina Bolfek-Radovani, Tel: +44 (0)20 7470 4800, [jasmina.bolfek-radovani@iop.org](mailto:jasmina.bolfek-radovani@iop.org) (abstracts due by Sept. 15, 2006) website: <http://conferences.iop.org/ELE/>

## Book Review

**Electrostatic Experiments: An Encyclopedia of Early Electrostatic Experiments, Demonstrations, Devices, and Apparatus.** By G.W. Francis. Edited and reformatted by Oleg D. Jefimenko. Electret Scientific Company, Star City, WV, 2005. \$48. 288 pp., hardcover. ISBN 0917406141.

There are only a handful of books of which I own two copies; one for my office, one for my office at home. Among these are C.V. Boys' *Soap Bubbles*, Isenberg's *The Science of Soap Films and Soap Bubbles*, and Moore and Crowley's *Electrostatics: Exploring, Controlling and Using Static Electricity*. G.W. Francis' *Electrostatics Experiments*, edited and reformatted by O.D. Jefimenko will soon join this list. This charming little book was originally published in the mid-19th century under the name *Electrical Experiments*. In his preface, Dr. Jefimenko notes that while the title *Electrical Experiments* was appropriate for the time, the subject matter today would be considered part of electrostatics; hence the change in title. Beyond this minor edit, Dr. Jefimenko's changes to the original text are all designed to make the book more accessible to the modern reader. A readable typeface is used, a glossary defining words whose meaning has changed is provided, and Dr. Jefimenko has added a description of the Wimshurst machine as well as pointers to literature appearing after the publication of Francis' manuscript.

*Electrostatic Experiments* is divided into ten chapters. Roughly, each chapter contains a discussion of the science of a particular aspect of electrostatics, a description of experimental evidence supporting the conclusions of this discussion, and numerous sections detailing various experiments and experimental apparatus related to the main topic of the chapter. Typical is Chapter 5, "Electrical Attraction, Repulsion, Induction, and Distribution." In this chapter, Francis begins by outlining the laws governing electrical attraction, in particular those based on Franklin's theory of electricity. While the modern sophisticated reader will probably be more comfortable with the mathematical statement of Coulomb's Law, from which three of the five laws stated follow, it is easy to imagine a younger reader finding Francis' formulation more accessible. Following the discussion of the laws of electrostatics, Francis presents a collection of "showy

experiments" that "enable us to exhibit, and to explain" the laws.

The real strength of the text lies in these numerous demonstrations and devices described and illustrated by Francis. While many will be familiar to students of electrostatics, one does not have to search long to find lost demonstrations and experiments well-worth repeating today. Francis' description of even standard demonstrations still makes for entertaining and informative reading. My favorite is his description of "the frightened head of hair" on page 89, an experiment familiar to anyone with an electrostatic generator and long hair. Francis suggests using a long-haired doll and tells us that each hair will stand on end "in the most grotesque manner." He also notes that with people, the effect is most conspicuous "when the hair is of grey color." Opposite his description of the hair experiment, Francis describes one of the many experiments in this book with which I was unfamiliar. This one is called "diverging threads" and consists of twenty eight-inch threads tied together at each end and hung from a conductor. When the conductor is charged, "the threads will recede from each other, forming a curious balloon-shaped body." The accompanying illustration, hand-drawn as are all illustrations in the text, is both informative and beautiful, and makes one wonder precisely what shape it is that the strings assume. Francis' text is chock-full of such experiments and demonstrations that I am sure will fire the imagination of any student of electrostatics.

I am certain that anyone interested in electrostatics who adds this text to their library will not be disappointed. Dr. Jefimenko is to be commended for making this obscure text accessible and available once again. The book is priced reasonably, is well-made, and likely to survive multiple readings. I hope someday that a less expensive paperback edition will appear, making the book available to high-school students and other young people who I am sure would be inspired by this text. For now, I highly recommend adding at least one copy to your library.

John A. Pelesko  
University of Delaware, Newark, Delaware

## Sources and Sinks

### Historical Electrostatics

Recently our member Anne Benninghoff forwarded an article on old scientific equipment which is displayed at Harvard. As you would expect, there are pieces related to time-keeping, astronomy, and optics. But also electrostatics.

One picture shows an airpump and flywheel which was used by the Abbe Nollet to rub objects together in vacuum. He did this in Paris about 1746. Jean-Antoine Nollet was well known at the time of Benjamin Franklin.

Glenn Schmieg

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### ESA Information

ESA Home Page: <http://www.electrostatics.org>

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**2006 ESA Annual Meeting**  
**Joint with IEEE-IAS, IEJ, & SFE**  
**June 6-9, 2006**  
**University of California at Berkeley**  
**Berkeley, California, USA**  
**Preliminary Program & Registration Form Enclosed**