



ESA Newsletter

Electrostatics Society of America - The Friendly Society

President's Message

I am honored and thrilled that the members of the Electrostatics Society of America have put their faith and trust in my leadership. I am honored because our Society is strong and well respected as the Friendly Society. I have a deep passion for electrostatics technology. When I have ventured into other pursuits, I have rediscovered that tackling electrostatic challenges is more satisfying to me than solving virtually any other problem. The ESA culture draws me. I enjoy attending our Annual Meetings, listening to presentations, and especially participating in the discussions and friendly debates.

I am thrilled because our Society has great potential to be more than we are today. In our constitution, I find the following words.

PURPOSE. The Society shall serve to unify and integrate the varied, diversified, and often isolated areas of electrostatic researches and applications by bringing together the workers in these areas through conferences, conventions and otherwise, for the mutual benefit of all; it shall serve the needs of its members by exchange of information, such as by a news sheet, and possibly eventually through a journal; it shall promote the proper growth and recognition of electrostatics in suitable ways, such as to secure the cooperation of the schools so that teaching of electrostatics may not be ignored; in general, it shall serve the cause of electrostatics in all possible ways; and it shall cooperate with like groups abroad to the mutual benefit of all.

Our founders were clear thinkers! The ESA must serve our diverse members for the mutual benefit of all. How best can we serve you? What more should we do to promote the proper growth and recognition of electrostatics ... to promote growth and interest in your work?

I am proud that members of the ESA are diverse and represent a broad spectrum of interests. I am among several of our members that are involved in industrial research, development, and product commercialization. Many of our members work in academic research, graduate, and undergraduate education. Others of us are application engineers, manufacturers of specialty equipment, inventors, entrepreneurs, private consultants, or teach in high schools or grade schools. And, of course, our Society has worked hard to involve more college students in our activities. In past years, we have supported high school science fairs and physics classes.

In the coming months, I'll share with you some ideas on how we might better serve our members ... on how your membership in the ESA might become more valuable. However, I am much more interested in your ideas and your vision for what the ESA can be. Please share your ideas with me! Or, better yet, share your ideas with your colleagues by contributing them to our Newsletter.

We are a strong, vibrant organization. I am excited to work with you to make the Electrostatics Society of America more valuable and more important to you.

Kelly Robinson
ESA President

Outgoing President's Message

It's hard to believe but my two-year term as president of the ESA came to a close at the annual conference last June. The time has passed very quickly. The ESA has truly lived up to its moniker "The Friendly Society". The tradition of respect, honor, helpfulness, and dedication to scientific enquiry is what prompted me to accept this position. The society has proved to live up to this identity.

I want to thank my council consisting of John Gagliardi, Sheryl Barringer and Mark Zaretsky, Vice President, Kelly Robinson, Treasurer/Secretary, Steve Cooper, my predecessor, Mark Horenstein, Awards Chair, Lance Jerale, our unofficial publishing committee of Joe and Barb Crowley and our historian, Anne Benninghoff. I want to give Mark Zaretsky a special thanks for the thankless job of publishing this newsletter. We all truly appreciate this effort. These members have proved to be a wonderful, supportive group who truly made my job easy and as pleasurable as can be expected.

A.D. Moore was one of the founding fathers, if not the founding father, of the ESA and set the tone for a friendly, cooperative organization which still carries on in this tradition. I only wish I had the pleasure to have gotten to know him better. It is interesting to note that there has become almost a friendly competition among electrostatic societies internationally to see who can be the most accommodating and friendly. I feel that it was rather bold for a society to call itself "The Friendly Society". That it might detract from the seriousness of the scientific focus of the group. In hindsight, it gave a very down-to-earth and compassionate quality to the group, where we are all people with a common interest first and the science almost takes a secondary spot. This isn't to detract from the science, but to keep things in a proper perspective.

I feel very good passing the ESA presidency to Kelly Robinson. He was an exceptional vice president, who took great interest in the activities of the ESA. He's the organizing force behind the student paper competition, which appears to be evolving into a new tradition of the ESA.

It was my honor to serve as president. I only hope that I did the position justice.

See you next year at the ESA meeting in Berkeley, California.

Bill Vosteen

Outgoing ESA President

Calendar

- ✓ IEEE Electrostatic Processes Committee 2005
Annual Meeting, Oct. 3-7, 2005, Hong Kong China,
Contact: Prof. Malay Mazumder, Tel: 501-569-8007;
Fax: 501-569-8020, website:
<http://dynamic.appsci.ualr.edu/labs/mkml/Index.html>
- ✓ Electrical Insulation Conference (EIC), Oct. 24-26,
2005, Indianapolis, Indiana, USA, info:
<http://www.deis.nrc.ca/eic2005/eic2005.htm>
- ✓ IEEE Conf. on Elect. Insul. & Diel. Phen., Oct. 16-19,
2005, Nashville, Tennessee, Contact:
ceidp@ieee.org , website:
<http://www.ewh.ieee.org/soc/deil/ceidp/5>
- ✓ ESA Annual Meeting, Jointly with IEEE-IAS and IEJ,
June 6-9, 2006, Berkeley, California, Contact: Scott
Gehlke, Tel: 501-704-2613, sgehlke@ion.com , web-

site:

<http://www.electrostatics.org/Call%20for%20Papers%202006.htm>

- ✓ 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, Howard.Sedding@kinectrics.com , website:
<http://www.deis.nrc.ca/isei2006.htm>

Society News

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

Reflections on the 2005 ESA Annual Meeting

Kelly Robinson
ESA President

Our 33rd Annual Meeting of the Electrostatics Society of America was held on the University of Alberta campus in Edmonton. Thanks to **Angela Antoniu**, our General Conference Chair, the meeting facilities were excellent, accommodations were comfortable, and Faculty Club meals were delightful.



Our Tuesday evening welcome reception provided an opportunity to meet interesting people and renew friendships.

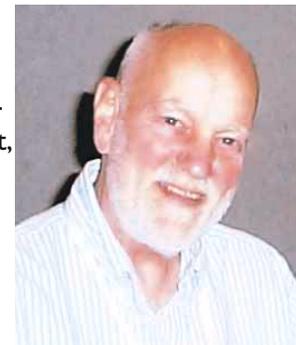
Prof. **John Pelesko**, our Technical Program Chair, did a great job organizing the presentations by themes into 7 sessions and a poster session.



Thanks to the generosity of Mystic Tan, Inc. our Student Paper Competition was a great success.

Eight student presentations were recognized on the basis of presentation clarity, response to questions, and technical merit. Winners, recognized at our Banquet on Thursday evening, are listed below.

After our excellent banquet meal at the University of Alberta Faculty Club, **Glenn Schmeig** delighted conference participants with a presentation that called attention to the beauty of light and how it can be bent, spread, and displayed in nature.



After the technical presentations had concluded on Friday afternoon, conference participants enjoyed an informative tour of the Canadian Institute of Nanotechnology on the University of Alberta campus.

Thanks to Dr. Al Seaver, you can enjoy the rest of the photos from our 2005 Annual Meeting at his website: <http://electrostatics.us/photos.jsp>

1st Prize Awards

Presenter	Affiliation	Presentation
C. Roero	ETH Swiss Federal Institute of Technology	Water Drops on High Voltage Transmission Lines
Sanket Goel	University of Alberta	High Voltage Switching of Electro-Osmotic Flow in Microfluidics
Lin Zhao	University of Western Ontario	Electrostatic Levitation Unit: Experimental Study Versus Numerical Simulation

2nd Prize Awards

Presenter	Affiliation	Presentation
Z. H. Khan	Ohio University	Capturing Fine Particulates with Sieving Electrostatic Precipitator
S. Zhao	University of Western Ontario	Air Assisted Electrostatic Liquid Spraying: A Short Circuited Electrogasdynamic Energy Converter
J. Zhang	University of Western Ontario	Multispecies: DC Stationary Model for Negative Corona Discharge in Oxygen: Point-Plane Configuration

3rd Prize Awards

Presenter	Affiliation	Presentation
Brian Lau	University of Alberta	Challenges and Packaging Solutions in Portable QC Laser Systems for Atmospheric Gas Detection
A. Rapa	University Alexandru Ioan Cuza, Douglas College	1. Corona Discharge Effect on Cell Proliferation in Plants 2. The Impact of Corona Discharge in Young Plants Exposed to Electromagnetic Waves.



Call for Papers

2006 Joint Conference ESA/ IEJ / IEEE-IAS

June 6-9, 2006

University of California at Berkeley

Berkeley, California USA

The 2006 Electrostatic Society of America (ESA), the Institute of Electrostatic Japan (IEJ), and the Institute of Electrical and Electronic Engineers, Industrial Applications Society (IEEE-IAS) electrostatics groups will hold their 7th and 2nd Joint Conferences, respectively, on the campus of the University of California Berkeley, Berkeley, California from June 6-9, 2006. Members of La Société Française d'Electrostatique (SFE), along with others, will be joining us for possibly the largest, most diversified, international gathering of those involved in electrostatics ever in North America. Join us for our technical sessions including comprehensive technical papers, a Student Paper Competition, informal discussions, poster sessions, and electrostatic demonstrations.

Topics of Interest Include:

Atmospheric Electricity	Electrostatic Drug Delivery	ESD Prevention and Detection
Biological applications	Electrostatic Painting	Ionization and Charge Control
BioMEMS and BioFluidics	Electrostatic Powder Coating	MEMS Devices
Breakdown and Discharges	Electrostatic Micro-encapsulation	Non-thermal Plasmas
Charge Neutralization	Electrophoresis	Nano-electrospray applications
Computational Methods	Electroviscous effects	Particle Control & Transport
Display Devices	Electrostatic Printing	Precipitators and Cleaners
Electrets	Electrostatic Propulsion	Safety and Hazards
Electrohydrodynamics	Electrostatics Demonstrations	Sprays and Droplets
Electrophotography	Electrostatics Education	Triboelectrification

Deadlines:

February 3, 2006: Titles, Paper Summary and name of 1 – 2 relevant subject area from the list above are due for submission on this web site.

Mid-February: Registration and Detailed conference information will be available on this web site.

February 15, 2006: Notification of Paper Acceptance.

March 15, 2006: Final Manuscripts Due. Instruction for authors will be available on this web site along with templates for MS Word and Latex.

Journal Publication: Authors may request their manuscripts be considered for publication in either the *Journal of Electrostatics* or *IEEE Transactions on Industry Applications*.

Student Paper Competition:

To encourage participation by student researchers, all presentations (either in the main session or poster session) that have a student as the presenter and first author will be considered for the student paper competition. Undergraduate and graduate students are eligible. Papers will be judged on their technical merit and the cogency of their presentation. Please indicate at submission that the abstract is to be considered for the student paper competition, and list all student authors.

Please watch the ESA website (<http://www.electrostatics.org>) for the most up to date information.

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Current Events

Proving Da Vinci right at the atomic scale

Ames Lab researchers use quasicrystal to prove 500 year-old theory

AMES, Iowa – A genius well ahead of his time, Leonardo Da Vinci continues to inspire even 500 years after his remarkable life. His works are central to the best selling mystery novel *The Da Vinci Code* and its upcoming film adaptation, and his theories on friction are helping a group of scientists from the U.S. Department of Energy's Ames Laboratory and Lawrence Berkeley National Laboratory unlock the mystery of friction at the molecular level.

In a nutshell, Da Vinci proposed that if two contacting surfaces are geometrically similar, – commensurable – they will have a much higher coefficient of friction than two geometrically dissimilar surfaces, due to the fact that the similar surfaces have a tendency to interlock. To test this theory at the molecular level, the research team looked at a quasicrystalline material that exhibits both periodic and aperiodic configurations in its crystal structure. What they found, in results to be published in the August 26 issue of the journal *Science*, was that friction along the periodic surface was about eight times greater than the friction along the aperiodic axis.

(Ed. note: Interesting as friction typically plays a major role in tribocharging processes. For more info. see <http://www.external.ameslab.gov/final/News/2005rel/Friction.htm>)

Sandia's dielectrophoresis device may revolutionize sample preparation

LIVERMORE, Calif. — Researchers at Sandia National Laboratories in California have developed an enhancement to a well known “force phenomenon” called dielectrophoresis that they say could revolutionize the way biological sample preparation is conducted. Sandia is actively seeking commercial partners to help bring the technology to the marketplace.

Known as an insulator-based dielectrophoretic device (iDEP), the new tool developed at Sandia selectively — and very quickly — concentrates live pathogenic bacteria within large water samples. The technology development was internally funded through the Laboratory-Directed Research and Development (LDRD) program.

How iDEP works

First reported by Pohl in 1951, dielectrophoresis is the movement of particles toward concentrated electric fields. The magnitude and direction of this motion depends on the size and shape of the particle as well as on the difference in conductivity between the particle and the suspending fluid. Thus, cell types can be sorted dielectrophoretically on the basis of shape and size, and

dead cells separated from live on the basis of their higher conductivity.

Conventional dielectrophoretic sorters place electrodes within a sampling device and use the non-uniform electric field adjacent to electrodes to provoke dielectrophoretic motion of cells. Unfortunately, these electrodes require costly microfabrication, produce bubbles and electrolysis products that can harm device operation, and can damage cells with their strong field gradients.

In contrast, iDEP places electrodes outside the device. Current from the electrodes conducts through the particle-bearing liquid into the device where patterned walls or insulating obstacles produce the required non-uniform electric field. This arrangement eliminates many of the disadvantages of conventional devices: insulating structures can be replicated economically, produce no electrolytic effect, and can be contoured to be gentle on cells.

(excerpted from <http://www.sandia.gov/news-center/news-releases/2005/all/idep.html>)

Room Temperature Ice

The American Institute of Physics Bulletin of Physics News, Number 742 August 19, 2005 by Phillip F. Schewe, Ben Stein, and Davide Castelvocchi (Courtesy of Al Seaver)

ROOM TEMPERATURE ICE is possible if the water molecules you're freezing are submitted to a high enough electric field. Some physicists had predicted that water could be coaxed into freezing at fields around 10^9 V/m. The fields are thought to trigger the formation of ordered hydrogen bonding needed for crystallization. Now, for the first time, such freezing has been observed, in the lab of Heon Kang at Seoul National University in Korea, at room temperature and at a much lower field than was expected, only 10^6 V/m. Exploring a new freezing mechanism should lead to additional insights about ice formation in various natural settings, Kang believes (surfion@snu.ac.kr). The field-assisted room-temperature freezing took place in cramped quarters: the water molecules were constrained to the essentially 2-dimensional enclosure between two surfaces: a gold substrate and the gold tip of a scanning tunneling microscope (STM). Nevertheless, the experimental conditions in this case, modest electric field and narrow spatial gap, might occur in nature. Fields of the size of 10^6 V/m are, for example, are thought to exist in thunderclouds, in some tiny rock crevices, and in certain nanometer electrical devices. (Choi et al., *Physical Review Letters*, 19 August 2005; for another example of seemingly room-temperature ice, see <http://www.aip.org/pnu/1995/split/pnu225-1.htm>)

Electrostatics
Society of America



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CALL FOR PAPERS

2006 ESA Annual Meeting, Joint with IEEE-IAS & IEJ

June 6-9, 2006

University of California at Berkeley

Berkeley, California, USA