



# ESA Newsletter

Electrostatics Society of America - The Friendly Society

## President's Message

In the last newsletter, John Chubb's letter regarding standards committees stirred our membership a bit, as expected, and brought a couple of letters, which we're sharing in this newsletter. One comment that was repeated in both letters is the need for financial support from both private and government sources to compensate writers and reviewers for their time and expenses. If the funding is nominal and the funds are dispersed on a piecemeal basis, I might be able to support such an idea. The idea of having enough funding for someone to enhance him or herself financially or make a good portion of their career as a standards committee(s) member doesn't sit too well with me. Presently, the committee member's company (employer) covers the expenses involved with participating on the standards committee. Without outside financial support, the committee member's reasons for serving on the committee are mainly for furthering their career. Some benefits may be a deepening/broadening of the person's interest and involvement in the field, or supporting the business interest of the employer. If the amount of cash assistance is too great, I could see all sorts of problems that could be created. I doubt there would ever be enough cash involved to create these kinds of problems in the area of electrostatic-related standards. We could look to other areas in which standards are written, where funding has been used and see what problems have occurred, if any. There are many very competent researchers, scientists, engineers and consultants who don't have the time or the financial resources to participate as committee members on a regular basis. These are the people who could possibly be available to offer their expertise periodically if funds were available.

Changing the subject, Angela Antoniu and John Pelesko are doing a great job on our annual conference in Edmonton this June. The facilities sound very nice and Angela has arranged a variety of very nice accommodations suitable for every budget. You can take a look at the housing options at <http://www.uofaweb.ualberta.ca/conferenceservices/>. Angela and John are organizing our second student paper competition and have some outstanding invited speakers,

which should make for another good conference. The conference registration form is included in this newsletter (see insert).

Steve Cooper, our treasurer, has sent out the ESA dues invoices for 2005. Please pay them promptly as we need these meager dues payments to operate our all-volunteer organization. Steve does prefer to be paid by Paypal as it makes his accounting extremely simple. You will not be reminded, so please don't misplace your invoice.

The second year of my term is winding down and it's time to think of the election of a new Executive Council and officers. You will find a reprint of the section of our constitution regarding the election of our Executive Council in this newsletter (p. 7). I'm surprised at how fast the term has passed and I appreciate how easy it has been to work with such a great, supportive group on the council and in the ESA membership.

Mark Horenstein has informed me that he would be willing to step down as the ESA webmaster. Mark developed this website and has been maintaining it for almost 10 years. We all truly appreciate this level of service and dedication to the ESA. Currently, the amount of work to maintain the website doesn't entail too much time. Just adding the newsletter and updating information on a regular basis. This could change, I could envision our website becoming a major electrostatic information crossroads in the hands of an inspired Executive Council and a webmaster with time and ideas to invest. We would most likely have to move our site to another server convenient to the new webmaster as it is currently on a server at Boston University. If anyone reading this feels motivated to help out, please contact me.

Hope everyone is having a good winter. We're finally having a few sunny days which makes life in Western NY much more bearable this time of year. Even though there is a foot of snow on the ground, we know that spring is around the corner.

*Bill Vosteen*  
ESA President

## Sources and Sinks

### Comments on the Preparation of Standards

In last month's newsletter (Nov/Dec 2004) there appeared an opinion by John Chubb regarding the process used to draft standards documents on electrostatic measurements. Presented here are two responses to John's letter.

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**David L. Myers, Ph. D., D&S Consulting**, *email: myers.david@earthlink.net*

How can the measurement be incorrect? I followed the "Standard".

I am a relatively new member of the ESA, but I have quickly grown to enjoy the bimonthly newsletters. The Nov/Dec 2004 newsletter was no exception. I found the discussion of measurement standards to be both thought provoking and relevant to some work that I have been doing over the past few years. I am a physical chemist by training, and became well versed in the use of standard methods during a brief period of my career when I worked in the chemical industry. Recently, I have been working on the revision of a standard test method that directly effects how the performance of particular type of consumer product is measured. Neither the type of consumer product nor the details of the test standard are germane to my comments, so I will not disclose information about them. Rather, I would like to comment on the process and politics of the standards setting and revision process.

In John Chubb's comments he points out a serious flaw in the standards setting process, namely a lack of scientific or peer review by people versed in the technology, but outside the standard setting committee. I was appalled to find that very little scientific oversight is given to the establishment of standards that have the potential to change how products are marketed, sold, and perceived by the consumer. My specific experience was that the standards setting organization provided a framework within which the committee functioned, but provided very little oversight or review of the research that was done in support of the new or revised standard. In fact, few of the committee members actually bothered to read the final report that was submitted at the completion of the research phase of the process. No scientific or peer review was requested or required prior to acceptance of the reports findings. Oral presentations and overviews were considered to be adequate for informing members of the committee. As a participant operating outside the actual committee membership, one is given very little opportunity to provide technical insight or interpretation of research results. A participant's professional affiliation is viewed as critical to determining the credibility of their comments, rather than their comments being judged based on technical merit.

I concur with both John Chubb and Bill Vosteen that standards ought to reflect the best interpretation of the science behind the measurement. Standards should be required to reference pertinent technical literature, and some review process should be established that encourages rigorous technical review. Standards setting organizations should secure funding from both government and private sources to compensate reviewers for their time and technical insight. Revision of standards should be an ongoing process driven by new learning not by new sales targets. There is nothing glamorous about working on test and measurement standards. It is difficult to gain consensus from groups of people with diverse opinions and agendas. However, measurement standards have become a cornerstone for judging the credibility of products supplied by businesses large and small. It seems appropriate that the scientific community should take a more active role in shaping the dialog on how to improve the standards setting process.

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**David E. Swenson, Affinity Static Control Consulting, L.L.C.**, *2609 Quannah Drive, Round Rock, TX 78681, (Office + (512) 244-7514, Fax + (512) 244-1441, email: deswenson@affinity-esd.com*

I read with interest and some concern the column provided by our esteemed and well-known colleague, John Chubb, published in the Nov/Dec 2004 ESA Newsletter. While there are a few areas where I can agree with what Dr. Chubb wrote, I cannot agree with many points.

I too have been involved with the standards development process on the National and International level for over 20 years. Often times it is a frustrating experience because it is an inherently slow process and always full of individual agendas. After all the "dust settles", and the arguments and discussions completed, the final results of a finished standard should be something the writers can be proud of. When the group that works on a standard is unhappy with the result, there is something wrong with the process. Naturally, a standard or other document that is created by a group must be based on compromises in order to get published. That fact alone should be enough to show that the process to create a consensus document, of any type, is difficult and the resulting published work may not be as powerful as some of the members of the group might want. None-the-less, the group should be happy with the final results. ➡➡

## Sources and Sinks (cont'd.)

(Swenson cont'd.)

Each of the points made by Dr. Chubb are addressed in the following sections.

1) People that have an interest in a subject area will find out about new standards through information searches that they will make as part of their normal routine. More likely than not, people that have a material or specific interest in a subject area will know who is working on standards or at least which organization is involved. Standards development is not done in a vacuum.

2) When a new standard is being considered, at least in the American National Standards Institute (ANSI) system, an informational document outlining the proposed new work is published in a public forum document called Standards Action. Anyone who has an interest in the subject area may apply to the responsible organization and request to be involved. If the organization does not have the person's specific expertise already on the committee or the person represents an alternative, but responsible view, generally they are considered for membership. The technical community must recognize expertise before a person is considered an expert for committee activity.

3) When specific expertise is needed on a committee activity, it is actively sought. Committee members do not have to be members of the organization to assist in standards development in the ANSI system. Other parts of the world may have their own way of soliciting expertise but in the US it is pretty open as long as a person has something positive to offer.

4) In the ANSI system, ALL standards documents are sent out for a lengthy industry review. The review list goes well beyond the committee that prepared the document.

5) Dr. Chubb refers to an area of particular concern to him in his statement #5. He has submitted specific information on a certain test method he proposes to many different groups around the world, including the ESD Association in the United States. He has presented papers covering this specific area in many conferences. Much of the standards development world, at least the part involved with electrostatic measurements, is quite familiar with this work. On numerous occasions, concerns have been brought up regarding this specific test method. However, this is not the place or time for that discussion (maybe another time). The specific test method has not been considered for adoption as a US standard because there are certain issues that are of concern to the North American reviewers. The information is well known in the electrostatics community and there has been significant discussion. It is not that there has been no response, it has been responded to adequately from the North American perspective.

6) Standards exist for years – generally until they are ruled obsolete by the organization that produced them. I can agree that several standards that are controversial, such as FT(M)S 101C Method 4046 (now MIL-STD-3010, Test Method 4046), are often referenced inappropriately. While some standards are old and may not apply to some modern areas, they still have utility in specific areas. This becomes a matter of education for the industry to ensure that test methods or other procedures are used correctly and appropriately. Simply canceling a standard does not mean it will go away quickly. We are working very hard in North America to try to provide education related to electrostatics and electrostatic measurements. Organizations such as the ESA and the ESD Association are very important in bringing these messages to industry.

I might point out that the standard referenced above is not a resistance test method but an electrostatic decay test method. Interestingly enough, the test method that Dr. Chubb is most concerned about is, in essence, a portable version of an electrostatic decay measurement.

Very often, technical papers become the basis of a standard although the technical paper is not recognized in the References. This is an issue that can be discussed but it is a matter of principle and established policies and procedures within each standards development body.

8) Every standards development group in the ANSI system has an appeal process. In the case of the ESD Association, the first level of appeal is to the Standards Chairman. A higher level of appeal will go to the president of the organization. Beyond that, an appeal can be made to ANSI directly. Of course, that does not mean the person who has an appeal will have it upheld. There may be difficulty with the appeals process in other parts of the world but in the US there is a procedure. ➡➡➡

## ESA 2005 Conference

The annual meeting of the Electrostatics Society of America will be held this year on the campus of the University of Alberta in Alberta, Canada. Running from the 21st to the 24th of June, the meeting will feature technical presentations on classical electrostatics topics such as atmospheric electricity and triboelectrification as well as technical presentations on emerging electrostatics topics such as electrostatically driven granular media and electrostatic nanodevices. Of special note are the presentations by our invited speakers, all of whom bring new expertise to the ESA. These include Robert Blick of the University of Wisconsin, Charvaka Duvvury of Texas Instruments, Stein Kuiper of Phillips, Joerg Lahann of the University of Michigan, Igor Aronson of Argonne National Laboratory, Ronald Phillips of UC Davis, and Osman Basaran of Purdue University. The rapidly becoming traditional student paper competition will once again be held. Undergraduate and graduate students are encouraged to attend, to present their work, and participate in the competition. Details, including accommodations and reservations, may be found at: <http://www.electrostatics.org>. Please follow the links in the Registration Form.

We look forward to seeing you in Alberta!

Angela Antoniu (General Chair) and John Pelesko (Technical Chair)

## Sources and Sinks (cont'd.)

*(Swenson cont'd.)*

9) Funding for standards is an issue. In the US, there is NO Government funding for industry standards at all. Volunteers have to evaluate test methods and standards in the US since there is no other way. The main point is to have a representative cross-section of industry involved so all issues are brought to the table. When an ESD Association standard is released (after the Draft stage), it has been thoroughly vetted, reviewed, and tested.

10) I agree with Dr. Chubb's description of Round Robin testing. This testing makes sure the method, as described and defined, works as intended. Round Robin testing does not show that the method provides useful information. The appropriateness and applicability of the test method should have been determined long before it was ever put into a committee for preparation as a test method. Frankly, this is one of the reasons that the method Dr. Chubb is most concerned about has had difficulty in getting support of standards producing groups.

Nearly all of Dr. Chubb's suggestions are implemented in the ANSI organizational procedures. The objectives of proposed test methods and standards are published in Standards Action for a period of time and any interested party can find the information.

Draft documents go through a thorough industry review before being published as a final document. Experts are part of the standards development process. Experts that were not part of the process have the ability to comment. An appeal process is in place for all ANSI standards development organizations.

All of the measurement method standards developed in the ANSI system MUST have calibration and validation procedures. The Foreword of each document provides general background information that is necessary to understand the rationale behind the test method.

All ANSI documents are available for professional comment during the Draft to Final review process. However, it is up to each individual to know what is going on in their industry and where to get standards for review. This information is not talked about on the 6:00 PM TV news.

Government funding of industry standards is not likely to happen in the US. In other countries, there is some Government funding.

I am personally convinced that the standards and test method development process, in the US, is as open as it needs to be. Anyone that shows an interest, commitment and responsibility, may participate in the areas that they are concerned about. However, it is difficult to maintain the goal of openness if it is well known among industry peers that a specific individual has a significant personal agenda.

*Editor's Note:* For information on IEEE standards development, including a process that is open to formal participation by companies, visit <http://standards.ieee.org>

## Current Events

### Zap! A Music Review

Humphrey Wong

“Zap! Music for Van de Graaff Generator, Robots, Instruments and Voices” played to a full house in the Thomson Theater of Electricity at Boston’s famed Museum of Science on Friday evening, February 4, 2005. Created by Christine Southworth, a 2002 MIT grad in mathematics and music composition, the hour long event featured fanciful excursions into “post-minimalist acoustic-electronica” coupled with the pyrotechnics of enormous bolts of electrical energy for which the Thomson Theater is famous.

The musicians played from a relatively safe perch overlooking most of the audience and used a flute, two keyboards, a cello, a guitar, a bass, and various percussion instruments. The “robots” consisted of a xylophone-like device, a plucked string instrument and a drone instrument. The Van de Graaff generator, consisting of two massive globes atop twin 40 foot tall insulating columns, and the Tesla coils were controlled by a team led by Ms. Leila Hasan, a robotic engineer also from MIT. The generator dominates the Theater and was flanked on each side by large video screens displaying the band, interspersed with visual effects. Lights dimmed and the audience was silent as we waited for the show to begin.

“Zap!” opened with meters long arcs from the Van de Graaff, accompanied by something that sounded like an Aboriginal Didjeridoo. The bolts alternately cracked from the right and the left as the tinkling of bells (the robotic xylophone perhaps?) mimicked the sound of rainfall on a tin roof. It reminded me of one morning spent in a hotel in Nicaragua, rain pounding relentlessly overhead as thunder bellowed outside.

Christine, the composer, climbed into a protective “bird cage” as a plastic hand-key-kite simulacrum of Franklin’s famous experiment drew our attention. A tiny threadlike spark leaped repeatedly from key to ground as the voltage built up overhead on the twin globes. A drumbeat grew and grew to a crescendo. The kite rose upward and the tiny spark became nearly continuous, trying to keep up with the burgeoning voltage buildup, but at last a mighty bolt of indoor lightning closed the gap between kite and Van de Graaff, dwarfing the sound of the drum. A hissing sound drew my attention to two foil-covered balls overhead, close enough to the high voltage to produce noisy sprays of ions from their rough surfaces, propelling the balls away from the generator’s summit.

Slowly, the cage containing Christine rose up to the middle level, fearfully close to the electrical display. She sang in a high pitched ululation, an eerie sound that contrasted

with the instrumental music and the electrostatic displays above her. The lightning reached down and struck the cage over and over again, joining her singing in cracks redolent in high frequencies.

Christine stopped and sat down within the cage. The music continued and the tang of ozone became noticeable. Keyboard rhythms mixed with hot guitar licks, a rattling tambourine sound (the robot again?) and hefty sparks jumping faster and faster. Languorously, a horizontal spark climbed Jacob’s ladder. Finally, as the twin globes of the Van de Graaff were bathed from underneath in reddish light, the music turned somber, slowing down as if to give the atmosphere a rest from the experiences it had undergone within the confines of the Theater, and the concert drew to a close.

I think most of the audience felt as if they had experienced something unique. I know that I had. With luck, Ms. Southworth will have another opportunity to collaborate with the Museum again and experiment with the multi-sensual compositions of which this, hopefully, was only one.

(for further info. see <http://www.kotekan.com> )

### Advance in Transparent Electronics Could Spawn New Industry

Researchers at Oregon State University and Hewlett Packard have reported their first example of an entirely new class of materials which could be used to make transparent transistors that are inexpensive, stable and environmentally benign. Findings about this new class of “thin-film” materials, which are called amorphous heavy-metal cation multicomponent oxides, were just published in a professional journal, Applied Physics Letters. The new transistors are not only transparent, but they work extremely well and could have other advantages that will help them transcend carbon-based transistor materials, such as organics and polymers, that have been the focus of hundreds of millions of dollars of research around the world. “Compared to organic or polymer transistor materials, these new inorganic oxides have higher mobility, better chemical stability, ease of manufacture and are physically more robust,” said John Wager, a professor of electrical and computer engineering at OSU. The newest devices are zinc-tin-oxide thin film transistors, an evolution of zinc oxide transistors, which gained attention as the world’s first see-through transistor when OSU scientists announced their discovery last year.

(for more info. see <http://www.scimag.com/ShowPR.aspx?PUB-CODE=030&ACCT=3000000100&ISSUE=0501&REL-TYPE=PR&ORIGRELTTYPE=IW&PRODCODE=00000000&PR-ODLETT=S&CallFrom=Newsletter> )

## Current Events

### Magnetic Shaving

Magnetic shaving technology offers deeper and more thorough hair removal, decreased shaving frequency, lessened irritation, and more recovery and conditioning time for the skin.

The system consists of a set of products that work together and reinforce each others' effectiveness. They consist of:

\* Preconditioning lotion, gel, or foam, in which are suspended minute magnetic particles of ferrous oxide, magnetite, or similar substance, that adhere to the hair shafts. The preconditioning lotion can also open pores, lubricate, and perform other functions.

\* A razor -- manual or electric or some other design - that includes one or more magnets. The magnets (which may be electro-magnets) draw the prepared hair out further from the surface of the skin than can an ordinary razor and lubricant. The magnetic razor then cuts the drawn hair off beneath the skin's surface -- all without sacrifice to the skin.

\* Post-removal lotion that is applied to the treated area to condition and neutralize the skin. The post-removal lotion can also tighten skin, close pores, and perform other conditioning functions.

Particles of hair or magnetic material that adheres to the blade can be removed by reversing the magnetic polarity of the blade, cleaning it thoroughly. The magnetic skin products form an integrated system of skin care and hair removal. The technology includes formulations for magnetic particulates, razor designs, and preferred embodiments for pre- and post-removal lotions.

(for more info. see <http://www.yet2.com/app/insight/techofweek/35455?sid=240> )

### Nuclear Microbatteries

(excerpted from <http://www.spectrum.ieee.org/WEBONLY/publicfeature/sep04/0904nuc.html> )

For these batteries, which we call radioactive piezoelectric generators, the radioactive source is a 4-square-millimeter thin film of nickel-63. On top of it, we cantilever a small rectangular piece of silicon, its free end able to move up and down. As the electrons fly from the radioactive source, they travel across the air gap and hit the cantilever, charging it negatively. The source, which is positively charged, then attracts the cantilever, bending it down.

A piece of piezoelectric material bonded to the top of the silicon cantilever bends along with it. The mechanical stress of the bend unbalances the charge distribution inside the piezoelectric crystal structure, producing a

voltage in electrodes attached to the top and bottom of the crystal.

After a brief period—whose length depends on the shape and material of the cantilever and the initial size of the gap—the cantilever comes close enough to the source to discharge the accumulated electrons by direct contact. The discharge can also take place through tunneling or gas breakdown. At that moment, electrons flow back to the source, and the electrostatic attractive force vanishes. The cantilever then springs back and oscillates like a diving board after a diver jumps, and the recurring mechanical deformation of the piezoelectric plate produces a series of electric pulses.

The charge-discharge cycle of the cantilever repeats continuously, and the resulting electric pulses can be rectified and smoothed to provide direct-current electricity. Using this cantilever-based power source, we recently built a self-powered light sensor. The device contains a simple processor connected to a photodiode that detects light variations.

(for more info, perform a google search on Nuclear Batteries)

### Bentonite: Giving Electrostatics a Bad Name?

Contributed by Mark Horenstein:

Sometimes, the snake oil salesmen use our technical vocabulary to fool the general public. Seeing this posting made me realize the importance of science education for all. The following item was found for sale on EBay for \$24.99 (bold emphasis mine):

**Prevent aging with a negative electrostatic field -**  
Lose weight and feel healthy

Bentonite - the easiest, most effective way to stay healthy or to faster recover from a chronic illness. It is said it is easier to prevent than to treat. Bentonite does two very important things:

- generates a **negative electrostatic field** (energy);
- attracts the germs, fungi, heavy metals;

Based on its actions Bentonite is used to clarify wine. Bentonite can be mixed with water (juice, tea) and taken internally or it can be applied as a paste on the skin (face, scalp, legs, feet). Its most effective action is when taken internally. The **negative electrostatic field** travels through the intestinal juices and reaches the vast network of intestinal nervous system, blood, and lymphatic vessels.

NOTE: Bentonite is a material composed of clay minerals and is commonly used in drilling fluids.

(for more info., perform a google search on Bentonite)

## Society News

### ESA Officers

President: William Vosteen, Monroe Electronics  
Vice President: Kelly Robinson, Eastman Kodak  
Executive Council: Sheryl Barringer, Ohio State Univ.  
John Gagliardi, Rutgers Univ.  
Mark Zaretsky, Eastman Kodak

## Election of ESA Council Members

### ESA Elections Upcoming - New Council Slates Are Sought.

Based on Article 4 of the ESA Constitution, the two-year term of the present ESA Council ends on June 30, 2005 and the new Council term of office begins on July 1, 2005. It is now time for the Secretary (address found on back page of this ESA Newsletter) to receive slates of nominees for the upcoming (7/1/05 - 6/30/07) term. Article 4c states, "The Council shall be nominated as a full slate, naming the officers and members." Article 4d states, "Slates may be self-nominated, each being presented by a member of the slate. Also, the Council may nominate a slate." Article 4e states, "The several slates shall be presented to the Secretary three months before the end of the Council's term. After validation of the nominated slates, the Council shall cause the Secretary to present the slates to the membership two months before term end, with the mail vote deadline to be one month before term end. The slate receiving the largest number of votes shall be declared elected. If two slates are tied in receiving more votes than any other slate, the Council shall act to break the tie."

Since the Council shall be nominated as a full slate, the presenter of that slate is responsible for checking with all the members of that slate to insure each nominee is willing to serve. A slate consists of five members: the President, the Vice-President and three Council Members.

If more than one slate is presented to the Secretary, a ballot will be mailed out about April 15 with the deadline for receipt of the ballots by the Secretary being May 31, 2005. If only one slate is presented (then as tradition has held) no ballots will be mailed, and the Membership present at the ESA Annual Meeting will be asked to vote on the slate. If no slates are presented, then, as Article 4b states, "If extraordinary circumstances prevent the election of a new Council, the existing Council shall continue in office, year by year, until an election can be held."

## Calendar

- ✎ Electrostatics 2005, June 15-17, 2005, Helsinki, Finland, Contact: [electrostatics2005@congreszon.fi](mailto:electrostatics2005@congreszon.fi), website: <http://electrostatics2005.vtt.fi/>
- ✎ ESA 2005, June 21-24, 2005, University of Edmonton, Alberta, Canada. Contact: Angela Antoniu, [antoniu@ece.ualberta.ca](mailto:antoniu@ece.ualberta.ca) (Abstracts due Feb. 25)
- ✎ 15<sup>th</sup> IEEE Int'l. Conf. on Dielectric Liquids, June 26 - July 1, 2005, Coimbra, Portugal Contact: [electrostatics2005@congreszon.fi](mailto:electrostatics2005@congreszon.fi), website: <http://www-lip.fis.uc.pt/~icdl2005>
- ✎ 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>

## Awards Nominations

Do you feel that someone's contributions to the field of electrostatics needs to be recognized.? If so, please use the forms found on the ESA website (<http://www.electrostatics.org/awards/index.htm>) and submit your nomination today. Or contact our awards chairperson, Lance Jerale, at (920) 684-5660, email: [staticawards@hotmail.com](mailto:staticawards@hotmail.com)

## Electrostatic Profiles

### Kenneth A Fogel

Chief Technologist, Outside Sales, Delta Technical Systems Inc., 122 N York Rd, Hatboro, PA 19040, Phone: 215-957-0600, x3022, Fax: 215-957-0920, email: [kfogel@delta-technical.com](mailto:kfogel@delta-technical.com)

Current position as Chief Technologist with Delta Technical Systems Inc. supplying high end process control, automation, motion, and networking equipment.

I have various backgrounds including Machining, Manufacturing, Semiconductor, Instrumentation and Process control. I am involved with everything from wrapping candy to launching aircraft from my office in Bethlehem PA. Also very interested in Free energy generation, gravitation, and electrostatic motors.

LOOKING FOR A FEW MORE BRAVE SOULS: Please take advantage of this opportunity to introduce yourself to the rest of the ESA members and help keep the friendliness growing. Please send your profile to me at [mark.zaretsky@kodak.com](mailto:mark.zaretsky@kodak.com) .

Electrostatics  
Society of America



30 Shalimar Drive  
Rochester, NY 14618

### ESA Information

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

Bill Vosteen  
President  
Monroe Electronics, Inc.  
PO Box 535  
Lyndonville, NY 14098-0535  
585-765-2254  
[billv@monroe-electronics.com](mailto:billv@monroe-electronics.com)

Steve Cooper  
Secretary/Treasurer  
540 Morton Rd.  
Athens, GA 30605  
706-769-0025  
[steve@steve-cooper.com](mailto:steve@steve-cooper.com)

Mark Zaretsky  
Newsletter Editor  
30 Shalimar Drive  
Rochester, NY 14618  
585-588-6351  
[mark.zaretsky@kodak.com](mailto:mark.zaretsky@kodak.com)

## Important Society News on Page 7

ESA Council Member Elections  
Awards Nominations

**2005 ESA Annual Meeting - June 21-24, 2005**

University of Alberta  
Edmonton, Alberta, Canada

(Call for Papers & Registration Information insert)

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