



NATIONAL CAPITAL AREA CHAPTER  
SOCIETY OF TOXICOLOGY NEWSLETTER  
Electronic Edition

December 2005

Issue 20

**Renew Your SOT and NCAC Membership at**  
**<http://www.toxicology.org/script/loginredirect2.asp?page=dues>**

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The National Capital Area Chapter of the Society of Toxicology (NCAC-SOT) was established to provide a regional focus for scientists of all disciplines interested in toxicology. The Chapter acts to:

- Sponsor and co-sponsor symposia on current issues in toxicology.
- Provide an annual award to an outstanding student in toxicology to assist in attending the annual meeting of the SOT.
- Maintain communication with the National SOT regarding current toxicology and regulatory concerns.
- Sponsor regional Chapter events at the annual meeting of the SOT.

## **MESSAGE FROM THE PRESIDENT**

As 2005 comes to a close, it is a good time to take a moment and reflect on the many accomplishments that the National Capital Area Chapter of the Society of Toxicology (NCAC-SOT) has achieved over this past year with the help of its Executive Board.

Our fall symposium on “Biological, Toxicological, and Regulatory Considerations of Nano-Materials” was a huge success. This very informative and timely conference, which was co-sponsored by the National Capital Area Chapter of the Society for Risk Analysis and the Association of Government Toxicologists, was extremely well attended, with nearly 150 scientists participating. Congratulations and special thanks to Suzy Fitzpatrick, NCAC-SOT Executive Board Vice-President and organizer of the symposium.

Of special interest to area students was the Student Day symposium, ably organized by our SOT Student Representative and Vice-Representative, Mashaeh Al-Namaeh and Devon Graham, respectively. The topic of the symposium this year was “Conflict Resolution and Negotiation Skills for Graduate Students and Post-Docs”. Seven presenters spoke in early November about topics ranging from repairing mentor-student relationships and conflicts within the dissertation committee to how to avoid burning your bridges and various forms of harassment. Ten students from area colleges were registered for this conference. Congratulations to our student representatives for a job well done!

One of the aims of the Executive Board this year was to increase participation of area students (undergraduate, graduate and post-docs) in Chapter activities. Towards that goal, a “Student Activities Committee” was formed consisting of faculty representatives from several local universities to assist the Board in student recruitment and in identifying activities of specific interest for students. The Student Activities Committee is chaired by Dr. Katherine Squibb (University of Maryland) and includes Drs. Tee Guidotti (George Washington University), Tai Guo (Virginia Commonwealth University), Sid Green (Howard University), Marion Ehrich (Virginia Tech), Michael Trush (Johns Hopkins University) and our SOT Student Rep and Student Vice-Rep Mashaeh Al-Namaeh and Devon Graham, respectively. We have begun to see some benefits from this newly formed committee as students from John Hopkins, Maryland, Howard, and Virginia Tech universities have attended our November Fall and Student Day Symposia.

A second goal of the Board this year was to encourage area high school students, especially those from “gifted and talented” programs, to consider career paths in the sciences, and more specifically, in toxicology. To assist the Board with this endeavor, the Board formed an “Outreach Committee” composed of Board members Thomas Flynn (Chairperson), Lynn Flowers, Jennifer Weeks Sekowski, Harry Milman, and Suzie Fitzpatrick. With help from Board member Jennifer Weeks Sekowski, we hope to sponsor a class from the Aberdeen Science and Math Academy to attend the NCAC-SOT Spring Symposium.

Special thanks are in order to Thomas Flynn, our website Webmaster, and to Gary Burin, our Newsletter Editor. Both have done an outstanding job this year in ensuring that our Chapter's activities are well publicized and that the Chapter's membership is informed in a timely fashion of all Executive Board decisions. Thanks also to go to Pamela Chamberlain, Secretary, and to Jennifer Weeks Sekowski, Treasurer, both of whom have been wonderful in performing "above and beyond the call of duty", having the added responsibility of manning the registration desk at our two symposia. Thanks also to Board Councilor Lynn Flowers and Past-President David Jacobson-Kram for their valuable input to the Board's decision-making process and to securing meeting space at the new Food and Drug Administration facilities in White Oak, MD.

Several positions will become available on the NCAC-SOT Executive Board beginning May 2006 including Vice-President/President-elect, Secretary, Councilor/Newsletter Editor, and SOT Student Vice-Representative. More information on their duties can be found on the Chapter's website at [www.toxicology.org](http://www.toxicology.org) (scroll to the National Capital Area Chapter regional page). I urge you to consider applying for one of these positions and to submit a one-paragraph biography to [hmilman@verizon.net](mailto:hmilman@verizon.net) by February 1, 2006.

May you all have a happy holiday season.

Harry A. Milman

### **MESSAGE FROM THE NEWSLETTER EDITOR**

My term as newsletter editor is coming to a close in May 2006. As Dr. Milman has noted above NCAC-SOT is looking for candidates for this position. In addition to preparing the bi-annual newsletter for the next three years the position includes the responsibility of serving on the Executive Board. A good working knowledge of Microsoft "Word" is necessary in this position but journalism experience is not necessary. Contact me ([Gburin@tsgusa.com](mailto:Gburin@tsgusa.com)) if you have any questions. If you are interested in applying for the position please submit your biography prior to February 6, 2006 to Dr. Milman ([hmilman@verizon.net](mailto:hmilman@verizon.net)).

The NCAC newsletter disseminates information of interest to Toxicologists and members of related professions in the National Capital Area. We're happy to publicize upcoming not-for-profit events in Virginia, Maryland and the District of Columbia that may be of interest to toxicologists. Please send these announcements to my attention ([Gburin@tsgusa.com](mailto:Gburin@tsgusa.com)).

This issue of the NCAC newsletter contains, in addition to the usual features such as the reports of our President and Treasurer, the abstract from speakers at our Fall Symposium on the topic of nanomaterials. An application for membership can also be found at the end of the newsletter. Feel free to distribute this edition of the newsletter to colleagues who may be interested in joining our local chapter. The cost is nominal (\$20 for full membership, \$10 for student membership) and membership in the local chapter is an excellent introduction to local activities in the toxicology field. Additional information on our local chapter can be found at our website (<http://www.toxicology.org/isot/rc/ncac/default.htm>).

Gary Burin  
202-828-8980

## **MESSAGE FROM THE STUDENT REPRESENTATIVE**

Students and postdocs alike convened at the National Library of Medicine in Bethesda, MD, on November 3<sup>rd</sup> for their annual symposium. This year's program, entitled "Conflict Resolution and Negotiation Skills for Graduate Students and Postdocs", was a success, with representatives from the University of Maryland, Howard University, American University, and NIH in attendance. Speakers from various backgrounds spoke on a multitude of topics, including the intricacies of the student/mentor relationship, tactics for handling harassment, and the means to handle a sticky situation, among other things. A complete list of speakers and their abstracts can be found on the NCAC-SOT website.

Recently, a new committee has been added to the executive board (see "Message from the Incoming President" in this newsletter). The Student Activities Committee (SAC) was designed to increase student/postdoc involvement, and members serve as liaisons to the students at their respective universities. It is our hope that together we can build a stronger commitment to student/postdoc involvement within our chapter.

The SAC is also looking for a candidate to fill the student/postdoc vice-representative position. This is a 2 year term, in which the first year will be spent assisting the head representative in chapter functions, followed by succession to the head representative position for the second year. A full description of the officer's duties can be found on the NCAC-SOT website. All applicants should submit their CV to [drmashael@aol.com](mailto:drmashael@aol.com) or to [dgrah001@umaryland.edu](mailto:dgrah001@umaryland.edu) for review.

Finally, the student/postdoc poster session will be held at the upcoming spring symposium. There are monetary awards for the winners, so good luck to those that participate. Details are forthcoming.

Mashaël Al-Namaeb and Devon Graham

## EXECUTIVE COMMITTEE MEMBERS

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### National Capital Area Chapter – Society of Toxicology

President: Harry Milman ('05-'06)  
ToxNetwork.com  
301-871-6714  
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Vice-President/  
President-Elect Suzanne Fitzpatrick ('05-'06)  
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301-827-4591  
sfitzpat@oc.fda.gov

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Student Mashael Al-Namaeb ('05-'06)  
Representative Howard University  
drmashael@aolcom

Student Vice-  
Representative Devon Graham ('05-'06)  
University of Maryland  
410-550-1532; [dgrah001@umaryland.edu](mailto:dgrah001@umaryland.edu)

## **ABSTRACTS FROM NOVEMBER, 2005 NCAC-SOT SYMPOSIUM**

### **Introductory Remarks: Nanotechnology-What's the Hype?**

Celia Merzbacher, PhD

Nanotechnology encompasses the understanding, control, and use of matter at dimensions (roughly 1 to 100 nanometers) at which unique phenomena occur. Nanotechnology falls across a broad range of disciplines, areas of research, applications, and industries, and advances are announced daily by researchers and companies around the world. Nations and businesses are moving quickly in hopes of reaping the benefits of this emerging technology. At the same time, concerns have been raised regarding unknown risks associated with the novel materials. Within this dynamic setting, the NNI is working to balance and leverage investments, to stimulate innovation and promote transfer of research to commercial use and public benefit, to assess and manage risks, and to communicate with and engage the public. This talk will provide an overview of nanotechnology and the NNI.

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### **National Toxicology Program Activities Evaluating the Safety of Nano-scale Materials**

Nigel Walker, PhD

Currently there is a paucity of data on the potential toxicity of manufactured nanoscale materials. The unique and diverse physico-chemical properties of nanoscale materials suggest that toxicological properties may differ from materials of similar composition but larger size. The National Toxicology Program (NTP) coordinates toxicology research and testing programs within the federal government and conducts research to provide information about potentially toxic chemicals to health, regulatory, and research agencies, scientific and medical communities, and the public. The NTP is currently engaged in a research program to investigate fundamental questions concerning how nanoscale materials are absorbed and distributed in vivo and whether they can adversely impact biological systems. As part of this research program, the following specific studies are currently ongoing and will be discussed: evaluation of the role of size and surface characteristics on the biological fate and disposition of nanoscale crystalline fluorescent semiconductors ("quantum dots") and titanium dioxide following dermal exposure; evaluation of the in vivo toxicity of fullerene-based nanoscale materials by pulmonary and systemic routes of exposure.

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### **Dermal Penetration of Nano Materials and Possible Toxicity**

Robert L. Bronaugh, Ph.D.

Nanoparticles are beginning to be used in cosmetic products as well as other products regulated by FDA. Nanodispersed systems such as liposomes, nanoemulsions, and solid lipid nanoparticles can be used to encapsulate water or lipid soluble ingredients. The flexibility of liposomes and surfactant-based vesicles may aid in their penetration into the skin. More rigid nanoparticles such as polymers are more robust and may have increased stability after application to the skin. The sun blocking agents titanium dioxide and zinc oxide are used in over-the-counter drugs as well as in cosmetic products. The National Toxicology Program is funding a study that could lead to examination of the phototoxicity of nanoparticles of these sunblocking agents. Initial studies have focused on the ability of smaller particles to be

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absorbed through human, pig and hairless mouse skin. Preliminary results of these studies examining the penetration of quantum dots through skin will be presented.

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### **Pulmonary Toxicity and Impact on Respiratory Health – Particle Size isn't Everything**

David B. Warheit, PhD

The results of several lung toxicology studies in rats have demonstrated that ultrafine or nanoparticles (generally defined as particles in the size range  $< 100$  nm) administered to the lungs produce enhanced inflammatory responses when compared to fine-sized particles of similar chemical composition at equivalent doses. However, the common perception that nanoparticles are always more toxic than fine-sized particles is based upon a systematic comparison of only 2 particle-types, namely, titanium dioxide and carbon black particles. Apart from particle size and corresponding surface area considerations, several additional factors may play more important roles in influencing the pulmonary toxicity of nanoparticles. These include, but are not limited to: 1) surface treatments/coatings of particles; 2) the aggregation/disaggregation potential of aerosolized particles; 3) the method of nanoparticle synthesis – i.e., whether the particle was generated in the gas or liquid phase (i.e., fumed vs. colloidal/precipitated); 4) translocation potential of the particle; 5) particle shape; and 6) surface charge. Results of pulmonary bioassay hazard/safety studies will be presented demonstrating that fine-sized quartz particles ( $1.6 \mu\text{m}$ ) may produce greater pulmonary toxicity (inflammation, cytotoxicity, cell proliferation and/or histopathology) in rats when compared to nanoscale quartz particles ( $50$  nm), but not when compared to smaller nanoquartz sizes (e.g.,  $< 30$  nm). In addition, other studies have demonstrated no measurable difference in pulmonary toxicity indices among particle-types when comparing exposures in rats to 1) fine-sized  $\text{TiO}_2$  particles ( $300$  nm –  $6 \text{ m}^2/\text{g}$  (surface area)); 2)  $\text{TiO}_2$  nanodots ( $6$ - $10$  nm –  $169 \text{ m}^2/\text{g}$ ); or 3)  $\text{TiO}_2$  nanorods ( $25 \text{ m}^2/\text{g}$ ). Finally, studies will be presented which demonstrate that varying surface treatments on fine-sized  $\text{TiO}_2$  particles influence lung responses. In summary, some important take-home messages are the following:

- 1) Risk is a product of Hazard and Exposure;
- 2) In general, one cannot assume that nanomaterials have the same chemistry or biology (i.e., toxicity) as their microscale or macroscale counterparts (i.e., either greater than or less than); therefore, the hazards of each particle-type should be tested on a case-by-case basis.

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### **Engineered Nanomaterials and Occupational Health**

Andrew Maynard, PhD

Nanotechnology has been hailed by some as the next technological revolution, and is poised to impact on every aspect of our lives. Through the manipulation of matter at near-atomic scales, the technology is enabling remarkable progress in many fields to produce new materials, structures and devices with unique and truly innovative properties. Although predominantly at the laboratory and pre-commercial stage, nanotechnology-based commercial products are already available, ranging from cosmetics to stain-resistant clothing. The future promises significant advances in areas as diverse as next-generation electronics, high efficiency energy conversion and storage, novel sensors and advanced medical diagnostics.

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However, as with all new technologies, exploiting the unique behavior of nanomaterials and devices also introduces the potential for unique and unforeseen health and environmental impacts. Understanding and minimizing possible impacts is a daunting task, and not one that can be undertaken lightly or in isolation. Central to this task is the need to understand and address possible associations between nanotechnology and occupational health. While there are many components to assessing and reducing the possible health risk associated with engineered nanomaterials, perhaps one of the most immediate challenges is characterizing exposures – both in the workplace and in toxicity studies.

Characterizing exposures to particulate matter has always carried with it a unique set of challenges. Unlike bulk materials or gases and vapors, pertinent properties of particles extend beyond the chemistry of the material and encompass physical attributes such as shape and size. As available information on the toxicity of low solubility nanometer-scale particles and structures increases, it is apparent that we are being faced with a new set of challenges: Particle number, structure, surface area and surface activity as well as size and shape are indicated as potentially relevant properties, questioning the validity of characterizing exposures using mass concentration and bulk chemistry alone for these materials. As nanotechnology moves closer to widespread commercialization, new methods of characterizing relevant material attributes in toxicity studies and appropriately measuring exposure and dose are required.

This presentation will explore the need for appropriate materials characterization methods as we address the potential health implications of engineered nanomaterials in the workplace, and will discuss recent advances in understanding.

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### **Science Needs for Environmental Decision-Making for Nanotoxicity at the Environmental Protection Agency**

Jeff Morris, PhD

This presentation discusses how EPA currently is evaluating its scientific needs for leveraging the benefits of nanotechnology and assessing the potential impacts of nanomaterials on human health and the environment. EPA is developing a white paper to discuss science policy issues and research needs related to nanotechnology and the environment. The presentation will outline the issues being raised and the types of recommendations being proposed in the draft white paper, which is presently undergoing internal agency review.

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### **Characterization of nano particles as part of risk assessment**

Scott McNeil, PhD

The Nanotechnology Characterization Laboratory (NCL) conducts preclinical efficacy and toxicity testing of nanoparticles intended for cancer therapeutics and diagnostics. The NCL is a collaborating partnership between NCI, the U.S. Food and Drug Administration and the National Institute of Standards and Technology. As part of its assay cascade, NCL characterizes nanoparticles' physical attributes, their in vitro biological properties, and their in vivo compatibility using animal models. The Laboratory facilitates the rapid transition of basic nanoscale particles and devices into clinical applications by providing the critical infrastructure and characterization services to nanomaterial providers. It is a national resource available to investigators from academia, industry and government. The presentation will provide an overview of the NCL, discuss parameters that are critical to biocompatibility, and present assays

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used for preclinical characterization of nanoparticles.

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### **FDA's Current Thinking on the Assessment of Risks From Nano-Materials**

Stanley Brown, D. Eng

Dr. Brown has been an FDA delegate to the NSET (Nanoscale Science, Engineering and Technology) subcommittee of the President's Office of Science and Technology Policy for the past 3 years. He is also a member of the FDA OC NanoTechnology Interest Group. As a result, he has been watching the field develop, paying particular attention to new concepts or devices that would be in the FDA regulatory domain. Clipping from the literature, from the Web, and from presentations he has heard, Dr. Brown has built a PowerPoint presentation on Nano and FDA.

This seminar will attempt to answer 5 questions: With whom are we thinking and talking? What is Nano? What are the dose metrics? What are the toxicological issues? Who will regulate products utilizing nanotechnology; what are combination products? It is presented at a level to help FDA reviewers and toxicologists understand the implications, uniqueness, potential, and hype of nano. There are also a few off-the-wall examples for a bit of comic relief.

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### **National Capital Area SOT, Spring 2006 Symposium**

Mark your calendar-

Topic: "Toxicology and Disaster Preparation and Response"

Location: National Library of Medicine, Bethesda, Maryland

Date: May 22, 2006

## TREASURERS REPORT

October 17, 2005

Checking account balance (Sept. 29, 2005 statement)  
\$13,345.47

### Update on Fall Symposium registrations (as of Oct. 17):

Registration:	Cost	Rc'd	
Members			
Students (early-bird)	(\$0)	3	\$ 0.00
Regular (early-bird)	(\$35)	12	\$ 420.00
Non-Members:			
Students (early-bird)	(\$10)		\$
Regular (early-bird)	(\$45)	17	\$ 765.00
<hr/> TOTAL		31	\$ 1150.00
Membership			
Regular	(\$20)	3	\$ 60.00
Student	(\$10)	1	\$ 70.00
<hr/> TOTAL		4	\$ 70.00
 <b>Gross Symposium/ Membership income to-date</b>			<b>\$1255.00</b>

### Update on Fall Student Day registrations:

Student Registration:			
Members (early-bird):	(\$10)	1	\$10.00
Non-Members (early-bird):	(\$15)	0	\$ 0.00
<hr/> TOTAL		1	\$10.00
 <b>Gross Student Day income to-date</b>			<b>\$10.00</b>

### Anticipated contributions from co-sponsors:

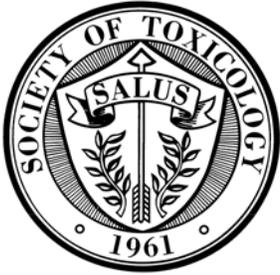
AGT (\$500)  
SRA (\$500)

### Reference on past Symposium costs (from Laurie Roszell's records):

Spring Symposium- related expenses (final):		
Printing (programs)		\$ 74.87
Supplies (Badges)		\$ 0.00

Plaque		\$ 106.52
Speaker (estimated):	Dr. Lipscomb	\$ 300.00
	Dr. Mumtaz	\$ 300.00
Room rental		\$ 0.00
Catering:		\$ 615.00
Posters		\$ 1465.95
Student Awards		\$ 750.00
<b><i>Total meeting expenses</i></b>		<b>\$ 3612.34</b>

Respectfully Submitted,  
Jennifer Sekowski  
17 October 2005



# National Capital Area

## MEMBERSHIP APPLICATION

Name: \_\_\_\_\_

Affiliation: \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Area Code: \_\_\_\_\_ Phone: \_\_\_\_\_ FAX: \_\_\_\_\_

E-mail: \_\_\_\_\_

Membership Type \_\_\_\_\_ Full Member (\$20) \_\_\_\_\_ Student (\$10)

Please check the most appropriate responses:

SOT Member	Highest Degree Attained		Type of Affiliation
_____ Yes	_____ A.S.	_____ M.P.H.	_____ Academia
_____ No	_____ B.A.	_____ M.S.	_____ Consulting
	_____ B.S.	_____ M.A.	_____ Contract Lab
	_____ D.V.M.	_____ Ph.D.	_____ Government
	_____ D.V.M./Ph.D.	_____ Sc.D.	_____ Industry-
	_____ M.D.	_____ V.M.D.	Chemical/Petroleum
	_____ M.D./Ph.D.	_____ V.M.D./Ph.D.	_____ Industry- Pharmaceutical
			_____ Industry- Other
			_____ Other- _____

Please complete the information above and send with a check, money order or credit card (payable to [specific RC], no POs) to the address below. The chapter to which you are applying will review your application and you will be notified within 30 days. Those not accepted will receive a full refund. *Current RC members: please do not use this form since your renewal dues are billed annually through SOT.*

Payment Type: Money Order \_\_\_\_\_ Check \_\_\_\_\_ Credit Card \_\_\_\_\_

Credit Card # \_\_\_\_\_ Exp date \_\_\_\_\_

Name on Card \_\_\_\_\_

**Send to:**

**Jennifer Weeks Sekowski, Treasurer**  
**US Army**  
 CHPPM ATTN MCHBS TS THE, 5158 Blackhawk Road  
 Aberdeen Proving Ground, MD 21010