

Inside: Staff Updates from Headquarters

BIOMATERIALS FORUM



Fourth Quarter 2007 • Volume 29, Issue 4



**State of the Surface Characterization
and Modification SIG**



**Members
in the
News**

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BIOMATERIALS FORUM



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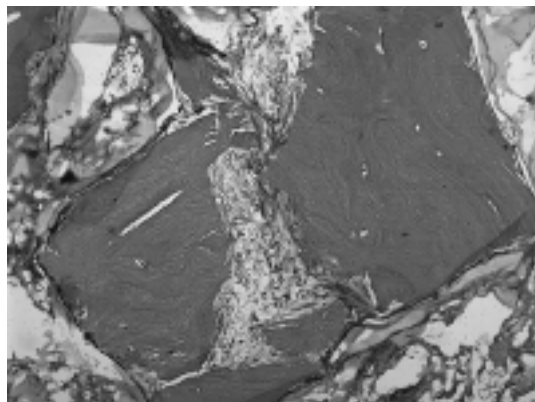
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The Surface Characterization and Modification Special Interest Group had a very good year. At the annual meeting held in Chicago, it led two general sessions with 15 podium and more than 50 poster presentations. And 2008 is shaping up to be another successful year.



Injectable composite cellular bone graft material.
 Photograph courtesy of Dr. Chuck Thomas (Clemson University).

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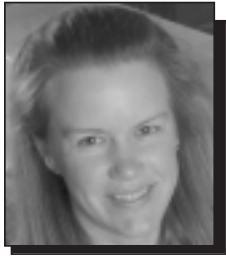
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From the Editor

The Torch

By Karen J.L. Burg



Open access—two simple words that, when used together, can cause great debate and fear. We are living in an interesting transition period, a time when the electronic age is maturing to the point of becoming the age of collaborative freedom. MIT provided a compelling example when, in 2003, it was announced that substantial MIT course materials would be made freely available and the web would become a “web of knowledge.” Recently, the Wall Street Journal editor announced his intention to eliminate online subscription fees in anticipation of a subsequent 15-fold increase in readership. Similarly, many technical journal editors are considering providing open access to journal content after a period of time when it has been estimated that the paying readers have received sufficient benefit. Often, open access models are based on the premise that a free exchange of technical material will further accelerate the generation of new ideas and thus benefit society collectively. The frightening part of executing the open access model is in determining how we, as individuals, or how our individual organizations, can generate and manage information as a business in an open-access environment.

From the President



Dear Members and Friends of the Society For Biomaterials,

During the past months, the Council and Board members have diligently worked toward accomplishing goals that were presented to you in the last issue of *Biomaterials Forum*. Beyond the activities reported by the committees in this current issue, the President,

President-Elect, Secretary-Treasurer, and Executive Director have addressed many concerns that are clearly of interest to all members of the Society. These concerns revolve around: 1. increasing membership value for retention and recruitment, 2. promoting biomaterials science and engineering as a forefront field in materials research and healthcare, and 3. assuring that the SFB is the premier professional society for discovery, innovation, and translation of medical devices.

Examples of some of our activities include:

- Partnering with the FDA, NIH CSR, and NSF to provide opportunities for our members to serve as consultants or reviewers for these agencies.
- Increasing our participation with medical professional societies; the SFB participated at the Council of Musculoskeletal Educators Planning Meeting in June 2007, a program organized under the auspices of the U.S. Bone and Joint Decade.
- Assuring that the SFB is in a positive financial situation, including operating funds, discretionary funds, scholarship, and meeting/symposium support, to allow us to maintain momentum in reshaping the SFB as the members' society.
- Supporting advocacy activities such as the AIMBE

The obvious question is, who will pay for this wealth of knowledge, and how will a high and consistent standard of publication be maintained? Will the individual, the employer, or a funding agency pay? The Wall Street Journal publishers, for example, are planning increases in ad revenue to counterbalance the loss in subscription revenue. Although the journal peer review process is generally voluntary, there are publication and editing costs. Typically, some of the editorial staff are paid to maintain a streamlined process, and the copy editors and publication staff who ensure, for example, that the layout is appropriately organized, that the grammar is up to par, and that the pictorial content is of the highest quality, are generally paid professionals. Certainly in the open-access world there is a real danger of varying levels of cost-driven publication quality. Some open-access journals require an author fee – will this method be the norm and, if so, are we not simply shifting the financial burden from one source to another? In this case, rather than having readers who cannot afford the price to read, will we have authors who cannot afford to write? In an interdisciplinary field such as ours, we must consider the differential effect that publication costs may have on different disciplines – i.e., disciplines for which large research grants (that can include publication costs) are the norm, versus those fields, just as crucial to the field of biomaterials

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The Torch

By Martine LaBerge

Federal Symposium, which provides a unique platform to recommend increased funding of the National Institutes of Health and the Food and Drug Administration, and to further disseminate the mission of the SFB.

- Investigating means to increase the recognition of our publications as the leading journals in basic, applied, and translational biomaterials research. Our Society is quite fortunate to count among its marketing tools two outstanding journals: *Journal of Biomedical Materials Research Part A and Part B – Applied Biomaterials*. How the impact factor of our journals can be increased is a major question that triggers numerous discussions with the Publications Committee, as our members and authors' opinions greatly matter to the SFB.

The Board and Council meetings were held at the Marriott Airport in Philadelphia on October 27, 2007. An agenda that clearly emphasizes accountability and results was developed. The next issue of *Biomaterials Forum* will summarize the activities and reports of standing committees, task forces, and the executive team.

On behalf of the executive team, I thank all Board and Council members for their diligent and continuous work for the SFB, and all members who have carried the Torch by participating in SFB activities, answered annual meeting and branding surveys, sponsored a colleague for membership, submitted their best work for publication in our journals, as well as recognized and promoted SFB as the leading form for biomaterials research and medical devices.

Best regards,
Martine LaBerge, President

SIGs and Networking

The Torch

By Lynne Jones, SIG Committee Chair

Networking: A quick review of Roget's thesaurus yields synonyms from business (organization, association, merger), science (linkage, binding), and sociology (connections, peer group, team, friendships, or relationships). One of the major strengths of the Society For Biomaterials is the people. Networking, therefore, is a very important asset of the Society, and Special Interest Groups (SIGs) are vital to the promotion of networking and bring a sense of community to a very diverse organization.

SIGs, by their very nature, are conducive to networking. They provide an opportunity for individuals with common interests to meet and discuss issues that are important to them as a group. SIGs engage in the exchange of ideas and information between their members. Members have interacted with other SIG members to get advice on presentations, websites, and recommendations on textbooks and publications. One of the fruits of this activity is the significant number of proposals that are submitted by SIGs for the program content (sessions, symposia, panel discussions, workshops) at our annual meeting.

Activities within the SIGs have an impact not only on the annual meeting, but also on the operation of the Society and its committees. SIGs also foster interactions between members of industry, government, academia, consultants and other interested parties.

The SIGs are now exploring new ways to increase networking. Members of SIGs are volunteering as speakers and mentors for the SFB Student Chapters throughout the country. And, more experienced and established SIG members are being invited to mentor other SIG members with career advice, to promote scientific collaborations, and to offer their perspectives on specific scientific issues. SIGs are the best mechanisms for getting involved at the grassroots level in the Society to gain leadership experience.

I believe that SIGs are really about building lasting relationships. Just ask any SIG member. The "science" is what brings us to the Society, but it is the "friendships" developed from networking that strengthen this connection.

Not by Geeky Minds Alone

The Torch

By Guigen Zhang, Education Editor

Recently, Chester Finn and Diane Ravitch wrote an opinion piece in the *Wall Street Journal* bashing the federal STEM (Science, Technology, Engineering and Mathematics) bills: "Not By Geeks Alone" (Aug. 8, 2007). They basically argued that the STEM subjects are not what make Americans competitive; instead, the subjects of liberal arts do. They listed a successful bunch, including Steve Jobs, Alan Greenspan, Warren Buffett and Adam Smith to strengthen their case. The authors even dropped a couple of rather contentious lines: "Rich kids will study philosophy and arts, music and history, while their poor peers fill in bubbles on test sheets. The lucky few will spawn the next generation of tycoons, political leaders, inventors, authors, artists and entrepreneurs. The less lucky masses will see narrower opportunity."

I don't know how you feel when you read these lines. I felt offended but enlightened at the same time.

This piece made me realize why STEM-oriented people like us are stuck in positions that pay quite a bit less than those held by the successful bunch, but it did not make me feel any less creative, competitive or poorer. The satisfaction I derive from being able to learn constantly by taking on new challenges makes me feel rich enough. It did, however, make me ask the question: what can we do for the "poor" kids who happen to be STEM-oriented geeks?

To me, a person educated in liberal arts without technological competence is not a well educated person; a person equipped with knowledge of all the advanced technologies without the consciousness of the humanistic context surrounding the technological challenges will fare no better.

"It did, however, make me ask the question: what can we do for the 'poor' kids who happen to be STEM-oriented geeks?"

So, what should we do then? One solution is to integrate key liberal arts components into a STEM education. Take engineering as an example. We need to educate engineers in a liberal arts environment – to educate future engineers to not just solve technical problems of today or the problems presented to them, but to identify the opportunities for the future with deep consciousness of the humanistic (including social, economic, environmental and artistic) context.

After all, engineering is to create what has never been, to turn the opportunities into means for the advancement of society. A wrongly defined problem, even if it is solved rightly in a technical sense, can lead to some unfortunate consequences. Thus, to be able to define the problems correctly, engineers should be technically competent and fully conscious of the humanistic context surrounding these technical challenges, for all engineering problems are technical challenges rooted in a socially, economically, environmentally, artistically and humanistically intertwined network.

SFB 2007 Member Survey

The Branding Task Force of the Long Range Planning Committee recently conducted a survey of the SFB Membership to better articulate member's perceptions of the Society for marketing and promotional purposes. The focus on biomaterials was regarded as the Society's most important attribute. Perceptions were rather evenly split on the Society's demographics, with 50 percent believing the Society to be geared toward a mix of academics and industry, and about 45 percent believing the Society is primarily geared towards academics. It should be no surprise that program content and quality are perceived as the driving factors behind the Annual Meeting's success, and it was the clear desire of those that participated in the survey that the Society be more active in its participation with other societies in meetings and publications. A complete set of survey responses is available in the "members only" section of the SFB website.

Committee Reporting

Following up on the committee reports from the last issue of the Forum, each of the Society's committees are listed below with an update on their activities during the past quarter.

Awards, Ceremonies & Nominations Committee

The Awards, Ceremonies, and Nominations Committee (ACNC) met by conference call on June 4 to discuss its goals for the year and its activities to ensure that a high-quality slate of officer candidates and awardees are nominated to Council for approval. The main points and actions from this meeting were:

In the event that there are not sufficient qualified nominations from the general membership to publish a ballot with two qualified nominees for each position, the Chair of the committee will solicit nominations from other members of the committee, and from the Council of the Society.

There are a total of 11 awards - 8 SFB awards and 3 Clemson awards. Clemson awards are given every year. The ACNC decides which award the winner will receive, with special consideration of the nomination category. Once the ACNC chooses the winners of the Clemson awards, and Council has ratified their selections, SFB's President notifies Clemson University's President in writing.

The WBC organizers have informed headquarters that SFB will be given five minutes at the podium for the opening ceremonies at the 2008 WBC. The Annual business Meeting of the Society will be held at noon on Thursday, May 29, 2008 in Amsterdam. Dan informed the ACNC of the membership's ratification of the new quorum bylaws which states that 50 members are needed now for a quorum instead of 10% of the membership.

Award winners are given \$500 for travel expenses. Dan asked the committee if this money should be allocated for the WBC, for the SFB Fall Meeting, or if the winner should be allowed to choose which meeting to apply the travel money toward. The committee discussed this point and recommended that the award winner should decide where to spend the travel money.

As voted and approved at the April 21, 2007, Council meeting, the award nominees for 2007 who were not selected will automatically be nominated for the 2008 awards without the requirement for re-submission of CVs and letters of recommendations, although these materials can be re-submitted. These candidates are in the process of being contacted to determine their interest in nomination. Currently there are more than 30 award nominations, with at least one nominee for each award.

The website for award nominations closed as of September 15 and September 21 for officers. The ACNC will carefully review all nominations and present a final slate of awardees and officers at the Fall Council meeting.

Bylaws Committee

With no current issues facing the Bylaws Committee, no action has yet been taken; however, discussions will begin shortly on addressing the possibility of not having a meeting quorum at the Annual Business Meeting in Amsterdam during the 2008 World Biomaterials Conference.

Devices & Materials Committee

This committee has not formally met. The committee members have had e-mail discussions about possible directions for this year. There have been discussions between the Society For Biomaterials and ASM International leaders concerning the Materials and Processes for Medical Devices Conference (MPMD), and the materials database currently under development by ASM. SFB endorsed the MPMD meeting, which occurred September 23-25 in Palm Desert, Calif. The committee intends to pursue establishing more formal links with the ASM database as a means of increasing access to state-of-the-art knowledge on materials used in medical devices.

Education & Professional Development

To better address member needs, the Education and Professional Development Committee is focusing on developing strategies, listing actions, and planning budgets in four areas: 1) National Student Section, 2) Continuous Education for Professionals, 3) K-12, and 4) Student-Industry Liaisons. These initiatives will be presented to the Council at the end of October. Some items in the current proposal include webinars for members, resume clinics for graduating students, and biomaterials toolkits for the classroom.

Finance Committee

The Finance Committee is overseeing the implementation of the Board-approved investment and reserve policies, and will be developing a draft policy on the solicitation of funds on the Society's behalf.

Liaison Committee

This committee has continued to interact with ORS, and Warren Haggard has provided leadership for the organization of one more meeting. Dr. Nicholas Peppas (Chair) is also the chair of the BMES Affiliations Committee, and has looked at the possibility of organizing a common symposium or meeting. The earliest such opportunity will be at the 2009 San Antonio SFB meeting or at the 2010 Austin BMES meeting, when Dr.

Peppas will be the organizer. In addition, the committee has initiated preliminary discussions of the possibility of hosting the 2016 World Congress in the United States.

Long Range Planning Committee

This committee has focused its recent activities on analysis of the ranking and perception of the journals of the Society, namely the Journal of Biomedical Materials Research Part A and B, relative to other peer journals in the field of biomaterials and related disciplines. This analysis will be used to generate recommendations regarding the journals, to maintain the most competitive rankings possible, and to maintain them as a highly attractive venue for publication by members and non-members of the Society. This analysis is underway.

Meetings Committee

The Meetings Committee sought and reviewed proposals for the 2010 and 2011 meetings. The Board of Directors approved the site recommendations from the committee. The 2010 meeting will be held the week of April 19 at the Washington State Convention and Trade Center in Seattle with accommodations at The Sheraton Seattle Hotel. In 2011, the annual meeting of the Society For Biomaterials will be held at Disney's Contemporary Resort in Orlando Florida the week of April 11, with hotel accommodations at the Disney's Contemporary Resort and Disney's Polynesian Resort. Currently, the committee is diligently addressing sponsorship avenues and schemes for annual meetings and pursuing its goals.

Membership Committee

Since the SFB meeting in Chicago, the Membership Committee is continuing to address issues of recruiting new members into the Society as well as a retention plan for current, active members. The committee is revisiting aspects of building an Associate membership and drafting a proposal for bylaws changes for required membership in the Society. A major thrust has been made to target new audiences at other societies similar to SFB (such as BMES), to non-members at companies and universities where there are existing SFB members, as well as to those who do not have any SFB members. The Membership Committee is also working with the Education and Professional Development Committee to improve visibility by sponsoring Biomaterials Days at universities as well as creating more student chapters.

Presidents Advisory Committee

The goals for the President's Committee for this year include developing recommendations for the President in three different areas: 1. Review the annual meeting to determine how well the SFB and the intellectual field are currently served by the meeting and suggest changes if so needed; 2. Evaluate if a merger or alliance with some other scientific society would be appropriate for the SFB; and 3. Review the existing SIGs and determine which have the broadest appeal.

Program Committee

The committee has spent considerable time in the planning and organization of the 2008 Fall meeting focusing on "Translational Biomaterials." The following milestones have been accomplished: 1. Contract with the Buckhead Hyatt has been signed. The conference will be Sept 11-13, 2008; 2. Keynote speakers (four) from academia and industry have been

identified and invited; 3. A preliminary program has been outlined; 4. Session proposals were requested from SIGs, evaluated, and integrated within the preliminary program. SIGs will be notified and requests will be made to modify proposals, where appropriate, to accommodate programmatic constraints.

Publications Committee

Committee members include Rick Gemeinhart, University of Illinois (Chair); Julia Babensee, Georgia Institute of Technology; Peter Jarrett, I-Therapeutix; Syed Hossainy, Abbott Vascular; and the editors of the Society's publications: James Anderson, Case Western Reserve University (JBMR-A); Harold Alexander, Orthogen (JBMR-B); Karen Burg, Clemson University (Biomaterials Forum); and Thomas Webster, Brown University (website). The Committee is evaluating draft agreements from publishers for a book series; and collecting proposals for the redevelopment of the SFB website.

Special Interest Groups

SIGs have reformed the SIG Committee, comprised of each of the twelve SIG Chairs. The SIG Committee is chaired by SIG Representative Lynne Jones. The SIG Committee met in person on July 17, 2007, and is developing a strategic plan to stimulate activity within the SIGs and to integrate the SIGs further into the operations of the Society as a whole. The SIG strategic plan will be reviewed by the Board and Council at the upcoming Fall Meeting (October 27, 2007) and ongoing progress reports will be featured in the Forum (see page 6 of this issue).

If you are interested in knowing more about a particular issue, policy or committee activity, or if you have any suggestions for improved membership services, please contact me directly at the SFB headquarters office.

Sincerely,



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Executive Director

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State of the Surface Characterization and Modification Special Interest Group

The Torch

By Lara Gamble, Peter Edelman, and Jeff Schwartz,
Surface Characterization and Modification Special Interest Group

The Surface Characterization and Modification (SC&M) SIG has had a very successful year. At the 2007 annual meeting held in Chicago, our SIG led two general sessions with 15 podium and more than 50 poster presentations. In addition, the SC&M SIG co-hosted three symposia: "Surface Modification and Characterization of Orthopaedic and Dental Implants at the Nano/Micro Scale for Improved Osseointegration," a joint two-session symposium with the Dental/Craniofacial and Orthopaedic SIGs, as well as "Controlled Interactions of Proteins and Peptides with Biomaterial Surfaces" and "Cell Function on Biomaterial Gradients and Arrays," both held jointly with the Proteins and Cells at Interfaces SIG. We would like to congratulate our 2007 Student Travel Achievement Recognition (STAR) recipient Amanda Bridges (Georgia Institute of Technology) for her outstanding abstract, as well as honorable mention recipients Susan Tam (École Polytechnique de Montréal), Timothy Sargeant (Northwestern University), Gopinath Mani (University of Texas at San Antonio), Ge Zhao (Georgia Institute of Technology), Mischa Zelzer (University of Nottingham), and Fang Cheng (University of Washington).

New this year was the distribution at the annual meeting of 50 SC&M SIG Student Résumé CDs to several enthusiastic companies. The Student Résumé CDs were a big hit as more companies are looking to hire. During our SIG meeting, officer elections were held, resulting in the election of Chair Lara Gamble (University of Washington), Vice-Chair Peter Edelman (Boston Scientific), Secretary/Treasurer Jeff Schwartz (W. L. Gore & Associates) and Programs Chair Khalid Kader (University of Iowa). We would like to thank our exiting 2006 and 2007 Chair, Erika Johnston (Genzyme Corp.), for her dedication. Through her leadership, the SIG has grown to be one of the larger SIGs and has played a significant role in the past two annual meetings.

Currently, 2008 is shaping up to be another successful year. Two sessions are being crafted by SIG representatives for the World Biomaterial Congress (WBC) to be held in Amsterdam. One session will focus on surface characterization while the other will focus on surface modification to provide in-depth, cutting-edge presentations for both topics. The SC&M SIG will also sponsor sessions at the 2008 annual meeting in Atlanta, which has the theme of "Translational Biomaterials." In addition to providing excellent sessions in the field of surface science, this year we will once again distribute the Student Résumé CD. The call for résumés and CVs is open to all undergraduate, graduate and post doctoral members of our SIG; CDs will be dispersed to companies that match our students' career interests. We, the elected SC&M officers, thank our members for their support and look forward to an exciting 2008!

Importance of Surface Modification and Characterization in Industry

The production of biomaterials often involves the development of surface modification methods to improve the biocompatibility of materials. To verify that these modifications have occurred, analytical methods to provide a more detailed understanding of the chemistry, structure and morphology of complex surfaces need to be employed. Surface characterization in industry is used in many areas. Examples include correlation of biological response with surface chemistry; optimization of surface cleaning or plasma treatment to enhance performance, e.g. adhesion/bonding, drug release rate, biocompatibility; demonstration of equivalence between process changes; surface optimization for biomolecule attachment for immunosensors or microarrays; and assessment of surface roughness to enhance osseointegration.

The surface analysis techniques range from qualitative to quantitative. Some give physical information, some give chemical information.

Surface analysis techniques most commonly employed:

- X-ray Photoelectron Spectroscopy (XPS) or Electron Spectroscopy for Chemical Analysis (ESCA)
- Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (FTIR-ATR)
- Contact Angle
- Secondary Ion Mass Spectrometry (SIMS)
- Atomic Force Microscopy (AFM)
- White Light Interferometry

X-ray Photoelectron Spectroscopy and Biomaterials

In *Biomaterials Forum* (Vol. 26 (1), 2004, pgs. 10 and 25) the SC&M SIG introduced some basic information about some of these techniques (XPS, SIMS, and AFM). The basics of XPS are again summarized here, followed by examples and details about how XPS may be used for biomaterials applications (with an emphasis on industry use). XPS, one of the most commonly used surface analysis techniques, utilizes the photoelectron effect to obtain information about the chemical composition and structure of a surface. The surface is exposed to a low-energy, monochromatic X-ray source producing photoelectrons at kinetic energies that are dependant on the element and orbital from where they came. The resulting spectrum shows peaks from the elements present in outer surface (<100 angstroms) of the sample, giving information about the atomic composition and molecular structure of the surface. Higher resolution scans of peaks for specific elements (e.g. carbon) give information about the types of binding environments of the carbon (e.g. CH, CO, or C=O). The information-rich quality of the XPS technique and its



quantitative capabilities makes XPS one of the most valuable surface analysis methods available for the study of biomaterials.

There are many possible examples to cite regarding the use of surface characterization in industrial biomedical applications. A search of the FDA website using XPS as a search term produced one such example: Contact Lens Solution 510K submission to the FDA.¹ This example represents one of the most common uses of XPS; i.e., the identification of surface contamination. The FDA submission was for the KARATS Multipurpose Solution, by CibaVision. X-ray Photoelectron Spectroscopy (XPS) was used to characterize surface chemistry changes on exposure to the contact lens solution. The contact lens cleaning formulation contains many ingredients: sorbitol; tromethamine; pluronic F127; sodium phosphate dihydrogen; dexpanthnol; edentate disodium dehydrate; and polyhexanide (preservative). In short, there are several components in the formulation that could conceivably adsorb to the surface of a contact lens polymer and change the surface chemistry. Lens irritation to the eye can depend on surface chemistry of the lens. XPS was used to assess any chemical changes to the surface of a silicone hydrogel contact lens after exposure to the solution, an ideal application for XPS. The report concluded "X-ray Photoelectron Spectroscopy (XPS) was used to analyze the surface of the lenses to determine if the surface coating was compromised by the solution. Following cycling in the solution, lens samples were processed and analyzed...The results showed that there were no significant changes to the surface of the...lens as analyzed by XPS testing."¹ In addition to the surface chemistry by XPS, there was supporting data from cytotoxicity, microbiology, cleaning efficacy and clinical testing studies.

Another typical application for surface analysis (and XPS) is the investigation of bond failure. Where there is a critical bond in a medical device, chances are that at one time in the development of that bonding process there have been failures caused by surface contamination. (An example of the diverse applications of adhesives in the medical device world can be found in this online article: www.devicelink.com/mddi/archive/01/06/004.html). Even for devices that are being manufactured using a long standing process, bond failure issues can flare up requiring a root cause

assessment which includes searching for sources of contamination. As those of us who have spent time in industry know all too well, much time and energy is spent chasing down surface contamination issues, such as trouble shooting adhesive bond failure.

The XPS quantitative data can also be correlated with biological performance. An excellent example of how surface analysis can be used to understand biomaterial performance is portrayed in an article by Yang and coworkers.² Several different polyurethanes are tested for calcification potential using an *in vitro* test. The tendency to calcify is not only correlated with soft segment chemical composition, but also the degree to which there is a change in the ratio of hard segment to soft segment at the surface as determined by XPS.

Recent advances in XPS systems allows XPS to be used for chemical state imaging giving information such as the spatial distribution of elements and surface functional groups. One advantage of this imaging capability is the ability to identify a specific area on a sample (such as the DNA spot on a microarray or the inside surface of a stent) and verify that the analysis is only at that particular area. Spectral imaging is also starting to become more common with XPS analysis, utilizing principal component analysis (PCA) to improve the image.

XPS is one of the most basic (and useful) tools for surface characterization and is often a good first step in surface analysis. However, it should be remembered that there is no one surface analysis technique that is optimal for all samples or all questions. One of the different surface characterization tools mentioned above (or better, a combination of tools) may be necessary for determining specific types of information.

References

1. <http://www.fda.gov/cdrh/pdf3/k031957.pdf>
2. Mingjing Yang, Ze Zhang, Charles Hahn, Martin W. King, Robert Guidoin, "Assessing the Resistance to Calcification of Polyurethane Membranes Used in the Manufacture of Ventricles for a Totally Implantable Artificial Heart", *Journal of Biomedical Materials Research* Volume 48, Issue 5, Date: 1999, Pages: 648-659.

University of Memphis

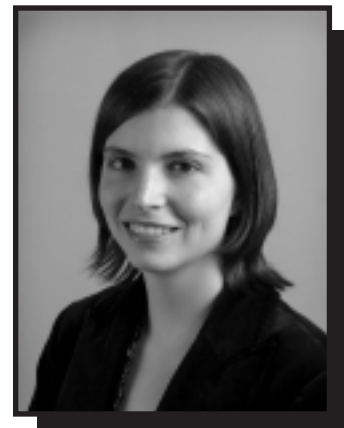
Doctoral Candidate

Receives Fulbright Program Grant

Student News
Contributed from Press Releases

Betsy M. Chesnutt, a doctoral candidate in the Department of Biomedical Engineering at the University of Memphis, received a Fulbright Program grant to study in The Netherlands this Fall. Chesnutt is working with Dr. John Jansen and Dr. Frank Walboomers at Radboud University Medical Center in Nijmegen. She is continuing her research on the evaluation of orthopedic and dental implants, tissue engineering scaffolds for bone regeneration, and scaffolds for other tissues, particularly in preclinical animal models. Previous honors awarded to Chesnutt include a National Science Foundation fellowship and a Herff College of Engineering fellowship. She also won the Sigma Xi award, and a STAR (Student Travel Award Recognition) honorable mention at the 2006 national meeting of the Society For Biomaterials.

Named for the late U.S. senator from Arkansas, the Fulbright Program is the largest international exchange program offering opportunities for students, scholars, and professionals to undertake international graduate study, advanced research, university teaching, and teaching in elementary and secondary schools.



From the Editor continued from page 2

research, for which large grants are the exception. We must also consider the financial diversity of institutions engaged in biomaterials training, research, and application.

So what does this mean for biomaterials research and those in our community? Open access may in fact be a boon for those companies and/or medical centers that do not invest in a broad range of journal subscriptions. Perhaps the most compelling force for open access may come from the research funding agencies, where the National Institutes of Health (NIH) may mandate open-access publication of results. Congress is pondering a proposal that all publications resulting from NIH-funded research be placed online and be freely available to the public within 12 months of publication in a peer-reviewed journal. The measure is radically narrowed from the original intent, which asserted that all government-funded research should follow these guidelines. Open access could then become, in principle, the equalizer, the factor that allows a clinician in a remote, family clinic to be as versed in the state-of-the-art as a clinician in a major urban academic medical center. It seems hard to argue with this logic, as it seems in the taxpayer's best interest to widely disseminate and share all medical results. Thus, from a purely consumer-oriented perspective, open access to research results appears to be a great idea. At the moment, the suggestion is that NIH-supported research findings be placed in a free online database within 12 months of publication in a peer-reviewed journal, not necessarily in place of publication in a peer-reviewed journal. However, one can envision a definite progression of events.

But how does open access affect those, especially academicians, writing research papers as part of their job? Often, faculty members are faced with the expectation that they will publish their results in prestigious journals (with great frequency). Tenure and promotion are often correlated with publication in "high impact" journals. What will this phrase mean in an open-access scenario? The worry about publishing in a "high impact" journal may diminish as open-access journals may, in fact, rapidly become

the high impact journals because they may be read by the masses. Perhaps even more likely is that a significant research result can become high-impact on its own. In this scenario, the specific location where the content is introduced to the online community may not be important.

What does open access mean for industry? Will any of the rulings concerning government-funded research affect industry-university collaborations? For example, what about those industrially relevant university projects that are funded through a mix of sources – what level of NIH funding will require open-access publication? Will open access bring us closer together and accelerate research? Philosophically I would suggest that any process that creates friction in the research, development, and production pipeline would slow the overall advancement of the field. A myriad of journals that must be purchased to access the full breadth of biomaterials information may create such friction. One can argue that open access may create a stronger connection between clinical, academic, and industry partners by reducing the time for material to be widely available, reducing the cost of the information, and a more equitable distribution of information. However, one can also argue that the time spent sifting through a much larger volume of unreviewed information may negate any perceived benefits. There are many facets to consider and it is difficult to say if open access will be a huge success or a dismal failure. However, we must be vigilant and involved in exploring this issue so we can best serve our field with the highest quality information. Is your mind open or closed to an open access discussion?

Best wishes from Clemson,

*Karen J.L. Burg
Hunter Endowed Chair & Professor of Bioengineering
Clemson University*

Microspheres, Microcapsules, and Liposomes

An eight(+) volume series: ISSN 1461-1732; Copyright 2006, Kentus Books, London, UK. Each volume is approximately 400-500 pages. Total 4,000 pages, 103 reviews, 170 authors, 8,600 references, 1,750 figures and tables. New hardcover, \$300 each, www.kentusbooks.com/MMLVolumes.html.

Description and Critique

If you are interested in nano and microparticulates for drug delivery, gene transfection, imaging, or other applications, then *Microspheres, Microcapsules and Liposomes (MML)* series is recommended. Whether you're trying to get up to speed on a new subject or review the entire field for a grant application, this series makes the job a breeze. While it's possible to do a PUBMED search and quickly locate hundreds of original research articles on the subject, these books will provide nearly all the information you need and go into much more depth than a short journal article. Rather than providing only a surface-level review, these books include detailed methods for making the nano and micro-particles, and for modifying their surfaces to accomplish the technical aims. The various techniques that have been developed by groups around the world are combined and compared in these volumes, which has not been done in other publications. For this reason, they are invaluable. I have had the opportunity to read *Vol. 8: Smart Nano and Microparticles* and *Vol. 9: Smart Nanoparticles in Medicine*. Abbreviated tables of content are provided below. The focus of these volumes is on particles that are responsive or sensitive to specific environments, triggers or stimuli, like temperature, magnetism, pH, sugar or other agents. The chapters are all well-written, easily understandable and clear. They contain historical information about the early conception of the type of material or the application. If you are a professor looking for a textbook to teach the biomaterials preparation of nano and micro-particulates, either one of these volumes could be used because of the wealth of figures and tables, the clarity of writing and the focus on the biomaterials, not the biology. The MML series includes the following titles:

- Vol. 1: Preparation and Chemical Applications
- Vol. 2: Medical and Biotechnology Applications
- Vol. 3: Radiolabeled and Magnetic Particulates in Medicine and Biology
- Vol. 4: Functional Polymer Colloids and Microparticles
- Vol. 5: Dendrimers, Assemblies, Nanocomposites
- Vol. 6: Microcapsule Patents and Products
- Vol. 7: Smart Nano and Microparticles
- Vol. 8: Smart Nanoparticles in Nanomedicine

Recently in this column, I reviewed a series called *Nanotechnologies for the Life Sciences*, edited by CSSR Kumar, which includes Vol 10: Nanomaterials for Medical Diagnosis and Therapy (see table of contents below). For comparative purposes, the MML series is much more focused on actual biomaterials science and methods. If you are looking for highlights of the biomaterials and more about the disease state, then the *Nanotechnologies for the Life Sciences* is a good choice. If you are a biomaterials scientist in need of specific methods

to practice in the lab, then the *Microspheres, Microcapsules and Liposomes* series is an excellent resource.

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For comparative purposes, Table of Contents for: Nanomaterials for Medical Diagnosis and Therapy, Edited by Challa Kumar

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AIMBE Federal Symposium Update

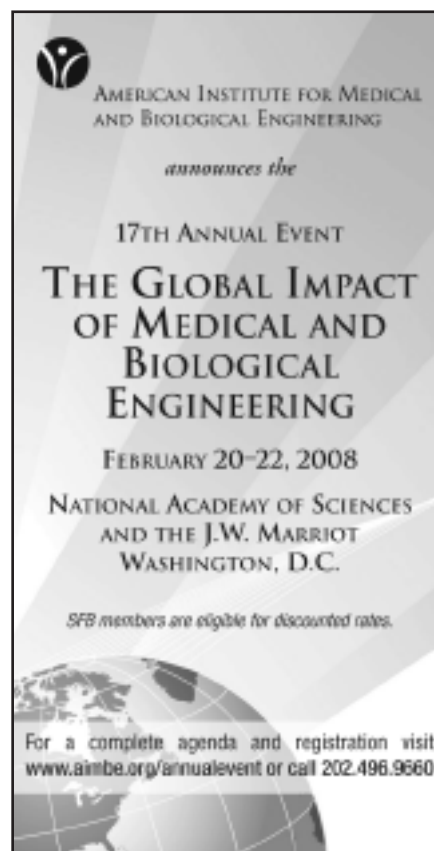
On September 10 and 11, 2007, the American Institute for Medical and Biological Engineering’s Council of Societies hosted their 2nd Annual Federal Symposium, in Washington, D.C.

The first day included seminars, panels, and discussions with key leaders in the health, science and engineering agencies. The focus was on developing an understanding of the Federal budget process and the need for increased funding of the National Institutes of Health and the Food and Drug Administration in the 2008 Budget. On the second day, AIMBE representatives met with their respective elected officials in Washington to lobby in support of fully appropriating the 2008 budget levels to the authorization levels passed in the America COMPETES Act, and the NIH and FDA authorizations. This year’s attendance doubled last year’s figures with more than 60 representatives of the medical and biological engineering community. A full description of the event is available on the AIMBE website: www.aimbe.org/fedsymposium.

The Federal Symposium emphasizes AIMBE’s presence and visibility in Washington and affirms AIMBE’s place in the science and technology community as the premier voice for medical and biological engineering. The Society For Biomaterials remains a committed supporter of the AIMBE mission, and continues to strengthen its ties to this important voice in our field. The Society For Biomaterials’ participation in the AIMBE Council of Societies adds its voice to that of 14 other professional associations representing more than 50,000 members, thereby making its voice on the Federal level louder and stronger.

Biomaterials Community

*Linda Lucas, AIMBE President;
 Anne Meyer, AIMBE Council of Societies Chair;
 Lynne Jones, SFB SIG Chair Representative;
 Dan Lemyre, SFB Executive Director;
 Jason Rivkin, AIMBE Assistant Director*



Acambis (Cambridge, United Kingdom) has gained FDA approval for its smallpox vaccine ACAM 2000, the first new biodefense vaccine to be licensed since the U.S. government launched Project Bioshield in 2001. Acambis previously supplied 192.5 million doses of the vaccine under the investigational new drug application, and the license paves the way for the company to agree to a deal with the Centers for Disease Control and Prevention (CDC) for a warm base manufacturing contract to maintain the stockpile. Apart from the U.S., ACAM 2000 has been sold to 14 other governments.

Advanced Medical Technology Association

(Washington, D.C.) General Counsel Christopher White issued the following statement expressing concerns about the passage of H.R. 1908, The Patent Reform Act of 2007: "The closely divided vote today in the House of Representatives demonstrates the significant bipartisan opposition to the patent reform plan as currently written. It weakens important patent protections by making patents easier to challenge and cheaper to infringe at a time when America's innovators, manufacturers and workers need stronger patent protections to compete internationally. AdvaMed hopes the U.S. Senate will carefully consider this legislation and act to protect America's competitiveness and the future of medical innovation. This law contains some of the most sweeping changes America's patent system since the 1950s. AdvaMed urges the Senate to delay further patent legislation until important improvements can be made to protect America's workers, inventors and investors."

AtriCure Inc. (West Chester, Ohio) announced that its Cosgrove-Gillinov Left Atrial Appendage Occlusion System was successfully implanted during an open-heart surgical procedure performed in Switzerland. It has been estimated that 15 to 20 percent of all strokes are attributable to atrial fibrillation (AF). The Cosgrove-Gillinov Left Atrial Appendage Occlusion System is a clip device that is designed to occlude the left atrial appendage, a hollow sac-like structure attached to the heart's left atrium appendage. The left atrial appendage has internal peaks and valleys, or trabeculations. During AF, stagnant blood pools in the trabeculations of the left atrial appendage and is known to form clots that can migrate to other parts of the body.

Biomet Inc. (Warsaw, Ind.) announced that its shareholders approved a merger agreement with LVB Acquisition Inc. and LVB Acquisition Merger Sub Inc. LVB Acquisition and LVB Acquisition Merger Sub are indirectly owned by investment partnerships directly or indirectly advised or managed by The Blackstone Group, Goldman, Sachs & Co., Kohlberg Kravis Roberts & Co. and TPG. Biomet expects the transaction to be completed by the end of September. Biomet will become a wholly-owned subsidiary of LVB Acquisition Inc.

CellCyte Genetics Corp. (Kirkland, Wash.) has entered into a collaborative research agreement with physician scientists at the Cleveland Clinic Foundation of Cleveland, Ohio. The goal of the collaboration is to investigate the presence and regulation of heart receptors involved in stem cell trafficking in normal and diseased human hearts, using CellCyte's proprietary compounds. The company's first product in development, CCG-TH30, is designed to send autologous bone-marrow-derived (adult) stem cells to the heart of patients after a heart attack. In preclinical models, CCG-TH30 has been shown to increase the retention of stem cells up to as much as 80 percent compared to conventional methods, which achieve only up to about 7 percent. Importantly, CellCyte's product can be delivered intravenously through the patients' circulatory system without an invasive procedure.

Integra LifeSciences Holdings Corp. (Plainsboro, N.J.) and **IsoTis Inc.** (Irvine, Calif.) announced a definitive agreement whereby Integra would acquire IsoTis in an all cash transaction. This combination creates one of the largest sales organizations focused on orthobiologics in the United States. The transaction is expected to be completed in the fourth calendar quarter of 2007.

Medtronic Inc. (Minneapolis, Minn.) and **Kyphon** (Sunnyvale, Calif.) announced on July 27, 2007, that the companies have signed a definitive merger agreement under which Medtronic will acquire all of the outstanding shares of Kyphon for \$71 per share in cash. The transaction, which was unanimously approved by the boards of directors of both companies, is valued at approximately \$3.9 billion.

Members in the News

Member News

Contributed from Press Releases

Congratulations to:
Professor Cato Laurencin of the University of Virginia, whose research team was awarded one of 12 NSF Emerging Frontiers in Research Innovation grants. The grant was among 12 awarded to institutions to advance basic knowledge and control of both the biological and manufactured worlds, through the newly established NSF Emerging Frontiers in Research Innovation Office (EFRI).

Dr. Karen Burg, founding Director of the Center for Biological Interfaces of Engineering (CBIOE) at Clemson University, whose multi-institutional CBIOE research team was awarded one of 12 NSF EFRI grants. The mission of CBIOE, a state-supported center, is to promote the development of clinically relevant biomaterials technology and products for disease treatment and the transfer of this technology for patient care.

Community Calendar

Materials Research Society Meeting

San Francisco, CA
March 24-28, 2008
www.mrs.org

2nd International Conference on Mechanics of Biomaterials & Tissues

Lihue - Kau'i, HI
December 9-13, 2007
www.icombt.elsevier.com/

54th Annual Meeting of the Orthopaedic Research Society

San Francisco, CA
March 2-5, 2008
www.ors.org

The Annual Hilton Head Workshop

Hilton Head Island, SC
March 12-16, 2008
www.hiltonhead.gatech.edu

8th World Biomaterials Congress

Society For Biomaterials and IUSBSE
Amsterdam, The Netherlands
May 28-June 1

2008 SFB Meeting on Translational Research

Buckhead (Atlanta), GA
September 11-13, 2008

2009 SFB Meeting and Exposition

San Antonio, Texas
April 22-25, 2009

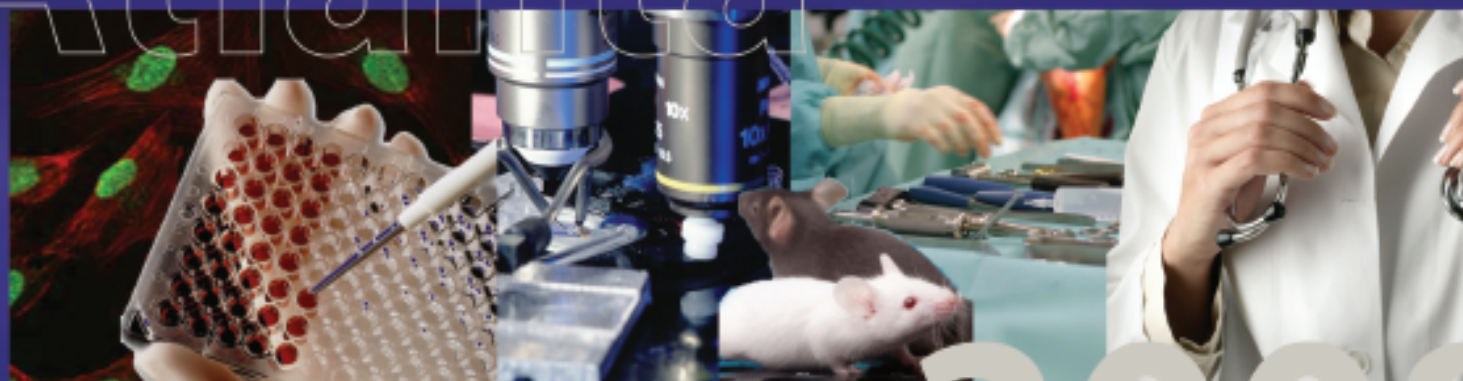


Society For Biomaterials

Translational Biomaterial Research

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Atlanta



Abstract Deadline: March 15, 2008

2008

Clinical Application Sessions

Stents & Coronary Technologies
Ophthalmologic Devices & Drug Delivery
Inflammation & Immunology
Neural & Neurosurgical Applications
Dental & Orthopaedic Implants
Musculoskeletal Applications
Imaging & Therapeutics Delivery

Technology Rapid Fire Sessions

Biomaterials for Nanomedicine
Cell-interfacing Technologies
Tissue Engineering Strategies
Novel Biomaterials

Workshops & Tutorials

Genomic & Proteomic Chips in Translational Medicine
Process Development & Manufacturing of Cells &
Tissue Engineered Constructs

Focused Workshops & Panels

Regulation of Biomaterials
Intellectual Property Primer



September 11-13, 2008

Atlanta, Georgia

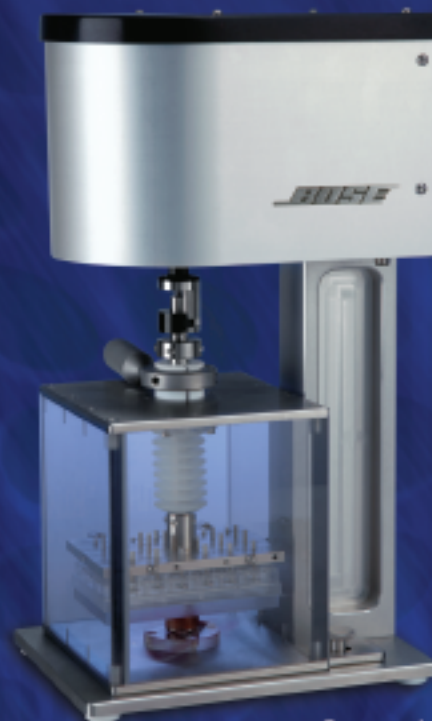
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