

Annual Meeting Registration Info Inside

BIOMATERIALS FORUM



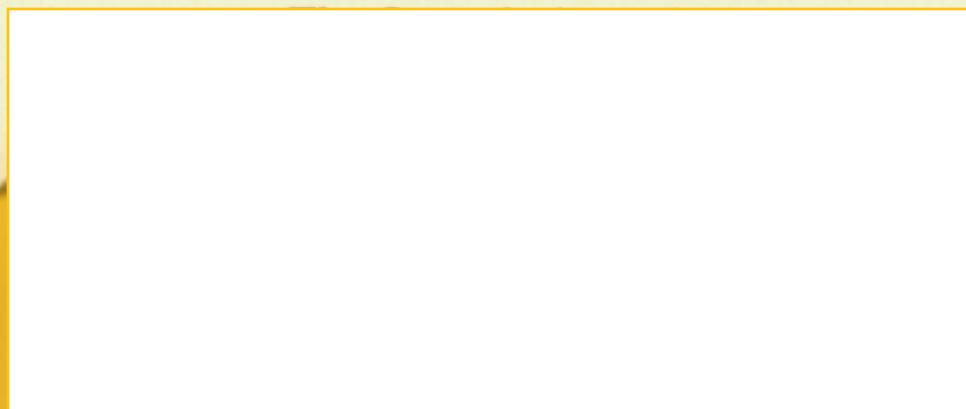
First Quarter 2006 • Volume 28, Issue 1

MATERIALS FOR
RECONSTRUCTIVE SURGERY **1975**

**High-Throughput Evaluation
of Restorative Dental Polymers**

2006 Officer Nominees

**Society For Biomaterials:
Celebrating 30 Years**



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BIOMATERIALS FORUM



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This year the Society For Biomaterials celebrates 30 years of annual technical meetings! It was April 26, 1975, that the first meeting of the Society For Biomaterials was held in the facilities of Clemson University in Clemson, South Carolina.

18 Society Officer Nominees

The Society For Biomaterials introduces the 2006-2007 slate of nominees for President-Elect and Member-at-Large. Voting members are urged to cast their ballots for the candidates of their choice.

21 High-Throughput Evaluation of Restorative Dental Polymers

High-throughput and combinatorial methods have become increasingly popular in material discovery, characterization, and optimization due to faster data acquisition, more thorough examination of experimental variables, equal processing conditions for a given specimen, and lower experimental error.



From the materials for the 7th Annual International Biomaterials Symposium at Clemson University in 1975.

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From the Editor

The Torch

By Karen J.L. Burg



I begin my term as Executive Editor of *Biomaterials Forum* with this issue.

As a faculty member at Clemson University, the initial site of SFB meetings, I am very aware of the roots of the Society and have access to many of the early papers from pioneers in the Society, such as those by C. William Hall. Clemson

University, in conjunction with the Society For Biomaterials, has developed a C. William Hall library in the Rhodes Engineering Research Center at Clemson University, in which seminal papers have been deposited by many renowned biomaterialists. Drawing from this resource and from contributors to this resource, each *Forum* issue in the 2006 volume will highlight events from the early SFB years to the present, providing perspectives from participants and leaders of the inaugural Meeting. This issue captures the essence of the early meetings from the perspective of a participating student....I think you may recognize his name.

Why is our Society history important? Consider, for example, the burgeoning field of nanotechnology and its correlation to

the seminal, foundational work of pioneers in the field who found that surface texturing a hip stem could indeed cause greater implant stability in the long term. What were the lessons learned then and what have we learned since that time? Consider also the students who participated in the inaugural meetings — they are now our esteemed leaders! Who will lead our Society in 2036 and what will their reflections be regarding the 2006 Meeting? It is crucial that we remember our roots so we learn and grow from our experiences and findings, and chart a course for new and exciting discoveries.

The *Biomaterials Forum* plays a critical role in informing the SFB membership and I am honored to have the opportunity to grow the tradition of excellence of *Biomaterials Forum* during the next five years. The editorial staff of *Biomaterials Forum* and I wish you a productive and rewarding 2006. We look forward to working with you to keep the SFB membership well informed.

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

From the President

The Torch

By Michael V. Sefton



Excellence and Cutting-Edge; Fun and Approachable.

No, this is not the start of a personals ad.

Critics of SFB annual meetings and those who complained about being trapped on a boat during a long-ago bash might not agree, but

“excellence,” “cutting edge,” “fun” and “approachable” emerged as SFB’s core values during its strategic planning retreat last November. So the question now is, have we lost sight of those values and, if so, what do we need to do to enable SFB to succeed during the next 10 or more years?

In one form or another, these are the thoughts that animated the strategic planning discussion the SFB Council, supplemented with some future and past SFB leaders, held in Baltimore November 11-12. Laura Otten of the Nonprofit Center at La Salle University in Philadelphia acted as a facilitator and I don’t think we would have covered as much territory as we did without her help and without the preparation of Vicky Elliott and her team at Association Headquarters. Your survey responses, plus some hard data, suffused the deliberations: membership numbers are down; we need royalty income from JBMR and great attendance at the meetings to balance the books; there are lots of other societies competing for your “biomaterial dollar;” you aren’t impressed

with the quality of the annual meeting; you are ambivalent about Special Interest Groups.

So discussion focused around a few key questions, which I paraphrase here, for rhetorical purposes:

- How do we restore “excellence and cutting-edge” to the annual meeting?
- How do we deploy the SIGs to add the “fun” and “buzz” back into SFB?
- How do we ensure members enjoy the fruits of our “approachability”?
- How do we improve the financial position of SFB and its mode of governance so SFB can thrive through the next generation?

There was no shortage of ideas on each of these topics and a few more. We are now digesting them and identifying the task forces needed to translate the ideas into an action plan. You will be hearing more about this in the coming weeks and during the next year.

SFB has a focus on biomaterials and biocompatibility that is unique. It is multidisciplinary and it is multisectoral. It is focused on education, research, and the benefits to society. As Jim Anderson put it: “SFB has tomorrow’s biomaterials today.”

Now that is the start of a great ad.

Update on the 2006 Annual Meeting

The Annual Meeting of the Society For Biomaterials has a long tradition of excellence in showcasing advances and cutting-edge technologies related to implant materials and devices. In recent years, the field of biomaterials encompasses the enabling technologies necessary to propel the progress of emerging strategies such as tissue engineering, nanotechnology, and the delivery of bioactive agents for treating, repairing and restoring function of tissues. The session organizers, reviewers, Program Committee, SIGs, and the staff at SFB headquarters have been working hard to finalize the program for the 2006 meeting. I thank them all for the high level of dedication to excellence and the attention to detail. For the most up-to-date information on the meeting, please visit the official Web site often: www.biomaterials.org/Meetings/06AnnualMeeting/index.htm

Here is an update on several exciting features of the meeting that the Program Committee is working on:

Scientific and Social Overlaps with the 2006 Regenerate World Congress

To address the need for multidisciplinary approach and to expand on the success of past joint sessions with other professional societies, the 2006 meeting will have significant scientific and social overlaps with the Regenerate World Congress of the Tissue Engineering and Regenerative Medicine International Society, the Regenerative Medicine Foundation, and the Pittsburgh Tissue Engineering Initiative. Both Program Committees have identified sessions of mutual interest and the sponsoring Societies are providing registration discounts and other incentives to promote cross-fertilization of these conferences. The goal is to reflect and enhance the diverse expertise and value of membership. In short, more science, more networking, and more fun for your conference dollar and time.

Keynote Address

Professor James J. Collins of the Centers for Advanced Biotechnology and Biodynamics and the Department of Biomedical Engineering at Boston University will be the Keynote Speaker during the Opening Ceremony/Bash.

The development of biomaterials and the understanding of the biology-material interaction are crucial for the future of our field. Excellent research in both worlds of materials and biology is represented by the abstracts in our Annual Meetings; however, the dynamic interaction of all biological systems that can impact the function of biomaterials is poorly understood. The field of systems biology offers a unique paradigm to appreciate and to understand these important interrelationships. A preeminent figure in this systems approach is Professor J.J. Collins. Dr. Collins received a BA in physics from the College of the Holy Cross and a doctor of philosophy degree in medical engineering from the University of Oxford. He was a Rhodes Scholar and has received a number of awards and honors, including the Thomas Stephen Group Prize from the Engineering in Medicine Group of the

Continued on page 23

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Hello from the Society For Biomaterials headquarters! By providing a regular update of staff and membership activities, it is our sincere wish that all of the Society's members stay abreast of current Society activities, and we encourage more members to take an active role in the Society For Biomaterials!

This quarter, headquarters staff has been active in their support of the following committee activities:

Awards Ceremonies & Nominations Committee - Vision statements and brief biographies for each nominee for 2006-2007 President-Elect and Member-at-Large are presented in this issue of the *Forum* (Page 18). The 2006-2007 Election Web site has been available at www.biomaterials.org since January 13, 2006. The 2006 Award recipients will be announced in the 2nd quarter 2006 issue of the *Biomaterials Forum*!

Bylaws Committee - If there are any members wishing to propose a bylaws change, please contact Tim Topoleski, SFB Bylaws Committee chair, for details soon. Bylaws changes must be distributed to the entire membership and to do so, must be signed by six active members and received by headquarters no later than March 17, 2006.

Devices & Materials Committee - The Devices & Materials Committee is continuing work with ASM International to develop a materials database, and is also coordinating SFB activities with ASTM and the ISO.

Education & Professional Development Committee - The Education & Professional Development Committee is working with student chapter leaders and headquarters staff to develop activities for the 2006 Annual Meeting in Pittsburgh. Current plans include a student workshop titled "What Fits You Best: Academia or Industry and How Do You Get There?" and a Student Career Fair with, as of this writing, 10 participating companies.

Finance Committee - The Finance Committee is implementing the new investment policy and has obtained approval from the board of directors for the 2006 annual budget and a new check signature policy. As required by the bylaws of the Society, this new check signature policy is hereby fully disclosed to the Society's membership: an e-mail list of checks with descriptions from each check run will be sent to the Treasurer for approval in advance of issuing payment; the Treasurer will have electronic access (read only) to the Society's checking account for the purpose of reviewing payment activity at any time; and checks more than \$10,000 require the Treasurer's second signature.

Long Range Planning Committee - The Long Range Planning Committee is working with the board and headquarters staff to create an operational plan for the initiatives resulting from the November strategic planning meeting held in Baltimore. An overview of this strategic planning meeting is provided in this issue of the *Forum* from SFB President, Michael Sefton, ScD (Page 2).

Meeting Committee - The Meeting Committee's proposal to the board for the 2007 Annual Meeting venue has been approved. The 2007 meeting will be held at the Sheraton Chicago Hotel & Towers from April 19-21, 2007. The 2009 meeting locations are still being reviewed. Also under consideration are plans to hold a topic-specific meeting in Fall 2008. Ideas for topics should be forwarded to Dr. Sefton for evaluation.

Membership Committee - As you are by now aware, SFB is now offering an option to subscribe to the *Journal of Biomedical Materials Research* (Parts A&B) strictly electronically as part of your membership, reducing dues by more than 40 percent in most instances. On the heels of the new membership dues structure, which has been adopted by about half of the SFB membership renewing for 2006, the Membership Committee is preparing to embark on a marketing campaign to increase SFB's membership. In addition, several proposals for increasing the value of membership are in development by the committee.

Program Committee - The Program Committee received 714 abstracts for the 2006 Annual Meeting, in addition to six proposals for Technology & Training Forums. A current list of exhibitors and sponsors is available at www.biomaterials.org. The registration fee schedule has been approved and the registration Web site should be online shortly. We look forward to an excellent program in Pittsburgh!

Publications Committee - This marks the first issue of the *Biomaterials Forum* under its new Executive Editor, Karen Burg, from Clemson University. In addition, Tom Webster, of Brown University, has been approved by the board of directors to take the helm as Web site editor! SFB staff welcomes our two new editors and we look forward to working with them to provide the SFB membership with the very best publications in the field!

Special Interest Groups - SIG representative Andres Garcia is working with the board and SFB staff to finalize the updated SIG officer handbook, and outline new policies and procedures for the SIGs, with an eye on giving them more autonomy and budgetary discretion.

If you have any questions or require any information, or have suggestions for improved services, please feel free to contact the Society's headquarters office:

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www.biomaterials.org

The SFB is on a Budget

The fiscal year for SFB began January 1, 2006. But what does this mean for the members of the Society? We thought it would be of interest to SFB members to learn about the financial planning process and what is involved in developing the budget for each year.

Preparation of the budget for each fiscal year begins during the Annual Meeting held during the preceding year. The budget is prepared by the Secretary-Treasurer and the Secretary-Treasurer-Elect with assistance from the Finance Committee. It starts with gathering information about the goals and new initiatives of the members of the board (including the President-Elect), members of council (including the Program Chair for the following year), and the staff at headquarters. A cost-benefit analysis is conducted for any new project ideas. Of course, the budget is developed with knowledge of what is budgeted and the monthly expenses for the current year. The budget is then presented to the board for review and, after any modifications, approved. The goal is to obtain approval of the budget by early Fall so it can be presented at the Fall council meeting.

Our primary sources of revenue are membership dues, the Annual Meeting and workshops, Special Interest Group membership dues, and royalties from the journals and the textbook. As one would expect, the primary budget expenses relate to the Annual Meeting, the Society's publications, and operations. Meeting costs include (but are not limited to) expenses related to facilities contracts, audiovisual, abstract submission and preparation, and the social events. Our Society publishes (through J. Wiley & Sons, Inc.) the *Journals of Biomedical Materials Research A and B* (Applied Biomaterials). We also provide a high-quality newsletter, the *Biomaterials Forum*, for our members. Our primary operational cost is associated with the contract with our management group.

Other costs include the operation of the Special Interest Groups, maintenance of our Web site, awards, and a newly-developed video library.

During 2005, the major fiscal issues surrounded investments/reserves and membership fees. Policies concerning investments and the establishment of a reserve were approved. Implementation included the allocation of monies for investment (\$250,000) and the selection of an investment consulting group, Condor Capital. Our goal is to have 50 percent of one year's expenses in our reserves to cover unforeseen emergencies. Increasing the Society's membership base is a priority for 2005 and 2006. With this in mind, a new fee structure was approved. Highlights include providing a new fee for members requesting an electronic-only version of the journals, the establishment of a new category for Associate Post-Grad members, and the holding of all other dues to 2005 levels.

This year brings with it new issues facing the Society. We will be negotiating the renewal of the management contract with Association Headquarters. Although Whitaker funding of student-related projects (workshops, awards) is no longer available, the Society will continue to support student activities. This commitment has an impact on our next major issue, which is identifying new sources of non-annual-meeting revenue. A task force, chaired by Lynne Jones, has been established to explore the possibilities.

The take-home message is that the Society is financially healthy. However, we need to continue to examine our fiscal policies, our standard operating procedures, and the value of membership to each member of the Society. With new board and council members will come new ideas, and the identification of new ways to fund those ideas!

AIMBE 2006 College of Fellows Elected

From press release

The Society For Biomaterials would like to congratulate those members who were recently elected to the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows:

Ravi Bellamkonda, PhD, *Georgia Institute of Technology and Emory University*
Cheryl R. Blanchard, PhD, *Zimmer Inc.*
Barbara Dale Boyan, PhD, *Georgia Institute of Technology and Emory University*
Karen J. L. Burg, PhD, *Clemson University*
Elliot L. Chaikof, MD, PhD, *Emory University*
Charles D. Griffin, *Carbomedics Inc.*
Syed Hossainy, PhD, *Guidant Corp.*
Martine LaBerge, PhD, *Clemson University*
Phillip Messersmith, PhD, *Northwestern University*
Donald E. Morel, PhD, *West Pharm Services*
Joseph C. Salamone, PhD, *Bausch & Lomb*
Molly S. Shoichet, PhD, *University of Toronto, Canada*
Myron Spector, PhD, *Harvard Medical School*
Samuel I. Stupp, PhD, *Northwestern University*
Hsing-Wen Sung, PhD, *Tsing Hua University, Taiwan*

Anderson Receives Elsevier Biomaterials Gold

The Torch
From Press Release

James M. Anderson, MD, PhD, professor of pathology, macromolecular science and biomedical engineering, is the recipient of the Elsevier Biomaterials Gold Medal. The Elsevier Biomaterials Gold Medal was awarded to Dr. Anderson for the most accumulated significant contributions to biomaterials science by an individual from 1980 to 2005. The scope of this award was for Dr. Anderson's accumulated research accomplishments, consulting, his efforts on behalf of the International Standards Organization, as well as his outstanding mentoring of students in the field of biomaterials. Dr. Anderson received the award at the Tissue Engineering Science International Conference held in Shanghai, China, October 22, 2005. Dr. Anderson was chosen for this award by an international panel of biomaterials scientists chaired by Dr. David Williams, Editor-in-Chief of the Elsevier journal *Biomaterials*.



from Case Western Reserve University School of Medicine in 1976. In 2003, he was elected to the Institute of Medicine of the National Academies. An expert in clinical device retrieval and evaluation, and policy development, Dr. Anderson has provided leadership and contributions to the science and engineering of biomaterials and medical devices through interactions with the NIH, the Food and Drug Administration, the International Standards Organization, and the American Institute for Medical and Biological Engineering. Dr.

Anderson is internationally recognized for his pioneering and significant advances in the understanding of the inflammatory cell biology of tissue interactions with biomaterials and implantable medical devices. His efforts range from fundamental research in the related areas of biomaterials, drug delivery systems, and tissue engineering, to clinical implant retrieval and evaluation. Dr. Anderson is a past-president of the Society For Biomaterials (USA) and the Controlled Release Society.

The Society For Biomaterials congratulates Dr. Anderson for his accomplishments.

A Lyndhurst, Ohio, resident, Dr. Anderson earned his bachelor's degree in chemistry from the University of Wisconsin-Eau Claire in 1963. He earned his PhD in chemistry from Oregon State University in 1967 and his MD

Upgrading the Web Site II

The Torch

By Richard A. Gemeinhart, Publications Committee

What is your impression of the Society For Biomaterials Web site? Did you know the address is easy to remember: www.biomaterials.org? Are you able to find the information you want? Is the site helpful? These questions were asked in an article in the *Forum* about a year ago (Volume 25 Number 4) and continue to be asked by those in charge of the Web site. These are still valid questions because only a few changes have been made during the last year, but major changes are on the way.

The first major change during the last year was to create the position of Web Editor. The charges of Web Editor are to monitor the Web site for accuracy, solicit content, originate content and initiate new features. It has been my pleasure to act as interim Web Editor since the Annual Meeting in Memphis. As part of my duties, I have updated the calendar and made numerous small changes to the Web site to assure the site is updated and current. These were only small changes that hopefully have not gone unnoticed.

The primary change under my watch is to be unveiled shortly. The Web site now has individualized access for specific information, in particular board, council, committee, and Special Interest Group (SIG) Web sites. Only members of a particular group have access to the information on a particular page, but all members can soon view their own individualized Web page. This change will allow any member to log into the "Members Only" section of the site to find out in which SIGs they participate and view information particular for that SIG. Members who are part of the volunteer leadership will be able to share information using board, council and committee Web sites. This change will allow particular groups—SIGs in

particular—to have access to create individualized Web pages, online newsletters, hold discussions and identify the other members of that particular group. The informational SIG Web sites will still be viewable without membership. Once this functionality is fully operational, it is up to those groups to populate those sites with information that will attract their members with the help of the Web Editor! If you have questions or comments about this update, please contact me at any time (rag@uic.edu) for more information.

It was my pleasure to act as interim Web Editor, but I accepted that responsibility with the understanding that another individual would be charged with the task of rejuvenating the Web site in 2006. During the last several months, we have screened several candidates and we are pleased to announce that Professor Thomas Webster (Brown University) has been selected to lead the rejuvenation of the Society For Biomaterials Web site. Dr. Webster has an exceptional vision for the Web site involving positioning of the Society For Biomaterials Web site as "the portal" for biomaterials on the Internet. I want to be the first to wish him luck in this task, and I ask that the entire membership wish him success and assist him in his new role.

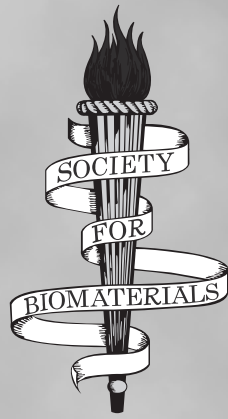
Please give Dr. Webster your suggestions as to information, content, and services that you would like to have available on the Web site. How can you do this? It's simple. Go to www.biomaterials.org, access the "Contact Us" link, select info@biomaterials.org and title your comments in the subject line: WEBSITE IDEA, or simply send an e-mail to webeditor@biomaterials.org.

Society For Biomaterials

2006 Annual Meeting

April 26 - 29, 2006

David L. Lawrence Convention Center
Pittsburgh, Pennsylvania, USA



"Biomaterials: The Enabling Technology"



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Registration Information

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"Biomaterials: The Enabling Technology"

ABOUT THE SOCIETY

The Society For Biomaterials is a professional society that promotes advances in biomedical materials research and development by encouragement of cooperative research, educational programs, clinical application, and professional standards in the biomaterials field. Biomaterials scientists and engineers study cells, their components, complex tissues and organs, and their interactions with natural and synthetic materials and implanted prosthetic devices, as well as develop and characterize the materials used to measure, restore, and improve physiologic function, and enhance survival and quality of life.

PROGRAM OVERVIEW

The Annual Meeting of the Society For Biomaterials has a long tradition of excellence in showcasing advances and cutting-edge technologies related to implant materials and devices. In recent years, the field of biomaterials represents the **enabling technology** necessary to propel the progress of emerging strategies such as tissue engineering, nanotechnology, and the delivery of bioactive agents for treating, repairing, and restoring function of tissues. Attendees of the Society For Biomaterials meeting reflect the multidisciplinary nature of our field, and work every day to advance these topic areas by applying many of the lessons learned at the SFB meeting to new clinical approaches. These new and challenging topics are not only related to basic and applied biomaterials research, but also to the education and recruitment of new biomaterials scientists, engineers, and clinicians, and the continued growth and development of the biomedical industry.

To address the need for this multidisciplinary approach and expand on the success of past joint sessions with other professional societies, our 2006 meeting will have significant scientific and social overlaps with the Regenerate Meeting of the Tissue Engineering and Regenerative Medicine International Society (TERMIS) and PTEI. Both Program Committees are working hard to identify sessions of mutual interest and both societies are providing registration discounts and other incentives to promote cross-fertilization of these conferences. Our goal is to reflect and enhance the diverse expertise and value of our membership. In short, more science, more networking, and more fun for your conference dollar and time.

PRELIMINARY PROGRAM (TENTATIVE AND SUBJECT TO CHANGE)

Keynote Address

J.J. Collins of the Center for BioDynamics and the Department of Biomedical Engineering at Boston University will be the Keynote Speaker during this year's Opening Ceremony! As a leader in the field of systems biology, J.J. Collins will offer a unique perspective to understand the important interrelationships between worlds of materials and biology. Dr. Collins' research focuses on developing nonlinear dynamical techniques and devices to characterize, improve, and mimic biological function.

GENERAL SESSIONS AND SYMPOSIA

General Sessions

A General Session is on a topic that is familiar to the general membership. Abstracts reflect the most current research in that field.

- Biodegradable Hydrogels for Tissue Engineering
- Fibrin Sealant and its Application in Tissue Engineering
- Biomimesis in Drug Delivery
- Dental and Orthopaedic Implant Coatings and Materials: Characterization, In-vitro, In-vivo and Clinical Assessments
- Innovative Techniques in Biomaterials Education
- Mechanobiology of Skin and Bone
- Ophthalmic Drug Delivery
- Cell Response to Micro/nanopatterned Biomaterials
- Urological Tissue Engineering and Biomaterials
- Surface Modification and Characterization of Biomaterials
- Synthetic Orthopedic Materials
- Orthopedic Bearing Surfaces



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Symposia

A Symposium is designed to focus our attention on a specific topic within the large disciplines that make up the Society's membership. The symposium highlights a well-defined topic that is not addressed by the regular sessions of the annual meeting.

The format includes a single lead speaker followed by related abstracts. The lead speaker either presents the current concepts of the topic or presents cutting-edge research within the area.

- Bionanotechnology: The Future of Biomaterials
- Modeling Bioresponse to Biomaterials
- Organic/Inorganic Hybrid Biomaterials
- New Concepts and Challenges for the Delivery of Therapeutic Nucleic Acids
- Cellular Signal Transduction
- Stem Cells: Source, Culture, and Application
- Advances in Biomaterials Science: What's in the Future of Biomaterials...Addressing Biological Problems Again!
- Advances in Biomaterials Science: What We Have Learned from Our Mistakes

Workshops

The workshops will provide an in-depth educational experience on topics relating to biomaterials with a significant amount of time dedicated to discussion and questions and answers. Each workshop requires separate registration, the fees for which are detailed on the registration form.

- What Fits You Best, Academia or Industry, and How Do You Get There?
- Vascularization and Innervation of Tissue Engineered Constructs
- Microscopy: Basic Principles and Applications for Biomaterial Analysis

What Fits You Best, Academia or Industry, and How Do You Get There?

(Biomaterials Education SIG)

To enhance the professional development of graduate students as well as provide knowledge about academia and industry through invited speakers, this workshop will be divided into three sections. In the first section we will have invited speakers who have started in academia and switched to industry, and vice versa. The intent is that students will be more informed when it comes time to choose either pathway. The second section will focus on how to develop a budget for a research program featuring invited speakers from both academia and industry to address the differences in this process. The last section will focus on sharpening students' interviewing skills and ultimately making them more confident and comfortable during their first interview.

Vascularization and Innervation of Tissue Engineered Constructs

(Tissue Engineering SIG)

Tissue engineering of thick tissues or whole organ engineering remains a significant clinical need. The latest research has demonstrated that every tissue, with the exception of cartilage, has both a blood supply and is innervated, including bone, heart valves, and skin. Vascularization and neural ingrowth are important in healing, tissue regeneration, and tissue and organ function. The engineering of replacement tissues or organs will require complex systems to be integrated into or generated after implantation. Two of the important challenges will be to provide: 1) a stable blood supply to the implanted construct, and 2) neural integration with the host tissues. Although angiogenesis and neural regeneration are active areas clinically, bringing these complex systems together with other cells or tissues and biomaterial scaffolds to create an integrated, fully functional tissue engineered product that is vascularized and innervated still remains a major barrier to thick tissue and organ engineering.

Microscopy: Basic Principles and Applications for Biomaterial Analysis

(Implant Pathology SIG)

The applications of microscopic principles and analysis of biomedical devices (materials) is fundamental in understanding device/tissue interactions and remodeling and regeneration at the tissue, cell, and molecular levels. At each level, there are core areas of physiology, engineering, biology, and modeling that can be discovered by the application of various microscopic techniques. A basic understanding of microscopic principles and optical tools enables the researcher to apply these in the studies of biomaterial surfaces and microstructure, which would provide data to further elucidate mechanisms of biocompatibility. This workshop will provide an overview of the different microscopes useful for biomaterial analysis.

Tutorials

The purpose of a tutorial is to teach the attendees about a specific technology or focus area. Tutorials are free of charge, but SFB requests that attendees indicate their intention to attend on the registration form.

- Advancements in Surface Characterization Methods
- Product Liability Law as Part of the Product Design Process: What Every Scientist Should Know

Advances in Surface Characterization Methods

(Surface Characterization and Modification SIG)

As surface modifications to induce specific biological responses become more subtle, surface characterization methods must necessarily become more sophisticated. This tutorial will survey recent advances in surface characterization techniques that can detect such subtle features as molecular orientations and submonolayer adsorbed species. Speakers will address several areas of development including: sum frequency generation (SFG), near-field scanning optical microscopy (NSOM), and synchrotron-based x-ray absorption techniques such as near edge x-ray absorption for fine structure (NEXAFS), imaging NEXAFS, and variable energy x-ray photoelectron spectroscopy. New activity to increase the sensitivity of time-of-flight secondary ion mass spectrometry (ToF-SIMS) will also be presented. This includes work using cluster ion beam sources to generate the secondary ions, deposition of MALDI matrix molecules onto the surface (matrix-enhanced SIMS), and gold deposition onto the surface (metal-enhanced SIMS). Presenters will emphasize the strengths and limitations of each technique, why one might choose a given tool over others, important details regarding sample preparation, and the benefits of applying surface analysis methods in combination. This session is being co-sponsored by the American Vacuum Society.

Product Liability Law as Part of the Product Design Process: What Every Scientist Should Know

(Biomaterial Availability and Policy SIG)

Learn realistic product design principles to build in success against product liability lawsuits. Device designers can take realistic steps to enhance the success of a product against product liability challenges. And businesses can use specific principles to manage product liability lawsuit risks. This tutorial will explain the legal principles that underpin medical product liability law and realistic design principles that anticipate potential legal challenges. Legal experts in medical device design and experienced designers will describe best practices for medical device design with respect to product liability. The tutorial is intended to provide scientists with tools they want and need to make the best products possible.



“Biomaterials: The Enabling Technology”

Panel Discussions

Panel discussions are a format that foster open debate on a topic. The invited guests include renowned experts on the area of focus and the chair allows time for open discussion with the audience.

- Entrepreneurship and Biomaterials/Medical Devices
- Clinical Experience with Orthopaedic and Dental Biomaterials
- The Role Players in the Drama of Anti-Biomaterial Immunity: the Macrophage, the Dendritic Cell, the B Cell, and the T Cell

Entrepreneurship and Biomaterials/Medical Devices (Biomaterial Availability and Policy SIG)

Entrepreneurial small business start-ups are being increasingly recognized and supported by federal, state, and local governments, and by universities as a mechanism for successful technology commercialization. “Biotech” start-ups based on biomaterials technology utilized for medical device applications have a unique set of challenges and rewards. Our society has previously examined the business models used by large corporations; this forum will address many of the issues faced by entrepreneurial individuals such as faculty members or graduate students as they attempt to bring their biomaterials technology to the market through a start-up business.

Clinical Experience with Orthopaedic and Dental Biomaterials (Dental/Craniofacial Biomaterials SIG, Implant Pathology SIG, Orthopaedic Biomaterials SIG)

Materials science and engineering is about the processing-structure-property relationship of various materials. The above relationship of biomaterials is ultimately tested in clinics. The development of biomaterials should have the goal of successful clinical applications. This panel discussion will invite leading clinicians who have much experience with biomaterials in areas such as orthopedics, dentistry, and tissue engineering. The

objectives of this panel discussion are (1) present the clinical applications of currently available biomaterials; and (2) discuss the improvement and directions of new biomaterials in different clinical areas.

The Role Players in the Drama of Anti-Biomaterial Immunity: The Macrophage, the Dendritic Cell, the B Cell, and the T Cell (Implant Pathology SIG)

Each panelist will review the role of one of the players as an immunological cell in general and as an antagonist of implants. Then the panelists will convene as a panel to discuss how the roles become parts in a drama featuring player interaction. Finally, the floor will be opened for questions from the audience. The purpose of the presentation is to make all SFB researchers aware of the scope of immune cell activity as it applies to implants and to help those specializing in one small area of host response to relate their work to the larger picture of host recognition of non-self.

Technology & Training Forums

These Forums will be technically-based educational opportunities hosted by SFB corporate supporters.

- Invibio, Inc. Technology & Training Forum: “Using Novel High Performance Polyetheretherketone Biomaterials for Implantable Medical Devices”
- IonBond, LLC Technology & Training Forum: “Coatings for Medical Device Applications”
- FMC BioPolymer/NovaMatrix Technology & Training Forum: “Alginate Technology Workshop”
- Medtronic, Inc. Technology & Training Forum: “Long Term Biostability of Polymeric Biomaterials”
- Polymer Technology Group Technology & Training Forum: “A New Approach for Tailoring Biomaterials Properties: Polymers with Self Assembling End Groups”

TENTATIVE PROGRAM SCHEDULE

Wednesday, April 26, 2006

7:00 a.m.	Registration Open
8:00 a.m. - 12:00 p.m.	Concurrent Workshops <ul style="list-style-type: none"> • Vascularization and Innervation of Tissue Engineered Constructs (this workshop ends at 10:00 a.m.) • Microscopy: Basic Principles and Applications for Biomaterial Analysis • What Fits You Best, Academia or Industry, and How do You Get There?
1:00 p.m. - 2:30 p.m.	Technology and Training Forums <ul style="list-style-type: none"> • Invibio, Inc., Technology and Training Forum: “Using Novel High Performance Polyetheretherketone Biomaterials for Implantable Medical Devices” • IonBond, LLC, Technology and Training Forum: “Coatings for Medical Device Applications”
3:00 p.m. - 4:30 p.m.	Technology and Training Forums <ul style="list-style-type: none"> • FMC BioPolymer/NovaMatrix Technology and Training Forum: “Alginate Technology Workshop” • Medtronic, Inc., Technology and Training Forum: “Long Term Biostability of Polymeric Biomaterials” • Polymer Technology Group Technology and Training Forum: “A New Approach for Tailoring Biomaterials Properties: Polymers with Self Assembling End Groups”

5:00 p.m. - 6:30 p.m.	Opening Ceremony
5:30 p.m. - 6:15 p.m.	Keynote: J.J. Collins, Center for BioDynamics and the Department of Biomedical Engineering, Boston University
6:30 p.m. - 9:30 p.m.	Opening Bash





Thursday, April 27, 2006

- 7:00 a.m. **Registration Open**
- 7:00 a.m. - 8:00 a.m. **Special Interest Group Meetings**
- 8:00 a.m. - 9:30 a.m. **Plenary Session I**
Presentations by SFB Awardees
- 9:30 a.m. - 7:30 p.m. **Exhibit Hall Open**
- 9:30 a.m. - 10:45 a.m. **Poster Session I/Break**
- 10:45 a.m. - 12:15 p.m. **Concurrent Oral Abstract Presentations Session I**
- Stem Cells: Source, Culture, and Application Symposium
 - Cell Response to Micro/Nanopatterned Biomaterials
 - Urological Tissue Engineering and Biomaterials
 - Biomimesis in Drug Delivery
- 12:15 p.m. - 1:15 p.m. **Lunch (on own)**
Student Career Fair
- 1:15 p.m. - 3:15 p.m. **Concurrent Oral Abstract Presentations Session II**
- Biodegradable Hydrogels for Tissue Engineering
 - Bionanotechnology: The Future of Biomaterials Symposium
 - New Concepts and Challenges for the Delivery of Therapeutic Nucleic Acids Symposium
 - Organic/Inorganic Hybrid Biomaterials Symposium
 - Surface Modification and Characterization of Biomaterials
- 3:15 p.m. - 3:45 p.m. **Break**
- 3:45 p.m. - 5:45 p.m. **Panel Discussions I and II**
- Entrepreneurship and Biomaterials/Medical Devices
 - The Role Players in the Drama of Anti-Biomaterial Immunity: The Macrophage, the Dendritic Cell, the B Cell, and the T Cell
- 5:45 p.m. - 7:15 p.m. **Poster Session II and Exhibition Reception**

Friday, April 28, 2006

- 7:00 a.m. **Registration Open**
- 7:00 a.m. - 8:00 a.m. **Special Interest Group Meetings**
- 8:00 a.m. - 10:00 a.m. **Concurrent Oral Abstract Presentations Session III**
- Bionanotechnology: the Future of Biomaterials Symposium II
 - Fibrin Sealant and its Application in Tissue Engineering
 - Ophthalmic Drug Delivery
 - Synthetic Orthopedic Materials
 - Surface Modification and Characterization of Biomaterials II
- 9:30 a.m. - 4:30 p.m. **Exhibit Hall Open**
- 10:00 a.m. - 10:45 a.m. **Break**
- 10:45 a.m. - 11:45 a.m.
- Annual Business Meeting
 - National Student Chapter Meeting
- 12:00 p.m. - 2:00 p.m. **Lunch (on own)**
Tutorial I - Advances in Surface Characterization Methods
Panel Discussion III - Clinical Experience with Orthopaedic and Dental Biomaterials
- 2:00 p.m. - 4:30 p.m. **Poster Session III/Break**

4:30 p.m. - 6:00 p.m.

Concurrent Oral Abstract Presentations Session IV

- Innovative Techniques in Biomaterials Education
- Stem Cells: Source, Culture, and Application Symposium II
- Cell Response to Micro/Nanopatterned Biomaterials II
- Biodegradable Hydrogels for Tissue Engineering II
- Advances in Biomaterials Science: What's in the Future of Biomaterials...Addressing Biological Problems Again.

6:00 p.m. - 7:00 p.m.

Special Interest Group Meetings

Saturday, April 29, 2006

- 7:00 a.m. **Registration Open**
- 7:00 a.m. - 8:00 a.m. **All Special Interest Group Officers Meeting**
- 8:00 a.m. - 10:00 a.m. **Concurrent Oral Abstract Presentations Session V**
- Biomimesis in Drug Delivery II
 - Bionanotechnology: The Future of Biomaterials Symposium III
 - Dental and Orthopaedic Implant Coatings and Materials: Characterization, In-vitro, In-vivo and Clinical Assessments
 - Mechanobiology of Skin and Bone
 - Advances in Biomaterials Science: What We Have Learned from Our Mistakes
 - Modeling Bioresponse to Biomaterials Symposium
- 10:00 a.m. - 10:30 a.m. **Break**
- 10:30 a.m. - 12:15 p.m. **Plenary Session II**
Presentations by SFB Awardees
- 12:30 p.m. - 2:30 p.m. **Lunch (on own)**
Tutorial II - Product Liability Law as Part of the Product Design Process: What Every Scientist Should Know
- 2:30 p.m. - 4:30 p.m. **Concurrent Oral Abstract Presentations Session VI**
- Biodegradable Hydrogels for Tissue Engineering III
 - Biomimesis in Drug Delivery III
 - Cellular Signal Transduction Symposium
 - Organic/Inorganic Hybrid Biomaterials Symposium II
 - Orthopedic Bearing Surfaces
 - Modeling Bioresponse to Biomaterials Symposium II



On Thursday, April 27, 2006, the Society For Biomaterials will be holding sessions concurrently with the 2006 Regenerate World

Congress on Tissue Engineering and Regenerative Medicine. Working collaboratively with PTEI and TERMIS, the SFB Program Committee offers the SFB Thursday Program to Regenerate attendees, and reciprocally, the Regenerate Program is also available to SFB meeting attendees. Regenerate's Thursday Program includes the following sessions: Third Party Reimbursement; Biomechanical Training of Tissue Constructs; Digitally Enabled Tissue Engineering; Bioreactors; Extensions of Regenerative Medicine to Ex-Vivo Discovery; Structural and Biomechanical Characterization; Addressing Immune System Issues; Imaging in Regenerative Medicine; and Controlled Ligand Presentation. For more information, or to register for the entire Regenerate 2006 Meeting, please visit: www.regenerate-online.com.



"Biomaterials: The Enabling Technology"

HOTEL INFORMATION/RESERVATIONS

Blocks of sleeping rooms have been reserved at two hotels in Pittsburgh. Both of the hotels can be contacted directly for individual reservations and they are both on a first-come, first-served basis.

Please be sure to reference the Society For Biomaterials or SFB Annual Meeting when making reservations. Reservations can also be made online through the SFB Web site by clicking on the Hotel Reservations Link.

The Westin Convention Center Pittsburgh

\$155 Single/double occupancy
(Connected to David Lawrence Convention Center)
1000 Penn Avenue
Pittsburgh, PA 15222
Phone: (412) 281-3700 • Fax: (412) 227-4500
Reservations: 1-800-WESTIN 1
Online at www.biomaterials.org

Located in the heart of the city's business and cultural districts, The Westin Convention Center Pittsburgh is connected by skywalk to the David L. Lawrence Convention Center. Guests will appreciate high-speed Internet access and a self-service business center along with the 8,000-square-foot Westin WORKOUT® Powered by Reebok Gym, which offers free weights, aerobic equipment, Nautilus training, indoor lap pool, steam, sauna, massage therapy, and aerobic classes. The hotel is connected to one of Pittsburgh's premier destination restaurants, The Original Fish Market, serving dinner until 1 a.m. nightly. Complimentary transportation is available Monday through Friday within the central business district and to local attractions such as the Heinz History Center, Andy Warhol Museum, PNC Park, and Mellon Arena.

Sleeping room rates have been reserved for attendees at a conference rate of \$155 single/double occupancy. These reduced rates are available until March 23, 2006, depending upon availability.

To reserve a room at the group rate, contact the hotel directly by calling their reservation line at 1-412-227-4500 or toll free at 1-800-WESTIN 1.

Hilton Pittsburgh

\$140 Single/double occupancy
600 Commonwealth Place
Pittsburgh, PA 15222
Phone: (412) 391-4600
Reservations: 1-800-HILTONS (445-8667)
Online at www.biomaterials.org

The Hilton Pittsburgh is the city's largest, most recognized hotel conveniently located Downtown at Gateway Center, facing Point State Park and Pittsburgh's famed three rivers, six blocks from the Convention Center, and across the river from Heinz Field and PNC Park. Located at the gateway to the cultural district, the Hilton Pittsburgh is the hub of activities for sporting events.

All rooms provide breathtaking views in every direction. They are beautifully appointed with ergonomically designed work areas, dual-line speakerphone with voice mail, and wireless high-speed Internet access.

Sleeping room rates have been reserved for attendees at a conference rate of \$140 single/double occupancy. These reduced rates are available until March 23, 2006, depending upon availability.

To reserve a room at the group rate, contact the hotel directly by calling their reservation line at 1-412-391-4600 or toll free at 1-800-HILTONS (445-8667).

Join SFB at the new reduced rate of \$160 and receive a \$180 discount on your registration. See www.biomaterials.org for more information.

GENERAL INFORMATION

All sessions of the meeting, including exhibits, posters, and oral presentations will take place in the David Lawrence Convention Center in Downtown Pittsburgh, Penn.

Transportation To and From the Airport

The Greater Pittsburgh International Airport is located 25 miles from the Convention Center with an approximate taxi fare of \$35 each way. Shuttle service is available at the airport.

Registration

All attendees are expected to register for the meeting. Register early and get the pre-registration fees, which are much lower than on-site registration. The pre-registration deadline is March 31, 2006. If you are attending the Regenerate 2006 Meeting please indicate on the registration form to receive a 20% registration discount.

Registration fees include: Abstract CD-ROM, admittance to all

scientific sessions, tutorials, technology and training forums, panel discussions, exhibits, opening reception, poster and exhibition reception, and breaks (additional fees apply to Wednesday workshops).

Member Rates

Member rates apply to members of the Society For Biomaterials, USA, other world biomaterials congress societies, and TERMIS. Members of TERMIS or world biomaterials congress societies must include a photocopy of a current dues receipt or membership card with registration to qualify for member discount. World biomaterials congress societies are Australian Society for Biomaterials, European Society for Biomaterials, the Japanese Society for Biomaterials, and Korean Society for Biomaterials. Probationary Special Interest Group members do not qualify for member rate.

Full-time student and Post-graduate meeting registration includes access to all scientific sessions, Opening Ceremony Reception, and



“Biomaterials: The Enabling Technology”

a complimentary Abstract CD-ROM. To qualify for discounted registration rates, proof of full-time student or post-graduate status must accompany registration.

Cancellations/Refunds

To cancel your registration and receive a refund, a written request must be received by March 31, 2006. Cancellation requests received by this date will receive a refund less a \$75 processing fee. Requests will be processed after the meeting. All requests received after March 31, 2006, will forfeit 100 percent of monies paid.

Web Registration

Registration for members and non-members may be submitted via the SFB Web site, www.biomaterials.org. NO REGISTRATIONS WILL BE ACCEPTED VIA TELEPHONE.

Final Program, Certificates of Attendance, and Visa

Certificates of attendance will be available for all registrants at the on-site registration desk. Badges will be required to be worn at all functions of the meeting. Participants are expected to make their own

travel arrangements, and procure their own visas. The final program will be distributed at the meeting.

The official language of the meeting is English.

Dress Code

Business casual is the recommended dress for the meeting.

Transactions Book

All of the abstracts being presented at the meeting, both oral and poster will be on CD-ROM, which is included in your meeting registration. A printed *Transactions Book* will be available for purchase upon registration.

Special Needs

The Society For Biomaterials wishes to take steps to ensure that no disabled person is excluded, denied services, segregated, or otherwise treated differently than other individuals because of the absence of auxiliary aids and services. If you require any auxiliary aids or services identified in the Americans with Disabilities Act, please indicate so on your registration form.

SPONSORS AND EXHIBITS

Each year, the Society For Biomaterials Annual Meeting serves as the central gathering point for the entire biomaterials field. This year's Annual Meeting in Pittsburgh, Penn., promises to offer an exciting interaction between conference registrants and exhibitors.

In order to provide exhibitors with steady exposure to conference attendees, all coffee breaks and poster sessions will be held exclusively in the exhibit area. This format encourages frequent contact and dialogue between biomaterials scientists in industry, academia, and the exhibiting companies.

For more information on exhibiting and sponsorship opportunities, please visit the Annual Meeting page of the society's Web site (www.biomaterials.org) and download the Exhibitor and Sponsorship Prospectus or contact:

Sohini Mitra, Exhibits Manager
Society For Biomaterials
15000 Commerce Parkway, Suite C, Mount Laurel, NJ 08054
(856) 439-0500 • smitra@ahint.com

Exhibit Hours

Thursday, April 27 9:00 a.m. - 7:30 p.m.
Friday, April 28 9:00 a.m. - 4:00 p.m.

Sponsors as of January 15, 2006

Lifecore Biomedical
SurModics

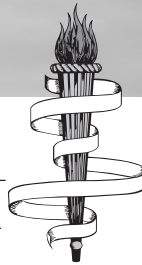
Exhibitors as of January 15, 2006

AMTI
Boehringer Ingelheim Chemicals, Inc.
Bose Corporation - EnduraTEC Systems
Evans Analytical Group
Fibrogen, Inc.
Hyaluron, Inc.
Hysitron, Inc.
Inamed Corporation
IoP Publishing
Invibio, Inc.
Lifecore Biomedical
MTS Systems Corporation
Materials Research Society
NESAC/BIO
National Institute of Biomedical Imaging and Bioengineering/ NIH
Novamatrix/ FMC Biopolymer
NuSil Technology
Phasex Corporation
Polymer Technology Group
Scano USA, Inc.
Spire Biomedical, Inc.
Springer
Surface Solutions Labs
SurModics
TESCO Associates, Inc.
Tissue Growth Technologies
Veeco Instruments
Wiley

Innovation Corridor

For the first time, we are excited to host an “Innovation Corridor Poster Session” during the 2006 SFB meeting. Innovation Corridor provides a unique opportunity for academic researchers to foster world-class collaborations among academia, early stage research organizations, industry, and governmental agencies. Please go to the official website for more information.

Registration Form



Please print or type.

First Name _____ Surname/Last Name _____
 Title _____ Specialty or Discipline _____
 Affiliation _____ Department _____
 Address _____
 City _____ State/Province _____ ZIP/Postal Code _____ Country _____
 Telephone _____ Facsimile _____
 (For international numbers, please include country and city codes.)
 E-mail _____ Special Requests (ADA, Dietary, Etc.) _____
 Member in which society? Society For Biomaterials, USA Other WBC Society or TERMIS (list) _____ Member Number _____

SCIENTIFIC REGISTRATION	SFB MEMBERS (or other as noted above)						NON-MEMBERS						NEW Government Employee rate
	BEFORE MARCH 31, 2006			AFTER MARCH 31, 2006			BEFORE MARCH 31, 2006			AFTER MARCH 31, 2006			
	Member	Post Grad*	Student*	Member	Post Grad*	Student*	Non Member	Post Grad*	Student*	Non Member	Post Grad*	Student*	
Meeting & Exhibit Registration	<input type="checkbox"/> \$375	<input type="checkbox"/> \$205	<input type="checkbox"/> \$65	<input type="checkbox"/> \$470	<input type="checkbox"/> \$250	<input type="checkbox"/> \$100	<input type="checkbox"/> \$555	<input type="checkbox"/> \$325	<input type="checkbox"/> \$135	<input type="checkbox"/> \$670	<input type="checkbox"/> \$380	<input type="checkbox"/> \$175	<input type="checkbox"/> \$400
Workshop 1. Vascularization and Innervation of Tissue Engineered Constructs	<input type="checkbox"/> \$200	<input type="checkbox"/> \$150	<input type="checkbox"/> \$105	<input type="checkbox"/> \$250	<input type="checkbox"/> \$185	<input type="checkbox"/> \$115	<input type="checkbox"/> \$280	<input type="checkbox"/> \$215	<input type="checkbox"/> \$150	<input type="checkbox"/> \$320	<input type="checkbox"/> \$245	<input type="checkbox"/> \$180	<input type="checkbox"/> \$200
Workshop 2. Microscopy: Basic Principles & Applications for Biomaterial Analysis	<input type="checkbox"/> \$200	<input type="checkbox"/> \$150	<input type="checkbox"/> \$105	<input type="checkbox"/> \$250	<input type="checkbox"/> \$185	<input type="checkbox"/> \$115	<input type="checkbox"/> \$280	<input type="checkbox"/> \$215	<input type="checkbox"/> \$150	<input type="checkbox"/> \$320	<input type="checkbox"/> \$245	<input type="checkbox"/> \$180	<input type="checkbox"/> \$200
Workshop 3. What Fits You Best, Academia or Industry, and How Do You Get There?	<input type="checkbox"/> \$20	<input type="checkbox"/> \$20	<input type="checkbox"/> \$Free	<input type="checkbox"/> \$20	<input type="checkbox"/> \$20	<input type="checkbox"/> Free	<input type="checkbox"/> \$20	<input type="checkbox"/> \$20	<input type="checkbox"/> \$Free	<input type="checkbox"/> \$20	<input type="checkbox"/> \$20	<input type="checkbox"/> Free	<input type="checkbox"/> \$20

SCIENTIFIC REGISTRATION SUBTOTAL \$ _____

REGENERATE 2006

Check here if you are registering for the Regenerate 2006 Meeting and receive a 20% discount on the Meeting and Exhibit Registration fee above. (You must register separately for the Regenerate 2006 Meeting.)

OTHER SPECIAL SESSIONS

- Tutorial 1: Advancements in Surface Characterization Methods
 Tutorial 2: Product Liability Law as Part of the Product Design Process: What Every Scientist Should Know

OPTIONAL TRANSACTIONS (one CD-ROM included with each Meeting Registration)

- Book.....\$75 Additional CD-ROM\$20

SOCIAL REGISTRATION

Opening Ceremony, Bash, and Exhibition Reception Extra Tickets for Accompanying Guests (#) _____ x Pre-March 31 \$50 each Post-March 31 \$60 each

(NAME of guest) _____

(one ticket included in Member & Non-Member Meeting Registration)

*** Student and Post-Graduate status verification required.**

I attest the named individual is a full-time, degree-seeking student.
 I attest the named individual is a post-graduate, degreed individual (such as a resident or post-doc) in training at an academic institution.

X _____
Signature of advisor or department chair

Advisor's Printed Name _____
 Advisor's Telephone _____
 Advisor's E-mail _____

TRANSACTION AND SOCIAL REGISTRATION SUBTOTAL \$ _____

TOTAL AMOUNT DUE \$ _____

METHOD OF PAYMENT:

- Check Enclosed (Checks must be in U.S. dollars drawn on a U.S. Bank and made payable to the Society For Biomaterials)
 MasterCard VISA American Express

Name (as it appears on card) _____

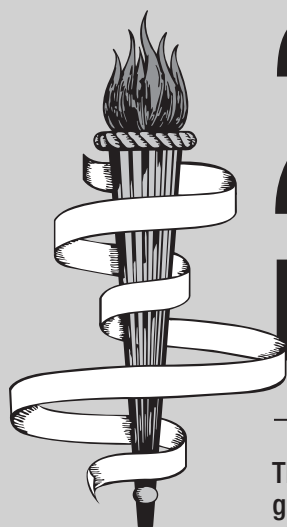
Card # _____

Expiration Date _____

Cardholder Signature _____

THREE OPTIONS FOR REGISTRATION:

- WWW.BIOMATERIALS.ORG
- Fax this registration form to 856-439-0525
- Mail this registration form to:
 SOCIETY FOR BIOMATERIALS
 15000 Commerce Parkway, Suite C
 Mount Laurel, NJ 08054 USA



2006 Buyers' Guide

The Society For Biomaterials presents its 2005 Buyers' Guide. This guide lists the leading companies in the biomaterials industry along with their areas of business. Use this guide throughout the year to find companies that are ready to provide you with the products and services you need to accomplish your professional endeavors.

Analytical Equipment Reagents & Services

AST Products Inc.

Coatings

4th State Inc.

Contract Research & Consulting

4th State Inc.

Device Development & Manufacture

Lakeshore Biomaterials
Midwest Plastic Components

Drug Delivery & Pharmaceuticals

Lakeshore Biomaterials
Midwest Plastic Components

Materials & Materials Services

Lakeshore Biomaterials
Midwest Plastic Components

Packaging Products & Services

Midwest Plastic Components

Surface Modification & Treatment

4th State Inc.
Surface Solutions Labs Inc.

Testing Equipment

Bose Corporation —
EnduraTEC Systems Group
MTS Systems Corp.



4th State Inc.

Stephen L. Kaplan
General Manager
1260 Elmer St.
Belmont, CA 94002
Phone: (650) 596-1600
Fax: (650) 596-1604
E-mail: skaplan@4thstate.com
www.4thstate.com



4th State specializes in plasma surface modification providing both process development as well as contract services. Whether the application is simple cleaning, surface activation, functionalization, or sophisticated plasma enhanced chemical vapor deposition (PECVD) of unique coatings 4th State has the expertise and experience to assist in developing your products.

Bose Corporation – EnduraTEC Systems Group

Evalina Klein
Marketing Communications Manager
10250 Valley View Rd.
Suite 113
Eden Prairie, MN
55344
Phone: (952) 278-3070
Fax: (952) 278-3071
E-mail: electroforce@bose.com
www.bose-electroforce.com



The Bose Corporation's EnduraTEC Systems Group manufactures the ElectroForce® Series of test instruments using patented linear motor technology. Bose offers instruments for the characterization of soft tissue, bones, biomaterials, viscoelastic engineered materials, and a variety of medical devices including stents, endovascular grafts, and spinal implants. The new ElectroForce BioDynamic™ test instrument provides characterization and stimulation of tissue constructs in a biological environment.

Lakeshore Biomaterials Inc.

Paul Spencer
Vice President,
General Manager
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Society For Biomaterials: Celebrating 30 Years

Feature

By Nicholas A. Peppas, SFB President 2003-04

Last year the Society For Biomaterials celebrated 30 years of annual technical meetings! It was April 26, 1975, that the first meeting of the Society For Biomaterials was held in the facilities of Clemson University in Clemson, South Carolina.

In 1969, a number of researchers in the biomaterials field initiated a series of International Biomaterials Symposia concentrating predominantly on materials for reconstructive surgery. In 1974, it was decided that the following meeting, the 7th International Symposium, would also become the first Annual Meeting of SFB. In April 1975, I was a young postdoctoral fellow working with Clark Colton and Bob Lees at the Arteriosclerosis Center of the Massachusetts Institute of Technology. I could not attend this first meeting but I received the program, which I have kept and cherished for the past 30 years. It is a telling document of the changes in the biomaterials field.



The Program Committee of the first Annual Meeting consisted of Francis Cooke, head of interdisciplinary engineering at Clemson University, Richard Edlich, assistant professor of plastic surgery at the University of Virginia, and JL Harms, director of engineering of the Extracorporeal Medical Specialties Co. in King of Prussia, Pa. There were four unopposed sessions on cardiovascular, dental, orthopedic and craniofacial materials as well as a fifth session on "Recent Advances in Biomaterials."

The first keynote speaker was, appropriately enough, the late Steve Bruck, who was a manager at the National Institutes of Health and later (1980) became the founder and first editor of the journal *Biomaterials* that was published then by Butterworths in the United Kingdom. Unfortunately, the first program does not mention the title of Bruck's 30-minute speech, although my notes indicate a general subject of "the future needs in biomaterials." The subjects presented and discussed leaned distinctly toward biomaterials for hard tissue replacement. Some of the pioneers in the field who presented their work in this first meeting, and who continue to come to SFB meetings after 30 years, are John Brash of McMaster, who talked about kinetics of platelet adhesion; David Williams of the University of Liverpool, who spoke about restorative materials; and Jonathan Black, then of the University of Pennsylvania, who discussed the problem of *in vitro* tissue mechanics.

The first annual business meeting of the Society was held Sunday, April 27, at 3:00 p.m. and was chaired by our founder, C. W. Hall. The Clemson Awards were presented at an awards

luncheon on Monday, April 28, 1975, by Dr. R.C. Edwards, president of Clemson University. It is interesting that at that time, these awards were simply known as the SFB Awards for Clinical Biomaterials Research, Basic Biomaterials Research and Contributions to the Biomaterials Literature. The term "Clemson Awards" was instituted later.

Registration for the meeting was quite expensive (\$175 for registrants; \$125 for presenters), but the fee included several dinners such as the traditional Biomaterials Bash, an international symposium banquet, the awards luncheon, a boiled shrimp dinner and a closing luncheon! The preprints of the first meeting were available only to the registrants. Sumner Levine, the editor of the *Journal of Biomedical Materials Research*, served also as the editor of these first SFB proceedings.

Things got bigger rather fast! I attended the 2nd Annual Meeting of the Society in Philadelphia April 9-13, 1976. It was held at an old Holiday Inn on City Line Avenue. Sam Hulbert was our SFB president and Sol Pollack served as program chair. The number of papers presented had doubled to about 230, but the emphasis was on bone implants, dental materials and related subjects. A whole session, chaired by Yukihiko Nosé of the Cleveland Clinic, was dedicated to polyurethanes as cardiovascular biomaterials. In the session on biocompatibility, Steve Bruck introduced Leo Vroman of the Veterans Administration Hospital in Brooklyn, who gave what has become one of

SESSION I	
CARDIOVASCULAR MATERIALS	
Session Chairman - STEPHEN D. BRUCK National Heart and Lung Institute	
8:30	Keynote Address - STEPHEN D. BRUCK, Department of Health, Education, and Welfare, National Institutes of Health, Bethesda, MD.
9:00	Blood Coagulation and Biomaterials. J. A. Paster, Univ. of Michigan, Ann Arbor, MI.
9:45	Implantable Cardiovascular Prostheses - Principles of Design. S. A. Westwood, Westinghouse, Rockville Center, NY.
10:30	COFFEE-CORE BREAK
10:45	Anatomical Polymers: Considerations for Prosthetic Applications. J. L. Kardos, Washington Univ., St. Louis, MO.
11:30	Fluid Enclosure: Present and Future Needs in Biomaterials. S. D. Bruck (Chairman), S. A. Westwood, J. L. Kardos, F. Leonard, G. T. Erskow, and H. Scott.
12:30	LUNCH - on your own
Saturday Afternoon	
1:00	Kinetics of Platelet Adhesion. J. L. Brack, J. Brophy and E. A. Peterson, McGill Univ., Hamilton, Ont., Canada.
1:28	Smooth Muscle Cell Culture on Cardiovascular Biomaterials. S. Eskin, Baylor College of Medicine, Houston, TX.
1:40	A New Microscopic Procedure for Small Blood Vessels: The "Fry-Less" Graft. E. L. Hanson, J. W. White, and R. A. Wham, State Univ. N.Y., Syracuse, N.Y. and Pennsylvania State Univ., University Park, PA.
3:00	Evaluation of the Blood Compatibility of Polytetrafluoroethylene. G. T. Erskow, W. S. Cooney, J. S. Bruck, L. J. Gossett and E. D. Bernal, Union Carbide Corp., Bound Brook, NJ.
3:20	COFFEE-CORE BREAK
3:40	A Simple In Vitro Screening Test for the Blood Compatibility of Materials. H. Kankia, S. Kirby and Y. Nam, Cleveland Case Foundation, OH.
4:00	Influence of Molecular Orientation on the Stability of Replicated Surfaces. G. F. Stewart and M. A. Miller, Univ. of Texas, Austin, TX.
4:20	DESIGNING WITH A BLOOD INTERFACE. J. N. Brack*, J. F. M. Wright**, E. Eskin, L. Van Koolb, and N. A. Newman, *Medical College of Ohio, Toledo, **Univ. of Liverpool, England, and Baylor College of Medicine, Houston, TX.
4:40	END OF SESSION
7:00	BIOMATERIALS BASH Lounge, Clemson University Alumni Center Sponsored by Zimmer USA, Warsaw, Indiana

the legendary biomaterials talks in the field, an early analysis of molecular interactions of plasma at interfaces.

And thus began the exchange of ideas and the evolution to the Society that we know today.

2006 Officer Nominees

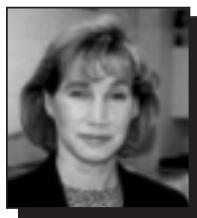
The task of selecting the slate of Officer Nominees for 2006 has been completed. Following are the nominees for President-Elect and Member-at-Large. The Society encourages all members to cast their vote for the candidate of their choice. Ballots will be distributed soon and are available on the Society's Web site.

Following are brief descriptions of the responsibilities of each position, along with a description of the nominees' biographical background and their Society experience. Each nominee has also developed a vision statement for the Society that they would work to achieve should they be elected.

President-Elect

The President-Elect shall become familiar with the duties of the President and shall at all times cooperate and assist with the duties of that office. In the absence of the President, the President-Elect shall preside at the meetings of the Society, the Council and the Board of Directors, and perform the duties and exercise the powers of President. The term of office is for a period of one year without succession. The President-Elect is the chairperson of the Long Range Planning Committee.

Nominees for President-Elect



Martine LaBerge, PhD

Martine LaBerge is Professor and Chair of Bioengineering at Clemson University. She joined the faculty of Clemson University in 1990 as Assistant Professor of Bioengineering following post-doctoral research at the University of Waterloo.

She holds graduate degrees in Biomedical

Engineering from the University of Montreal. Her research expertise is focused on the design of implants for orthopaedic and vascular applications. Martine has published more than 200 technical publications in journals, proceedings, and book chapters on these topics. At Clemson University, she received the Faculty Woman of the Year Award, the Murray Stokely Award for Excellence in Teaching, and the Faculty Mentoring Award.

She has been a member of the Society For Biomaterials since 1985 in addition to the Orthopaedic Research Society, ASM International, the American Society of Mechanical Engineers, the Biomedical Engineering Society, the American Society for Engineering Education, and the Association for Women in Science. Martine was recently elected to the College of Fellows of the American Institute for Medical and Biological Engineering.

In December 2005, she completed a five-year term as Executive Editor of *Biomaterials Forum*. Additionally, Martine has served the members of the Society For Biomaterials as chair of the Publications Committee (2000-2002), member of Organizational Committee of the 6th World Congress of Biomaterials (2000), program chair of the 25th Annual Meeting (1997-1998), chair of the sub-committee on Student Issues (1997-1998), chair of the Educational and Professional Development Committee (1993-1995, 1996-1997), Member-at-Large (1996-1997), and chair of the subcommittee Fellow (1992-1993), which led to the establishment of the status of Fellow of Biomaterials Science and Engineering. She serves as a reviewer for numerous scientific journals as well as for the National Science Foundation and the National Institutes of Health.

Vision Statement

The vision of the Society For Biomaterials is to promote the discipline of biomaterials and their uses in medical and surgical devices. It is the premier Society for education and



John L. (Jack) Ricci, PhD

Jack Ricci is an Associate Professor in the Department of Biomaterials and Biomimetics at the New York University College of Dentistry, and is co-director of the Biomaterials Masters program at the NYU Graduate School of Arts and Sciences. Jack holds a Bachelor of Science

degree from Muhlenberg College in Allentown, Pa., and a 1984 PhD from the University of Medicine and Dentistry of New Jersey (UMDNJ) in the Department of Anatomy. He conducted post-doctoral research in the Department of Orthopaedics at UMDNJ. He has held faculty positions at NYU's Hospital for Joint Diseases, where he ran the Philip B. Kimmel Biointerface Laboratory; the Department of Orthopaedics at New Jersey Medical School; and the Department of Restorative Dentistry at New Jersey Dental School. He has also held voluntary appointments at City College of New York, Rutgers University, and New Jersey Institute of Technology. He is one of the founders of Orthogen Corp., a subsidiary of BioLok International, a craniofacial repair/restoration company. His areas of research involve experimental model development, and bone and soft tissue response to permanent and resorbable biomaterials, implants, and tissue-engineered scaffolds for craniofacial and orthopaedic applications.

Jack has been a member of the Society For Biomaterials for more than 20 years, and has not missed an Annual Meeting since 1982. He has been on Program Committees, reviewed abstracts, chaired sessions, recently served as Chair of the Publications Committee, helped negotiate the newest contract with John Wiley and Sons, publishers of the Society's official journals, and is currently chair of the Dental/Craniofacial Materials SIG. He serves on the editorial board of the *Journal of Biomedical Materials Research*, Part B and occasionally reviews for Part A, as well as other journals.

Vision Statement

The Society For Biomaterials has always been a vibrant multidisciplinary organization with a high level of scientific diversity. We have always been a mentoring organization to our students, a career development resource for our young scientists and faculty, a source of collaboration and new talent for all of our corporate scientists and faculty, and a sounding board for new science and technology for all of our members.

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Continued on page 20

Member-at-Large

The Member-at-Large shall serve as an unencumbered representative of the membership at meetings of both the Board of Directors and Council. The Member-at-Large shall serve for a period of one year.

Nominees for Member-at-Large



David H. Kohn, PhD

David H. Kohn is a Professor at the University of Michigan with appointments in the Departments of Biologic and Materials Sciences, and Biomedical Engineering. He received his BS in Biomedical Engineering from Tulane University (1983) and his MS (1985) and PhD (1989) in Bioengineering from the

University of Pennsylvania. He joined the faculty at Michigan in 1989 and has progressed through the academic ranks. In 2000-2001, he was a visiting professor in the Craniofacial and Skeletal Diseases Branch of the NIH intramural laboratories.

David's research has progressed from investigations on synthetic biomaterials at the macroscopic and microstructural-levels to the synthesis and characterization of biomaterials at smaller levels of dimensional scale. In parallel, he has also established a research program in tissue mechanics. His early work provided insight into mechanisms of damage in biomaterials, and he has been able to translate some of his technologies into use with commercially available implants. His research has evolved as the field of biomaterials has undergone a paradigm change in the past decade. Currently, his research program focuses on more biologically based biomaterials and biomechanics research, which is well integrated with cell and molecular biology approaches. David's main research foci now are related to biomineralization, which is investigated by establishing structure-function relations in naturally forming mineralized structures, and utilizing this information to develop biomimetic strategies to engineer mineralized tissue. His work has provided insight into mechanisms of damage in tissue by coupling mechanical, acoustic and chemical analyses. His lab has also developed organic/inorganic materials that can better control biological function and enable stem cells to regenerate bone *in-vivo*. David has been continually funded throughout his career, including support from NIH, NSF, DoD, the Whitaker Foundation and industry. He has published more than 75 peer-reviewed papers and book chapters, holds five patents, and has more than 80 invited presentations.

David has taught biomaterials and tissue engineering courses, as well as more clinically related biomaterials courses to clinical students and residents. He is also extensively involved in student affairs. He has/is training 29 graduate students, four post-docs, 32 undergraduates, 14 clinical fellows, and four visiting scholars.

David is a long-standing member of many professional organizations, including the Society For Biomaterials, and has performed an extensive amount of service to the community, including organization of symposia and workshops at SFB, ASME, IADR, BMES and AAAS; service on NIH, NSF, DoD and Arthritis Foundation study sections; and reviewing manuscripts for more than 20 biomedical journals. He is the recipient of the Whitaker Foundation Biomedical Research Award, NSF Research Initiation Award, and he is a Fellow of

Continued on page 20



Anthony M. Lowman, PhD

Anthony M. (Tony) Lowman is currently the Associate Dean for Undergraduate Engineering and an Associate Professor of Chemical Engineering at Drexel University where he has been on the faculty since 1997. He also has appointments in the Department of

Materials Science and Engineering and the School of Biomedical Engineering at Drexel. Prior to joining Drexel, he was educated at the University of Virginia (BS) and Purdue University (PhD) where he received degrees in Chemical Engineering.

In addition to his main academic appointment, Tony has been active in international collaboration with major research centers around the world. He has served as a Visiting Professor at Hoshi University of Tokyo, Japan, and a Visiting Researcher at the University of Parma, Italy. Additionally, in 2002, Tony co-founded Gelifex Inc., a company pursuing methods for using hydrogels for repair of the nucleus pulposus of the intervertebral disc. Tony served as chief technical officer of Gelifex until 2004 when Gelifex was acquired by Synthes.

His research contributions have been in the area of polymers for biomedical applications. He is known for his work on the preparation, characterization and evaluation of the behavior of compatible, crosslinked polymers known as hydrogels, which have been used as biocompatible materials and in controlled release devices, especially in controlled delivery of drugs, peptides and proteins, and the development of novel biomaterials. He has more than 50 refereed publications and proceedings papers in this area and has four patents pending. Additionally, he is co-editor of the book *Biomimetic Materials and Design* by Marcel Dekker published in August 2002. Based on his innovative work, in September 2003 he was honored as one of the top 100 Scientific Innovators in the world under the age of 35 as named by *MIT-Technology Review Magazine*.

Tony has been active in professional societies, including AiChE, ACS, CRS and the Society For Biomaterials. He has taken numerous leadership roles in organizing and chairing conferences and symposia related to biomaterials and drug delivery systems. Additionally, he has twice served as the Drug Delivery Special Interest Group Chair for the Society For Biomaterials as well as the Vice-Chair (two years) and Chair (two years) of Area 8b, Biomaterials, of AiChE. Within the Society For Biomaterials, aside from serving as Chair of the Drug Delivery Special Interest Group, Tony has organized many sessions, served as an abstract reviewer and moderated many sessions. Additionally, Tony served on the President's Long Range Strategic Planning Committee and was on the Programming Committee for the fall 2004 meeting on Biomaterials in Regenerative Medicine: Advances in Combination Products.

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Officer Nominees

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Martine LaBerge, PhD, continued

dissemination of biomaterials research for the benefit of humankind. In past years, many members of the Society have questioned the leadership position of the Society in regard to duplicating activities and involvement of other professional societies. Ensuring the long-term viability of biomaterials science and engineering as the foundation of all research fields in bioengineering, and redefining the meaning of membership in the Society, will be primary goals of my term. I believe membership in the Society should be part of a planned professional career path in science, engineering, regulation, and medicine related to biomaterials. It is the essence of the long-term viability of the Society.

My vision for the Society centers on several key pillars that can positively influence the long-term viability of the Society by providing a unique, strong, and responsive professional environment: leadership, communication, professional development, professional affairs, education and training advocacy, and financial resources. Focus will be provided on: 1) enhancing the Society's visibility and image among its own members and its peer organizations, and its presence among government bodies; 2) providing advocacy to secure and advance biomaterials science and engineering as a viable profession through active involvement; 3) aggressively promoting and accurately representing the profession in the workplace; 4) targeting professional development to provide quality education and resources to advance the knowledge, skills and continued competence of members of the Society; 5) building a pipeline of biomaterials professionals and leaders from K through post-graduate levels by encouraging outreach and mentoring in the Society; and 6) securing resources to assure long-term viability.

John L. (Jack) Ricci, PhD, continued

We are at the forefront of a field that is booming, but our membership is not keeping pace. The primary mission of the Society must be recruitment of new members.

We have recently begun this mission by lowering the cost of full-time membership through use of electronic journal subscriptions. This is the first of many steps we need to take. I feel the most potential can be realized through recruitment of new members from our student ranks and from corporate scientists. As a young student presenting my research at SFB meetings, the input I received from members, both before and after presentations, changed the course of my work and career. The Society For Biomaterials should make this type of mentoring part of our mission by actively recruiting established academic and corporate scientists to act as reviewers and mentors for our younger members. These mentors should be used in an organized fashion to review and advise students on their research and presentations, as well as coach students on interviewing skills and ways to market themselves for corporate employment. This level of interaction would help us

reestablish corporate involvement in the Society, and it would represent added value for membership.

As President, I would make it the first priority of the Society For Biomaterials to actively develop programs that will reinvigorate our Society, raise membership levels, and raise awareness of our mission. In my view, the only way to recruit new members is for us to become a bigger part of their lives and careers.

I would like to thank the Society For Biomaterials for the opportunity to serve as President, and I anticipate being a part of this great organization for many years to come.

David H. Kohn, PhD, continued

the American Institute for Medical and Biological Engineering.

David has been an active member of the Society for more than 20 years, dating back to when he was a graduate student. He has organized several symposia over the years, served on the Program Committee, and is a former SIG chair. He has also served on the Awards, Ceremonies and Nominations Committee, and is currently on the Education and Professional Development Committee.

Vision Statement

I am honored to have been nominated for the position of Member-at-Large and to have the opportunity to represent the membership of the Society on Council. I am interested in bringing the concerns of the members (including student members) to the Society and helping enhance the value of the Society to our membership as we continually strive to be the premier professional organization in the field. I would like to involve more members in decision-making processes and improve the overall understanding of the Society, especially the SIGs, to its members. I would also like to help enhance the quality of the Annual Meetings and attract "outsiders" to the Society. I will be especially receptive to student affairs within the Society, so students become engaged in the Society and continue to do so as they embark on their careers.

Anthony M. Lowman, PhD, continued

Vision Statement

The most important challenge is to further improve the quality and scope of what the Society has to offer. With the number of professional societies that have overlap in technical areas, it is important the Society For Biomaterials offers unique, important benefits to its members. This can be achieved by working closely with professional organizations with similar missions. Additionally, a stronger connection between academia-industry-government organizations needs to be forged to provide guidance in feedback to the professionals in our field.

High-Throughput Evaluation of Restorative Dental Polymers

Feature

By Sheng Lin-Gibson,
Nancy J. Lin, and Forrest A. Landis

Polymeric dental composites are widely used in the restoration of anterior lesions and small- to medium-sized defects in the posterior region of the mouth. The composites are comprised of an organic matrix, inorganic fillers, and a sizing agent for improving the interface between the matrix and filler. Upon irradiation with visible light, the organic matrix cross-links to form a rigid polymeric network. For the matrix alone, a large number of material parameters (such as monomer chemical structure, molecular mass, viscosity, and co-monomer composition) and processing parameters (such as light wavelength, intensity, and exposure time) influence the material properties and biological responses.¹

High-throughput and combinatorial methods have become increasingly popular in material discovery, characterization, and optimization due to faster data acquisition, more thorough examination of experimental variables, equal processing conditions for a given specimen, and lower experimental error.² In a typical combinatorial measurement, an array specimen varying in two material parameters (variables) is first fabricated. The material properties as a function of the defined parameters are then characterized and analyzed. Given the vast number of variables in dental research, these approaches are expected to aid in the design of future experiments and facilitate process and application optimization.

In restorative dental materials, the mechanisms by which the monomer structures and composition affects the reaction kinetics, conversion, and a host of material properties are still unclear. In the current study, the relationships between chemical composition, monomer conversion, and polymer

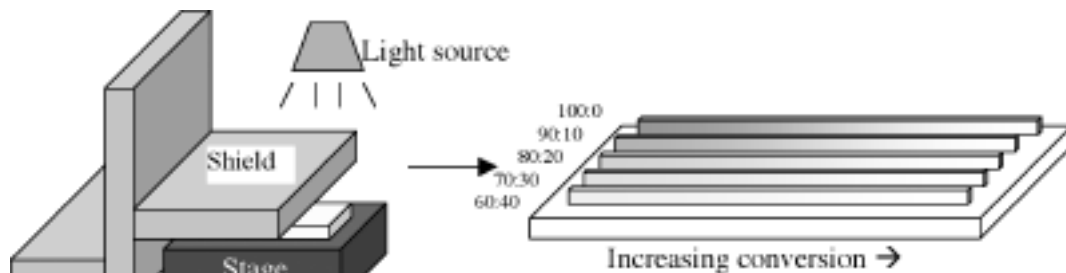


Figure 1. Two-dimensional gradient sample preparation. Each strip corresponds to a discrete dimethacrylate composition, and the degree of conversion is varied orthogonal to the composition gradient.

properties of two-component dimethacrylate networks via combinatorial approaches³ are assessed. A gradient sample varying in co-monomer composition along one axis in a discrete fashion and continuous conversion gradient in the orthogonal axis was prepared and characterized (Figure 1). The sample was mounted onto a translation stage that was programmed to vary the light exposure time to the sample, thus creating the conversion gradient. As a result of the photopolymerization process, conversion gradients were generated onto a single glass slide (gradient sample shown in Figure 1). Two monomer systems were examined for the current study: 1) BisGMA (2,2-bis[4-(2-hydroxy-3-ethacryloyloxypropyl)phenyl]propane) mixed with triethylene glycol dimethacrylate (TEGDMA) and 2) EBPADMA (ethoxylated-BisGMA) mixed with TEGDMA at various compositions. Upon photo-activation and subsequent photopolymerization, three-dimensional cross-linked networks were formed.

All measurements were carried out at least 24 hours after light exposure to ensure that the conversion no longer changed significantly with post-cure time. A notch was made across the composition gradient at the high conversion end and was defined as the zero position for subsequent conversion measurements and mechanical testing. Data were collected and reported over 50 mm at 5 mm intervals beginning at the zero position for each composition. The advantage of keeping the compositions discrete is the absence of ambiguities in the network chemical composition, allowing straightforward data analysis. The current process is also amenable for high-viscosity monomer mixtures and eliminates nonuniform (laminar) flow as typically observed when co-syringing monomer mixtures with a large disparity in viscosity.

The degree of conversion along the exposure gradient was determined using Fourier transform near infrared (NIR) spectroscopy, and the mechanical properties (hardness and modulus) were determined using nanoindentation. The relative uncertainty for all measurements was less than 5 percent. Figure 2 shows the degree of conversion and modulus as a function of the irradiation time for all compositions of the

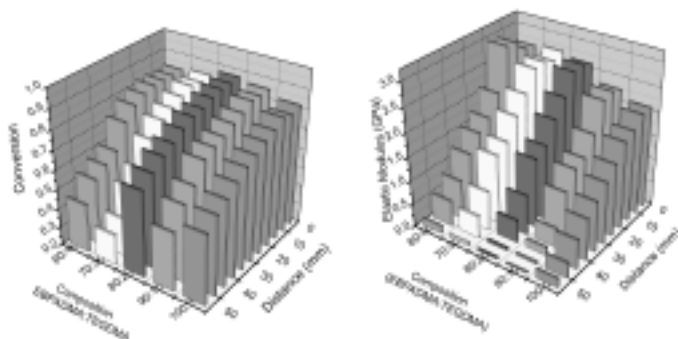


Figure 2. The methacrylate conversion (left) and elastic modulus (right) for EBPADMA:TEGDMA blends of different compositions and photopolymerized by different irradiation times.

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High-Throughput Evaluation...

Continued from page 21

EBPADMA-TEGDMA system. Similar results were observed for the BisGMA-TEGDMA system. The methacrylate conversion was determined by normalizing the area of the methacrylate =C-H

absorption band to the aromatic C-H absorption band as compared to the unreacted resin from the NIR measurement. In the current text, the conversion value at the longest exposure time is defined as the ultimate conversion. In general, the gradients exhibited conversions ranging from approximately 40 percent to approximately 85 percent spanning a large cross-linked conversion range.

The reaction conversions are nearly identical for distances 0 mm to 10 mm as a result of the fabrication process. Figure 2 clearly illustrates that the ultimate reaction conversion depends on the chemical structure of the co-monomers. For the EBPADMA-TEGDMA system, ultimate conversions for all compositions ranged between 82 percent and 88 percent with the 100:0 composition showing the lowest ultimate conversion and the 80:20 showing the highest ultimate conversion.

The corresponding elastic modulus of the gradient sample was characterized using nanoindentation (Figure 2). The effect of co-monomer composition on the elastic modulus was also evaluated. The 60:40 composition exhibited the highest modulus and the elastic modulus decreased as the TEGDMA content decreased. In BisGMA-TEGDMA networks (data not shown), the flexible lower molecular mass TEGDMA is considered a reactive diluent and thus reduces the modulus. However, co-monomer compositions containing higher TEGDMA contents have a higher number of methacrylates per volume. At comparable reaction conversions, it was concluded that systems containing higher TEGDMA contents had higher cross-link densities. In the EBPADMA-TEGDMA system, the ability of TEGDMA to increase the network cross-link density dominates its diluent effects, as observed by the

increased elastic modulus with TEGDMA content increase. Moreover, the 80:20 composition exhibited the highest methacrylate conversion but not the highest modulus. The

60:40 composition exhibited the highest modulus while showing a lower ultimate reaction conversion. This further indicates the complex role of the TEGDMA diluent monomer in affecting the conversion and properties.

The effect of methacrylate conversion on the elastic modulus and hardness for a typical composition (90:10) is plotted in Figure 3. Excellent agreement is observed between the conversion and modulus as an increase in methacrylate conversion corresponds to a dramatic increase in the modulus. The modulus increased over two orders of magnitude as the conversion increased from approximately 50 percent to 86 percent. It is expected that the mechanical

properties change rapidly with conversion at the low conversion range. The modulus increased significantly even at the high conversion end, indicating the need to achieve high methacrylate conversion. Equally important is the evolution of the hardness, which increased with increased conversion. This increase was due to changes in the network cross-link density at the high conversion range and clearly illustrates the importance of obtaining high reaction conversion in the dental restorative composites.

For the initial evaluation of cell response to BisGMA-TEGDMA networks, RAW 264.7 macrophages were cultured on samples with a degree of conversion that varied from 43 percent to 62 percent in a continuous fashion. After 24 hours of culture, cell viability was assessed using fluorescent microscopy (Figure 4). In viable cells (green), calcein acetoxymethyl ester diffused through the cell membranes and was hydrolyzed to cell-impermeant fluorescent calcein via intracellular esterases. Compromised/dead cells fluoresced red due to ethidium homodimer-1, which entered via damaged cell membranes and bound to nucleic acids. Cell viability increased

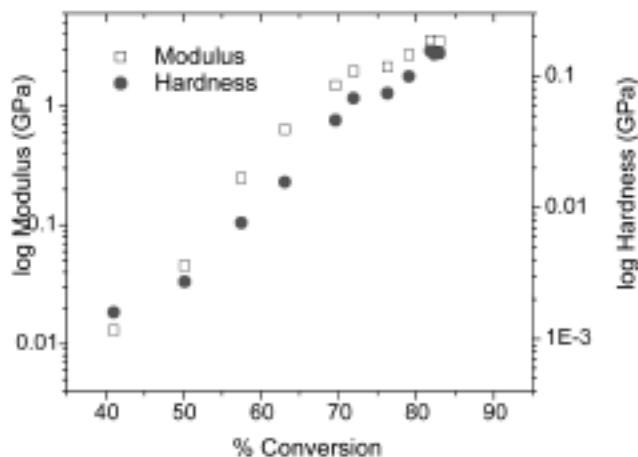


Figure 3. Elastic modulus and hardness measured as function of percent conversion for the 90:10 composition. The standard uncertainty associated with the nanoindentation measurements is smaller than the size of the symbol.

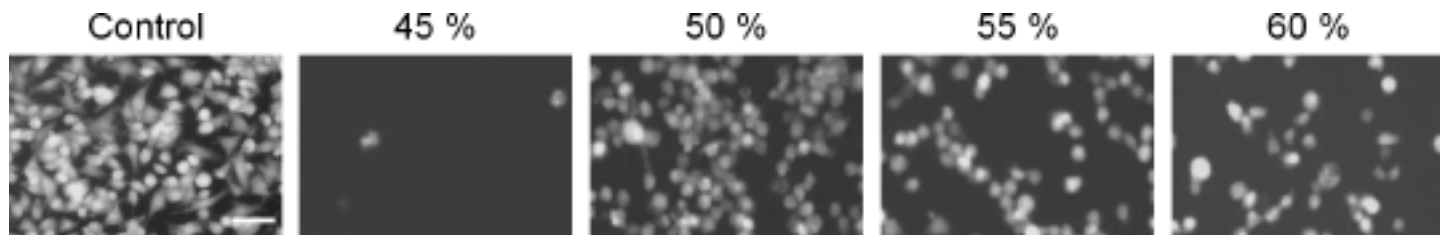


Figure 4. Macrophage viability as a function of methacrylate conversion. Green indicates viable cells and red indicates cells with compromised membranes. Scale bar = 50 μ m.

as the conversion increased, with viability at 60 percent conversion similar to viability on controls (tissue culture polystyrene).

Acknowledgments

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Institute of Mechanical Engineers, the Engineering in Medicine and Biology Society Early Career Achievement Award, Boston University's Metcalf Cup and Prize for Excellence in Teaching, and selection for *Technology Review's* inaugural TR100 young innovator list. Dr. Collins is a Fellow of the American Physical Society and the Institute of Physics, and of the American Institute for Medical and Biological Engineering. In 2003, he received a MacArthur Foundation "Genius Award," and in 2005, was selected for the Scientific American 50—the top 50 outstanding leaders in science and technology. Dr. Collins is a scientific cofounder and chair of the scientific advisory board of Cellicon Biotechnologies Inc. and Afferent Corp. Dr. Collins' research focuses on developing nonlinear dynamical techniques and devices to characterize, improve and mimic biological function. His specific interests include: systems biology — reverse engineering naturally occurring gene regulatory networks; synthetic biology — modeling, designing and constructing synthetic gene networks; developing noise-based sensory prosthetics.

Innovation Corridor

We are excited to host the inaugural "Innovation Corridor" poster session during the 2006 meeting. Innovation Corridor provides a unique opportunity for academic researchers to foster world-class collaborations among academia, early stage research organizations, industry, and governmental agencies. Please visit the meeting Web site for more information.

I hope you are excited about the program and are planning to come to Pittsburgh. Let me know what else I can do for you and for our meeting.



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AdvaMed, Washington, D.C., issued a statement from President Stephen J. Ubl in support of the Save America's Biotechnology Innovative Research (SABIR) Act (H.R. 943/S.1263) co-authored by Senator Bond and Representative Graves. The important legislation ensures smaller medical technology companies, which constitute the vast majority of the industry, will be eligible for NIH-sponsored Small Business Innovation Research (SBIR) grants. Many breakthrough medical technologies—from innovative heart pumps to new diagnostic tests to implantable monitors—emerge from small, start-up companies that are dependent on the help of venture financing. Under relatively new eligibility criteria, firms receiving more than 51 percent funding from venture capital are barred from receiving SBIR support. The SABIR Act will return the eligibility requirement to one that allows much-needed funds to be awarded to companies whose products will provide solutions to patients and their families, as well as for the challenges facing the U.S. health care system.

Aldagen Inc., Durham, N.C., announced that researchers from the Washington University School of Medicine presented results demonstrating the unique human adult stem cell population isolated by Aldagen's products (ALDHbr cells) are able to regenerate vascular function in a preclinical model of ischemic injury. To test the neoangiogenic function of ALDHbr cells *in vivo*, the Washington University group performed femoral artery ligation in the hind limb of NOD/SCID B2M null mice, and transplanted purified ALDHbr cells from human bone marrow via the tail vein within 24 hours of ischemic injury. The recovery from acute ischemic injury was calculated by the ratio of blood flow in the ischemic versus the non-ischemic leg by laser Doppler perfusion imaging, performed twice weekly over 28 days. In comparison to PBS-injected control mice (n=6), mice transplanted with ALDHbr cells (n=7) showed enhanced blood flow to the ischemic limb by day 7 post-injection (significance level less than 0.05). This enhanced recovery of blood flow was maintained throughout the 28-day monitoring period.

Boehringer Ingelheim Austria GmbH, Vienna, Austria, and **BIA Separations d.o.o.**, Ljubljana, Slovenia, announced a technological innovation in the field of plasmid DNA (pDNA) manufacture. To meet the growing need for pharmaceutical grade pDNA, **Boehringer Ingelheim Austria** has developed a high-cell density fermentation technology achieving titers up to 1 g pDNA per liter, and has specifically designed equipment for the automated and gentle lysis of the biomass. A key and novel element of the production process is the use of CIM Convection Interaction Media® short monolithic columns for the purification of pDNA. The fast separation speed, outstanding capacity, and excellent separation power of CIM columns, developed by **BIA Separations**, allows a 15-fold increase in productivity compared to traditional supports.

Boston Scientific Corp., Natick, Mass., announced it is proposing to acquire all the outstanding shares of **Guidant Corp.** for a combination of cash and stock worth \$72 per Guidant share. Boston Scientific's proposal represents a premium of approximately 14

percent over the \$63.43 value proposed to be paid for Guidant shares in the revised merger agreement between Guidant and Johnson & Johnson, based on the closing price of Johnson & Johnson's common stock on December 2, 2005. The proposed transaction is valued at approximately \$25 billion, a premium of approximately \$3 billion to the valuation of the transaction between Johnson & Johnson and Guidant. Boston Scientific's proposed price of \$72 per share represents a premium of approximately 16 percent over the closing price of Guidant's shares on December 2, 2005—the last day of trading before the Boston Scientific proposal was made public.

FzioMed Inc., San Luis Obispo, Calif., announced it has submitted its third Pre-Market Approval (PMA) application module to the FDA for the company's Oxiplex®/SP Adhesion Barrier Gel. Four modules are required to complete FzioMed's PMA application for approval to market Oxiplex®/SP Gel in the United States. The three modules filed thus far contained documentation and data related to the design, development, pre-clinical testing, quality assurance and manufacturing of Oxiplex®/SP Gel. The fourth, and final, module will include the clinical results from the Oxiplex®/SP Gel pivotal clinical trial currently in progress in the U.S. FDA previously granted expedited review status to FzioMed for its Oxiplex®/SP PMA application.

Tenure Track Faculty Position Biomedical Engineering

The College of Engineering at the University of Texas at El Paso is actively engaged in developing a graduate Biomedical Engineering program and invites applications for a biomedical engineering faculty member who will enthusiastically contribute to that goal. Candidates with expertise in tissue engineering and biomaterials are particularly encouraged to apply, although other candidates with fields of expertise in biomedical engineering will be considered. Additional expertise in biocompatible polymers, cellular biology, and tissue scaffold design, fabrication and testing (in vitro and in vivo) would add considerable strength to the application.

Applicants must have a Ph.D. or equivalent degree in biomedical engineering, chemical engineering, electrical engineering, mechanical engineering or a related area. Applicants should also have the ability to establish an independently funded research program and have a strong commitment to teaching in the undergraduate and graduate programs in the College of Engineering. UTEP encourages inter-disciplinary research with other College of Engineering and university-wide programs. The search is focused at the assistant professor level, but exceptionally qualified applicants at higher levels may also be considered.

UTEP is a Carnegie doctoral-intensive university with an enrollment of 19,000 students. The UTEP campus, situated where the Rocky Mountains meet the Rio Grande, echoes the beauty of the surrounding high desert. El Paso is a highly livable, bi-cultural community of 700,000 people offering affordable homes and is a major meeting point for the United States and Latin America.

Candidates should send a letter of application, detailed curriculum vitae, names of at least three references, a statement of teaching philosophy, and a description of proposed research to: UTEP, College of Engineering, El Paso, TX, 79968-0517, Attention: Biomedical Engineering Search Committee. Review of applications will begin upon receipt and search will continue until the position is filled. The nominal starting date for the position is September 1, 2006. Specific inquiries on the position can be directed to Dr. Ryan Wicker, Chair of the Biomedical Engineering Search Committee, at 915-747-7099 or rwicker@utep.edu. Additional information about the College of Engineering and El Paso is available at <http://www.utep.edu/academics/>. EOE.

Community Calendar

Orthopaedic Research Society 52nd Annual Meeting

March 19-22, 2006
The Lakeside Center, McCormick Place
Chicago, IL
ors@aaos.org
www.ors.org

The Minerals, Metals & Materials Society 135th Annual Meeting & Exhibition

March 12-16, 2006
Henry B. Gonzalez Convention Center
San Antonio, TX
www.tms.org

2nd International Conference on Epithelial Technologies and Tissue Engineering

April 3-4, 2006
Washington, DC
info@uweb.engr.washington.edu

Regenerate 2006

April 24-27, 2006
Westin Convention Center
Pittsburgh, PA
www.regenerate-online.com

Society For Biomaterials Annual Meeting & Exhibition

David Lawrence Convention Center
April 26-29, 2006
Pittsburgh, PA
www.biomaterials.org

Wound Healing Society 16th Annual Meeting & Exhibition

May 14-17, 2006
Double Tree Paradise Valley
Scottsdale, AZ
meetings@woundheal.org
www.woundheal.org

2nd International Symposium on Interface Biology of Implants

May 17-19
University of Rostock and Johannes Gutenberg University
Rostock, Germany
www.uni-rostock.de/ibi/

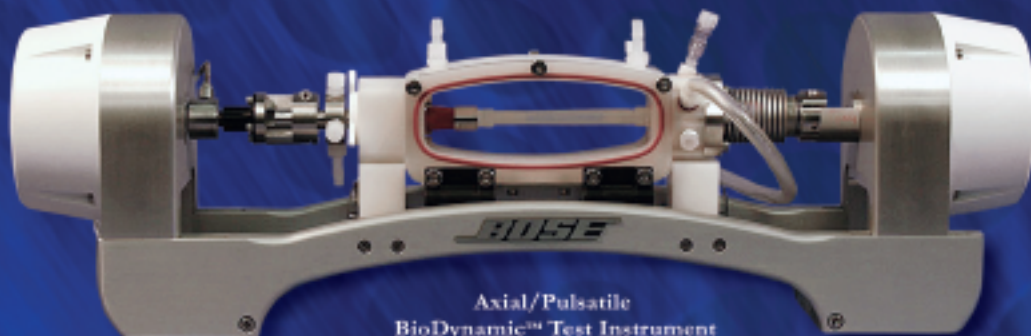
Controlled Release Society 33rd Annual Meeting & Exposition

July 22-26, 2006
Austria Center
Vienna, Austria
www.controlledrelease.org



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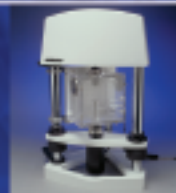
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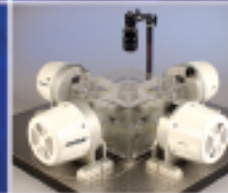
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