

BIOMATERIALS FORUM



Fourth Quarter 2004 • Volume 26, Issue 4



**Five Members Confirmed
Fellows at World Congress**

**Updating
the SFB
Web site**

**Preview of
2005 Annual
Meeting Topics**



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The 2005 Annual Meeting will focus on new areas and challenges that are not only related to basic and applied biomaterials research, but also to the education and recruitment of new biomaterial scientists and the continued growth and development of our biomaterials industry.

8 **Updating the SFB Web site**

A new subcommittee has been formed and tasked with updating and upgrading the Society For Biomaterials Web site. The subcommittee is encouraging Society members to contribute suggestions and ideas.



The 2005 Society For Biomaterials Annual Meeting is being held in Memphis, Tenn., the home of Rock n' Roll and the Blues. The city features attractions such as the world famous Beale Street, Graceland, Main Street Trolley, Sun Studios, the American Museum of Soul Music, and many more.

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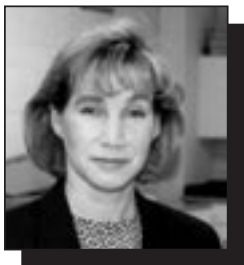
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From the Editor

Spreading and Sharing the News



Biomaterials Forum strives to gather and disseminate the best, most timely news and information emerging from the biomaterials community and the Society For Biomaterials. We rely on members and Council volunteers to help us by sharing their hottest news with other biomaterials scientists and engineers. We encourage Society members and subscribers of *Biomaterials Forum* to send information

or industry news that we might have missed. We sincerely encourage you to contribute items for the industry, government, or university news sections, and the member news section also known as "The Torch." Society members, either from academia, industry, or the government, are known to make their mark as award winners in science and engineering, both nationally and internationally. These accomplishments should be shared with members of the Society. This publication of noteworthy accomplishments will likely impact the career of biomaterials scientists in-training (the students) by depicting members as role models. You are also invited to contribute full-length stories about completed research and development, and to share opinions or submit reports from professional conferences that would be of an interest to those who were not able to attend.

In an effort to better serve the Society For Biomaterials and its members, the next volume of *Biomaterials Forum* will feature new, informative columns and will depict a new look; something the editorial team is excited about, and looks forward to sharing with you in 2005.

Author guidelines are available at www.biomaterials.org/publications/pubabout.htm. If there is a subject regarding biomaterials that you feel we have not covered adequately, or should cover in the next volume, please let us know. Please send inquiries and contributions to any member of the editorial team.



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A Little from the Newsroom, A Little from the Soapbox



Hello, again, everyone!

I hope you had a good summer and are charged up and ready to finish calendar year 2004 with a burst of activity! For those of you in the government, and many of you in industry, October brings the beginning of a new fiscal year and its fresh challenges. For those of you in

academia, the end of summer means new faces in the classroom and in the lab. Never a dull moment!

Society For Biomaterials had quite a busy summer in preparation for our Regenerative Medicine symposium in collaboration with the Biomedical Engineering Society (Philadelphia, October 16-18), for our 2005 annual meeting (Memphis, Tenn., April 27-30), and for several other initiatives spearheaded by the Society's Council committees. For instance, the Publications Committee (Rick Gemeinhart, Chair) is working on updating the design and content of the Web site to make the site not only more user-friendly, but also more user-relevant and content-rich. In the publications area, attention is brought to the special offer on the new edition of the "Biomaterials Science" textbook (see page 11); this is a deal worth pursuing! And, a special working group (led by Jack Ricci) is in negotiation with J. Wiley & Sons Inc. regarding the Society's future relationship with the *Journal of Biomedical Materials Research*. All of these efforts by volunteers and the office staff have the same target: to provide members with the tools and connections needed to succeed in their professional life. A large part of that, of course, is to make sure that publications of the Society and technical meetings are both up-to-date with current research and look into the future. The committee encourages members to take the time to read Joel Bumgardner's overview of the Society's 2005 annual meeting in this issue of *Forum*, then plan to participate in the meeting in April. The Web site will have more details about abstract submission and accommodations.

In addition to annual requests for the Society's endorsement of meetings and workshops convened by other societies, the Society For Biomaterials has been asked by several societies (e.g. TMS, ASAIIO, IBE) to collaborate more closely in the coming months and years. Our Liaison Committee (Jim Burns, Chair) is working on a means to evaluate the many invitations and opportunities that have been presented to the Society. The committee will report on its progress at the fall Council meeting in October. The committee will also see whether the collaborative test balloon floated by the Implant Pathology Special Interest Group found wings. In this case, in the form of a conference session invited by Canon for its MD&M-

Minneapolis meeting in mid-October, which included the potential for some revenue sharing with the Society.

On another front, the Education & Professional Development Committee (K.C. Dee, Chair) is working to add educational content to the Web site, identify grant opportunities for student and professional development support, and establish communications with associations that are focused on the professional development of under-represented groups in science and engineering (e.g. minorities, women, disabled).

"When autumn leaves begin to fall..." thoughts also turn to membership renewals. The newly elected Membership Committee (Alan Litsky, Chair) has put the new bylaws into action and will review applications on a rolling basis; no more waiting until the annual business meeting to see whether someone will be approved as a new member! The committee is working with the office staff on an online membership application and membership renewal system, too. This is a high priority for us, as we plan to roll it out in stages over the next several months. There is no doubt that you are the Society's highest priority, and we look forward to your continuing membership.

By the time you read this issue of *Biomaterials Forum*, the period of open nominations for new officers and for 2005 awardees will be over and the next stage of the process will be in the hands of the Awards, Ceremonies & Nominations Committee (Linda Lucas, Chair). The number of nominations from the membership-at-large have been good this year, but we can always improve. Please make a note in your 2005 calendar of people you think would make good Society officers, or are deserving of SFB awards. When the call for nominations comes up again next year — and it will — you will be prepared to participate. The Special Interest Groups will also have their nominations and elections for officers soon. If you are a member of one or more SIGs, contact your SIG Chair to find out how you can nominate someone, or be nominated, to be a SIG officer. Current, or recent, SIG Chairs are eligible to be elected to the SIG representative position on SFB's Board and Council. If you are interested, I encourage you to check the bylaws (www.biomaterials.org), or contact Elaine Duncan (current SIG representative) or Tim Topoleski (Chair, Bylaws Committee) to learn the details. And a final calendar note for all eligible voting SFB members: online voting will be available early in 2005. Please take advantage of this opportunity to cast your votes.

That's it from the newsroom and the soapbox for now. See you in these pages and online with more news in the next issue. In the meantime, keep those e-messages coming!

Staff Updates from Headquarters

The Torch

By Dan Lemyre,
Assistant Executive Director

Greetings from the Society For Biomaterials headquarters! As we prepare to send out dues invoices for 2005, we would like to tell you what SFB staff and volunteer leaders are doing to enhance the benefits of your SFB membership:

Subscription to the *Journal of Biomedical Materials Research* — SFB volunteers and headquarters staff are working with John Wiley & Sons to offer SFB members an “online-only” subscription option that will greatly reduce the cost of your SFB membership!

Registration Discounts — as SFB continues to expand its offerings with special events like the one held in Philadelphia on Regenerative Medicine, rest assured that as an SFB member, you will receive discounted registrations for all SFB events.

Members-Only Section of the Web site — The searchable membership directory is up and running and staff is gearing up to produce the 2005 resource guide. We would also like to hear from you with any ideas for new content! On page 8 in this issue, please see the article from Richard Gemeinhart on new plans for the SFB Web site!

Important Dates:

Abstract Deadline, November 12 – The abstract deadline for the 2005 annual meeting in Memphis, Tenn., is November 12. Please log on to www.biomaterials.org to submit your abstract today!

Save the Date, April 27-30, 2005 – The Society For Biomaterials 2005 annual meeting will be held April 27-30, 2005, at the Memphis Cook Convention Center in Memphis, Tenn. Registration and program information will be available on the SFB Web site in coming months.

Staff Overview

In the event you wish to contact the headquarters' office, below is a listing of the Society For Biomaterials headquarters staff, and brief descriptions of their areas of responsibility. The

SFB headquarters main phone number is 856-439-0826; extensions and e-mails are listed below:

Steve Echard, CAE, Executive Director — Primary staff contact for SFB Board of Directors. Responsibilities include oversight of all executive office activities including financial management, publications, membership services, meetings, and public relations. (sechard@ahint.com; x3058)

Dan Lemyre, Assistant Executive Director — Primary staff contact for Council, SIGs, and committees, secondary staff contact for Board of Directors. Responsibilities include preparation of agendas, minutes and budgets, collaboration with Board, Council, and committees on ongoing projects, and assisting executive director. (dlemyre@ahint.com; x3039)

Larissa Cahill, Administrative Director — All general inquiries, membership, mailing lists, student chapters, copyright, accounts payable/receivable, subscriptions, and SIGs. (lcahill@ahint.com; x3011)

Rhonda Flowers, Membership Coordinator — Membership and member inquiries, copyright, and accounts payable/receivable. (rflowers@ahint.com; x3073)

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Rebecca Haines, Registration Coordinator — Handles all meeting registrations. (rhaines@ahint.com; x3061)

Amy Chezem, Public Relations Director — Manages all public relations efforts including media relations, editorial services, promotional material development, etc. (achezem@ahint.com; x3022)

Frank Scussa, Publications Manager — Managing Editor of Biomaterials Forum. (fscussa@ahint.com; x3064)

CALL FOR SCIENTIFIC ARTICLES AND TECHNICAL NOTES



Members of the Society For Biomaterials and subscribers to *Biomaterials Forum* are invited to submit original scientific articles and technical notes addressing biomaterials science and engineering for publication in *Biomaterials Forum*. The editorial board will review and approve submissions, based on content and appropriateness. Authors are encouraged to review previous issues of *Forum* for style and content of published scientific material. Article publication in *Forum* will be based on available pages for a particular issue. Guidelines for authors can be found at www.biomaterials.org/publications/pubabout.htm.

Society Members Confirmed Fellow, Biomaterials Science and Engineering, at Seventh World Biomaterials Congress

The Torch
By Martine LaBerge,
Executive Editor

During the last World Biomaterials Congress in Sydney, Australia, the International Union of Societies for Biomaterials Science and Engineering Inc. (IUSBSE) conferred the honorary status of Fellow, Biomaterials Science and Engineering, (FBSE) to David Castner, University of Washington; Stuart Goodman, Stanford University; Joachim Kohn, Rutgers University; Russ Parsons, New Jersey Medical School/UMDNJ; and Samuel Stupp, Northwestern University. The status of fellow recognizes individuals for their outstanding contribution to biomaterials research and also for their professional accomplishments in the field of biomaterials. Fellows are considered as accomplished members and role models for the Society's internal and external needs, including consultants, spokespersons, policy makers, and teachers. The 2004 class of fellows joins an impressive group of researchers and scientists in biomaterials who have received this prestigious honor at the fifth and sixth world congresses. The status of founding fellow was first granted to recipients of senior awards of the Society For Biomaterials. Founding fellows have been acknowledged as pioneers who foster the field of biomaterials and support its professional development as a practical and intellectual endeavor.

Candidates for fellow status who are sponsored by the Society For Biomaterials are nominated and evaluated by existing fellows, approved by the Council of the Society, and confirmed on an international level by the IUSBSE. A formal nomination with the written support of two additional fellows is submitted to the Society's Evaluation Committee of fellows. Criteria that must be met for consideration are: (a) 10 years of scientific or professional contributions to the field of biomaterials science and engineering, (b) 10 years of continuous active (full) membership upon nomination, or alternatively, founding membership in the Society, (c) professional training, competence, and good standing in a discipline appropriate for biomaterials science and engineering research. The formal education includes a bachelor's degree and a professional or research degree (such as M.S., Ph.D., D.V.M., M.D., D.D.S., or equivalent). The Society For Biomaterials shall have no more fellows than 10 percent of its active membership. The FBSE letters indicate the national recognition and international respect of the fellow comprehension of professional issues and accomplishments as a scientist or engineer in the field of biomaterials science and engineering. The Society For Biomaterials congratulates Professors Castner, Goodman, Kohn, Parsons, and Stupp!

Fellows, Biomaterials Science and Engineering (1996, 2000)

Harold Alexander	1996	Larry Hench	1996	Antonios Mikos	2000
James Anderson	1996	Allan Hoffman	1996	Marcel Nimni	1996
Joseph Andrade	1996	Thomas Horbett	1996	Y. Nosé	1996
J. Autian	1996	Jeffrey Hubbell	2000	Kinam Park	2000
Robert Baier	1996	Samuel Hulbert	1996	Nicholas Peppas	1996
Rena Bizios	2000	Jacqueline Jozefonwicz	2000	W.S. Pierce	1996
Jonathan Black	1996	Lawrence Katz	1996	Robert Pilliar	1996
Jack Bokros	1996	Haruyuku Kawahara	1996	Hanns Plenck	1996
John Brash	1996	Sung-Wan Kim	1996	Solomon Pollack	1996
Henry Brem	2000	James Koeneman	2000	Buddy Ratner	1996
Karin Caldwell	2000	W.J. Kolff	1996	T.N. Salthouse	1996
A.D. Callow	1996	Jindrich Kopecek	2000	Philip Sawyer	1996
Stuart Cooper	1996	Robert Langer	1996	Frederick Schoen	1996
Robert Craig	1996	Cato Laurencin	2000	Michael Sefton	1996
Norman Cranin	1996	E.P. Lautenschlager	2000	Dennis Smith	1996
M.E. DeBakey	1996	R.I. Leininger	1996	T.M. Valega	1996
Jan Feijen	1996	Jack Lemons	1996	Andreas von Recum	1996
J.O. Galante	1996	Robert Levy	1996	Leo Vroman	1996
Linda Griffith	2000	Linda Lucas	2000	David Williams	1996
Ulrich Gross	1996	Donald Lyman	1996	Ioannis Yannas	1996
G. Heimke	1996	Edith Mathiowitz	2000		
J. Heller	1996	E.W. Merrill	1996		

Kristi Anseth Receives National Science Foundation's Coveted Waterman Award



Dr. Kristi Anseth, Howard Hughes Medical Institute assistant investigator and professor of chemical engineering at the University of Colorado, Boulder, and member of the Society For Biomaterials and of the Publications Committee of the Society, received the 2004 Alan T. Waterman Award of the NSF, the foundation's highest honor for a young researcher. The award

carries with it a medal and a \$500,000 grant over a three-year period to do research or advanced study in the field and institution of her choice. The Waterman Award, created in 1975, is named for NSF's first director and recognizes demonstrated individual achievements in scientific or engineering research that place the awardee at the forefront of his or her peers. Criteria include originality, innovation, and significant impact on the individual's field of science or engineering. Candidates must be U.S. citizens or permanent residents, and not be more than 35-years-old, or seven years beyond receiving a doctorate, by the end of the year in which nominated.

Anseth is a nationwide leader in the study of biomaterials, and her work of creatively intersecting chemistry, biology, and engineering may lead to wide use of easily replaceable body parts for people suffering from injuries or chronic conditions. The NSF has given Anseth the Waterman's Award based on her groundbreaking work in new biomaterials that are engineered to help the body heal itself. The availability of these new materials, as opposed to the use of synthetic body parts, may lead to sooner-than-expected developments for treating knees, hips, and even heart structures in ways that will contribute to faster healing and a quicker return to a better quality of life for the injured and temporarily disabled. And despite the voluminous list of awards, publication citations, and patents on her resume, she speaks passionately of what "can be."

Anseth's lab was the first to develop light-activated biomaterials that would degrade and be useful for interacting with cells while promoting re-growth of tissue. The hope is that development of these biodegradable, flexible materials may be medically available within a decade for procedures that will allow the "injection" of new body parts into persons who are injured or suffer from debilitating injuries or diseases — without the trauma that can accompany major surgery.

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Jacob Markowitz Award Given to Past President Andreas von Recum



Dr. Andreas F. von Recum, past-president of the Society For Biomaterials, received the 2004 Jacob Markowitz Award of the Academy of Surgical Research. The award was established by the Academy in 1986 to identify, honor, and promote outstanding contributions to medicine through the art, science, and technology of experimental surgery.

von Recum, professor of veterinary biosciences and director of the Biomedical Engineering Center at Ohio State University, is one of the founding fathers of the Academy of Surgical Research, which was founded in 1982 to foster the interdisciplinary transfer of ideas and theories of surgical research. The award recognizes von Recum for his outstanding contributions to medicine through the art, science, and technology of experimental surgery. He received his professional

(DVM) and his first academic research degree from the Free University of Berlin in 1968 and 1969 respectively. Subsequently, he earned a doctorate in veterinary (experimental) surgery at Colorado State University in 1974.

Most of his research career has been spent in biomaterials science and engineering from Clemson University with a special interest in the mechanisms of biocompatibility. He is an international Fellow of Biomaterials Science and Engineering (FBSE). He has headed the College of Veterinary Medicine's research administration at Ohio State University since 1997, where he leads the college's research program to mentor and assist its faculty. While continuing his role in the College of Veterinary Medicine, he also serves the Biomedical Engineering Center (within the Colleges of Engineering and of Medicine and Public Health) as its fifth director since August 1, 2002. Sincere congratulations to Dr. von Recum!

New Biomaterials Applications and Technologies

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. Over the years, new strategies and clinical demands for treating, repairing, and restoring function of tissues have emerged, including tissue engineering, nanotechnology, and delivery of therapeutic or bioactive agents. The Society and its members have begun to embrace and advance these topic areas and apply many of the lessons previously learned to new clinical problems. Hence, the theme for the 2005 annual meeting is "New Biomaterials Applications and Technologies to Meet Tomorrow's Clinical Challenges." These new areas and challenges are not only related to basic and applied biomaterials research, but also to the education and recruitment of new biomaterial scientists and the continued growth and development of our biomaterials industry. This theme is evident in many of the special symposia, workshops, and tutorials being organized for the 2005 meeting to be held April 27-30 at the Cook Convention Center in Memphis, Tenn.

SYMPOSIA IN NEW TOPIC AREAS

- Clinical and Biomaterials Issues of Artificial Lung Development
- Urological Tissue Engineering
- Surface Modification of Biochips and Biosensors

These symposia address clinical demands and issues regarding the use of materials in medical applications that have not been well addressed by our meetings or journals. Yet, these areas are becoming increasingly important due to poor performance of current devices, an aging population, and the demand for enhancing the performance of compact, rapid, and accurate sensors. Medical and biodefense sensor applications include evaluating genes, glucose, and toxic agents.

PROGRAMS IN EMERGING TOPICS AND TECHNOLOGIES

- Stem and Progenitor Cells in Regenerative Medicine
- Immunological Aspects of Regenerative Medicine
- Smart Scaffolds for Tissue Engineering
- Computational Modeling of Bioresponse to Biomaterials
- Biomaterials and Nanotechnology
- Nanotechnology for the Development of Better Orthopedic Implants
- Delivery of Therapeutics from Implant Surfaces

The use of biomaterials in the discipline of regenerative medicine was highlighted in the Society's fall 2004 symposium and will be continued for the 2005 meeting. These symposia will focus on interactions between stem and progenitor cells with materials for tissue regeneration, and on immunological and inflammatory processes associated with biomaterials used in regenerative medicine. In keeping with the continued growth of the Society and its members as leaders and innovators in the tissue engineering, nanotechnology, and drug delivery disciplines, symposia and workshops are being developed to highlight advances, new knowledge, and techniques in these areas.

PROGRAMS ON NEW METHODS AND EDUCATION

- Influence of Function and Wear Simulation in Artificial Knee Joints
- Clinical Tutorial on Peripheral Vascular Disease
- Novel Techniques for Biomaterials Instruction
- Methods to Characterize Cells in Contact with Materials: Gene Expression and Activation f-Cell Signaling Cascades

While the above symposia and workshops highlight the new and emerging areas of biomaterials research and applications, there is still much to be learned from current clinical devices and problems.

The demand for biomaterial-savvy employees in the workplace is increasing, and there is a need to recruit and prepare new biomaterials scientists for the challenges of the future. A special educational symposium is being organized to provide educators, new and experienced, with ideas to increase interest, and improve the quality of, instructional methods and techniques. This is a particularly important issue not only for the professional development and growth of the Society and discipline, but also because of the potential impact well-educated and trained biomaterial scientists will have in the medical device industry and entrepreneurship. The tutorial will provide attendees with a valued primer on molecular biological techniques necessary for understanding cell-implant material interactions.

DEVELOPMENT AND MANUFACTURING PROGRAMS

- Tissue Engineered Product Regulations
- Biomaterials Availability
- Business of Biomaterials II: The Merging of Cell and Tissue Engineering With a Successful Business Model

Ultimately, governments and businesses are responsible for developing, improving, and manufacturing implant devices and for ensuring their safe use. To help disseminate new information and obstacles regarding regulatory compliance and to highlight business strategies for the new bio-based implant industry, several symposia and a panel discussion are being developed.

Many of the planned symposia and workshops involve clinicians who are best at articulating critical needs and assessing outcomes of current and experimental therapies and devices. The meeting will continue to have regular sessions closely allied with topics of importance to the SIGs and general membership such as: dental/craniofacial, cardiovascular, orthopedics, organ/tissue engineering, ophthalmology, proteins and cells at interfaces, implant pathology, and surface modifications, to name a few. In summary, the wide range of new and emerging research, development, and education programs that will be highlighted at the 2005 annual meeting indicate the continued growth and expansion of the Society into new and critical areas of

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Upgrading the SFB Web site

Feature

By By Kristi Anseth, Elaine Duncan,
Richard Gemeinhart, and Phil Messersmith

The Publications Committee, with endorsement of the Council of the Society For Biomaterials, has formed a subcommittee tasked with updating and upgrading the Society For Biomaterials Web site. Members use the Web site for conducting business with the Society, such as registration and membership information. But has it really been a useful resource beyond direct Society news and business? The overwhelming chorus has been that changes are needed and the subcommittee wants to hear from members of the Society. 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? The goal is to make the Society For Biomaterials Web site the premier Web site for the biomaterials community. But to do this, each member must help. Suggestions for information, content, and services that members would like to have available on the Web site should be communicated to the subcommittee by (1) visiting www.biomaterials.org, (2) clicking on info@biomaterials.org, and (3) typing in the subject line: WEB SITE IDEA. Suggestions and comments will be organized for the subcommittee to help develop the revised Web site requirements.

The Society For Biomaterials Web site is one of the major publications of the Society For Biomaterials; therefore, the Publications Committee will provide oversight and administration of the Web site, which may be the most visible and accessible publication of the Society For Biomaterials, particularly for the general public. The scientific journals associated with the Society are well-respected and have cutting-edge science, but they are not readily accessible to the general public. *Biomaterials Forum* is distributed primarily to Society For Biomaterials members and only published quarterly. The Web site can be viewed by any person across the entire planet at any time; therefore, it is the dynamic portal to the Society For Biomaterials and the associated global organizations. The intention of the subcommittee is to have this valuable publication become the premier biomaterials Web site available, not just the business access for the organization.

Substance and timeliness of the Web site may be the most important issues to be addressed. The Society For Biomaterials will have the flexibility and responsiveness in coming months to imbed dynamic controls within Web site administration so the content and features will stay fresh and appealing. But with that dynamic responsiveness come the needs for oversight and editing of proposed content, just like the Society For Biomaterials has editors for the journals, transactions, advertisements of meetings, and *Biomaterials Forum*. Just like any publication of the Society For Biomaterials, the Web site must be accurate, ethical, and represent the Society as a whole. It is even more difficult for a Web site because this oversight must be done promptly to assure active updating.

Although a final action plan has not been determined, the Publications Committee recommends an editor/webmaster have final authority for the information and content of the Web site, as well as the lonesome job of soliciting

contributions to feature sections. The Publications Committee currently anticipates that major changes in format or design, new feature sections, and signification content additions would be suggested and approved by an editorial board or a subcommittee of the Publications Committee, with oversight by the Council and the Board of Directors. At this stage, management architecture, design, and nomenclature are still in the early planning stages. There are several important issues that must be addressed, but the subcommittee hopes to have a preliminary plan to present to the Council at the October meeting in Philadelphia. With this tight schedule, the subcommittee is requesting that members who have suggestions on how to develop a dynamic administration system, Web site design and layout, Web site content, or even complaints about the current Web site, share their thoughts through info@biomaterials.org as mentioned above.

Future editorial processes will allow rapid approval for changes in content and features of www.biomaterials.org, but content and contributions will still need to come from members. The special interest groups (SIGs) have vociferously called for



quicker updates and more access to get information to SIG members. For example, SIGs have requested access to www.biomaterials.org so SIGs can administer pages that are specific to the business and interest of each SIG. This is not currently possible. However, with potential changes to the Web site administration procedures, SIGs could have significantly improved accessibility to the Web site. By giving each SIG access to Web site content, the entire Web site can offer information about broad areas of biomaterials research, development, and socio-political issues. This will not completely address the Web site issues, however, and a broader approach to content development is required. That is where each individual member can play an important role. Each member can go to info@biomaterials.org and let the subcommittee know likes, dislikes, and what other Web sites have that the Society For Biomaterials should offer.

Several content additions have been discussed, including the addition of an online application for membership, information on current or upcoming manuscripts in journals associated

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The National Student Section Plans to Enhance Student Membership Value

University News

By Dina Basalyga, Marlon Riley,
and Sarina Kay

Through an active election held this summer, new officers have been elected to represent the student members for a mandate of two years: Dina Basalyga, Clemson University, president; Marlon Ridley, University of Memphis, secretary; and Sarina Kay, bylaws chair. Many activities will be pursued over the next two years to enhance student membership and encourage new students to join the Society For Biomaterials as members. With new management within the Society For Biomaterials, it is necessary for the National Student Section to re-establish dialogue with the Society, Board of Directors, and the Council, so the students are directly involved with different aspects within the Society. The new student officers will make every effort to ensure that this is accomplished. However, student members are asked to communicate with the officers about their concerns and ideas. Periodic video-conferenced meetings between the officers and a representative from all student chapters will be scheduled to enhance communication between the chapters and their representatives. It was also proposed that student officers work with other societies who have student chapter associations,

which will allow for joint activities such as regional career fairs. Now that job postings have been launched on the Society Web site for members, students are encouraged to take advantage of this resource. The officers will encourage the Society to also post available doctoral assistantships and internships, both national and international, on this site.

As the Society's annual meeting in Memphis, Tenn., approaches, the National Student Section, through the Education and Professional Development Committee, is planning several activities, including professional development, career decision, and interview skills, among others, either in the form of a workshop and/or a career fair. Suggestions from all student members are highly desired and should be addressed to Dina at dbasaly@clemson.edu or Marlon at mridley@memphis.edu. The student officers are looking forward to serving the student members and the Society For Biomaterials.

Cryogenics Research Yields Possible Cure for Arrhythmia

Government News

A United States clinical study is in process that, if successful, could lead to a non-surgical cure for the most common type of cardiac arrhythmia. The study is evaluating a new type of cryogenic catheter, co-developed by the National Institute of Standards and Technology (NIST).

The catheter system, commercialized by CryoCor of San Diego, Calif., is designed to selectively freeze cardiac tissue to block the abnormal electrical signals that cause arrhythmia, thereby returning the heart to its normal rhythm. On June 29, the company announced Food and Drug Administration (FDA) approval for clinical trials to evaluate the system's safety and efficacy in treating atrial fibrillation, an irregular heart rhythm that affects about 2.3 million Americans and increases the risk of stroke and death. Clinical trials are already underway to treat atrial flutter, or rapid heart rate.

International clinical trials had a 98 percent overall treatment success rate and the company has approval to sell the system in Europe. The technology offers a potential cure for arrhythmia, whereas current treatments, including drug therapy and

implantable devices such as pacemakers, are management strategies.

The system consists of a catheter about three millimeters in diameter, a sheath for introducing the catheter into pulmonary veins, and a console for controlling the temperature of refrigerant inside the catheter, and thus the size of the tissue area to be frozen. Inside the heart, the catheter can achieve temperatures less than minus 80 degrees Celsius (minus 112 degrees Fahrenheit).

CryoCor is a spin-off of CryoGen Inc., of San Diego, Calif., which originally worked with NIST researchers through a cooperative research and development agreement to develop the ultracold catheter. CryoGen has used some of the same technology to treat abnormal uterine bleeding. Approved for clinical use in 2001, the procedure is an alternative to a hysterectomy and has a one-day recovery period instead of up to six weeks. CryoGen was purchased by American Medical Systems in 2002.

Measuring Artificial Viruses to Improve Disease Detection

Government News

At the second American Conference on Neutron Scattering, June 6-10, in College Park, Md., researchers at the National Institute of Standards and Technology (NIST) unveiled a new method for accurately measuring the concentration of artificial viruses in a solution, which may ultimately help doctors diagnose diseases like HIV and hepatitis C more quickly.

These artificial viruses are commercial standards made from the same basic chemical components in RNA (the single-stranded version of DNA needed for protein synthesis). They are constructed to be nearly chemically identical to real viruses, but are encased with a protein covering to prevent degradation. The standards are currently used in research laboratories to help check analysis methods for detecting specific types of RNA, but the product has not been approved for clinical use.

What is needed, according to NIST researcher Susan Krueger, is a standard, reliable way to measure the concentration of artificial RNA in solution. By knowing exactly how much of the “fake” virus is present in a patient sample, a lab can better

detect any additional signals caused by real virus molecules. Traditional (cell-based culture) methods for measuring concentrations don't work well with the new product, since the artificial viruses are not infectious.

Instead, NIST scientists measured the concentration of artificial RNA virus solutions using a beam of neutrons as probes. As neutrons pass through the test solution, they interact in very specific ways with particular atoms, providing scientists with detailed information on molecular weight and geometry. This information can be used to accurately measure the amount of RNA in a given solution. Precise calibration of artificial RNA concentrations may allow laboratories to reliably detect lower concentrations of real viruses at earlier stages of infection.

The NIST research was conducted in collaboration with the United States Army Aberdeen Proving Ground, Aberdeen, Md.

Developing Tools for Reliable “Gene Chip” Measurements

Government News

Microarrays, sometimes called “gene chip” devices, enable researchers to monitor the activities of thousands of genes from a single tissue sample while simultaneously identifying patterns that may be novel indicators of disease status. However, generating consistent, verifiable results is difficult because of a lack of standards to validate these analyses, scientists from the National Institute of Standards and Technology (NIST) and collaborators warned in the May 20 online issue of *Clinical Chemistry*.

Microarrays are keychain-sized devices with as many as several million tiny spots, each of which examines genes of interest while simultaneously using minute sample volumes. This highly sensitive technology is relatively new and standard procedures to ensure the reliability and comparability of results are only beginning to emerge. For instance, results can change as a result of differences in how tissues are collected and processed; variations in how the molecules are counted, attached to substrates, and labeled for detection; deviations from recommended protocols by lab personnel; and malfunctioning or miscalibrated equipment. Such variations

need to be controlled before this technology can be used reliably in clinical settings and in devices requiring regulatory approval, according to the paper.

As a first step toward addressing reliability issues, a consortium co-led by NIST and industry is developing standards that will satisfy needs identified at a 2003 workshop. At the workshop, organized and hosted by NIST, leaders in the microarray field from industry, government, and universities recommended the development of a well-characterized set of ribonucleic acid (RNA) molecules (an important product of gene activity) whose identity and concentration are known. Users will be able to validate the results of gene chip analyses by adding such a reference material to their samples and comparing the measured values to what would be expected for them. Such a reference material will also enable technology developers and researchers to assess the performance of their assays.

The paper was co-authored by scientists from Genomic Health Inc., Agilent Technologies, the U.S. Food and Drug Administration, and The Institute for Genome Research.

“Biomaterials Science: An Introduction to Materials in Medicine, 2nd Edition”

Book Review

By Liisa Kuhn

Authors: Buddy Ratner, Allan S. Hoffman, Frederick J. Schoen, Jack E. Lemons
Copyright 2004, Elsevier Academic Press, San Diego, CA, 851 pages



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Description

Throughout the ages, materials used in medicine (biomaterials) have made an enormous impact on the treatment of injury and disease of the human body. Millions of lives have been saved due to biomaterials and the quality of life for millions more is improved every year due to biomaterials. The field remains a rich area for research and invention because no one material is suitable for all biomaterial applications, and new applications continue to be developed as medicine advances. But how do you begin or continue to study the vast field of biomaterials? It is difficult to teach and comprehend because it encompasses aspects of medicine, biology, chemistry, and materials science. This unified textbook is the answer and provides a needed portal to readily access the diverse scientific and engineering fundamentals behind biomaterials and their applications. This textbook provides a unified collection of articles contributed by more than 108 leading biomaterials professionals from academia, industry, and government. There is a balanced presentation of subject material concerning hard and soft biomaterials, biological concepts, engineering aspects, and medical/clinical concerns. While the first edition was very good, the second edition is superb, due to an updating of the biological science elements that support modern biomaterials research endeavors and a new chapter on tissue engineering.

The book is divided into three parts: I. Materials Science and Engineering, II. Biology, Biochemistry, and Medicine, and III. Practical Aspects of Biomaterials. Part I covers properties of materials and classes of materials used in medicine. Part II is the bulk of the text and covers background biological concepts (e.g. protein adsorption, cell injury, extracellular matrix), host reactions to biomaterials and their evaluation (e.g. inflammation, wound healing, immunity, blood-biomaterials interactions), biological testing of biomaterials (e.g. *in vivo* and *in vitro* assessment of tissue compatibility), degradation of materials in the biological environment (e.g. chemical and biochemical degradation of polymers, pathological calcification), application of materials in medicine, biology, and artificial organs (including, but not limited to, cardiovascular, orthopedic, ophthalmological, drug delivery, and sensor applications), and tissue engineering (e.g. tissue engineering overview, immunoisolation, and polymer scaffolds). Part III covers implants, devices, and biomaterials (e.g. sterilization and implant retrieval), and new products and standards (consensus standards, regulatory and legal issues). For those of you that already own the first edition of “Biomaterials Science,” it should be clear that the second edition includes substantial new information and is well worth acquiring.

Instructors of biomaterials will find that this text provides a useful framework for the study of biomaterials, particularly since it is well-balanced with respect to the multidisciplinary nature of biomaterials. The text is written at a fairly high level; therefore graduate students, post-docs, faculty, and senior corporate researchers will find it very useful for their studies and as a reference book, while undergraduates may be overwhelmed. There are some homework problems in this version of the text, but only in five of the 78 sub-chapters. The authors are in the process of creating a Web site that will be coupled with the book and will offer supplemental educational material such as surgical videos and homework problems. This will enhance the classroom use of this textbook. The textbook is somewhat encyclopedic in nature and therefore makes an excellent general purpose, biomaterials reference book for academic and corporate researchers and clinicians.

To summarize, this is a first-class, substantial textbook/reference book on biomaterials. The biomaterials field has moved forward in a remarkable way with the advent of tissue engineering, and the second edition captures those biology-based advancements and the biological principles underpinning biomaterials research of the future. Every effort was made to ensure that the book is well-balanced with respect to the sub-disciplines within the field, and therefore this book should appeal to a wide audience.

Audience

Students and faculty of medicine, dentistry, veterinary science, engineering, biomedical engineering, materials science, chemistry, physics, and biology; corporate researchers; and doctors of medicine or dentistry.

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SFB MEMBERS GET DISCOUNT ON BOOK

Members of the Society For Biomaterials can get a discount on the purchase of *Biomaterials Science: An Introduction to Materials in Medicine*, 2nd Edition. To take advantage of the discount, contact the Society's headquarters office at 856-439-0826 or e-mail to info@biomaterials.org to receive the appropriate discount code and then visit www.books.elsevier.com/bioengineering to place your order.

EnduraTEC Systems Group — Bose Corporation: Testing Instruments for Biomaterials Research and Medical Device Development

Background

EnduraTEC was founded in 1989 as a manufacturer of test instruments for medical device and engineered materials industries. Over the years, the company has supplied hundreds of specialized test systems for medical device development, tissue research, and many other biomedical test applications. Its customers include a wide variety of prestigious research institutions, universities, and medical device and engineering companies.



Bose and EnduraTEC join Forces

In May 2004, Bose Corporation acquired the assets of EnduraTEC to manage and operate it as a business unit within Bose. The transaction combined the strength of EnduraTEC's experienced staff in materials testing and applications engineering with the significant technical resources of Bose in linear actuator technologies and sophisticated digital signal processing. Bose Corporation has been a key technology supplier to EnduraTEC over the past several years, and the new EnduraTEC Systems Group is chartered to accelerate the availability of innovative products for biomedical researchers worldwide.

EElectroForce® Technology

Bose EElectroForce® technology is a revolutionary alternative to traditional testing systems because of its simple and durable moving-magnet design. The linear motor design utilizes a friction-free flexure suspension to provide exceptional fidelity and precision. The EElectroForce® technology provides dynamic testing ranges, from microns per hour to over 400 hertz. The linear motor is highly energy efficient and durable, and no air or oil pressure source is required. Thanks to its advanced performance and clean packaging for biomedical laboratories, it has been well received by researchers for a variety of testing applications.

EnduraTEC's philosophy is to work closely with its customers to understand their application needs and provide complete testing solutions. A growing requirement for modern biomaterials research is the ability to simulate *in vivo* conditions in the laboratory, and to properly load very small specimens that are often fragile and difficult to handle. EnduraTEC has developed several techniques for testing small specimens, and can provide specialized environmental capabilities for a variety of conditions. The combination of EElectroForce® technology and environmental capabilities in dedicated test packages represent important advancements for biomaterials researchers.

New Capabilities for Biomaterials Research

The EnduraTEC Systems Group of Bose Corporation recently introduced the new BioDynamic™ Test Series for biomaterials research and tissue engineering. The development of new biomaterials for medical applications is a rapidly growing area, and their compatibility and performance in biological environments must be fully characterized. Future developments in medical research will depend on a better understanding of the mechanical properties of healthy and damaged tissue. These properties provide important benchmarks for the performance requirements of new manmade biomaterials, as well as tissue-engineered substitutes. Testing applications for cardiovascular tissue engineering include characterization of arterial tissue and myocardial patches. Bone, cartilage, ligament, and spinal disk tissue systems are typical examples for musculoskeletal applications.



The BioDynamic™ Test Series provides precise loading and measurement of specimens within either a closed-saline or nutrient environment. It represents a new tool for scaffold engineering, and the investigation of tissue construct and

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Evidence is emerging that **adult stem-cells** from bone marrow have therapeutic potential for restoring cardiac cells among people who have had a heart attack, reported "The Lancet." Helmut Drexler (University of Freiburg, Germany) and colleagues assessed whether the transfer of patients' own bone marrow cells could improve functioning of the left ventricle of the heart six months after treatment. Sixty patients who had undergone successful percutaneous coronary intervention (PCI; balloon angioplasty and coronary stenting) to restore coronary artery bloodflow took part in the study. Half the patients were given a bone marrow stem-cell transfer five days after PCI, the other half were given optimum medical therapy. Patients who had been given a stem-cell transfer had around a 7 percent improvement in left ventricular function compared with only a 0.7 percent increase for patients given medical therapy.

AdvaMed expressed dissatisfaction with the Food and Drug Administration (FDA) announcement that user fees for most medical technology applications will rise nearly 16 percent in fiscal year 2005. The new user fee rates were scheduled to be published in the August 2 Federal Register. The FDA based the increase on a conservative estimate of full-fee paying applications that it will receive next year. AdvaMed had forcefully advocated for a single-digit increase based on long-term trend data and industry survey results that indicate a higher number of applications in 2005. The survey of the association's 42-member board of directors suggests that the FDA should expect in excess of 80 full-fee paying PMAs, panel-track supplements, and BLAs next year.

A major milestone in industrial biotechnology was achieved with the first commercial shipment of **bioethanol**. Unlike conventional ethanol, bioethanol is made not from grain, but from cellulosic biomass, such as wheat straw, sugar-cane bagasse, and corn stovers and stalks left over after harvesting. This green alternative fuel, compatible with current automobile engines, could significantly reduce greenhouse gas emissions. Using this technology, raw materials such as wood-product manufacturing residues, municipal solid waste and garden waste could supply more than 500 million dry tons of biomass — enough to make more than 50 billion gallons of ethanol, equivalent to approximately a quarter of current United States gasoline consumption. Another 10 to 15 billion gallons could be produced from corn stalks, husks and wheat straw, according to the Biotech 2003 report from Burrill & Co. The commercial production breakthrough reported by a Canadian biotech company, Iogen Corp. (Ottawa, Canada), involved using recombinant DNA-produced enzymes to break apart cellulose — the tough substance that gives plants their rigidity — to produce sugars. The sugars produced in such a biorefinery process are used to make greener versions of ethanol and plastics. Many members of BIO's Industrial & Environmental Section are pursuing similar projects.

Boston Scientific Corp. (Natick, Mass.) announced that it is voluntarily recalling approximately 200 units of its TAXUSTM Express2TM paclitaxel-eluting coronary stent systems nationwide due to characteristics in the delivery catheters that have the potential to impede balloon deflation during a coronary angioplasty procedure. Impeded balloon deflation can result in significant patient complications, including coronary artery bypass graft surgery and death. The characteristics were found in two manufacturing lots by the company's quality monitoring program. The Food and Drug Administration received reports of one death and 16 serious injuries associated with balloon deflation. In addition, the agency has received eight reports of balloon malfunction that were not associated with patient injury. The recall does not affect patients who have already received a TAXUSTM stent

because the difficulty is with the delivery system and occurs at the time of insertion, not afterward.

Concentric Medical (Mountain View, Calif.), a small privately held company, received clearance from the United States Food and Drug Administration to market the MERCI Retriever, the first device created for removing blood clots from the brains of stroke victims. The device is a miniaturized version of the tool used to clear blockages from household plumbing. The device's corkscrew-like tip is turned through a blood clot to snag and remove it from any of the large arteries in the brain. The device could be used to treat as many as 300,000 of the 700,000 Americans who have strokes each year, primarily those who reach the hospital too late for standard therapy with clot-busting medications. At \$3,000 to \$3,500 for the disposable device, the potential market is \$3 billion.

Fuzeon[®] (enfuvirtide), developed by Roche (Basel, Switzerland), the first and only fusion-inhibitor for the treatment of HIV, durably suppresses HIV and provides continuous increases in immune (CD4) cells over a period of 96 weeks, according to new data presented at the 15th International AIDS Conference (IAC). Investigators reported no late-emerging safety issues associated with the long-term use of Fuzeon[®]. Unlike other HIV drugs that work after HIV has entered the human immune cell, Fuzeon[®] works outside the CD4 cell, blocking HIV from entering the cell. For this reason, Fuzeon[®] is effective in treatment-experienced patients who have developed resistance to other anti-HIV drugs, though patients may still develop resistance to Fuzeon[®].

Genzyme Corp. (Cambridge, Mass.) announced its market launch of a new rapid test that will aid in the diagnosis of bacterial vaginosis (BV), the most common cause of vaginitis/vaginosis in women. The OSOM[®] BVBLUE[®] provides reagent, sample swabs, and testing vessels in this 10-minute, user-friendly kit. Once a vaginal swab is added to the testing vessel, a drop of developer solution turns the solution blue or green if the sample is positive for BV. This product launch comes only a few months after Genzyme received clearance from the United States Food and Drug Administration to market the OSOM[®] Trichomonas Rapid test that aids in the diagnosis of trichomonas infection — a frequent cause of vaginitis/vaginosis and the most common non-viral sexually transmitted disease in the world. Both tests detect pathogenic antigens directly from vaginal swabs.

Researchers at **Howard Hughes Medical Institute** have discovered the PDGF/VEGF receptor (PVR) gene in the fruit fly that aids survival of developing blood cells. Because the gene shows striking conservation with a corresponding gene family in mammals, including humans, the scientists speculate that the fruit fly may provide a far simpler model to study blood-cell formation. Among other things, this will enable researchers to investigate how aberrant genes trigger the prolongation of blood cell survival that results in certain forms of leukemia.

Results of the first randomized, prospective study, published in the July 2004 peer-reviewed issue of "Diabetes Care," directly comparing insulin pumps with multiple daily injection therapy using long-acting **Lantus**[®] insulin therapy in pediatric patients, confirmed pump therapy as a more optimal treatment for

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Kristi Anseth...

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Anseth's awards come from many sectors because of her discoveries. She earned a Colburn Award from the American Institute for Chemical Engineers as the most outstanding individual in that field under age 36. She received a 2001 Materials Research Society Young Investigator Award. She also received an NSF Faculty Early Career Award to develop a new class of polymers that can be used for orthopedic applications, such as bone (fracture) repair. Her research articles, published in more than 80 journals, have been cited about 1,300 times. She is an award-winning teacher. Her mentoring of students has garnered them no fewer than eight NSF graduate research fellowships and numerous other awards from major technical societies, including the Materials Research Society, American Chemical Society, and the Society For Biomaterials for outstanding graduate research.

Anseth received her Bachelor's degree from Purdue University in 1992 and her doctorate in 1994 from the University of Colorado; both degrees were in chemical engineering. Her doctoral thesis received the American Chemical Society's Unilever Award for the most outstanding graduate thesis in the polymer science area. Upon completion of her doctorate, Anseth was a National Institute of Health (NIH) postdoctoral fellow at the Massachusetts Institute of Technology and subsequently accepted a faculty position at the University of Colorado in 1996.

The Society For Biomaterials congratulates Dr. Anseth!

30th Annual Meeting

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biomaterials. The symposia, workshops, tutorials, and regular sessions will have wide cross-disciplinary appeal for Society members, non-members, and clinicians as well as many of the biomedical implant industries and institutions in the Memphis region. Hence, we anticipate an educational, exciting, and fun program with ample opportunities to learn about cutting-edge research, techniques, and applications that will be valuable for clinicians and academic and industry leaders.

We look forward to having you attend the meeting and welcome you to the land of Elvis, barbecue, blues, and new biomaterials!

Upgrading the SFB Web site

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with the Society, current and historical proceedings from the annual meeting, and to have technical and non-technical reporting on the Web site, particularly current news and events related to biomaterials. Our discussions have also specifically identified public outreach as a potential value of the Web site. With models including the Materials Research Society and the American Chemical Society, societies with which most members are quite familiar, the www.biomaterials.org can report science news, significant developments in the field, and hot topics in the regulation of biomaterials and medical devices. Public outreach and public policy information could be a valuable addition to our Web site.

Before any of these specific changes are implemented, a plan will be presented to the Society For Biomaterials Board of Directors and Council. This plan will include immediate changes that are to be made, a new administrative structure, and suggestions for future content and features. If any member would like more detail on the activity of the subcommittee, please contact info@biomaterials.org, the Publications Chair, Richard A. Gemeinhart (rag@uic.edu), or another member of the Publications Committee (for names, go to www.biomaterials.org). However, the fastest way to contribute to this effort is to locate the information hyperlink on www.biomaterial.org. Lines are open.

BioInk

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blood sugar control in children and adolescents with type 1 diabetes. The pediatric patients using Medtronic insulin pumps experienced a statistically significant reduction in HbA1c levels (from 8.1 percent to 7.2 percent), whereas no significant change was reported in patients using multiple daily injections with Lantus® (from 8.2 percent to 8.1 percent). Studies have found that for every 1 percent drop in HbA1c, the risk of developing eye, kidney, and nerve disease is reduced by up to 40 percent. In addition, lowering HbA1c levels and maintaining near-normal glucose control has shown a reduction in the risk of overall diabetes-related complications, as much as 76 percent, thereby improving health and extending life for people with diabetes.

Titan Pharmaceuticals Inc. (South San Francisco, Calif.), announced that the United States Food and Drug Administration has granted fast-track designation for Spheramine for the treatment of advanced Parkinson's disease. Spheramine is a novel cell-therapy product initially developed for the treatment of advanced Parkinson's patients who are not satisfactorily controlled with current medications. Spheramine consists of normal, human retinal pigment epithelial (RPE) cells adhered to spherical microscopic carriers. RPE cells act to increase levels of dopamine, a neurotransmitter that is deficient in certain regions of the brain in patients with Parkinson's disease.

Industry Insights

(Continued from page 13)

biomaterial performance, as well as many other biocompatibility research topics. By utilizing a closed-media environment with specially configured test chambers, time-dependent experiments can also be carried out under a variety of conditions.

The EnduraTEC BioDynamic™ test platform is available either as a dedicated bench-top instrument, or as an accessory to an existing EElectroForce® system. The ability to perform precision experimentation and simulate biological conditions in a single instrument opens up new research possibilities for medical device development and tissue engineering.

The Bose Commitment to Customer Satisfaction

Through 16 years of business with leading companies and research organizations, EnduraTEC has built a reputation for innovation as a biomedical test instrument supplier. At Bose,

the overriding goal is to create value for their clients by offering products and services that meet and exceed their needs. The newly combined expertise of Bose and EnduraTEC provide worldwide biomedical researchers with a strong, committed supplier who will do just that. At Bose, success is measured solely by the success of its customers.

With the rapid growth and demanding requirements of biomaterials research today, the EnduraTEC Systems Group of Bose Corporation is a compelling addition to the testing community. The availability of new, advanced instruments developed specifically for biomaterials research continues to be an important need for the worldwide biomedical community.

For more information, visit www.enduratec.com.

Community Calendar



Osteoarthritis Research Society International 2004 World Congress

December 2-5, 2004
Hyatt Regency Chicago
Chicago, IL
www.oarsi.org

Orthopaedic Research Society 51st Annual Meeting

Washington Convention Center
February 20-23, 2005
Washington, D.C.
www.ors.org

The Minerals, Metals & Materials Society 134th Annual Meeting & Exhibition

Symposium on Biological
Materials Science
February 13-17, 2005
Moscone Convention Center
San Francisco, CA
www.tms.org

Wound Healing Society 15th Annual Meeting & Exhibition

May 18-21, 2005
Hyatt Regency Chicago
Chicago, IL
www.woundheal.org

Controlled Release Society 32nd Annual Meeting & Exposition

June 18-22, 2005
Fontainebleau Hilton
Miami Beach, FL
www.controlledrelease.org

15th Interdisciplinary Research Conference on Biomaterials

March 18-20, 2005
Shanghai, China
www.scschina.org

Regenerate 2005

June 1-4, 2005
Westin Peachtree Plaza
Atlanta, GA
www.regenerate-online.com

9th Industry Symposium

February 9-11, 2005
Best Western University Tower
Ballroom
Seattle, WA
www.uweb.engr.washington.edu

Society For Biomaterials



30th Annual Meeting: New Applications and Technologies

Memphis, TN • April 27 - 30, 2005

CALL FOR ABSTRACTS
DEADLINE: NOVEMBER 12TH, 2004

Abstracts are solicited for the Society's general sessions and featured symposia at the 2005 annual meeting. General sessions cover diverse topics. Featured symposia emphasize new applications and challenges in the biomaterials discipline.

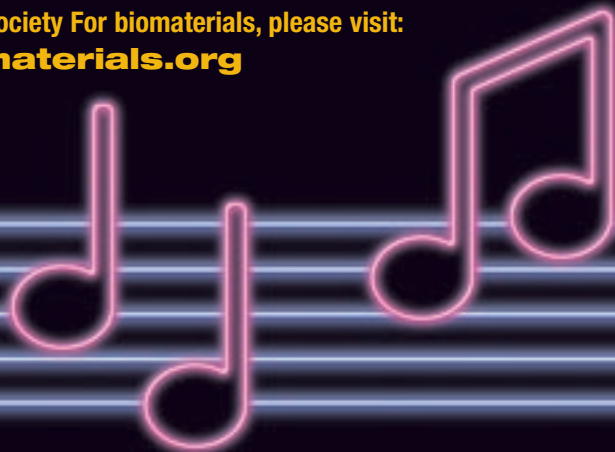
General Session/Special Interest Group Topics:

- Biomaterials Availability and Policy
- Biomaterials-Cell/Organ Therapies
- Biomaterials Education
- Cardiovascular Biomaterials
- Dental/Craniofacial Materials
- Drug Delivery
- Implant Pathology
- Ophthalmologic Biomaterials
- Orthopedic Biomaterials
- Proteins and Cells at Interfaces
- Surface Characterization and Modification
- Tissue Engineered Products

Featured Symposia:

- Biomaterials and Nanotechnology
- Surface Modification of Biochips and Biosensors
- Computational Modeling of Bioresponse to Biomaterials
- Clinical and Biomaterials Issues of Artificial Lung Development
- Business of Biomaterials: Merging of Cell and Tissue Engineering with a Successful Business Model
- Tissue Engineered Product Regulations
- Stem and Progenitor Cells in Regenerative Medicine
- Immunological Aspects of Regenerative Medicine
- Urological Tissue Engineering
- ECM and Smart Stimulus Scaffolds for Tissue Engineering
- Delivery of Therapeutics from Implant Surfaces
- The Influence of Function on Wear Simulation in Artificial Knee Joints
- Novel Techniques for Biomaterials Instruction

To submit an abstract for consideration at the 30th Annual Meeting of the Society For biomaterials, please visit:
www.biomaterials.org



Form Follows Function

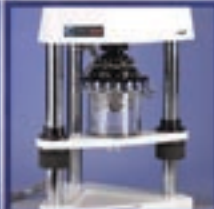
In the past, biomedical researchers have been forced to use testing machines that were oversized for their needs and designed for other industries. Now, with ELeCtroForce® technology, EnduraTEC gives you a new performance standard for the demanding requirements of biomedical research. Simple. Elegant. Easy-to-use. Form does follow function.



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