

**A *BIO-INSPIRED* ADVENTURE INTO SYNTHETIC
BLOOD SURROGATES AND GLOBAL HEALTH EQUITY**

BIOMATERIALS FORUM



OFFICIAL NEWSLETTER OF THE SOCIETY FOR BIOMATERIALS

FIRST QUARTER 2023 • VOLUME 45, ISSUE 1

ALSO INSIDE

**THE CENTER FOR ADVANCED REGENERATIVE ENGINEERING AT NORTHWESTERN
UNIVERSITY: PAVING THE WAY FOR THE TRANSLATION OF REGENERATIVE
BIOMATERIALS TECHNOLOGY FOR THE BENEFIT OF PATIENTS**

BIOMATERIALS FORUM!

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MCRA experts Mehdi Kazemzadeh-Narbat, and Gretchen Nelson led the **Regulatory Challenges for Medical Products** workshop at the Society For Biomaterials Annual Meeting in April 2023.

MCRA's experts aid medical device and technology companies in managing clinical trials, developing global regulatory strategies, and navigating biocompatibility standards to bring medical devices from inception to commercialization.



Mehdi Kazemzadeh-Narbat,
Ph.D., PMP, CQA,
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Contents

THE TORCH

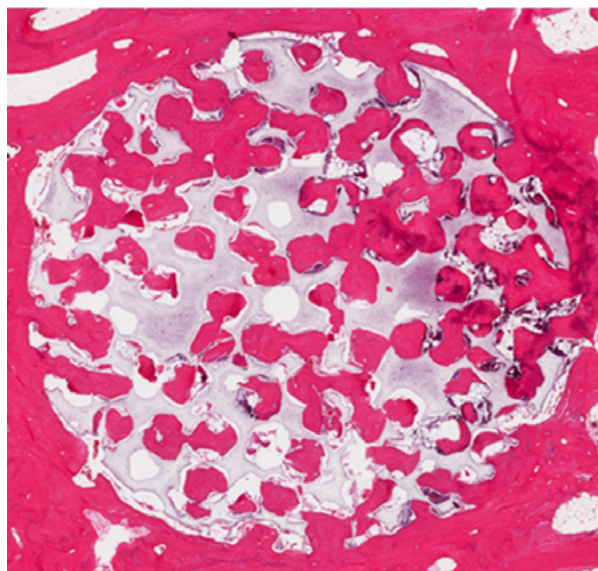
- 5 FROM THE EDITOR
- 6 FROM THE PRESIDENT

NEWS & UPDATES

- 7 MEMBER NEWS
- 13 INDUSTRY NEWS

FEATURES

- 8 A BIO-INSPIRED ADVENTURE INTO SYNTHETIC BLOOD SURROGATES AND GLOBAL HEALTH EQUITY
- 10 THE CENTER FOR ADVANCED REGENERATIVE ENGINEERING AT NORTHWESTERN UNIVERSITY: PAVING THE WAY FOR THE TRANSLATION OF REGENERATIVE BIOMATERIALS TECHNOLOGY FOR THE BENEFIT OF PATIENTS



ON THE COVER

A cylindrical Citregen porous implant that was placed in the vertebra of a sheep and evaluated at six months via histology. There was evidence of bone ingrowth throughout the device and signs of chronic inflammation were absent. (Image credit: Acuitive Technologies, Inc.)

From the Editor

By Roger Narayan, *Biomaterials Forum Executive Editor*



I am glad to share this first quarter issue of *Biomaterials Forum* with you, which has a regional focus on the Great Lakes region. One of the feature articles in this issue is from Guillermo Ameer at Northwestern University; this article considers the use of citrate-based materials for tissue regeneration. The commercialization of a hydroxyapatite-containing citrate-based materials known as Citregen (TM) for bone regeneration applications is described. In another feature article, Anirban Sen Gupta describes his journey as an international graduate student, his decision to pursue an academic career, as well as his current efforts related to platelet mimicry as a faculty member at Case Western Reserve University. The issue also includes a letter from Elizabeth Cosgriff-Hernandez, which highlights activities by the governing council to support the financial well-being of the society and activities to support members from a variety of backgrounds at the recent

Annual Meeting. In addition, her letter mentions the upcoming Materials Science & Technology Technical Meeting, which the society is co-sponsoring, and the 12th World Biomaterials Congress. In member news, Stephanie K. Seidlits shares with us recent accomplishments by Jaydee Cabral, Shaochen Chen, Mykel Green and co-authors, Christopher Jewell, Nashaita Patrawalla, Tatiana Segura, Christine Schmidt and Silviya Zustiak.

I want to thank the members, volunteer leadership, and staff who helped prepare this issue. As always, please do not hesitate to contact me at roger_narayan@ncsu.edu if you are interested in sharing an article for an upcoming issue of the *Forum*.

Yours truly,
Roger Narayan

CALL FOR COVER ART

WE WANT TO FEATURE YOUR EXCITING BIOMATERIALS ARTWORK ON THE COVER OF *BIOMATERIALS FORUM*!

Deadline: Accepted on a rolling basis.

Instructions: Please email artwork (digital images, artistic creations, etc.) to info@biomaterials.org, to the attention of the Executive Editor of the *Biomaterials Forum*. All artwork with biomaterials relevance that have not appeared as a *Forum* cover are welcome. Multiple submissions are permissible.

Description: Selected artwork will appear as the cover of a future issue of *Biomaterials Forum* along with a brief "On the Cover" description of the subject and name/affiliation of the creator.

Format: High-resolution electronic version in .gif, .tiff or .jpeg file format.



From the President

By Elizabeth Cosgriff-Hernandez, SFB President



First, I would like to say that it has truly been an honor to serve you as president over the past year. As with most scientific societies, this has been a year of rebuilding after the pandemic, and I am proud to say that we are in a strong position through the collective

efforts of our SFB leadership and AH staff. We have focused on three key areas: developing a sustainable financial model to support our society, enhancing member value and inclusivity and expanding the impact of SFB. I spoke at the Business Meeting in Baltimore about the need to “right the ship” after the pandemic in order to continue providing member value while maintaining fiscal responsibility for the long-term viability of our society. To this end, Council implemented several policies over the past year that I believe will be the foundation to ensuring financial sustainability of our society. I want to especially thank Sarah Stabenfeldt (Secretary/Treasurer) and Danielle Benoit (Secretary/Treasurer-Elect) for leading these efforts and Dan Lemyre and Shena Seppanen for their critical roles in advising on and implementing new policies. Another important operational effort this year was to [increase the transparency of our processes](#) including a session programming roadmap and published award and nomination processes with rubrics.

Scientific discourse is at the core of our mission of advancing biomaterial science to improve human health and quality of life. Our Special Interest Groups have continued to engage our community throughout the year with webinars. Thank you to Ashley Brown (SIG Chair), SIG leadership, and Shena Seppanen for facilitating these efforts. We are in the final stages of preparing for our [Annual Meeting in San Diego](#).

A big shout out to our Annual Meeting Program Chairs, Karen Christman and Jennifer Woodell-May, Program Committee, and AH staff for their tireless efforts in putting together a cutting-edge scientific program. This is going to be one for the books! Thank you to all the Special Interest Groups, session organizers and reviewers! We will continue our family-friendly policies, pronouns on badges, and name pronunciation guides at our meeting this year to provide a meeting where everyone can participate and feel welcomed. The Annual Meeting will also provide ample opportunities for networking and professional development for our members to connect with people of shared identities through a variety of mixers and sessions focused on highlighting our members (3MT, PRA, Black and Latinx Voices). I am also excited for the new Diversity Award that will be presented for the first time in San Diego. We have made special efforts this year to engage our student and industry members so be on the lookout for programming pages dedicated to these groups. Thank you

to Gopi Mani and the Industry Engagement Task Force as well as our YSG and Student Chapter for their help with these efforts. I hope that you will check out the new Industry Rising Star Award session and the industry networking events this year. If you have ideas about how to further improve member value, please reach out – we would love to hear from you!

We also continue to work with other professional societies and advocacy groups to increase the broad impact of SFB. Based on our successful partnership with the 2022 Materials Science & Technology Technical Meeting and Exhibition, we plan to continue our partnership with MS&T next year. If you would like to be involved in organizing this joint symposium, please reach out to Dan Lemyre at dlemyre@biomaterials.org. We are also continuing to build relationships with our sister societies and provide opportunities for international crossover and collaborations.

Next year will be the 12th World Biomaterials Congress (WBC), which will be held in Daegu, South Korea, May 26-31, 2024. Through coordinated efforts, we had a record number of session proposals from SFB members! Keep up to date on the meeting at wbc2024.com. We will not have our regular meeting in 2024 but we will be hosting a new format for our Fall Symposium in September 2024 with Anita Shukla as our Program Chair. We will have concurrent regional meetings with streaming of award plenaries and keynotes. Keep an eye out for more details to come soon!

As my last letter as President of SFB, I want to again say that it has been an honor to serve the society that has been my home for over twenty years. I am happy to know that it will be in good hands with Bill Wagner as your next President and a dedicated Board and Council. I cannot say enough about the steadfast support and tireless efforts of Dan Lemyre, Shena Seppanen and the whole AH team that make this society work. Thank you a thousand times over!

As always, I welcome your suggestions for ways to engage in the society (email me at cosgriff.hernandez@utexas.edu). Thank you all for your dedication and contributions to our Society and I look forward to seeing you in San Diego!



Member News

By Stephanie K. Seidlits, PhD, Member-at-Large

Jaydee Cabral, University of Otago, was promoted to Associate Professor in February 2023. In addition, Professor Cabral has been awarded a Catalyst Seed Grant from the Royal Society New Zealand which, in collaboration with Distinguished Professor John Fisher from the University of Maryland's Fischell Department of Bioengineering, will support development of 3D printed, vascularized nipple areolar complexes for reconstructive surgery after mastectomy.

Shaochen Chen, Professor and Chair in the Department of Nanoengineering at the **University of California San Diego**, and his lab members recently published a manuscript in *Science Advances* describing a new technique for 3D bioprinting of cells at high density with high spatial resolution to create vascularized constructs with improved fidelity to human tissues. [The manuscript findings were highlighted in UC San Diego Today.](#)



Mykel Green, University of Texas at Austin, along with co-authors **Olivia Lanier, Gilda Barabino**, and **Elizabeth Cosgriff-Hernandez**, recently published an article entitled "Ten simple rules in biomedical engineering to improve healthcare equity" in

PLOS Computational Biology. [The goal of this manuscript](#) is to teach engineers and scientists alike how to use their research, mentoring, teaching, and science communication as platforms to address health and healthcare technology inequities.



Christopher M. Jewell, MPower Professor and Minta Martin Professor at the **University of Maryland**, has been appointed as **Chief Scientific Officer** at **Cartesian Therapeutics**, a clinical stage biotech company pioneering RNA cell therapies. Over the past decade at the

University of Maryland, Dr. Jewell has secured over \$25M in funding and published 125 manuscripts and patents, including papers in *Nature*, *Nature Biotechnology*, *Nature Materials*, and others. He is also an elected fellow of numerous professional societies and has experience at Boston Consulting Group and as an advisor to dozens of drugmakers over the past 15 years. Cartesian is pioneering RNA cell therapies for autoimmune diseases and cancer with a first-in-class, RNA-engineered chimeric antigen receptor T-cell therapy (rCAR-T) in Phase 2b clinical development for patients with generalized myasthenia

gravis. Cartesian operates a wholly owned, state-of-the-art cGMP manufacturing facility in Gaithersburg, MD. For more information visit www.cartesiantherapeutics.com.



Nashaita Patrawalla, a PhD Candidate in Biomedical Engineering at **Florida Institute of Technology**, is a 2023 Student Catalyst Awardee for Women Inspiring Success and Excellence at the Florida Institute of Technology. Her research in anterior cruciate ligament (ACL)

repair and breast cancer yielded four peer-reviewed scientific publications in 2022 and was featured in 2023 by multiple news outlets, including [Space Coast Daily](#), [3DPrinting.com](#) and [Florida Trend](#). While she is continuing to work on her PhD, Ms. Patrawalla is also serving as Chief Biomedical Engineer at EarlyByrd, a company working to lower barriers to cancer screening and early detection.



Tatiana Segura, Professor in the Department of Biomedical Engineering at **Duke University**, was recently named a Senior Member of the National Academy of Inventors. In addition, she was selected as co-director, with Professor Charles Gersbach, of the Center for Biotechnology and Tissue Engineering at Duke University.



Christine Schmidt, Professor and Chair in the Department of Biomedical Engineering at the **University of Florida**, was recently inducted as an inaugural member of the University of Texas at Austin Academy of Distinguished Biomedical Engineers. As an alumna and former

faculty member, Prof. Schmidt was selected for her numerous contributions to biomedical research and the biomedical research community.



Silviya Zustiak, Associate Professor in the Department of Biomedical Engineering at **Saint Louis University**, was awarded the 2023 Women of the Year Award from the Saint Louis University Women's Commission. She was recognized for exemplifying an on-going commitment and dedication to the ideas of Saint Louis University, and for a history of achievement and service which have encouraged emulation and appreciation by others.

A *bio*-Inspired Adventure into Synthetic Blood Surrogates and Global Health Equity

By Anirban Sen Gupta, PhD

In 1998, during the glory days of the so-called “dot com bubble,” I arrived in the US as a graduate student, with more excitement than a plan. I came from Kolkata (West Bengal, India), a city made famous by British colonialism (capital of British India from 1772-1911), the immortal poems of Rabindranath Tagore, the benevolence of Mother Teresa (her residence was in Kolkata), and the book *City of Joy* by Dominique Lapierre (later adopted as a movie by Roland Joffe). During my undergraduate years in Chemistry (HONORS) at St. Xavier’s College Calcutta and then as Chemical Engineer at the University of Calcutta, I did not have much exposure to the magical world of “biomaterials” and was rather attracted to the area of “Transport Phenomena.” However, once in the US, I found myself surrounded by ‘biomaterials research’ in my home department (Chemical Engineering) as well as across other disciplines (Polymers, Materials Science & Engineering, Chemistry etc.). I was fascinated by (and hooked to) the field! Under the mentorship of Prof. Stephanie Lopina at the University of Akron I began my bright-eyed adventure into the world of biomaterials, focusing on “pseudo-poly (amino acid)” scaffolds for tissue engineering applications. And the Society For Biomaterials (SFB) became a part of my life!

AN INTERESTING JOURNEY

Navigating doctoral research as an *international student* is quite an interesting journey. I was ineligible to apply for majority of federal scholarships and I am very grateful that UAkron provided me with a Teacher’s Assistantship (TA) position to cover my tuition and stipend.

A few critical things happened during those years that have played pivotal roles in my career and life:

1. I became the TA for the Biomaterials core course in the Biomedical Engineering department of UAkron and had the opportunity to teach several lectures on polymeric biomaterials for several years. I realized pretty soon that I like teaching!
2. Dr. William Landis joined UAkron, and together with Dr. Lopina, started a seminar series with invited experts in biomaterials. I cherish the amazing seminars and meeting with renowned experts in the field like Dr. Joseph Vacanti and Dr. Antonios Mikos.
3. By virtue of a newly created ‘internship course’ at UAkron, I got the opportunity to work in impactful biomaterials projects at Guilford Pharmaceuticals (of Gliadel Wafer fame) in Baltimore, and at Procter & Gamble in Cincinnati, learning about

important translational aspects and real-world healthcare needs related to biomaterials.

4. The year 2001 turned out to be a roller-coaster. In May 2001 the *New York Times* published the article with the now famous picture of a human ear grown on a mouse, taking the tissue engineering world by storm! And, in September of that year the terrorist attacks on the NYC twin-towers happened, and the world stopped in shock! For an international student like me, on the verge of graduating and hoping to find an industry R&D position, all opportunities evaporated as the economy collapsed and work visa logistics vanished in the aftermath.

STAYING IN ACADEMIA

In the summer of 2003, I made the decision of staying in the academia (recall my love for teaching and research), and after several different interviews, chose to join the laboratory of Prof. Roger Marchant at Case Western as a post-doctoral Research Associate. I was introduced to an exciting project of exploring the design and evaluation of amphiphilic graft co-polymers that can physisorb on biomaterial device surface and mimic the thromboresistant properties of endothelial glycocalyx.

This project became my gateway into the elegant and complex aspects of vascular biology and hematology, under the guidance of Prof. Marchant as well as his wife Prof. Kandice Marchant (at the Cleveland Clinic), and Prof. James Anderson and Prof. Nicholas Ziats (at Case School of Medicine). While working on this project, I delved into my own design ideas of utilizing synthetic biomaterials to modulate blood clotting mechanisms and initiated the design approach of ‘heteromultivalent modification’ where a synthetic biomaterial platform could be engineered to present multiple copies of different ligand motifs performing different biointeractive functions in parallel, inspired by how many natural biological mechanisms occur.

A timely influence in this design development was the work published by Dr. Daniel Hammer and Dr. Omolola Eniola-Adefeso who, during that time, were publishing work on decorating polymer particles with heterotypic ligand combinations to mimic leukocyte interactions with the vascular endothelium. In Prof. Marchant’s project, we applied this design in creating heteromultivalent brush polymer coatings that allow endothelialization while preventing clotting on vascular grafts. In my own parallel research, I began exploring the possibility of mimicking the heteromultivalent functions of blood platelets in clotting mechanisms.

A bio-Inspired Adventure into Synthetic Blood Surrogates and Global Health Equity (Continued)

'PLATELET MIMICRY'

My design approach on "platelet mimicry" received initial funding from AHA in 2006, the same year that I transitioned into a tenure-track faculty position at Case Western. Subsequently I also took over the faculty advisory role for the Case Western SFB chapter, immensely enjoying the opportunity to mentor our students into organizing Biomaterials Day symposiums and Biomaterials Education Challenge activities. Over the past 16 years, our group's learning and understanding of blood biology has grown, along with our federally funded research endeavors in the area to potentially create synthetic blood surrogates. We have realized that our research can address a very critical global health problem: The timely availability of life-saving blood transfusions in a variety of clinical scenarios spanning congenital or drug-induced coagulation issues, various anemias, complex surgeries, post-partum hemorrhage and acute traumatic injuries (Figure 1).

These pathophysiologies happen in many populations globally and a critical treatment modality is blood transfusion. However, blood products are currently solely dependent on blood donor availability, which is a persistent challenge (more so during pandemic scenarios like the recent COVID-19) and on top of that the blood collection and distribution logistics are very disparate across the world, with severe challenges in developing

nations. Biomaterials-based synthetic blood surrogates, that can be manufactured and scaled up reproducibly to enable donor-independence, can be transported anywhere in the world, stored over long periods of time, and transfused without the need of type matching, can address this global need, and establish efficient health equity in transfusion medicine. This is what our laboratory has become focused on now, both via academic research as well as translation through a biotechnology company, Haima Therapeutics, that I co-founded in 2016. This bio-inspired journey has also enabled us to establish impactful collaborations with other researchers and clinicians in this field, such as Dr. Samir Mitragotri and Dr. Ashley Brown. With Dr. Brown I have been organizing an SFB (and WBC) session on "Biomaterials and Devices for Hemostasis and Wound Care" area for past eight years. With the mentorship of SFB leadership such as Dr. William Murphy, Dr. Andres Garcia, Dr. David Kohn, Dr. Shelly Sakiyama-Elbert, Dr. Ziats, and the assistance of Dan Lemyre and his team, I have had the opportunity to integrate my organizational and leadership roles at SFB with our academic and research activities in resolving global health equity challenges, with a strong focus on diversity and inclusivity in our professional endeavors. It continues to be an amazing bio-inspired journey in this field, and I am honored and grateful to be able to continue this adventure with all of you.

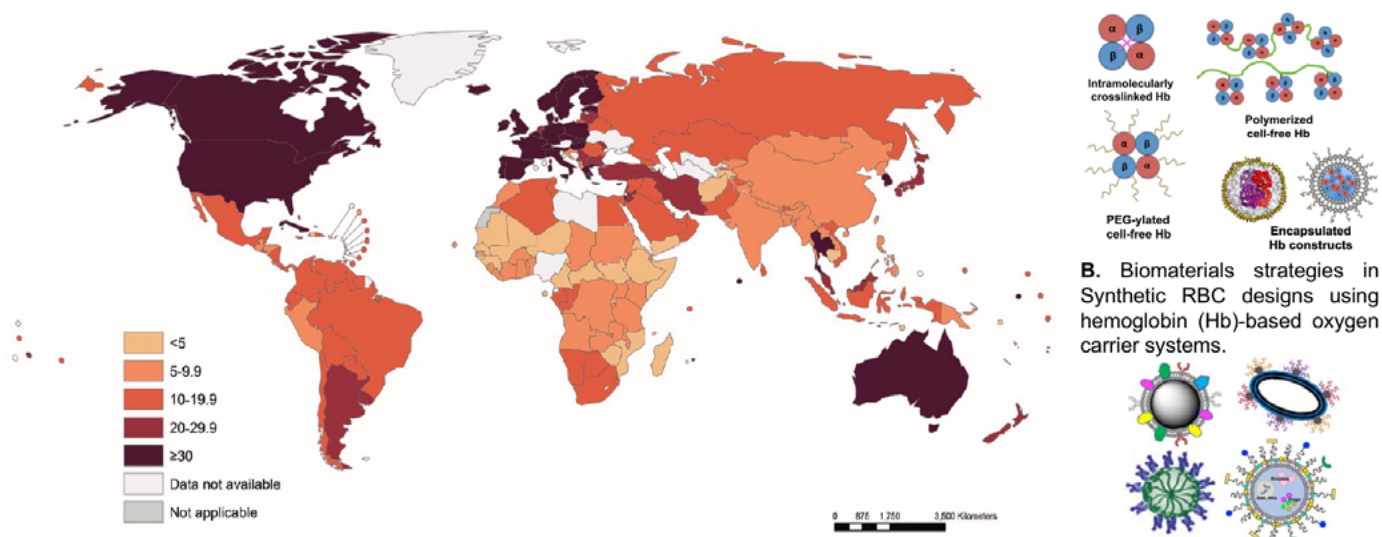


Figure 1. Addressing the timely availability of blood transfusions

The Center for Advanced Regenerative Engineering at Northwestern University: Paving the Way for the Translation of Regenerative Biomaterials Technology for the Benefit of Patients

By Guillermo A. Ameer, ScD

One of the most significant obstacles faced by patients and surgeons is the body's inability to initiate the regeneration of damaged or diseased tissue. Regenerative engineering and medicine seek to provide therapeutic options to the clinician and patient to restore normal anatomy and physiological function, eliminating the need for prosthetics devices and other permanent implants. However, achieving this objective has proven challenging, and the field of regenerative medicine remains primarily an academic discipline with limited products currently in widespread clinical use. Barriers include the lack of pro-regenerative biomaterials, challenges with cell product manufacturing, a complex regulatory pathway to establish safety and efficacy, challenges with user adoption, difficulty of implementing effective convergence research and training, and the small number of commercially successful products in this space. To address these challenges, we established the Center for Advanced Regenerative Engineering (CARE), which integrates and supports research, technology development, education, and clinical expertise to improve the outcome of tissue and organ repair and regeneration for adult and pediatric patients. Research at CARE aims to regenerate or reconstruct damaged tissues and organs through the convergence of advanced materials science, stem cell and developmental biology, physical sciences, and translational medicine.

Within our laboratory, research has been focused on the use of citric acid as a fundamental building block for the development of innovative polymeric biomaterials for tissue and regenerative engineering applications. Citric acid is naturally produced in the human body and plays a crucial role in bone formation, stability and remodeling.¹ It is readily available and has a well-established safety record in various consumer and professional products.²

Through the reaction with co-monomers, particularly diols, citric acid can be used to generate polydiolcitrate and citrate-based biomaterials (CBBs) with customizable mechanical and degradation properties.³ They also have interesting antioxidant and anti-inflammatory properties.⁴ CBBs have been researched to address a broad spectrum of medical issues involving the skin, blood vessels, bladder, cartilage, ligament, and bone.^{5,6} Regarding a translational path for these biomaterials, a CBB composed of a composite of poly(1,8 octamethylene citrate) (POC) and hydroxyapatite (HA), referred to as Citregen™, was used for the fabrication of bioresorbable tissue fixation devices recently cleared by the U.S. Food and Drug Administration for use in musculoskeletal surgeries.⁷ Products currently using Citregen™ include the Citrelock™ Tendon Fixation Device System, which is designed to secure soft tissue grafts to bone and the Citrefix™ Suture Anchor System, which is intended to facilitate the re-attachment of tendons to bone.^{7,8} These products are now marketed worldwide by Stryker Corporation and the biomaterial technology behind them has been recognized by leading market research firms as a major driver for growth in the musculoskeletal surgery products sector.⁹ The CBB technology has also been recognized for its innovation and impact on research and society in general by the Society for Biomaterials and the Tissue Engineering and Regenerative Medicine International Society - North America.

During degradation, Citregen™ gradually releases citric acid, calcium, and phosphate, which contribute to bone regeneration. The mechanical properties of CBBs allow for innovative device designs that result in easy device delivery and improved performance, the latter reflected in higher tissue pullout strengths from bone.¹⁰ POC is the first thermoset biodegradable



A bio-Inspired Adventure into Synthetic Blood Surrogates and Global Health Equity (Continued)

synthetic polymer used in an implantable medical device where the aim of the surgery is to restore tissue function while leaving behind all biological components. Hence, given the applications versatility and demonstrated translation of CBBs into medical products, they have significant potential for the development of novel pro-regenerative medical devices, such as scaffolds for the regeneration of tissues and organs.

CARE is now approaching five years. Our vision is to be the lead entity in disseminating regenerative engineering technology and innovation by providing novel insights, conducting research, promoting education, and facilitating clinical translation of biomaterial technology. This goal positions CARE to be a vital resource for the healthcare industry, government, academia and the community. Given the successful commercialization of the biomaterial Citregen™, we believe regenerative biomaterials technology will continue to improve the outcome of tissue reconstruction surgeries for patients soon.

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Citrelock™ Tendon Fixation Device System



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If you'd like to contribute a review of your recent favorite read to the **Biomaterials Forum**, send it for consideration to the Editor at **Roger_narayan@ncsu.edu**. If it's approved, it will be published in a future Forum Book Review column!



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Giving life to a world of materials



The Society For Biomaterials is excited to announce that for the second year in a row, we will be co-sponsoring the Materials Science & Technology Technical Meeting and Exhibition in 2023!

The Materials Science & Technology (MS&T) technical meeting and exhibition series is a long-standing, recognized forum for fostering technical innovation at the intersection of materials science, engineering, and application. At MS&T, you can learn from those who are on the cutting edge of their disciplines, share your work with the leading minds in your field, and build the valuable cross-disciplinary collaborations unique to this conference series. Join us for MS&T23 at the Greater Columbus Convention Center in Columbus, Ohio!

Make sure to check out the [technical program](#) along with the following biomaterials-specific symposia:

- Biological Response to Materials and Material's Response to Biological Environments
- Biomaterial Applications in Today's Industry: Development, Translation & Commercialization
- Biomaterial Applications
- Next Generation Biomaterials
- Student Poster + Rapid Fire

Additional details can be found at matscitech.org/MST/MST23

Industry News: The Need to Revamp Our VAC System

By Subra Guna, PhD

There is a compelling need to address the proper valuation of biomaterial-based medical devices. Unfortunately, present practice leads to making such decisions mostly by Materials Management and Direct/Group Purchasing System in place for the Hospital rather than relevant by Clinicians or Providers. This forces the Manufacturers to convince the gatekeepers (as mentioned above) who may not be professionally qualified to take such decisions without the involvement of concerned Clinicians. On the other hand, Clinicians are hesitant to speak out about their recommendations due to unnecessary worry created by the so-called gatekeepers. It appears to be their tactic to avoid any influence so that they can accept the indirect benefits they may be obtaining from those wealthy Manufacturers. Such traditional practices lead to inappropriate lobbying and other non-ethical, immoral practices that erode the real value of a genuine product to reach the hands of Clinicians. This is one of the reasons why an independent scientist with an innovative technology product may not be able to reach a higher level of distribution of the product to the hospital system.

Since there is no evidence for these facts, the author of this article does not claim any legal responsibilities or liabilities for its content. However, most of the Professionals would agree with the above as they may have realized the political power imparted on them to express their independent thoughts. Even if they have limited Clinical Professional inputs, unfortunately, there is no single contribution potential from experts in biomaterial science that can be provided through the Society for Biomaterials, USA.

I'm forced to raise this topic to reach most of the relevant members of our Society as our Industry Forum Reporter. It is a shame on our healthcare society and I'm hopefully reflecting the mind-voice of several Biomaterial Researchers like me who have failed to make changes to obvious problems in the establishment of the Value Analysis Committee (VAC) without proper scientific involvement of Biomaterial Professionals. Unless relevant change happens, very many genuinely advanced products may get lost in the system without adequate recognition. On the contrary, a Manufacturer with a higher influencing capacity can take even their inferior quality product to the hospital system by merely convincing the gatekeepers.

Now, turning our view towards finding a solution for this problem, it is time for every Biomaterial Scientist with Biological expertise to raise their voices to seek official/governmental privileges to support Clinicians through the American Medical Association (AMA) by participating in the Regenerative Medical Device/Product Evaluation Committee. This is crucial to improve the quality of our healthcare system. Please send your feedback(s) to the Society via email and based on your majority support, I, as the Program-Chair of the BMPC SIG, would step forward to voice all your opinions to concerned authorities like HHS and its affiliates, FDA, Medicare and other relevant payors.

Wishing you all the very best!

If you have any questions,

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

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Convergence in Biomaterials: a vision for the future of healthcare

Meet Our Plenary Speakers



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Maastricht University,
The Netherlands



Paula T. Hammond

Massachusetts Institute of Technology,
USA



Takao Hanawa

Tokyo Medical and Dental University,
Japan



Yunbing Wang

Sichuan University, China

※ Listing Names in Alphabetical Order

Dates to Remember:

- Early-bird Registration: April 30, 2023 ~ January 31, 2024
- Regular Registration: February 1 ~ March 31, 2024
- Late Registration: April 1, 2024 ~ On-site

To learn more, please visit wbc2024.com