

Fiber Society News

February 2006

This edition of the *Fiber Society News* includes an update on the 2006 spring conference, a recap of the 2005 fall conference in Newark, New Jersey, an article on the new *Journal of Engineered Fibers and Fabrics*, and an introduction to the recently elected Fiber Society officers and governing council members for 2006.

Please contact me with your thoughts or suggestions for future newsletter editions. We appreciate contributions of short news articles, announcements, or editorials of interest to our members.

Phil Gibson, President, The Fiber Society phil.gibson@natick.army.mil

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Spring Meeting Update

Joint Fiber Society and Korean Fiber Society 2006 Spring Technical Conference in Seoul, South Korea

The Fiber Society and the Korean Fiber Society will conduct a joint conference on the subject of Extreme Textiles: Functionality, Performance, and Industrial Aspects. The conference will be held at the Engineer House at Seoul National University from May 30 to June 2, 2006.



Drawing from an international consortium of fiber and textile scientists and engineers, the conference will cover such topics as fiber and polymer materials; textile processing; dyeing and finishing; general subjects associated with the area of fiber, apparel, and textiles; and other related topics.

The deadline for abstract and poster submissions to be considered for presentation is **February 28**. Consult the conference website at www.fiber2006.org for online submission, registration, and program information.

The Korean Fiber Society (KFS) is one of the oldest academic societies in Korea. Established in 1963, its roots date back to 1945. Its membership consists largely of engineers, scientists, and technologists, working in academia, industry, and government. Each year, the society holds spring and fall technical conferences. It also publishes the official society journal *Fibers and Polymers*.



www.fiber2006.org

2005 Fall Annual Meeting and Technical Conference New Jersey Institute of Technology Newark, New Jersey

The Fiber Society 2005 Fall Annual Meeting and Technical Conference took place October 17–19, 2005, at the New Jersey Institute of Technology in Newark, New Jersey.



Professor Alan Windle, Cambridge University, beginning his plenary lecture on "The Development and Mechanical Properties of Carbon Nanotube Fibres."

The theme of the conference was *Fiber Science—The Next Generation*. The fiber industry has undergone massive change in the last decade, with many familiar company names disappearing as new, global fiber businesses have arisen. Perceptions of the fiber industry have changed rapidly, from high growth to mature and resource intensive; long-range fiber research organizations have given way to business-linked development laboratories, poised to quickly and efficiently meet short-term market demands.

Current fiber research, mostly centered in universities and small companies, is focused on perceived emerging markets for biomedical, high-performance, smart, and nanoscaled applications and products. Against this backdrop of rapid change, the Fiber Society's fall 2005 conference explored the future of fiber science, with emphasis on:

- Biomedical applications
- High-performance fibers
- Nanofibers and nanotubes
- New process insights, models, and simulations
- Progress in traditional fiber science



Mingling Ma, MIT, lectures on "Superhydrophobic Textiles by Electrospinning."



Suresh Shenoy, Case Western, talks on "Fiber Formation by Electrospinning."

A panel discussion on *The Future of Fiber Science* was featured. Panelists included industry, academic, and government scientists, reviewing opportunities for and challenges to fiber research over the next 20 years.

Conference attendees were treated to the first museum exhibition devoted to technical textiles, during an evening excursion following the first day of the conference. The Smithsonian's Cooper-Hewitt National Design Museum in New York City opened its exhibit on Extreme Textiles: Designing for High Performance for a special showing to conference attendees. Many Fiber Society members contributed items for inclusion in the exhibit or were consulted in the course of the exhibit's development.







NJIT

NEW JERSEY INSTITUTE OF TECHNOLOGY

The Fiber Society extends its thanks to the organizers of the fall conference. Professor Michael Jaffe, New Jersey Center for Biomaterials; Professor George Collins and Vera Collins of NJIT; and NJIT student volunteers worked long and hard to produce a successful conference. The society also thanks the sponsors of the fall conference: Teijin Fibers; Ethicon (Johnson & Johnson); and the New Jersey Institute of Technology.

The conference's *Book of Abstracts* is available in pdf format on the Fiber Society website: www.thefibersociety.org.

2005 Fiber Society Awards

Distinguished Achievement in Fiber Science Award

The Distinguished Achievement in Fiber Science Award is given to individuals under the age of 40 who have made significant contributions to the field. The award recognizes early achievement and continuing commitment to the field of fiber science.



Xungai Wang of Deakin University received the 2005 Award for Distinguished Achievement in Fiber Science. Professor Wang holds a bachelor's degree in mechanical engineering from Xi'an University of Engineering Science and

Technology, as well as a Ph.D. in fibre science and technology and a graduate diploma in higher education from the University of New South Wales. Before joining Deakin, he was a senior lecturer in the School of Materials Science and Engineering at the University of New South Wales. In 1998, Dr. Wang joined Deakin University's School of Engineering and Technology as an associate professor. With his research interests resting primarily in fibre science and textile technology, Dr. Wang has worked to establish a research and training program in fibres and textiles at Deakin. The fibre group has grown 10-fold and is now part of the university's research mission, doing work in the area of advanced materials manufacturing and performance. In 2003, Dr. Wang earned a personal chair professorship in fibre science and technology. He is the author of over 100 research publications in various journals and conference proceedings. Presently, he serves as the associate head of school (research) at Deakin. Professor Wang is a fellow of the Textile Institute and of the Institute of Nanotechnology.

Dr. Wang is deputy director of the newly created Centre for Material and Fibre Innovation at Deakin. He is a member of the editorial board for the *Journal of the Textile Institute* and a member of the editorial advisory boards for the *Textile Research Journal* and *Fiber and Polymers*.

The Founder's Award

The Founder's Award recognizes an outstanding contribution to the science and technology of

fibrous materials by a professionally active scientist, regardless of age. Each award is presented in honor of a founding member or honorary member of the Fiber Society.



You-Lo Hsieh accepted her Founder's Award in the name of Giuliana Tesoro. Dr. Hsieh has enjoyed distinguished achievements in the areas of cellulose chemistry and fiber structures, liquid interactions with fibrous structures, and fiber surface modification for

functional properties. During her tenure at the University of California, Professor Hsieh has not only chaired but has also initiated and led research efforts in several degree and research programs, including fiber and polymer science, agricultural and environmental chemistry, and forensic science. Her findings have advanced the fundamental understanding of fiber chemistry and structure, with most significant contributions made in the areas of cellulose chemistry, novel fibers (nanoporous, surface-bound polymer structures), functional polymer synthesis (biobased, amphiphilic, protein binding, stimuliresponsive), and surface/interfacial and transport properties of fibrous materials.



Founder Giuliana Tesoro (1921–2002) was known as one of the world's most prolific inventors and innovators in textile and fiber science. With a Ph.D. in organic chemistry from Yale University, she worked in

many areas of chemistry for industrial companies. She also held a position as a research professor at Polytechnic University in Brooklyn, New York. Dr. Tesoro developed processes to prevent static accumulation in synthetic fibers, designed flame-resistant fibers, pioneered improved permanent press properties for textiles, and discovered ways to make new manufacturing projects run at peak operation and efficiency. She served on the editorial board for the Textile Research Journal and on the Committee on Fire Safety of Polymeric Materials, National Academy of Sciences. Dr. Tesoro held more than 125 patents in areas related to organic compounds and textile processing. (Biographical information from the Society of Women Engineers.)



James Economy accepted his Founder's Award in the names of Herman Mark and Ludwig Rebenfeld. Over the past 40 years, Professor Economy has established a remarkable record with his unique ability to develop a number of new fibers, each

designed with properties tailored to specific needs. He has published on and patented more than 20 new fiber compositions, of which at least five are available commercially. His work has impacted developments in the areas of fibers for high-performance composites, flame-resistant fibers, and fibers for air and water purification. His research has also led to the design of new refractory fibers and superconducting fibers. In nonfiber-related work, Dr. Economy has pioneered the field of liquid crystalline polyesters: very recently developed an ultralow-k dielectric film that meets the industry roadmap; designed greatly improved wear-resistant materials; and produced high-performance polymeric, ceramic, and metal matrix composites, which extend greatly the utility of current materials.

Professor Economy received his bachelor of science degree from Wayne State University and his Ph.D. from the University of Maryland. From 1960-75, while at Carborundum Company, he was manager of materials science and chemistry as well as manager of the research branch in the company's research and development division. During that period, he was responsible for the development of a number of advanced polymers and ceramics, eight of which are commercially available today. From 1975-89, Dr. Economy managed the polymer science and technology department in IBM's research division, where his group achieved worldwide prominence, scientifically and technologically. He joined the University of Illinois at Urbana-Champaign in 1989 as professor and head of the Department of Materials Science and Engineering.



Founder Herman F. Mark (1895–1992) is often called the Grandfather of Polymer Science. Along with Hermann Staudinger and Wallace Carothers, Herman Mark can be credited as a cofounder of polymer science. In the 1920s, his X-ray crystallographic

studies of cellulose showed it to be made of giant

molecules containing thousands of atoms, as Staudinger held. Mark also showed that most polymer molecules are made of flexible chains, while Staudinger had thought them to be rigid rods. The Mark-Houwink-Sakurada relationship, describing the relationship between a polymer's solution viscosity and its molecular weight, was another of Mark's early discoveries.

Escaping into Switzerland after Austria was annexed by the Nazis in 1938, Mark made his way first to Canada and then to the United States, where he joined the faculty of Brooklyn Polytechnic. There he established a strong polymer program, which included not only research but also the first undergraduate polymer education in the United States. To this day, most American polymer chemists can trace their academic lineage back to Mark and Brooklyn Polytechnic. (Biographical information from Chemical Heritage Foundation.)



Founder Ludwig Rebenfeld (1928–2004) was a world-renowned leader and expert in fiber structure and properties, who served for many years as the editor of the *Textile Research Journal*, the leading scientific journal for

fiber and fabric research. Dr. Rebenfeld earned a B.S. in chemistry from the University of Lowell in 1951 and a Ph.D., also in chemistry, from Princeton University in 1955.

During his time as a graduate student at Princeton University, Dr. Rebenfeld began his more than 50-year career at TRI, first as a research fellow (1951-1954), and later moving up to senior scientist (1955-1959), associate research director (1960-1965), vice president of education and research (1966-1970), and then president and director (1971-1993). Dr. Rebenfeld also held academic positions as assistant instructor in the Department of Chemistry at the University of Lowell (1949-1951) and as a visiting lecturer with the rank of professor in the Department of Chemical Engineering at Princeton University (1964-2002). It was through that position that Dr. Rebenfeld served as an academic advisor to dozens of doctoral candidates, who continue to be research leaders in many chemical engineering fields.

Previous Founder's Award Winners

- John Hearle in the name of S. Backer (2003)
- Menachem Lewin in the name of E. Kaswell (2003)
- Richard Gregory in the name of L. Rebenfeld (2004)

Fiber Society Lecturers for 2006

The Fiber Society sponsors lectureships at selected colleges and universities in the United States, designed to acquaint students and members of faculty with the scientific challenges and opportunities in the areas of fiber science, engineering, and technology. Interested organizations should contact the lecturers directly to arrange a visit.



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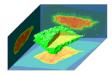
Email: haskell.beckham@ptfe.gatech.edu Internet: www.ptfe.gatech.edu/beckham

Lecture Topics

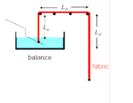
 Magnetic Resonance Applications in Textile and Fiber Science

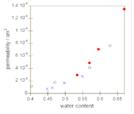






Wicking of Fluids in Fibrous Substrates





Haskell Beckham is an associate professor in the School of Polymer, Textile and Fiber Engineering at Georgia Institute of Technology, with an adjunct appointment in the School of Chemistry and Biochemistry. He earned a B.S. in textile chemistry from Auburn University (1986) and a Ph.D. in polymer science from Massachusetts Institute of Technology (1991). After graduating from MIT, Dr. Beckham accepted a two-year postdoctoral internship at the Max Planck Institute for Polymer Research in Mainz, Germany. In 2003, he spent a sabbatical year at the Naval Research Laboratory in Washington, D.C. Current research interests include threaded macromolecules and the application of magnetic resonance methods to polymers and fibrous substrates.

Dr. H. Young Chung

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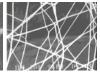
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Lecture Topics

 Electrospun Nanofibers and Their Application in Filtration







Synthetic Nanofibrillar Surface for Cell Growth







H. Young Chung received his B.S. in textile engineering (1967), followed by a M.S. in textile chemistry (1972), from Seoul National University. He earned his Ph.D. in macromolecular science from Case Western Reserve University (1979). Before joining Donaldson Company, Dr. Chung was involved in the development of fluorocarbon polymers while employed at 3M. Presently, Dr. Chung works as a research fellow at Donaldson. For more than 20 years, he has been involved in the research and development of electrospinning. His research focuses on polymers used in electrospinning, the principles behind and application of nanofiber formation, the formation of expanded PTFE membrane and other membrane processes, and nonwovens. He holds several patents in these areas.

Fiber Society Officers for 2006

Dr. Phil Gibson, U.S. Army Natick Soldier Center, vacates his post as vice president and assumes the role of president. Dr. You-Lo Hsieh, University of California at Davis, begins her service as vice president. Dr. Subhash Batra, College of Textiles, North Carolina State University, retains his position as secretary. Dr. Bhuvenesh Goswami of Clemson University's School of Materials Science and Engineering continues as the Society's treasurer.



Dr. Phil Gibson stepped into the president's position at the conclusion of Dr. Kay Obendorf's term at the end of 2005. Before joining the U.S. Army Natick Soldier Center as a materials research engineer, Dr. Gibson served in the U.S. Air Force as a senior rocket propulsion engineer at the

Air Force Astronautics Laboratory, where he conducted research on solid rocket propellants. Dr. Gibson's work for the army has included research on computational and experimental heat and mass transfer through porous materials, on ballistic protection, on the development of novel chemical protective uniform materials, and on blast protection. He has written or contributed to over 200 publications or presentations and three patents.



After earning her Ph.D. in polymer chemistry from the University of Maryland, **Dr. You-Lo Hsieh** joined the University of California faculty. She is a professor of fiber and polymer science at UC Davis and a professor of wood science and technology at UC Berkeley. Dr. Hsieh's research efforts

include work on ultrafine and porous fibers, wetting and absorbent properties, surface-reactive fibers for supporting biologically significant molecules and smart polymers, synthesis of biobased polymers, and cellulose chemistry. She is also a 2005 Fiber Society Founder's Award winner.



Charles A. Cannon Professor **Subhash Batra's** career spans many years of active participation in teaching and research, complemented by service in many professional associations and activities, and by the

receipt of numerous recognitions and awards. Presently, Dr. Batra is professor of textiles at North Carolina State University, where he concentrates on nonwovens technology and the mechanics of yarns and fabrics, and where he is director emeritus of the Nonwovens Cooperative Research Center, which he established with the support of colleagues and from a collaborative venture with the State of North Carolina and industry leaders, initiated by a National Science Foundation grant.



Dr. Bhuvenesh Goswami joined Clemson University in 1984, where he teaches and concentrates his research efforts on the dynamics of processing and the mechanics of fibers, yarn, and fabrics, including woven, nonwoven, and 3-D woven structures for composite

applications. Prior to Clemson, Dr. Goswami worked as a visiting lecturer at that university, before moving on to the Textile Research Institute. He followed a one-year research fellowship at UMIST-Manchester with a stint at the University of Tennessee. Representative current research projects include work in the translation of fiber properties into staple yarn characteristics, fatigue failure in fibers, the mechanical properties of coated fabrics, and the mechanics of nonwoven structures.

Special Thanks

Professor Kay Obendorf, Cornell University, for her outstanding leadership and dedication as president of the Fiber Society in 2005.

Dr. Kyung-Ju Choi of AAF International and Dr. Michael Ellison of Clemson University, for their service as 2005 lecturers.

Journal of Engineered Fibers and Fabrics (JEFF)

The Fiber Society, the Nonwovens Division of TAPPI (Technical Association of the Paper and Pulp Industry), and INDA (Association of the Nonwoven Fabrics Industry) announce a cooperative venture to publish a highly recognized, scientific, and peer-reviewed journal that fosters the worldwide growth and application of fibers, fibrous materials, and their components. The inaugural online issue of the Journal of Engineered Fibers and Fabrics (JEFF) is planned for early 2006, with free article access in the initial years of publication. The goal of the editors, the steering committee, and the advisory board is to produce a journal composed of rigorously peer-reviewed articles that will become a primary reference journal for industry and academia and that will add true value to the ongoing body of work and scientific research in fiber and fiber science and in engineering.

Bill Haile, former Fiber Society president, serves as the journal's managing editor. He is supported by co-editors Michael Jaffe (Fiber Society) and Norman Lifshutz (TAPPI). Technical area editors are responsible for soliciting manuscripts and sending papers to expert peer reviewers. A steering committee, comprised of representatives from each partnering organization, governs the journal. An editorial advisory board also assists in manuscript solicitation and the review process.

Substantial financial support in the first year of publication has been provided by North Carolina State University's Nonwovens Cooperative Research Center.

Anyone interested in submitting a manuscript should contact the appropriate area editor. Names and contact information are listed below. Be sure to bookmark the *JEFF* website at www.JEFFJournal.org and visit it often to view articles as they are published.

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Society Conferences

Fiber Society conferences are twice-yearly events, run on a volunteer basis by organizations and individuals. Sponsorships by individuals, companies, and professional organizations interested in arranging special-interest topic sessions, in acquiring meeting chairs and speakers, or wishing to create a joint venture with the society are welcomed. Anyone with ideas or a willingness to help with future meetings should contact the society's secretary.

Future Meetings

Spring 2006, May 30-June 2

Joint Conference with the Korean Fiber Society

Seoul, South Korea

Extreme Textiles: Functionality, Performance,

and Industrial Aspects www.fiber2006.org

Fall 2006 (October 10–12) University of Tennessee Knoxville, Tennessee, USA

Spring 2007 (May/June) Dong Hua University Shanghai, PRC

Fall 2007 (October)

University of California at Davis (tentative)

Spring 2008 (May/June) ENSAIT/ENSITM

Information and Calls for Papers are available on our website, as plans for each meeting are finalized.

Past Meetings

Note: Many of the recent meetings include online abstracts and programs archived on the Fiber Society website: www.thefibersociety.org.

Fall 2005, October 17–19
Fiber Science—The Next Generation
New Jersey Institute of Technology
Newark, New Jersey, USA

Spring 2005, May 25–27
Technical Textiles, from Fiber to Composites
ETH/Empa
St. Gallen, Switzerland

Fall 2004, October 11–13
A Symposium on Advanced Materials and Processes
Cornell University
Ithaca, New York, USA

Spring 2004, May 18–20 International Symposium on Fibers, Fibrous Structures, and Filtration Clayton, Missouri, USA

Fiber Society Contacts

For most correspondence, contact the society's secretary:

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For membership status, dues, and other administrative questions, please contact Pam Gabriel at pam_gabriel@ncsu.edu; phone (919) 513-0143.

Feel free to contact any of our officers or governing council members with suggestions or concerns.

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- President, Phil Gibson
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- Past-president (2004), William (Bill) Haile Eastman Chemical (retired) hailefamily@chartertn.net
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THE FIBER SOCIETY GRADUATE STUDENT RESEARCH PAPER COMPETITION

in conjunction with the

Fiber Society 2006 Fall Conference Hosted by the University of Tennessee Knoxville, Tennessee, USA October 10–12, 2006

CALL FOR SUBMISSIONS

Purpose of the Competition

To recognize outstanding achievement in science and technology of fibers and their use, at the graduate student level.

Competition Rules

- 1. The award is open to current graduate/ research (Ph.D., M.Phil., M.Sc., M.S.) students as well as those who have graduated any time since May 2005.
- 2. The work and the writing must be that of the student. However, the research paper must be submitted by the student's advisor, who must be a Fiber Society member at the time of the submission.
- 3. Submission requirements
 - English is the language of the competition
 - 8.5" x 11" or A4; 1" margin all around;
 1.5 or greater line spacing; 12-point font
 - submission should be made in pdf form
 - total number of pages with figures and tables should not exceed thirty (30)
 - the last page must provide complete information concerning the candidate, including affiliation, address, email, etc.
 - attached cover letter, signed by the research advisor/supervisor certifying that the research and writing is that of the student and containing the advisor's contact information for award notification
 - if confirmation of submission receipt is desired, an email request should be sent to the chair, who will confirm receipt by email reply

- 4. Preliminary judging of submitted papers will be by the Fiber Society's Student Award Committee. The judging criteria will include:
 - scientific rigor (experimental design and execution) of the research
 - clarity and accuracy of data interpretation
 - · adherence to standard written style
- 5. Each of the three finalists selected by the committee will present an oral report of his/her work at the Fall 2006 conference in Knoxville, Tennessee. The three finalists will receive free registration and up to US\$700 for students traveling from Asia and Europe or US\$300 for students traveling from North America for expenses against receipts. Any additional expenses incurred will be the responsibility of the students or their advisors/university departments. The oral competition will be judged by a set of three judges selected from those attending the conference. Criteria for oral judging will include:
 - proficient, clear presentation
 - handling questions from the audience
 - · quality and relevance of visual aids
- 6. The best paper will be awarded a monetary prize presented at the conference banquet.
- 7. All papers submitted to the competition are eligible for presentation in poster form at the symposium, irrespective of placement in the competition.

Deadlines

- Prior to May 1, 2006, paper submitted to the Student Award Committee Chair via postal service, courier, or email
- June 30, 2006, notification to the three finalists and their advisors/supervisors by the committee

Professor Dominique C. Adolphe, Chair

Fiber Society Student Award Committee ENSITM 11, rue Alfred Werner F 68093 MULHOUSE CEDEX

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