



Welcome to the inaugural edition of the *Fiber Society News*. We hope to develop the newsletter as a resource for members as well as for anyone interested in the society and our goal of promoting all-things fiber. Recommendations for future content or ideas to make the newsletter useful and topical are appreciated. We also encourage anyone interested in publishing announcements or contributing short articles to contact us.

Some of what you'll find inside this first edition include articles that describe our upcoming conference, that recap the Fall 2004 Conference at Cornell University, and that introduce the newly elected Fiber Society officers and governing council. Also featured is a tribute to Dr. Ludwig Rebenfeld.

We hope you enjoy this initial effort, and we look forward to hearing from you. Feel free to contact me with your thoughts or suggestions.

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## Spring Meeting Update

The program for the Spring 2005 Fiber Society Conference, May 25–27, in St. Gallen, Switzerland, has been finalized. It includes nearly 150 oral presentations and posters, with participants from over 20 countries.

The theme of the conference is *Technical Textiles, from Fiber to Composites*, supported by symposia on:

- materials and fibers;
- fabrics, nonwovens, and technology;
- composites and composite structures.

Organized in collaboration with Empa, the Swiss Federal Institute for Materials Testing and Research, and ETH, the Swiss Federal Institute of Technology, Zurich, the conference will be held on the premises of Empa, marking the 125th year of the institute's commitment to research in fibers, fiber-based products, and textiles. Markus Rüedi of Empa and Professor Urs Meyer of ETH co-chair the Program Committee and the Local Arrangements Committee.

Online meeting registration, hotel reservations, travel information, and program are available on the conference website at

<http://www.empa.ch/fiberconference/>.



## The Fiber Society Announces Officers for 2005

Dr. Kay Obendorf, professor of textiles and apparel at Cornell University, vacates her post as vice president and assumes the role of president. Dr. Phil Gibson, materials research engineer with the U.S. Army Natick Soldier Center, serves as vice president. Dr. Subhash Batra, College of Textiles, North Carolina State University, retains his position as secretary. Dr. Bhuvanesh Goswami of Clemson University's School of Materials Science and Engineering continues as the society's treasurer.



**Dr. Kay Obendorf** stepped into the president's position at the conclusion of Dr. William Haile's term at the end of 2004. She devotes herself to research in the field of fiber science, specifically in the areas of protective clothing, morphology, dye diffusion, and detergency;

she has authored or co-authored numerous books and articles on these subjects.

Dr. Obendorf serves as the associate dean for research and facilities at Cornell University and is active in numerous textiles-related professional organizations.



Before joining the U.S. Army Natick Soldier Center as a materials research engineer, **Dr. Phil 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.



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, from a collaborative venture with the State of North Carolina and industry leaders, initiated by a National Science Foundation grant.



**Dr. Bhuvanesh 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.

### Governing Council

Governing council members include:

- Dr. Kyung-Ju Choi, AAF International;
- Dr. Mike Ellison, Clemson University;
- Dr. You-Lo Hsieh, UC Davis;
- Dr. Thomas Godfrey, Natick Soldier Center;
- Dr. H. Young Chung, Donaldson Co., Inc.;
- Dr. Gajanan Bhat, University of Tennessee.

# The Fiber Society Probes Advanced Materials at Its October 2004 Annual Meeting and Technical Conference at Cornell University

By Larry Klaes, Cornell University

The Fiber Society held its annual meeting and technical conference at Cornell University, October 11–13, 2004. This international gathering of professionals dedicated to research in the science, technology, and engineering of fibers was hosted by the Department of Textiles and Apparel in Cornell's College of Human Ecology. The gathering included a symposium on advanced materials and processes for fibers and fibrous structures.

The meeting featured 59 scientific papers and over 30 posters, with participants from more than 20 countries, including two Nobel laureates. Key speakers at the conference included:

- Nobel laureate Robert C. Richardson, Cornell vice provost for research and the F.R. Newman Professor of Physics;
- Howard Greisler of Loyola University, a leading researcher in the vascular application of fibrous materials;
- Nobel laureate and chemist Roald Hoffmann, the Frank H.T. Rhodes Professor in Humane Letters at Cornell;
- Richard V. Gregory, Dean, College of Sciences at Old Dominion University;
- Elizabeth McCullough, Department of Apparel, Textiles and Interior Design, Kansas State University, and co-director of the Institute for Environmental Research.

Kay Obendorf, professor of textiles and apparel at Cornell, co-chaired the conference with Anil Netravali, also a Cornell professor of textiles and apparel.

Conference sessions focused on the following topics:

- fiber-reinforced composites;
- biomaterials;
- advances in fiber formation;
- advanced materials;
- the interface of materials, technology, and apparel design;
- mass customization;
- body scanning technology.

Specific papers and posters addressed the subjects of civil and structural applications of composites, industrial materials, "green" composites, electrospinning, newly developed fibers, mathematical modeling, nanostructures, and "smart" materials that are sensitive to environmental stimuli.

## **Reports from Biomaterials**

The biomaterials section covered topics ranging from DNA, cellulose, and collagen to spider fibers, carbon nanotubes, and novel biodegradable polymers/fibers. Also featured were such biomedical applications as drug/gene carriers, skin substitutes for skin wound management, biosensors, tissue engineering, and more efficient sterilization methods.

Professor Howard P. Greisler, plenary lecturer and well-known vascular surgeon, described the importance of vascular surgery in terms of the five-year restenosis rate and the strategy of using synthetic absorbable polymers/fibers as biomaterial scaffolds for the regeneration of blood vessels. These strategies include:

- in vivo tissue induction—directed in vivo remodeling approach;
- in vitro tissue construction approach;
- combined approaches.

Tissue reactions between host and biomaterials play a major role in determining the success or failure of the graft materials. Greisler's hypothesis holds that macrophage plays a pivotal role in controlling how vascular tissues would be regenerated by biomaterial scaffolds. Greisler pointed out that the characteristics of individual human beings would complicate the outcomes of using biomaterials for human body repair.

Professor Dan Luo of Cornell's Biological and Environmental Engineering department presented a very exciting and unconventional approach to biomaterial design. He uses nucleic acids as the raw materials for building a complex molecular architecture, which can be used for drug and/or gene carriers.

Professor Gang Sun and graduate student Louise Huang (a former Cornell undergraduate working for Kay Obendorf) of UC Davis reported on a simple but very useful and efficient chemistry for imparting antimicrobial properties to textile materials. The applications include homeland security and soldiers' uniforms. The U.S. Army is currently testing such antimicrobial textile products in Iraq.

Patti Lewis, master's candidate in Cornell's Fiber Science program, presented on a novel fibrous scaffolding that has mechanical properties similar to skin and can support the growth of human skin cells. This new and inventive fibrous scaffold may have the potential for helping burn victims heal faster and better.

Dr. S.W. Shalaby, president of Poly-Med, Inc., reported on a patented technology for sterilization of biomaterials/devices that combines formaldehyde and gamma irradiation, which acts synergistically to minimize the potential damage to material properties.

Dr. Michael Jaffe of the New Jersey Institute of Technology reviewed the benefits of nanofibers in the biomedical field, such as biosensors and the challenge of fabricating them by the electrospinning process.

### ***Advances in Fiber Formation***

Tuesday's sessions surveyed significant new developments in smart textiles and fibers. Although humans have been using and investigating fibers since the dawn of civilization, new developments continue to have significant impact on how fibers are processed and what can be done with them.

Dr. Richard Gregory, Dean, College of Science at Old Dominion University, presented the plenary lecture on new materials. He described the development of electroactive and photonic all-organic polymers for applications with fiber-based smart materials. The developed microstructure of conjugated polymers influences the optical and electronic properties of the resulting fibers.

Several presentations focused on electrospinning of nanofibers, a fiber formation method based on electrical rather than mechanical driving forces. Although polymers have been successfully

electrospun from a wide array of materials, the physics of the process are quite complex.

Dr. Sergey Fridrikh of MIT presented a mathematical model that explained the process, which is based on the viscoelastic properties of the fluid. The predictions of the model were used to develop a coaxial spinning technique, designed to spin nanoscale fibers from materials having insufficient viscoelastic properties by supporting them with an easily spinnable material.

Charge Injection Technology's Dr. David Salem presented a method for electrospinning nonconducting materials that utilizes direct injection of electrons into the spinning dope.

Beyond the physics of the spinning process, several new developments in fibers were presented, such as those regarding fibers that contain ferromagnetic particles, which stiffen on impact when held in a magnetic field, and superconducting polymeric fibers that are based on polyaniline.

Even such conventional natural fibers as cotton are getting new properties. Dr. Huantian Cao of Oklahoma State University presented on a sensor technology for cotton fabrics that utilizes selected fabric dyes. Porphyrine-based dyes change colors when exposed to cyanide gas; the degree of color change is directly related to cyanide concentration. A patch of fabric dyed with porphyrine-based dyes could act as a lightweight and easy-to-read detector for first responders.

On the final day of the conference, plenary speaker Professor Elizabeth McCullough of Kansas State University's Department of Apparel, Textiles, and Interior Design, spoke on methods for measuring and predicting thermal comfort of clothing systems. Further discussions followed on the interface among materials, technology, and apparel design.

The meeting was sponsored in part by U.S. Surgical, a subsidiary of Tyco Healthcare; Cornell University's Department of Textiles and Apparel; the Cornell Center for Materials Research; Cornell's Bioengineering program; North Carolina State University's College of Textiles; and Albany International.

## In Memoriam *Dr. Ludwig Rebenfeld*



The Fall 2004 Conference at Cornell was the occasion to celebrate the life of Dr. Ludwig “Luddy” Rebenfeld, who passed away May 26, 2004, at age 76. Dr. David Brookstein, Dean, School of Textiles and Materials Technology, Philadelphia University, a former student and life-long friend of Dr. Rebenfeld, hosted an after-dinner tribute on Monday evening

Dr. Ludwig Rebenfeld was a world-renowned leader and expert in fiber structure and properties, who had 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.

It was during his time as a graduate student at Princeton that 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 was also the editor of *Textile Research Journal*, a position he held up until his death.

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.

He was active as a leader in a number of professional organizations, including as secretary-treasurer of the Fiber Society (1962–1984); president of the National Council of Textile Education (1969–1971); life trustee and chairman of the board (1974–1979) of the Philadelphia College of Textiles and Science (now Philadelphia University); chairman of the advisory board on Military Personnel Supplies and member of the board on Army Science and Technology of the National Research Council (198–1982); president of the Association of Princeton Graduate Alumni (1981–1983); and vice president of the Textile Institute in England.

Dr. Rebenfeld was also a member of numerous professional societies, such as the American Chemical Society; the Fiber Society; the American Association of Textile Chemists and Colorists; the Association of Research Directors; the American Association for the Advancement of Science; the Sigma Xi Society; the Society of Plastics Engineers; the American Institute of Chemical Engineers; and the Directors of Industrial Research.

For his work, Dr. Rebenfeld won many awards and honors during his career. In 1968 he won the Fiber Society Award for Distinguished Achievement in Basic or Applied Fiber Science, followed by the Harold DeWitt Smith Medal from ASTM (1974); the Institute Medal from the Textile Institute in England (1978); the K.L. Hertel Award from the University of Tennessee (1984); the Olney Medal Award from AATCC (1987); and the University of Lowell Distinguished Alumni Award (1990). He also received an honorary Doctor of Textile Science from Philadelphia College of Textiles and Science in 1980.

## Fiber Society Contacts

For most correspondence, contact the society's secretary.

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We also welcome our administrative assistant, Pam Gabriel, based at North Carolina State University, who now works full time for the Fiber Society. Pam is working to get our membership database in order and is invaluable in our efforts to publicize Fiber Society activities and to keep the membership informed on society business. Administrative questions, such as membership status and dues, may be addressed to Pam.

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You should also feel free to contact any of the following officers or governing council members with suggestions or concerns:

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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

Fall 2005 Conference (October)  
Hosted by New Jersey Institute of Technology  
Newark, New Jersey, USA

Spring 2006 (May or June)  
Joint Conference with the Korean Fiber Society  
Seoul, Korea

Fall 2006 (October)  
Fiber Society Fall Conference  
Hosted by the University of Tennessee  
Knoxville, Tennessee, USA

As plans are developed and formalized for each meeting, information will be posted on our website: [www.thefibersociety.org](http://www.thefibersociety.org).

## 2005 Fiber Society Lecturers



**Professor Mike Ellison**  
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### **Lecture Topics:**

- biomimetic fiber-forming polymer production;
- physical properties of natural silks;
- structure/property development during spinning;
- instrumentation development for online monitoring of fiber properties during spinning;
- studies of thermally stimulated current at polymer interfaces;
- chaos in polymer dynamics via thermally stimulated current studies;
- chaos in polymer melt processing;
- modeling of melt spinning of blends;
- torque/torsion relationships in single filaments.



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### **Lecture Topics:**

- air filtration through fibrous nonwoven materials: a comprehensive review;
- new design of meltblown system: making multilayered filter media;
- future requirements for indoor air quality.

The society sponsors lectureships at selected colleges and universities in the United States, with the underlying purpose being to acquaint students and faculty with the scientific challenges and opportunities in the field of fiber science, engineering, and technology. Interested organizations may contact the lecturers directly to arrange a visit.

## Fiber Society Award Winners

Congratulations go to these recent Fiber Society award winners.

**Dipayan Das** of the Department of Textile Structures, Technical University of Liberec, Czech Republic, won the **2004 Student Paper Competition** for his paper titled "Mathematical Modeling and Experimental Investigation of Yarn Strength as a Stochastic Process."

**Dr. Richard V. Gregory**, College of Sciences, Old Dominion University, Norfolk, Virginia, received a **Founder's Award** in the name of Ludwig Rebenfeld for "Development of Electroactive and Photonic All-Organic Polymers for Application to Fiber-Based Smart Materials: Consequences of Developed Microstructure on the Optical and Electronic Properties of Conjugated Polymeric Fibers."

## Past Fiber Society Meetings

*Many of the recent meetings offer online abstracts and programs archived on our website:*  
[www.thefibersociety.org](http://www.thefibersociety.org).

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

2004 Spring Symposium  
*International Symposium on Fibers, Fibrous Structures, and Filtration*  
May 17–20  
Clayton, Missouri, USA

2003 Fall Annual Meeting  
*Fibers and Fibrous Structures: From Science to Applications*  
*Tribute to Dr. Stanley Backer*  
October 14–16  
Raleigh, North Carolina, USA

2003 Spring Symposium  
*Advanced Flexible Materials and Structures: Engineering with Fibers*  
June 30–July 2  
Loughborough University, Loughborough, UK

2002 Fall Annual Meeting  
October 30–November 1  
Natick, Massachusetts, USA

# 2005 Fiber Society Committees

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