

Professional Master's in Manufacturing Leadership Designed to Serve Industry



A recent Institute of Paper Science and Technology (IPST) industry survey revealed the need for a leadership program to strengthen management skills of young engineers in the pulp and paper industry. Based on that input, IPST has launched an initiative to develop a professional master's degree in manufacturing leadership – forest bioproducts.

Supported by a previously announced legacy grant from the Institute of Paper Chemistry Foundation, IPST has taken initial steps to prepare the professional master's program for approval by Georgia Tech, the Georgia Board of Regents and the Southern Association of Colleges and Schools (accreditation). This unique program would serve the industry by providing an on-line learning environment with only periodic on-campus requirements.

“This is a ground-breaking endeavor on many levels, and it promises to serve many industries in addition to forest bioproducts,” said IPST director Norman Marsolan. “We are engendering a high level of collaboration at Georgia Tech to bring this professional master's program to fruition, and we already have received numerous commitments.”

The two-year program is being built around a core Georgia Tech curriculum of leadership, manufacturing best practices and business/finance, with a specific concentration on forest bioproducts (pulp and paper). Once approved, the program would be attractive to people such as mill technical professionals with three to five years of experience, providing them with industry-specific advanced leadership training.

“Georgia Tech and IPST are uniquely suited to provide this professional master's program because the academic elements are readily available at Tech, and Georgia Tech Professional Education has a high level of experience in serving business and industry with its wide range of capabilities,” Marsolan said. “Coupled with IPST's long-standing leadership position in forest bioproducts graduate education, the combination should be ideal for developing future leaders in the industry.”

“Georgia Tech's proposal met our request for ideas that could create a lasting legacy for the Institute of Paper Chemistry educational mission,” said Dr Jim Ferris of the Foundation Board of Trustees. “We were particularly attracted by the opportunity to enhance career growth opportunities for working professionals at paper industry manufacturing sites.”

From the Director



Norman Marsolan

I could not have been more pleased when the Institute for Paper Chemistry Foundation accepted our proposal for their Legacy grant this fall. Our program may well lay the groundwork for a significant change in the way we deliver educational support to the forest bioproducts industry. Although our process will be ground-breaking for the industry, the goal is not new. The formation of IPC in 1929 was based on establishing advanced education serving the pulp and paper industry to produce students who “eventually guide its future as industry leaders.” Among our approximately 1,500 alumni, the students who fulfilled that vision compose an impressive honor roll of leaders who have become corporate and academic legends. Our vision is to generate a new class of leaders for the decades ahead.

IPST, as an Interdisciplinary Research Institute (IRI) at Georgia Tech, is in a unique position to capitalize on the academic programs throughout Georgia Tech and build a meaningful professional master’s program in manufacturing leadership for forest bioproducts, which also can be adapted to suit a number of other industries or disciplines. There are other significant academic elements that will be developed as a result of the IPC Foundation grant.

This concept sprang from the challenge by the IPC Foundation to offer a creative, significant program that would be a lasting legacy to the Foundation, the history of IPST and the Institute of Paper Chemistry, and meet the mission of supporting the forest bioproducts industry. Our proposed professional master’s program is targeted directly at pulp and paper operations and any related functions. We arrived at this concept after more than 20 interviews with executives, corporate staff and engineers in the pulp and paper industry.

The survey responses were very clear – there is a need for targeted educational support to develop the future leaders in the forest bioproducts industry. Prompted by those findings, we developed a proposed curriculum that will offer courses in leadership, manufacturing best practices, business/finance and forest bioproducts. We expect to offer our first two-year, online professional master’s program in the fall of 2014.

There is a lot of work to do. We will be asking for further industry and academic input and guidance, as well as partnerships and sponsorship, when we reach key steps in our development of the program. We believe this is a significant milestone that will help our members in the challenging environment of the pulp and paper industry. We welcome your ideas and support.

Norman F. Marsolan, Director

TAPPI Research Management Committee Looks to Future Factors



Renu Kulkarni

The future of communication will include an evolving role for advanced paper-based materials, predicts Renu Kulkarni, founder and executive director of the FutureMedia Center at Georgia Tech (futuremediaga.com).

Speaking at the TAPPI International Research Management Committee meeting in Knoxville, Tennessee, she discussed the likely interactivity and requirements of content creation, distribution, and consumption in future media alternatives. Ted Farrington from Pepsico, representing the Industrial Research Institute, described tools to explore how future scenarios should affect research agendas. Other presentations addressed the organization, initiatives, and collaboration of forest products research and technical associations.

IPST director Norman Marsolan, who also serves as chair of TAPPI, represented IPST at the meetings in late November, attended by about 60 scientists from nine countries and five continents. Marsolan spoke about the concept of the proposed professional master's degree in manufacturing leadership at Georgia Tech (See related story). A panel in which Marsolan participated compared the challenges faced by research organizations in different parts of the world.

Oak Ridge National Laboratory hosted part of the meeting, where presentations included priority topics such as separations technologies, carbon fibers from lignin, nanotechnology, and opportunities for technology transfer. The committee also toured the lab's Manufacturing Demonstration Facility, where it was noted that the U.S. Department of Energy's Advanced Manufacturing Office has a goal of reducing energy consumption in the manufacture of goods by 50% in 10 years.

Federal Interest in Nanocellulosic Materials Increasing



Federal interest in development of nanocellulosic materials is increasing, according to the forest products industry's Agenda 2020 Technology Alliance. The Alliance has submitted a proposed Federal research program at the request of the Secretary of Agriculture.

The program would be implemented through a public/private partnership and would be funded through reallocation of existing Departmental funds. Whether the Department will include the suggested reallocation in its final budget request for FY 14 remains to be seen. The Technology Alliance, of which IPST is an affiliate member, discussed the growing nanocellulosic research demand at a quarterly meeting preceding the November TAPPI International Research Management Committee meeting in Knoxville, Tennessee.

The Agenda 2020 meeting also considered the industry's evolving research priorities. Participants stressed the continuing importance of supporting performance improvement opportunities in existing mills, along with emerging opportunities from novel products and materials such as nanocellulose and cellulose-based biofuels. The Technology Alliance also hopes to increase the availability of industry-knowledgeable experts to serve on government review panels considering research proposals for funding. Contact Agenda2020.org for more information.

Wei Mu Focuses Research on Catalysts to Upgrade Lignin

More than 50 million tons of lignin are produced in the paper industry each year with 98% of it burned for energy, according to doctoral student Wei Mu. Today, Wei is exploring other value-added opportunities for lignin, including the catalytic conversion of lignin into gasoline-compatible liquid fuel. Wei, who entered the doctoral program in Chemical and Biomolecular Engineering on an IPST Paper Science and Engineering Fellowship, is supervised by Professor Yulin Deng of IPST and the School of Chemical and Biomolecular Engineering. Wei plans to graduate with his PhD in December 2013. Wei's research employs a two-step conversion of lignin into a liquid transportation fuel. The first step is pyrolysis, which decomposes lignin into smaller molecules. Step two is upgrading, which increases the hydrogen amount and partially removes oxygen. The upgrading step requires robust and active catalysts. His research focuses on the catalyst synthesis step and reaction kinetics modeling.



Wei Mu in his laboratory at IPST

Wei's research has captured international attention, most recently at the International Conference of Bioengineering and Technology (ICBT) in Nanjing, China. He presented two papers at ICBT: "Lignin Pyrolysis Components and Upgrading – Technology Review," by Mei Wu and Professor Yulin Deng (ChBE); and "Catalytic Hydrodeoxygenation of Pyrolysis Oil Derived from Lignin," by Mei Wu, Haoxi Ben, Professor Yulin Deng (ChBE), and Professor Art Ragauskas (Chem).

After his return, he participated in the Annual Meeting of the American Institute of Chemical Engineers in Pittsburgh, Pennsylvania, where he also presented two papers: "Catalytic Hydrodeoxygenation of Pyrolysis Oil Derived from Lignin," by Mei Wu, Haoxi Ben, Professor Yulin Deng (ChBE), and Professor Art Ragauskas (Chem); and "ANOVA Study of Reaction Condition Effect on Hydrodeoxygenation," by Wei Mu and Professor Yulin Deng (ChBE).

As part of his master's work in Paper Science and Chemical Engineering at Miami University in Ohio, Wei conducted research at the Argonne National Laboratories in Illinois, to synthesize new materials for semi-conductors using layers. He has industry experience with the Hercules Paper Division and Hercules Paper Technologies and Ventures in China, prior to earning his master's degree and coming to Georgia Tech for his PhD.

Faculty Elected as Fellows of American Association for the Advancement of Science

Professor Art Ragauskas, School of Chemistry and Biochemistry, was elected as a Fellow in the Chemistry section of The American Association for the Advancement of Science (AAAS). Professor Mohan Srinivasarao, School of Materials Science & Engineering, also was elected in the Chemistry section. Both Ragauskas and Srinivasarao conduct IPST-relevant research and direct the research of Paper Science and Engineering students. Ragauskas supervises students researching cellulose modification, lignin utilization, biofuels and nanotechnologies, to name a few of his published topics. Srinivasarao supervises a Paper Science and Engineering student researching the utilization of nanocrystalline cellulose for new nanocomposites. “This is well deserved recognition of your many accomplishments and all you have done in your field of expertise and for Georgia Tech,” said G.P. “Bud” Peterson, president of Georgia Tech.



Art Ragauskas



Mohan Srinivasarao

A total of seven Georgia Tech faculty members were elected by AAAS this year. All new Fellows will be recognized for their contributions to science and technology at the Fellows Forum in February 2013, during the AAAS Annual Meeting in Boston, Massachusetts.

AAAS is the world’s largest general scientific society, and publisher of the journal, Science. AAAS was founded in 1848 and includes 261 affiliated societies and academies of science serving 10 million individuals. Science has the largest paid circulation of any peer-reviewed general science journal in the world.

Professor Deng to Lead New Sustainability Grant in 2013



Yulin Deng

Yulin Deng, Professor, School of Chemical & Biomolecular Engineering, is the project leader for a \$60,000 grant to Georgia Tech from the Ray C. Anderson Foundation for a project entitled, “Green polyurethanes from 100% sustainable natural materials through non-isocyanate reactions.” The Ray C. Anderson Foundation seeks to promote a sustainable society by supporting and pioneering initiatives that harmonize society, business and the environment for the present generation and tomorrow's child. They will achieve this mission through inspiring and funding innovative, educational and project-based initiatives that advance the revolution in sustainable production and consumption.

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