

**DEPARTMENT OF PAPER AND BIOPROCESS ENGINEERING
ANNUAL REPORT
2009-2010**

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Introduction

While we have completed the majority of the interior renovations of Walters Hall to update the water system, work continues around the building with a new parking lot and access road being constructed between Walters and Bray Halls. This lot is being built to offset the loss of the Moon parking lot at the other end of campus in anticipation of the construction of the new Gateway Building. Sadly, this construction necessitated the moving the Lincoln statue, which has resided in front of Walters Hall for almost 40 years. With the help of a crane, Lincoln moved approximately 100 yards to the northwest and now stands at the north end of Bray Hall looking into the quad. The view of Lincoln out the windows of Walters Hall will be sorely missed.

Enrollment in the Department continues to strengthen, partly due to the new program in Bioprocess Engineering, which was started by the department in Fall 2006. At the recent May SUNY-ESF Convocation, Mr Timothy Hull was recognized as the first (ever) graduate of the new program. Mr Hull is planning on continuing with graduate studies at the University of Buffalo in the Fall. With increasing enrollment in the upcoming classes, we expect more graduates in the program in the years to come. The incoming class has been consistently above 25 for the past three years.

Although the economy has slowed the placement of graduates in all majors, our Paper Engineering graduates continue to have success in finding employment after graduation and commanding the highest salaries of all the programs on campus. As the economy recovers and the engineer shortage continues, we expect demand for graduates from all of our programs to be strong.

The PBE Department is expanding its graduate educational programs to include a greater emphasis on Masters of Professional Studies (MPS) programs in addition to continuing our research graduate degrees (MS and PhD). With MPS degrees both in Paper Engineering and Bioprocess Engineering, students with BS degrees in other fields can enhance their marketability and career opportunities through these curricula. In addition, the PBE department through the Division of Engineering at SUNY-ESF will offer Professional Science Masters (PSM) programs in Paper Engineering and Bioprocess Engineering beginning Fall 2010. PSM programs offer a technical education in one of the STEM disciplines (science, technology, engineering, mathematics) augmented with “plus” courses in such areas as business, management, and policy. The PBE Department is excited about the opportunities that these programs bring to students graduating from other departments as well as to engineers and scientists currently working and looking to enhance their careers.

The PBE Department is now offering a number of international opportunities for students in our program as well as for students from across campus. In Spring 2008, Dr Shijie Liu and Dr Gary M. Scott took a group of five students to China, visiting Guangzhou, Xiamen, and Beijing. In Fall 2010, Dr Liu and Dr Scott took a group of students to China to visit Chengdu, Xi’an, and Beijing. During this trip, we interviewed exchange students from two universities in China for a program where they spend 2 to 3 semesters in residence at SUNY-ESF and complete programs at both universities. In other international opportunities, Dr Klaus Doelle, our newest faculty member, has arranged for one of our Paper Engineering undergraduate students, Mr Ryan Reed, to spend 10 months in Germany. While there, he will attend a semester of classes and complete his required internship with a European company. With the internationalization of the industry, we feel that programs such as these are very important to the education of our students.

We will be celebrating the 50th anniversary of the Syracuse Pulp and Paper Foundation (SPPF) this year. In 1960, representatives from the pulp and paper industry came together to form SPPF in order to encourage students to student Paper Engineering at SUNY-ESF. Since that time, many students have benefited from the scholarships that are offered to all students in the Paper Engineering and Paper Science programs. A celebration of this momentous occasion will be held in conjunction with the Fall annual meeting of SPPF in October.

The International Biorefinery Conference held in October, was extremely successful, drawing over 100 attendees, several corporate sponsors, and netting a profit to be used for the organization of future conferences. This effort was again led by Dr Thomas Amidon and Dr Shijie Liu, and resulted in the publication of special issues in a number of journals that highlighted the papers presented at the conference..

This report details the education, research, and outreach activities of the department for the past year as well as looking forward to the next academic year.

Retrospective

1. Teaching

Over the past year, we finished the incorporation of the new Bioprocess Engineering into our educational offerings. Since its initial offering in 2006, we have now had our first student work his way completely through the curriculum and graduate in May 2010. At the conclusion of this academic year, all the courses of the new Bioprocess Engineering program have been taught at least once. Over the next several years, the courses will be improved as the number of students in the courses increase each year as the increasing number of students move through the curriculum.

The Undergraduate Curriculum Committee has been working on a major revision of the Paper Engineering and Paper Science programs. The committee has engaged our advisory committee (through the Syracuse Pulp and Paper Foundation) on the needs of the industry. The committee has taken the information back to the committee and will be presenting a proposed new curriculum for discussion at the fall meeting. Some of the driving forces for these changes include:

- Increasing flexibility within the curricula
- Increasing the appeal to prospective students for the programs
- Decreasing the total credit load for the programs
- Meeting the needs of the constituents that hire the graduates of the program

In addition, the graduate programs have seen significant changes proposed for the 2010-11 academic year. Most significantly, the combined graduate program in the Division of Engineering will be split into three separate graduate programs along departmental lines. These changes are detailed below.

a) Workload summary by faculty member

Table 1 summarizes the teaching load by faculty member for the current academic year as provided by the Office of Instruction and Graduate Studies. The table categorizes the number of credit hours for each faculty member by research courses (498, 798, 899, 999), problem and seminar courses (797 primarily), and lecture (and laboratory) courses. The credit hours are further subdivided by graduate and undergraduate courses. Note that courses in PBE are taught under a number of different prefixes including APM, BPE, ERE, and PSE. Table 18 in Appendix B summarizes the specific courses taught by faculty and staff in the PBE Department.

Table 2. Workload summary year-to-year by course type. Table 2 and Table 3 summarize the teaching workload on a year-to-year basis as a function of the type of course and by instructor. As can be seen in these tables, our total teaching workload for the department increased by 24% over last year in terms of student-credit hours and an increase of 66% over 2007-2008. The majority of this increase can be attributed to a number of factors including:

- Increased enrollment within the department
- Addition of PSE 201 (Burry)
- Forest Engineering students taking PSE 361 (Amato)
- Increased enrollment in APM 153 (Scott)

We expect the teaching load in the department to further increase in the upcoming years as larger numbers of Bioprocess Engineering students will be taking the upper division courses in that program and a general increase in the undergraduate enrollment in the department.

Table 1. Workload summary by instructor.

Instructor	Student-Credit Hours (SCH)								TOTAL
	Research Courses		Problem Seminar Courses		Lecture Courses		Total		
	UG	G	UG	G	UG	G	UG	G	
Amato, Wayne	0	0	0	0	147	3	147	3	150
Amidon, Thomas	0	27	0	33	22	17	22	77	99
Bujanovic, Biljana	0	21	0	0	67	17	67	38	105
Burry, William	0	0	0	0	84	0	84	0	84
Chatterjee, Siddharth	1	0	0	0	259	12	260	12	272
Doelle, Klaus	17	36	0	1	51	6	68	43	111
Fieschko, John	0	0	0	0	2	0	2	0	2
Francis, Raymond	0	96	0	0	57	3	57	99	156
Iribarne, Jose	0	0	0	0	14	0	14	0	14
Lai, Yuan-Zong	0	35	0	1	0	21	0	57	57
Liu, Shijie	0	58	0	3	80	53	80	114	194
Ramarao, Bandaru	3	79	9	1	96	75	108	155	263
Schroeder, Leland	0	0	0	0	24	0	24	0	24
Scott, Gary	0	24	0	0	324	36	324	60	384
TOTAL	21	376	9	39	1227	243	1257	658	1915

Table 2. Workload summary year-to-year by course type.

Academic Year	Student-Credit Hours (SCH)								TOTAL
	Research Courses		Problem Seminar Courses		Lecture Courses		Total		
	UG	G	UG	G	UG	G	UG	G	
2006-2007	6	219	0	17	603	355	609	591	1200
2007-2008	4	226	0	49	609	267	613	542	1155
2008-2009	6	291	3	45	924	277	933	613	1546
2009-2010	21	376	9	39	1227	243	1257	658	1915

Table 3. Workload summary year-to-year by instructor.

Instructor	Student-Credit Hours (SCH)			
	2006 2007	2007 2008	2008 2009	2009 2010
Amato, Wayne	54	30	114	150
Amidon, Thomas	33	88	90	99
Bujanovic, Biljana	192	237	272	105
Burry, William	18	16	79	84
Chatterjee, Siddharth	126	222	239	272
Doelle, Klaus			79	111
Fieschko, John				2
Francis, Raymond	70	99	131	156
Hasan, Asif	117			
Iribarne, Jose	5	5	8	14
Keenan, Thomas	88	57		
Lai, Yuan-Zong	27	17	41	57
Liu, Shijie	115	145	164	194
Ramarao, Bandaru	222	147	187	263
Schroeder, Leland	12	30	24	24
Scott, Gary	121	62	118	384
TOTAL	1200	1155	1546	1915

b) Curriculum changes

The PBE Faculty made a number of minor curriculum changes during the last academic year.

Undergraduate Programs

The PBE department has instituted a Dual Diploma program with Beijing University of Chemical Technology (BUCT) and Sichuan University in China. Students in this program will complete the full requirements for the BS degree in Bioprocess Engineering while simultaneously completing the program at their home university. We are expecting our first student in this program in the Fall 2010.

At the undergraduate level, the department offered the following new courses:

EST 230 China Experience (3). Forty five hours (equivalent) of lecture and field studies. General survey of the history of China from ancient societies through the current time, with attention to cultural, ecological and natural resource issues focused on selected localities of China. The locality and/or hot spots will be selected from: the invention of paper; printing technology; renewable energy; anaerobic digestion of manual / plant biomass; wastewater treatment; Great Walls; Forbidden City; Three Gorges area; Canals; Chinese gardens; Sichuan; Dujianyang Irrigation Dam/ Channels; Panda preservation; Hakka culture; Tibetan culture; plants and vegetation, etc. Analysis of the evolution of the Chinese culture. Historical and contemporary influences of China.

BPE 300 Introduction to Industrial Bioprocessing (3). Three hours of lecture. Industrial examples of biotechnology and bioprocessing will be reviewed. Topics include applications of biotechnology

and bioprocessing to food, water and wastewater treatment, industrial biotechnology, biopharmaceutical and biofuel industries. Through case studies of process flow sheets for different products students will develop an understanding of unit operations typically utilized in bioprocessing manufacturing.

BPE 480 Introduction to Biorefinery Processes (3). Topics covered in this course include chemical and physical properties of biomass feedstocks; chemical processes and biological processes associated with converting plant biomass and agricultural residues to chemicals, liquid fuels, and materials. Discussions will be more geared towards green chemistry and/or environmentally benign processes. While discussions will lead to political and policy trends on sustainability and renewability, more engineering and engineering science aspects will be covered.

The following undergraduate level course was modified over the past year.

- BPE 132 Orientation Seminar: Bioprocess Engineering
- BPE 310 Colloid and Interfacial Sciences (3)
- BPE 441 Biomass Energy (3)
- GNE 160 Computing Methods for Engineers and Scientists (3) (formerly APM 153)
- PSE 132 Orientation Seminar: Paper Science and Engineering
- PSE 300 Introduction to Papermaking
- PSE 302 Pulp and Paper Laboratory Skills
- PSE 304 Mill Experience
- PSE 305 Co-op Experience
- PSE 351 Pulping and Bleaching Lab
- PSE 467 Papermaking Wetend Chemistry (3)
- PSE 468 Papermaking Processes
- PSE 480 Engineering Design Economics
- PSE 481 Engineering Design

Graduate Programs

The graduate program in the Division of Engineering is undergoing a significant change over the next year. The combined graduate program amongst the three departments is being split into three separate programs along departmental lines. The new program graduate program in Paper and Bioprocess Engineering, offering MS, MPS, and PhD degrees, will have options in:

- Paper Science and Engineering
- Bioprocess Engineering
- Biomaterials Engineering

In addition to these changes, the department proposed and had approved the following new programs:

MPS: Environmental and Resource Engineering: Renewable Energy and Bioprocess

Engineering. The purpose of the MPS program is to provide students with a graduate degree in the practice and profession of bioprocess engineering. Students can expect to be trained broadly in the skills, science and engineering of the processes and systems of bioproducts. The program emphasizes

breadth in training and skills essential to an engineering professional by requiring coursework in technology, engineering and application areas. This is in contrast to the Master of Science degree which is a more intensive course of study into the fundamental principles of the technology.

MPS: Sustainable Engineering Management (Professional Science Master's). The Division of Engineering proposes a Master of Professional Studies (MPS) in the new program of Sustainable Engineering Management. The initial offering will have the following three options:

- Bioprocess Engineering
- Paper Engineering
- Construction Management

This program, while being offered as an MPS degree, would also be certified as a Professional Science Master's program (PSM) by the Council of Graduate Schools. The PSM concept is an innovative graduate degree designed to allow students to pursue advanced training in science or engineering while also developing skills in the areas of business, management, and other professional skills. To be certified by CGS, the program must be a "science-plus" curriculum which combines coursework study in the STEM disciplines with coursework in the "plus" courses which can include business, management, policy, law, and other professional areas. Typically, the degree is approximately two-thirds STEM (science, technology, engineering, mathematics) courses and one-third "plus" courses. While the students will receive a MPS degree from SUNY-ESF, it is our intention to have the program certified by the Council of Graduate Schools as a PSM program. More information about the PSM program can be found at www.sciencemasters.com and www.cgsnet.org.

At the graduate level, the department offered the following new courses:

ERE 680 Introduction to Biorefinery Processes (3). Forty five hours of lecture and discussions. Topics covered in this course include chemical and physical properties of biomass feedstocks; chemical processes and biological processes associated with converting plant biomass and agricultural residues to chemicals, liquid fuels, and materials. Discussions will be more geared towards green chemistry and/or environmentally benign processes. While discussions will lead to political and policy trends on sustainability and renewability, more engineering and engineering science aspects will be covered.

The following graduate level course was modified over the past year:

ERE 641 Biomass Energy (3)

2. Research

The PBE department continues to have a strong research program through the ESPRI program, external research grants, and individual company funding. The strength of the research program is demonstrated by the number of publications and presentations given as well as the grant activity as detailed below.

a) Summary of publications/presentations

Appendix C lists the books and refereed publications of the PBE department as well as the papers, presentations, and posters presented at scientific and technical meetings during the academic year. Faculty members published a total of 43 articles for an average of 4.5 publications per full-time faculty member. Table 4 summarizes the number of times that the work of various authors in the department have been cited as well as providing the h-index for the researcher. Note that this analysis, provided by Ms Linda Galloway of Moon Library, does not apparently include patents nor citations to patents. Dr Dölle has had a significant number of patents during his career at Voith.

Table 4. Citation analysis of faculty members in the PBE department.

Faculty Member		#Citations 2009	#Citations 2005-2009	#Citations 2000-2009	h- index
AMATO	Wayne	1	7	10	1
AMIDON	Tom E.	26	74	82	6
BUJANOVIC	Biljana	4	18	33	3
CHATTERJEE	Siddharth	13	55	116	5
DÖLLE	Klaus	0	0	0	na
FIESCHKO	John	3	33	69	1
FRANCIS	Raymond	29	94	153	7
LAI	Yuan-Zong	19	77	138	5
LIU	Shijie	44	159	227	9
RAMARAO	Bandaru	42	194	306	10
SCOTT	Gary M.	20	86	145	8

c) Summary of grant activity

Table 5 summarizes the proposal activity within the PBE department by PI. Table 6 summarizes the total proposal activity on a year-to-year basis. Table 7 and Table 8 summarize the new awards for the year, which is new information provided by ORP for this year. Table 9 summarizes the current sponsored projects by faculty member while Table 10 compares this data on a year-to-year basis. Table 11 summarizes the sponsored program expenditures by the PBE department. Table 12 compares this metric on a year-to-year basis. The amount of new awards has increased significantly over the past year and total expenditures have increased slightly and remain above \$1.5 million.

The full reports from ORP can be found in Appendix I which summarizes the research activity with the department.

Table 5. Summary of proposal activity in the PBE department.

Name	Credited Number	Credited Amount
Amidon, Thomas E.	4.12	\$1,666,848.17
Bujanovic, Biljana	3.28	\$1,746,070.92
Chatterjee, Siddharth		
Doelle, Klaus	4.77	\$946,766.13
Fieschko, John	2.58	\$1,766,849.83
Francis, Raymond C.	2.92	\$1,273,370.33
Lai, Yuan Zong		
Liu, Shijie	2.75	\$1,468,606.25
Omori, Shigetoshi		
Ramarao, Bandaru V.	0.92	\$152,113.33
Scott, Gary M.	0.67	\$417,546.33
TOTAL	22.00	\$9,438,171.30

Table 6. Summary of proposal activity year-to-year in the PBE department.

Year	Credited Number	Credited Amount
2006-07	14.80	\$6,723,026
2007-08	21.75	\$9,747,797
2008-09	21.90	\$23,279,275
2009-10	22.00	\$9,438,171

Table 7. Summary of new awards in the PBE department.

Name	Credited Number	Credited Amount
Amidon, Thomas E.	2.58	\$469,557.00
Appleby, Raymond J.	0.20	\$15,597.67
Bujanovic, Biljana	1.09	\$70,875.00
Chatterjee, Siddharth	0.20	\$15,597.67
Doelle, Klaus	0.09	\$64,875.00
Fieschko, John	1.25	\$7,023.41
Francis, Raymond C.	2.29	\$321,811.67
Lai, Yuan Zong	0.29	\$80,472.67
Liu, Shijie	0.42	\$198,208.33
Omori, Shigetoshi	0.20	\$15,597.67
Ramarao, Bandaru V.	0.29	\$80,472.67
Scott, Gary M.	0.29	\$80,472.67
TOTAL	9.20	\$1,420,561.43

Table 8. Summary of new award year-to-year in the PBE department.

Year	Credited Number	Credited Amount
2006-07	N/A	N/A
2007-08	N/A	N/A
2008-09	2.62	\$904,594
2009-10	9.20	\$1,420,561

Table 9. Summary of current sponsored projects by PI.

Name	Number	Budget	Balance
Amidon, Thomas E.	17	\$2,768,842	\$278,558
Bujanovic, Biljana	4	\$76,805	\$12,722
Doelle, Klaus	2	\$33,000	\$7,505.56
Fieschko, John	4	\$395,350	\$44,647
Francis, Raymond C.	4	\$497,702	\$25,501
Liu, Shijie	4	\$250,200	\$65,895
Ramarao, Bandaru V.	1	\$39,404	\$1,151
Scott, Gary M.	2	\$46,000	\$19,879
Department Allocations*	39	\$308,118	\$125,081
TOTAL	77	\$4,420,703	\$583,467

*Includes department allocations, research incentives, outreach and technical services, laboratory maintenance, and pilot plant.

Table 10. Summary of current projects compared year-to-year

Date	Number	Budget	Balance
1 July 2007	24	\$2,954,541	
7 July 2008	40	\$3,057,043	\$1,486,048
9 June 2009	69	\$3,822,857	\$1,228,844
22 July 2010	77	\$4,420,703	\$583,467

Table 11. Summary of sponsored project expenditures.

Name	Credited Number	Credited Amount
Amidon, Thomas E	9.83	\$ 481,342.36
Bujanovic, Biljana	0.61	\$79,214.49
Doelle, Klaus	0.11	\$ 64,220.34
Fieschko, John C	3.40	\$117,014.04
Francis, Raymond C	7.03	\$268,621.01
Lai, Yuan Z	0.11	\$64,220.34
Liu, Shijie	5.69	\$241,423.39
Ramarao, Bandaru V	6.10	\$238,842.55
Scott, Gary M	3.69	\$173,971.09
TOTAL	36.57	\$1,728,869.61

Table 12. Summary of sponsored project expenditures year-to-year.

Year	Credited Number	Credited Amount
2006-07	31.29	\$1,036,345
2007-08	37.61	\$1,212,572
2008-09	37.66	\$1,629,025
2009-10	36.57	\$1,728,870

3. Outreach and Service

The PBE department has been very active in outreach and service to the public and to the associated pulp, paper, and bioprocessing industries. The specific activities of the faculty members are detailed in the appropriate appendices while a number of department-wide activities are discussed here.

For the fifth year, the PBE department has been offering a graduate certificate in Bioprocessing. The certificate consists of 15 graduate credits that can easily be applied to an M.S. program after completion. Several more students from the certificate program have matriculated into the M.S., M.P.S, or Ph.D. program at SUNY-ESF in Renewable Energy and Bioprocess Engineering offered by the PBE department. Table 13 summarizes the number of students that received the certificate this year and the current enrollment in the program. The strong interest in this certificate has made it one of the most successful engineering certificate programs at SUNY-ESF.

The PBE department hosts a number of tours and demonstrations each year. Participants include students from elementary school through high school. While the schedules for these tours vary depending on the interest and the time available, they often include hands-on demonstrations of papermaking and testing, tours of the papermaking process, and discussions of the role of the engineer in the design and manufacture of paper and other products.

The pilot plant is also used for service research by a number of companies. This often involves development trials using the papermachines and other equipment. A paper testing service is also available and used by some companies. The revenue from this activity is used mainly for the maintenance of the highly-specialized equipment in the department as well as to provide research, recruiting, and educational support.

a) Enumeration of outreach activities

Appendix D summarizes the presentations made to the public by PBE faculty members.

b) Summary of grant panel service (by agency)

Appendix D summarizes the presentations made to the public by PBE faculty members.

c) Summary of editorial board service (by journal)

Appendix D summarizes the presentations made to the public by PBE faculty members.

d) Significant meetings organized

Empire State Paper Research Associates, October 2008, Syracuse, NY (#131).

Empire State Paper Research Associates, May 2009, Syracuse, NY (#132).

Syracuse Pulp and Paper Foundation, Board of Directors, October 2008, Syracuse, NY.

Syracuse Pulp and Paper Foundation, Board of Directors, April 2009, Syracuse, NY.

International Biorefinery Conference, October 2009, Syracuse, NY.

4. Service-Learning

a) Courses with service learning component

No instructor indicated that service learning was incorporated into their course work. However, this does not indicate that students in PBE do not engage in service learning. Many of the service learning activities are coordinated through the student organization, Papyrus. Through Papyrus, students engage in outreach activities, which have included working at the state fair and engaging youth groups (e.g., the Girl Scouts) in papermaking demonstration.

In addition, all students must work at least one summer internship with a company or research facility. Depending on the type of work experience and their program of study, the students will take one of the following courses: PSE 304, PSE 305, BPE 304, BPE 305, BPE 498. In these internships, students engage in projects in support of the sponsoring company. In addition, the students must write a report about their experience as well as give a presentation to the freshman orientation class following their experience (PSE 132 and BPE 132).

b) Description of service learning activity in each course

Activities described above.

c) Estimated instructor input

Instructor and staff effort are needed to help secure the internship positions for the students. The staff of SPPF is instrumental in coordinating this effort. In addition, the instructor of PSE 304/305 and BPE 304/305 must evaluate the reports and the presentations.

5. Graduate Students

Graduate students who have completed degree requirements for the Ph.D., M.S., M.P.S., and certificate program are listed in Appendix E **Error! Reference source not found.**

a) Number of students by degree objective

Table 13 summarizes the number of graduate students currently enrolled in our program. Aside from the certificate students, we now have a greater emphasis on Ph.D. students. Table 14 summarizes the students on a year-to-year basis. Our total number of graduate students has remained relatively steady over the past two years. However, we expect that a large number will be graduating in the upcoming academic year.

Table 13. Number of graduate students by degree program in the Paper and Bioprocess Engineering Option for Environmental and Resource Engineering.

Degree Program	Number of Students (as of 6/1)	Students Graduated (7/1 to 6/30)
Certificate	5	10
M.P.S.	1	1
M.S.	10	2
Ph.D.	24	1
Total	40	14

Table 14. Number of graduate students by degree program in the Paper and Bioprocess Engineering Option for Environmental and Resource Engineering year-to-year.

Year	Number of Students	Students Graduated (7/1 to 6/30)				Total
		Certificate	MPS	MS	PhD	
2006-2007	38	13		2	2	17
2007-2008	30	13		6	1	20
2008-2009	41	12		3	2	17
2009-2010	40	10	1	2	1	14

b) Funding for graduate students

Table 15 summarizes the sources of support for graduate students in the department.

Table 15. Sources of funding for graduate students.

Funding Source	Positions
State GA's	4.5
GE&RI	2.5
Research Ph.D.	2.0
Joachim Endowment	3.0
Grants	12.0
Externally/Self funded students	6.0

c) Courses having TA support

Table 16 summarizes the courses that utilized TA support for delivery of the educational programs in the PBE department. The number of students includes graduate students in the corresponding graduate shared resource course. As has been our practice for a number of years, we supplement the state GA allotment for teaching assistants with students that are supported on other research assistantships. This allows us to broaden the pool of available students to support the large number of laboratory and problem-solving based courses that we have. This does, however, impact on the time that is available for these students to pursue their research.

Table 16. Courses having TA support and enrollment in each.

Course Number	Course Name	Number of students	Teaching Assistants
PSE 201	Art/History of Papermaking	20	1
PSE 300	Intro To Papermaking	7	1
PSE 302	Pulp&Paper Lab Skills	7	1
PSE 351	Pulp&Bleach Laboratory	8	1
PSE 361	Engr Thermodynamics	44 / 2	1.5
PSE 370	Prin Mass/Energy Balance	33 / 2	2
PSE 371	Fluid Mechanics	13 / 1	1
PSE 465	Paper Properties	5 / 2	1
PSE 466	Paper Coating and Converting	5 / 0	1
PSE 436	Pulp and Paper Unit Operations	9	1
PSE 467	Wet End Chemistry	7 / 3	1
PSE 468	Papermaking Processes	6 / 2	1
PSE 477	Process Control	7 / 1	1
APM 153	Comp Meth/Engr & Phys Sci	67	3
APM 485	Diff Equat/Engr&Scientist	41	2
ERE 441	Air Pollution Engineering	16 / 4	0.5
BPE 335	Transport Phenomena	15 / 0	1
BPE 336	Transport Phenomena Laboratory	7	0.5
BPE 421	Bioprocess Kinetics and System	2	0.5
BPE 440	Bioprocess and Systems Lab	1	0.5
BPE 441	Biomass Energy	16 / 2	1
BPE 542	Bioreaction Engineering	7	0.5

6. Governance Structure

Table 17 summarizes the holders of the current positions in the department. Figure 1 is the organizational chart for the department.

Table 17. Current position holders in the PBE department.

Position	Current
Chair	Gary M. Scott
Director, ESPRI	Thomas E. Amidon
Associate Director, ESPRI	Bandaru Ramarao
Administrative Manager, SPPF	Linda Fagan
Manager, Pilot Operations	Raymond Appleby
Curriculum Coordinator	Shijie Liu
Graduate Coordinator	Bandaru Ramarao
Internship Coordinator	Siddharth Chatterjee
Recruitment Coordinator	Biljana Bujanovic

a) Department Committees

Safety Committee

The safety committee has primary responsibility over issues involving the building, common equipment, and all issues of safety within the building. The SFE committee responsibilities are to:

- a. Coordinate safety issues within the Department;
- b. Coordinate with the Health and Safety Officer on issues of safety;
- c. Coordinate the laboratory and safety training of Department Members;
- d. Provide consultation to the Department Chair on matters appropriate to the committee; and
- e. In carrying out the above, to consult and cooperate on a permanent or temporary basis with appropriate persons, groups, and advisors.

Members: Amidon, Appleby, Burry, Chatterjee, Francis, Gratien, Omori

Equipment and Facilities Committee

The equipment and facilities committee has primary responsibility for the physical facilities, equipment, maintenance, and improvement of Walters Hall. Specifically, the committee should:

- a. Coordinate equipment and space issues within the Department;
- b. Coordinate repair and improvement of the facilities and equipment within the Department;
- c. Coordinate with the equipment committee of SPPF;
- d. Recommend equipment acquisitions and disposition within the Department;
- e. Provide consultation to the Department Chair on matters appropriate to the committee; and
- f. In carrying out the above, to consult and cooperate on a permanent or temporary basis with appropriate persons, groups, and advisors.

Members: Appleby, Brown, Burry, Doelle, Lai, Putnam, Lavyrkov

Graduate and Research Committee

The graduate and research committee is primarily responsible for the graduate educational programs in the PBE Faculty and coordination of the research program. Specifically, the committee should:

- a. Assess, review, and improve current departmental and College academic policies and graduate programs in the Division of Engineering and propose program revisions to the Department for consideration at a Department Meeting;
- b. Supervise the MS, MPS, PhD and other graduate programs that the Department offers in accordance with College policies;
- c. Review and recommend recipients for graduate scholarships and awards;
- d. Coordinate the graduate application review process and recommend Graduate Students for acceptance and funding;
- e. Provide consultation to the Department Chair on matters appropriate to the committee; and
- f. In carrying out the above, to consult and cooperate on a permanent or temporary basis with appropriate persons, groups, and advisors.

Members: Amidon, Bujanovic, Francis, Lai, Liu, Ramarao

Undergraduate Education Committee

The undergraduate education committee is primarily responsible for the undergraduate educational programs in the PBE Faculty. The committee has the responsibility to:

- a. Assess, review, and improve current departmental and College academic policies and undergraduate programs in the Department and propose revisions to the department for consideration at a Department Meeting;
- b. Supervise the BS and other undergraduate programs that the Department offers in accordance with College policies;
- c. Review and recommend recipients of undergraduate scholarships and awards;
- d. Coordinate course times and rooms in conjunction with the Registrar's office;
- e. Coordinate with the curriculum committee of SPPF;
- f. Provide consultation to the Department Chair on matters appropriate to the committee; and
- g. In carrying out the above, to consult and cooperate on a permanent or temporary basis with appropriate persons, groups, and advisors.

Members: Bujanovic, Chatterjee, Doelle, Fagan, Francis, Liu

Appointments, Promotion and Tenure Committee

The appointment, promotion, and tenure committee is the standing committee responsible for personnel issues within the Faculty. Specifically, the committee is to:

- a. Carry out provisions for Faculty Peer Review according to the department policies;
- b. Form appropriate promotion and/or tenure committees to review portfolios under consideration;
- c. Assess the personnel needs of the Department in terms of teaching, research, and support;
- d. Coordinate the election of representatives to College Committees;
- e. Provide consultation to the Department Chair on matters appropriate to the committee; and
- f. In carrying out the above, to consult and cooperate on a permanent or temporary basis with appropriate persons, groups, and advisors.

Members: Per department APT guidelines

Student Recruitment Committee

The recruitment committee is charged with issues related to undergraduate recruitment within the faculty. Specifically, the committee is to:

- a. Manage the undergraduate recruitment efforts of the Department;
- b. Coordinate with the recruitment committee and SPPF and the Office of Admissions;
- c. Provide consultation to the Department Chair on matters appropriate to the committee; and
- d. In carrying out the above, to consult and cooperate on a permanent or temporary basis with

appropriate persons, groups, and advisors.

Members: Appleby, Bujanovic, Doelle, Fagan, Liu, Ramarao

Web Coordinator: G. Scott

Computer Laboratory Coordinator: S. Chatterjee

Graduate Program Coordinator: B. Ramarao

Curriculum Coordinator: S. Liu

COI Representative: R. Francis

General Education Representative: R. Francis

Honorary Degree Committee: S. Anagnost (representing, PBE, ERFEG, CMWPE)

b) Organizational Chart

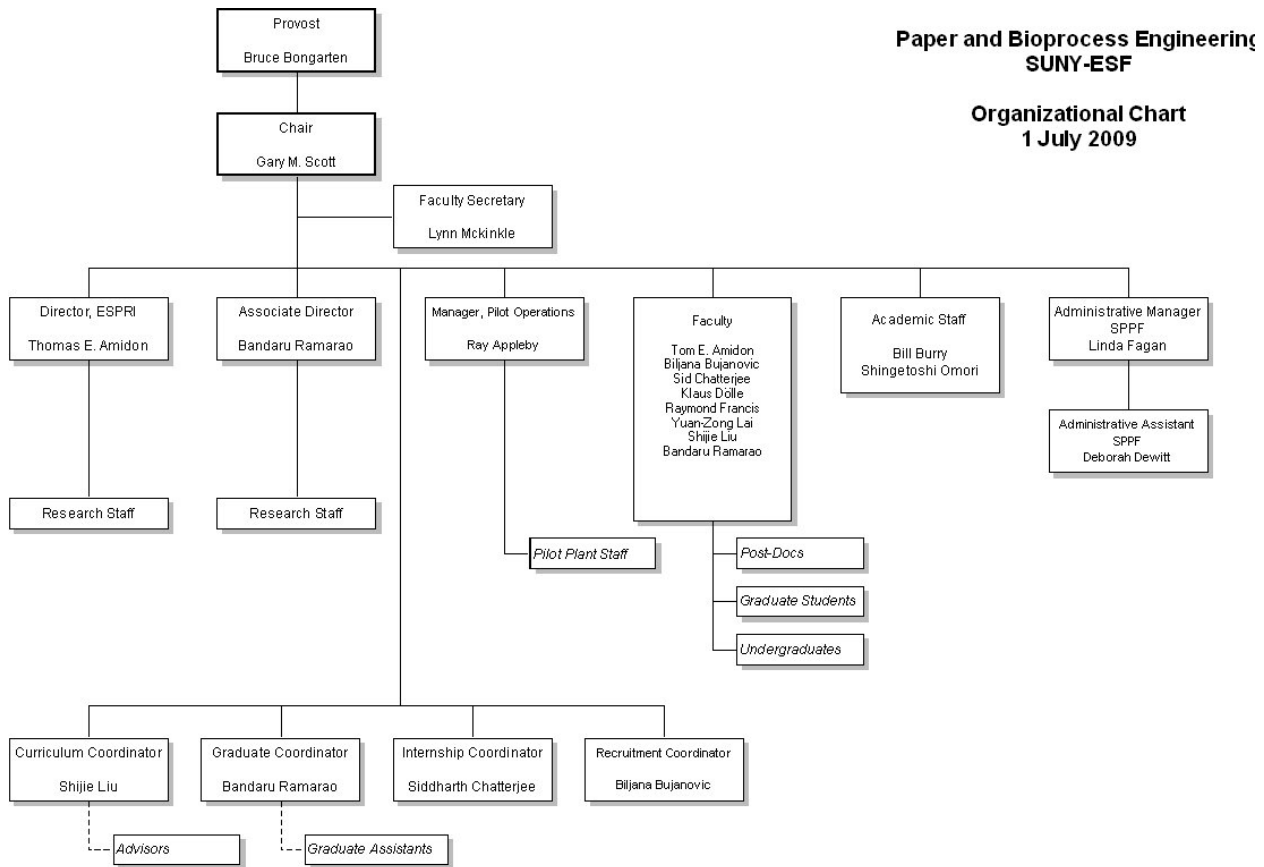


Figure 1. Organizational chart for the PBE department.

7. Assessment of the Educational Programs

At the undergraduate level, we offer three programs: Paper Engineering, Bioprocess Engineering, and Paper Science. The Paper Engineering program is accredited by ABET and the Bioprocess Engineering program will be submitted for accreditation on the next cycle in 2012. For assessment of these programs, we use the ABET model for all three programs collectively.

a) Data Collected

Data for our assessment of the educational programs is collected primarily through the use of Faculty Course Assessment Reports (FCARs) that are prepared by the instructor of each course at the end of the semester. The FCARs contain summary data about the course, assessment data with respect to accreditation, and proposed changes and improvements in the course for its next offering. The FCARs from the current academic year are provided in the accompanying file.

b) Results and Conclusions

The results from the FCARs show that students are, for the most part, performing as desired with respect to the program outcomes for the undergraduate programs.

c) Actions taken in response to assessment results

No actions were taken at this time with respect to the results of the assessment. However, we are in the process of reviewing the curriculum for the Paper Science and Paper Engineering programs. This has been discussed under Teaching and curriculum changes.

d) Modification of assessment plans

The assessment plan seems to be working well for the department in terms of the undergraduate programs. In our last ABET review, no concerns were cited with the assessment plan. Over the course of the next year, we will be codifying the assessment plan more clearly in terms of an "Assessment Manual." We will be modifying our assessment plan to address the change of the learning outcomes for our ABET accredited program. Beginning with the 2010-11 academic year, we will be adopting the ABET 'a-k' learning outcomes.

8. Progress on Objectives

This section reiterates the objectives from the previous annual report and the relationship of these objectives to the strategic plan, discusses the achievement of these objectives over the past year, and discusses the major accomplishments of the department over the past year. .

a) Current Objectives

The major operational objectives for the PBE department for the previous academic year were as follows:

1. Adoption of Bylaws for the Department. These Bylaws will provide the overarching guidelines for the operation of the department.

A draft set of Bylaws was written and discussed by a committee in the department. Any proposed amendments will be discussed at the first meeting of the new academic year and a vote on the proposed amendment and the bylaws as a whole will be taken at a subsequent meeting.

2. Creation of an Assessment Manual for the Department. This manual will detail the assessment procedures (particularly with respect to ABET) that are used in the department.

The work on the assessment manual continues and will be incorporated in the upcoming ABET self-study document.

3. Development of MPS (Bioprocess Engineering) and PSM (Sustainable Engineering Management) programs at the graduate level. These would primarily be coursework (non-thesis) degrees.

The MPS program in Bioprocess Engineering and the PSM program in Sustainable Engineering Management have been approved by COI and are currently up for consideration at the SUNY and State Education Department levels. In addition, the PSM program has been certified by the CGS as a PSM program.

4. Upgrade of Walters Hall facilities. This work will include coordination of funding the improvements with the College, SPPF, and the ESF Foundation.

Wireless access was installed in Walters over the past academic year. In addition, painting and other cosmetic improvements continue in the pilot plant. A number of other facilities projects have been proposed to the college including new updated furniture in the classrooms. We continue to work with the local Tappi/Pima section to secure funding for refurbishing the large conference room in Walters Hall. We continue to work with the ESF Foundation on the capital campaign to support improvements in Walters Hall.

5. Improvement of undergraduate programs. This continuing review is intended to be a comprehensive review with the possibilities of newly designed programs. The SPPF curriculum committee will be involved in this effort.

The Undergraduate Curriculum Committee has worked extensively on the revision and redesign of the undergraduate programs in Paper Engineering and Paper Science. The working draft of the new curriculum has been discussed extensively with our curriculum advisory board through SPPF. It is expected that a new curriculum revision will be proposed to COI in the next academic year.

6. Develop more robust research funding. The department needs to be more aggressive in obtaining external research funding especially looking to diversity the source of research funding.

Research funding for graduate students continues to be the limiting factor in attracting bringing graduate students to the program. The addition of the MPS and PSM programs at the graduate level should increase the number of students that are self-supporting.

b) Upcoming Objectives

As we look forward to the next academic year, we will be using the strategic plan as our guiding document. For the undergraduate educational programs, we are looking at the upcoming year as the beginning of a resurgence of our undergraduate program.

Following of the strategic plan, the following are the objectives for the 2010-2011 academic year.

1. Adoption of Bylaws for the Department. These Bylaws will provide the overarching guidelines for the operation of the department.
2. Creation of an Assessment Manual for the Department and writing a first draft of the ABET self-study. This manual will detail the assessment procedures (particularly with respect to ABET) that are used in the department. In addition, the draft self-study will detail the processes that are involved in assessment.
3. Marketing of the new MPS and PSM programs. The department, in conjunction with the College, should develop a marketing and recruiting plan for the new graduate programs.
4. Upgrade of Walters Hall facilities. This work will include coordination of funding the improvements with the College, SPPF, and the ESF Foundation, especially with respect to the capital campaign.
5. Approval of the new undergraduate programs in Paper Engineering and Paper Science.
6. Develop more robust research funding. The department needs to be more aggressive in obtaining external research funding especially looking to diversity the source of research funding.

Departmental resources will be utilized to the extent possible to meet these objectives. However, significant upgrades to the facilities in Walters Hall (Objective 4) is beyond the resources of just the department and will need significant support from the College, Foundations, and others.

c) Longer Term Visioning and Planning

The PBE department has produced a strategic plan in 2008. This document (previously distributed) provides the vision for the department. Below are summarized the five vision statements from the strategic plan and their associated goals. Those goals struck through have been met at some point during the life of the plan; those in bold were met this year. We plan on continuing our effort to meet these goals in the upcoming years.

Graduate Success

The educational programs will supply trained students for careers in entry-level positions within the various industries served by the department.

- A. 80 undergraduate students in PBE department
- ~~B. 30 incoming students as freshman and transfer~~
- ~~C. 25% of students enter as transfer students~~
- D. 15% of incoming students from out-of-state**
- E. 5 new undergraduate/graduate courses in paper engineering offered on a two-year cycle
- F. 5 students enrolled in the management minor**
- ~~G. One international experience available for students~~
- ~~H. MPS programs to train non-PS/PE BS graduates for the industry~~
- I. Accreditation of the BPE program
- J. Improved student quality index (SQI)
- K. Improved graduate quality index (GQI)

Educational Facilities

The educational facilities will contain an appropriate mixture of modern “digital” equipment and “hands-on” equipment to train students in all aspects and technology levels of the industry.

- ~~A. Building wide wireless coverage~~
- B. Removal of unused equipment from pilot plant
- ~~C. Completion of Phase III water line project~~
- D. Addition of process control/monitoring to the papermachine
- E. Replacement of three pieces of laboratory equipment
- F. Improvement of pilot plant safety in three areas
- G. Renovation of Walters Hall classrooms
- H. Renovation of conference room
- ~~I. Visit three other peer paper institutions to see their pilot facilities~~

Communication

The PBE department will effectively communicate its successes, offerings, and expertise to the college, the community, students, industry, and the world in general.

- ~~A. 30 new incoming students into the PBE programs~~
- B. 20 new incoming students into the PS/PE/MPS programs
- ~~C. Annual contact with 10 high schools~~
- D. Annual contact with 5 community colleges
- ~~E. Two program specific recruiting events annually~~
- F. Development of Walters Hall walking tour
- G. Two program informational stations in lobby
- H. 20 Research posters in building
- I. BPE advisory council in place and active**

Research Success

The PBE research program will be widely recognized to be a world leader in paper science and engineering fields and bioprocess engineering.

- A. 36 graduate students (MPS, MS, PhD) in the program
- ~~B. Minimum of two proposal per year from each faculty member~~
- ~~C. Faculty members lead robust and critically recognized research programs in key areas for the future~~
- ~~D. \$1.5 million in extramural funding per year~~
- ~~E. "Engineering and Applied Science" graduate program~~

Department Policies

The department policies need to be clear in terms of responsibilities, resource allocation, and workload resulting in a department that works together in an effective and integrated way.

- A. Department policies and procedures manual (bylaws)
- B. Department ABET accreditation manual
- ~~C. Updated department handbooks~~
- ~~D. Students representatives on at least three department committees~~
- ~~E. Capital Funding Plan~~

Appendices

Appendix A. ***PBE Faculty: Rank, Education, Interests***

Faculty

Thomas E. Amidon Professor / Director

B.S., SUNY-College of Environmental Science and Forestry (Silviculture)
M.S., Ph.D., SUNY-College of Environmental Science and Forestry (Forest Management)
Teaching: Management, pulping, bleaching, bioprocess engineering
Research: Biorefinery, fiber properties, paper properties, pulping, bleaching, de-inking
Office: 321 Walters Hall
Phone: 315-470-6524 Email: teamidon@esf.edu
Homepage: <http://www.esf.edu/pse/people/amidon.htm>

Biljana Bujanovic Assistant Professor

Grad. Eng., M.S., Ph.D., Belgrade University (Forestry Science)
Ph.D., Western Michigan University (Paper Engineering)
Teaching: Introduction to papermaking, paper properties, computing methods
Research: Wood chemistry, lignin/structure and reactivity, pulping bleaching
Office: 419 Walters Hall
Phone: 315-470-6907 Email: bbujanovic@esf.edu

Siddharth Chatterjee Associate Professor

B. Tech., Indian Institute of Technology (Chemical Engineering)
M.S., Ph.D., Rensselaer Polytechnic Institute (Chemical Eng.)
Teaching: Engineering design and economics, air and water pollution control
Research: Alternative energy, pollution abatement, separation processes, water conservation
Office: 406 Walters Hall
Phone: 315-470-6517 Email: schatterjee@esf.edu
Homepage: <http://www.esf.edu/pse/people/chatterjee.htm>

Klaus Dölle Assistant Professor

Diplom, University of Applied Science–Aalen (Mechanical Eng.)
Ph.D., University of Wisconsin (Agricultural Engineering)
Teaching: Papermaking, process & design engineering, reactor design, pneumatics & hydraulics, material sciences
Research: Papermaking, paper fillers, recycling, renewable energy (biogas), bioprocesses, CO₂ reduction
Office: 421 Walters Hall
Phone: 315-470-6531 Email: kdoelle@esf.edu

John C. Fieschko

Professor
Executive Director, CNY-BRC

B.S., Cornell University (Chemical Engineering)
M.S., Ph.D., University of Pennsylvania (Biochemical Engineering)
Teaching: Bioprocess Engineering Design
Research: Bioprocess engineering, fermentation processes, industrial biotechnology
Office: 224 Baker Laboratories
Phone: 315-470-68657 Email: FieschkJ@upstate.edu
Homepage: <http://www.upstate.edu/biocenter/>

Raymond C. Francis

Research Associate

B.S., University of Toronto (Chemical Engineering/Applied Chemistry)
Ph.D., University of Toronto (Chemical Engineering)
Teaching: Bioenergy, transport phenomena
Research: Wood chemistry, pulping, bleaching, biobased materials
Office: 311 Walters Hall
Phone: 315-470-6525 Email: francis@syr.edu
Homepage: <http://www.esf.edu/pse/people/francis.htm>

Yuan-Zong Lai

Senior Research Associate

B.S., National Taiwan University (Forestry)
M.S., Ph.D., University of Washington (Chemistry / Wood Chemistry)
Teaching: Pulping and bleaching
Research: Chemistry of wood, pulping, bleaching, bioproduct development
Office: 428 Walters Hall
Phone: 315-470-6514 Email: yzlai@syr.edu
Homepage: <http://www.esf.edu/pse/people/lai.htm>

Shijie Liu

Associate Professor

B.Sc., Sichuan University (Chemical Engineering)
Ph.D., University of Alberta (Chemical Engineering)
Teaching: Transport phenomena, bioprocess engineering
Research: Bioprocess kinetics, reaction engineering, fermentation, process optimization, fiber properties
Office: 302 Walters Hall
Phone: 315-470-6885 Email: sliu@esf.edu
Homepage: <http://www.esf.edu/pse/people/liu.htm>

Bandaru Ramarao

Professor/ Associate Director

B.S., University of Madras (Chemical Engineering)

M.S., Ph.D., Clarkson University (Chemical Engineering)

Teaching: Colloid science, fluid mechanics, process control, bioprocess engineering

Research: fluid particle separations, colloidal and surface phenomena, transport of moisture in paper, de-inking, digital image processing

Office: 310 Walters Hall

Phone: 315-470-6513

Email: bvramara@syr.edu

Homepage: <http://www.esf.edu/pse/people/ramarao.htm>

Gary M. Scott

Professor / Chair

B.S., University of Wisconsin-Stevens Point (Paper Science / Computer Information Systems)

M.S., Ph.D., University of Wisconsin (Computer Sciences / Chemical Engineering)

Teaching: Engineering calculations, papermaking, computing methods

Research: Biotechnology, bioprocess engineering, paper machine operations, recycling, modeling

Office: 205 Walters Hall

Phone: 315-470-6501

Email: gscott@esf.edu

Homepage: <http://web.syr.edu/~gscott>

Visiting Faculty

Wayne S. Amato, P.E.

Assistant Professor

B.S.Ch.E., New Jersey Institute of Technology (Chemical Engineering)

M.S., SUNY-Buffalo (Chemical Engineering)

Ph.D., Syracuse University (Chemical Engineering)

Teaching: Process control, thermodynamics, mathematics

Office: 208 Walters Hall

Phone: 315-470-6501

Email: dukeamato@a-znet.com

Adjunct Faculty

Jose Iribarne

Adjunct Professor

Ph.D., SUNY College of Environmental Science and Forestry (Paper Science and Engineering)

Teaching: Engineering design

Emeritus Faculty

William Holtzman

Professor Emeritus

B.S., Pennsylvania State University
M.S., Ph.D., Institute of Paper Chemistry
Office: 424 Walters Hall
Phone: 315-470-6506

Email: billh14@verizon.net

Richard E. Mark

Sr. Research Associate Emeritus

B.S., State University College of Forestry
M.F., Ph.D., Yale University

Leland R. Schroeder

Professor Emeritus

A.B., Ripon College (Chemistry)
M.S., Ph.D., Institute of Paper Chemistry
(Paper Science and Engineering / Organic Chemistry)
Teaching: Pulping and bleaching
Office: 402 Walters Hall
Phone: 315-470-6503

Email: lrschroeder@esf.edu

Appendix B. *Teaching Summary*

Table 18. Summary of courses taught by faculty and enrollment.

Instructor	Course	Course Title	SCH
AMATO, WAYNE	ERE 667	Process Control	3
AMATO, WAYNE	PSE 361	Engr Thermodynamics	123
AMATO, WAYNE	PSE 477	Process Control	24
			150
AMIDON, THOMAS	BPE 132	Orientation Seminar	10
AMIDON, THOMAS	ERE 596	Biorefinery Processes	11
AMIDON, THOMAS	ERE 676	Mgt/Paper Industry	3
AMIDON, THOMAS	ERE 898	Prof Exp/Synthesis Eng	33
AMIDON, THOMAS	ERE 899	Masters Thesis Research	12
AMIDON, THOMAS	ERE 999	Doctoral Thesis Research	15
AMIDON, THOMAS	PSE 132	Orientation Seminar:PSE	6
AMIDON, THOMAS	PSE 456	Mgt/Paper Industry	9
			99
BUJANOVIC, BILJANA	BPE 335	Transport Phenomena	23
BUJANOVIC, BILJANA	BPE 336	Transport Phenomena Lab	4
BUJANOVIC, BILJANA	ERE 496	Study Abroad	1
BUJANOVIC, BILJANA	ERE 534	Transport Phenomena	6
BUJANOVIC, BILJANA	ERE 596	Disc Lignocellulosics I Chem	6
BUJANOVIC, BILJANA	ERE 677	Paper Properties	8
BUJANOVIC, BILJANA	ERE 999	Doctoral Thesis Research	12
BUJANOVIC, BILJANA	ERE 999	Doctoral Thesis Research	9
BUJANOVIC, BILJANA	PSE 465	Paper Properties	20
BUJANOVIC, BILJANA	PSE 466	Paper Coating/Converting	16
			105
BURRY, WILLIAM	PSE 201	Art & Early History/Papermaking	63
BURRY, WILLIAM	PSE 302	Pulp&Paper Lab Skills	5
BURRY, WILLIAM	PSE 351	Pulp&Bleach Laboratory	16
			84
CHATTERJEE, S	APM 485	Diff Equat/Engr&Scientist	123
CHATTERJEE, S	BPE 481	Bioprocess Eng Design	2
CHATTERJEE, S	ERE 441	Air Pollution Engr	42
CHATTERJEE, S	ERE 496	Study Abroad	12
CHATTERJEE, S	ERE 691	Air Pollution Engr	9
CHATTERJEE, S	PSE 304	Mill Experience	16
CHATTERJEE, S	PSE 305	Co-Op Experience	8
CHATTERJEE, S	PSE 480	Engr Design Economics	45
CHATTERJEE, S	PSE 481	Proc/Plnt Dsgn II:Synthes	14
CHATTERJEE, S	PSE 498	Research Problem	1
			272

DOELLE,KLAUS	BPE	498	Resrch Prob/Bioprocess Eng	9
DOELLE,KLAUS	ERE	679	Papermaking Processes	6
DOELLE,KLAUS	ERE	898	Prof Exp/Synthesis Eng	1
DOELLE,KLAUS	ERE	899	Masters Thesis Research	13
DOELLE,KLAUS	ERE	999	Doctoral Thesis Research	23
DOELLE,KLAUS	PSE	300	Intro To Papermaking	21
DOELLE,KLAUS	PSE	468	Papermaking Processes	30
DOELLE,KLAUS	PSE	498	Research Problem	8
				111
FIESCHKO,JOHN	BPE	481	Bioprocess Eng Design	2
				2
FRANCIS, RAYMOND	BPE	441	Biomass Energy	27
FRANCIS, RAYMOND	ERE	641	Biomass Energy	3
FRANCIS, RAYMOND	ERE	798	Resrch/Paper Sci Engr	2
FRANCIS, RAYMOND	ERE	899	Masters Thesis Research	32
FRANCIS, RAYMOND	ERE	999	Doctoral Thesis Research	62
FRANCIS, RAYMOND	ESC	450	Renewable Energy Capstn Plng	3
FRANCIS, RAYMOND	PSE	436	Pulp & Paper Unit Operations	27
				156
IRIBARNE, JOSE	PSE	481	Proc/Plnt Dsgn II:Synthes	14
				14
LAI	ERE	596	Lignin Formation	12
LAI	ERE	670	Prin/Pulping&Bleaching	9
LAI	ERE	898	Prof Exp/Synthesis Eng	1
LAI	ERE	999	Doctoral Thesis Research	35
				57
LIU, SHIJIE	BPE	132	Orientation Seminar	10
LIU, SHIJIE	BPE	230	China Experience	24
LIU, SHIJIE	BPE	304	Summer Intern/Bioprocess Eng	4
LIU, SHIJIE	BPE	335	Transport Phenomena	23
LIU, SHIJIE	BPE	336	Transport Phenomena Lab	4
LIU, SHIJIE	BPE	421	Bioprocess Kinetics&System Eng	9
LIU, SHIJIE	BPE	440	Bioprocess & Systems Lab	3
LIU, SHIJIE	ERE	542	Bioreaction Engineering	33
LIU, SHIJIE	ERE	596	BPE Experiments&Data Analysis	9
LIU, SHIJIE	ERE	596	Biorefinery Processes	11
LIU, SHIJIE	ERE	798	Resrch/Paper Science Engr	6
LIU, SHIJIE	ERE	898	Prof Exp/Synthesis Eng	3
LIU, SHIJIE	ERE	899	Masters Thesis Research	11
LIU, SHIJIE	ERE	999	Doctoral Thesis Research	41
LIU, SHIJIE	PSE	132	Orientation Seminar:PSE	3
				194
RAMARAO,BANDARU	BPE	310	Colloid and Interface Science	21
RAMARAO,BANDARU	BPE	420	Bioseparations	9

RAMARAO,BANDARU	BPE	498	Resrch Prob/Bioprocess Eng	3
RAMARAO,BANDARU	ERE	502	Bioseparations	48
RAMARAO,BANDARU	ERE	571	Fluid Mechanics	3
RAMARAO,BANDARU	ERE	672	Colloid&Interface Sci App	9
RAMARAO,BANDARU	ERE	796	Adv Transport Phenomena/BPE	15
RAMARAO,BANDARU	ERE	798	Resrch/Paper Sci Engr	3
RAMARAO,BANDARU	ERE	898	Prof Exp/Synthesis Eng	1
RAMARAO,BANDARU	ERE	899	Masters Thesis Research	12
RAMARAO,BANDARU	ERE	999	Doctoral Thesis Research	64
RAMARAO,BANDARU	PSE	371	Fluid Mechanics	45
RAMARAO,BANDARU	PSE	467	Papermaking Wetend Chem	30
				263
SCHROEDER, LELAND	PSE	350	Pulp&Bleach Processes	24
				24
SCOTT,GARY	APM	153	Comp Meth/Engr & Phys Sci	207
SCOTT,GARY	ERE	503	Bioprocess Plant Design	24
SCOTT,GARY	ERE	570	Prin Mass/Energy Balance	3
SCOTT,GARY	ERE	596	Computing Methods/Engineers	3
SCOTT,GARY	ERE	679	Papermaking Processes	6
SCOTT,GARY	ERE	899	Masters Thesis Research	22
SCOTT,GARY	ERE	999	Doctoral Thesis Research	2
SCOTT,GARY	PSE	370	Prin Mass/Energy Balance	87
SCOTT,GARY	PSE	468	Papermaking Processes	30
				384

Appendix C. **Department Bibliography**

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- Bose, S. K., R. C. Francis, M. Govender, T. Bush, and A. Spark. 2009. Lignin content versus syringyl to guaiacyl ratio amongst poplars. *Bioresource Technology* 100 (4): 1628-33.
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Zhang, J., H. Deng, L. Lin, Y. Sun, C. Pan, and S. Liu. 2009. Isolation and characterization of wheat straw lignin with a formic acid process. *Bioresource Technology*.

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Zhang, J. -Q, L. Lin, B. -H He, S. -J Liu, and P. -K Ouyang. 2009. XPS analysis of cellulose treated with two ionic liquids. *Huanan Ligong Daxue Xuebao/Journal of South China University of Technology (Natural Science)* 37 (6): 17-21.

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Appendix D. ***PBE Faculty Report Summaries***

Thomas Amidon

Publications

Amidon, T. E., and S. Liu. 2009. Water-based woody biorefinery. *Biotechnology Advances* 27 (5): 542-50.

Hasan, A., B. Bujanovic, and T. Amidon. 2009. Use of PLA as a paper-reinforcing agent.

Liu, S., T. E. Amidon, and C. D. Wood. 2008. Membrane filtration: Concentration and purification of hydrolyzates from biomass. *Journal of Biobased Materials and Bioenergy* 2 (2): 121-34.

Liu, S., G. Mishra, T. E. Amidon, and K. Gratien. 2009. Effect of hot-water extraction of woodchips on the kraft pulping of eucalyptus woodchips. *Journal of Biobased Materials and Bioenergy* 3 (4): 363-72.

Mittal, A., S. G. Chatterjee, G. M. Scott, and T. E. Amidon. 2009. Modeling xylan solubilization during autohydrolysis of sugar maple and aspen wood chips: Reaction kinetics and mass transfer. *Chemical Engineering Science* 64 (13): 3031-41.

Presentations

Outreach and Service

Awards

Biljana Bujanovic

Publications

Goundalkar, M., **Bujanovic, B.**, Amidon, T. (2010): "Analysis of Non-Carbohydrate Based Low-Molecular Weight Organic Compounds Dissolved During Hot-Water Extraction of Sugar Maple," **Cellulose Chemistry and Technology**, 44 (1-3):27-33.

Hasan, A., **Bujanovic, B.**, Amidon, T. (2010): "Strength properties of kraft pulp produced from hot-water extracted wood chips within the biorefinery," **J. Biobas. Mat. Bioenerg.**, 4(1): 46-52.

Bujanovic, B., Ralph, S. A., Reiner, R. S., Hirth, K. Atalla, R. H. (2010): "Polyoxometalates in oxidative delignification of chemical pulps: Effect on lignin," **Materials**, 3(3): 1888-1903 (invited review article).

Bujanovic, B., Ralph, S. A., Reiner, R. S., Atalla, R. H. (2010): "Polyoxometalate Delignification of Birch Kraft pulp and Effect on Residual Lignin," **J. Wood Chem. Technol.**, accepted, under revision

Presentations

Hasan, A., **Bujanovic, B.**, Amidon, T. (2009): "Strength properties of kraft pulp produced from hot-water extracted wood chips within the biorefinery," Int. Biorefinery Conf. IBC 09, October 6-7, 2009, Syracuse, NY; oral presentation; IBC Book of Abstracts:11A.

Goundalkar, M., **Bujanovic, B.**, Amidon, T. (2009): "Lignin in the hot-water extract of sugar maple – isolation, characterization and potential use," Int. Biorefinery Conf. IBC 09, October 6-7, 2009, Syracuse, NY; oral presentation; IBC Book of Abstracts:3A.

Bujanovic, B., Goundalkar, M., Amidon, T. (2009): "Non-carbohydrate-based products extracted during hot-water extraction of sugar maple," 30th SETAC North America Annual Meeting: Green Biorefinery, November 19-23 2009 New Orleans, LA: platform presentation: 425.

Goundalkar, M., **Bujanovic, B.**, Amidon, T. (2009): "Analysis of low-molecular weight organic compounds from hot-water extract of sugar maple," The 2nd Nordic Biorefinery Conference, Helsinki, Finland, September 2-4, 2009; Proceedings-Posters: 24: 111-115.

Hasan, A., Gong, C., Goundalkar, M., **Bujanovic, B.**, Amidon, T. (2010): "Environmentally Friendly Wet-end Paper Reinforcement Agents," PaperCon 2010, Atlanta, GA, May 2-3, 2010; poster presentation

Goundalkar, M., **Bujanovic, B.**, Gong, Ch., Amidon, T. (2010): "Characterization of Organic Precipitate from Hot-Water Extraction of Hardwoods," The 37th Northeast Regional Meeting of the ACS, NERM2010, "Chemistry for a Sustainable World," SUNY Potsdam, June 2-5, 2010; Poster #39.
Hasan, A., **Bujanovic, B.**, Amidon, T. (2009): "More about use of PLA as an ESF Biorefinery product," ESPRA Fall Meeting; oral presentation.

Hasan, A., Gong, C., Goundalkar, M., **Bujanovic, B.**, Amidon, T. (2010): “Introducing Polylactic acid as a green wet-end paper strength additive,” Art Ragauskas Earth Day Poster Session, IPST/GATech, Atlanta, GA; available on line:
http://www.ipst.gatech.edu/faculty_new/faculty_bios/ragauskas/global/biochemicals_5.pdf

Goundalkar, M., Gong, C., **Bujanovic, B.**, Amidon, T. (2010): “Non-carbohydrate Components in hot-water extracts of hardwoods,” Art Ragauskas Earth Day Poster Session, IPST/GATech, Atlanta, GA; available on line:
http://www.ipst.gatech.edu/faculty_new/faculty_bios/ragauskas/global/biochemicals_8.pdf

Outreach and Service

- a. Summary of grant panel service (by agency)
 - i. The Cooperative Forestry Research (McIntire-Stennis)
- b. Summary of editorial board service
 - i. The Works (Radovi) (Serbia, Novi Sad)
- c. Review of the journal articles for
 1. Central European Journal of Chemistry
 2. Environmental Science and Technology
 3. Chemical Engineering Communications
 4. Bioresource Technology
 5. Enzyme & Microbial Technology
 6. The Works (Radovi) (Serbia, Novi Sad)
 7. Wood Processing (Prerada Drveta) (Serbia, Belgrade)
 8. BioResources
 9. Chemical Reviews
 10. Journal of Biobased materials and Bioenergy
- d. Served as a judge for the first-ever graduate student session of the Spotlight on Student Research held on 4/13/2010: Poster session
- e. Presented at the workshop “Saving the Earth: The Future of Energy” held at Chenango Forks High School in Binghamton on 4/17/2010. The workshop was mainly for middle and high school science teachers. Title of my presentation was ‘ESF Biorefinery’
- f. PBE Faculty Member serving in the GSA Professional Development Committee which organized a session “Preparing for your Thesis Defense,” March 30th, 2010
- g. Department / College Governance

- i. List of department governance/service activities
 1. Undergraduate Committee
 2. Recruiting Committee/Chair
 3. Graduate Committee
 4. Advisor: undergraduate and graduate students

Awards

William Burry

Publications

1. Publications and presentations are forthcoming resulting from the willow course/research work.
2. The Research Foundation recognized the willow work as my first New Technology Disclosure.

Presentations

Outreach and Service

1. My contributions in college and community services have been consistent in time spent over the last five years (five percent of my time) but the emphasis has shifted more to organizing events and training other staff and students to carry out the tours and hand-paper making. Specific program/event involvement includes:
 - a. ESF in the High School
 - b. ESF Summer Camp
 - c. ESF Bring Your Daughter/Son to Work
 - d. ESF/PBE at the NYS Fair
 - e. PBE at the Westcott Cultural Fair (Girl Scouts) as well as Boy Scout Merit Badge Day
 - f. PBE Job Shadow Days (LaFayette and Jordan Elbridge)
 - g. PBE Primary School Class Tours (Holly Cross)
 - h. PBE Open House
2. Approximately eight percent of my time is split ~equally between activities associated with the PBE Safety Committee and the PBE Equipment Committee. Both committees have been quite productive this past year. For a list of accomplishments...see the committee chair's reports.

Awards

Siddharth Chatterjee

Publications

Chatterjee, S. G., Omori, S., Marda, S., Shastri, S., “Process for Making Biodiesel from Crude Tall Oil,” US Patent No.: 7,695,532 B2, April 13, 2010.

Presentations

Chatterjee, S. G., “Air and Water Pollution Control,” Division of Environmental Science (to ESC 132 students), SUNY-ESF, Syracuse, New York, 21 October 2009.

Outreach and Service

Bioprocess Plant Design (ERE 503). I was a guest lecturer in this course, which was offered in spring 2010 to 8 students. This course, in which I also helped the instructors Dr Noshir Mistry and Mr Susumu Ikuta on a voluntary basis, is a requirement in the *Certificate in Bioprocess Engineering* program offered by the Manufacturers Association of Central New York in cooperation with the SUNY College of Environmental Science and Forestry and Syracuse University.

Air Quality. I was instructor for this class, which was held at ARCADIS, 6711 Towpath Road, Syracuse, NY 13214 on 3/24/10 (Air Quality) and 3/31/10 (Air Quality – Advanced). This class is a part of the Review Classes for the Fundamentals of Engineering and Professional Engineering examinations offered by SUNY-ESF Outreach.

Summary of grant panel service (by agency): None

Summary of editorial board service (by journal): I reviewed manuscripts for *Indian Chemical Engineer* (2 reviews), *Environmental Progress* (1 review), *Chemical Engineering Science* (1 review), *Nordic Pulp and Paper Research Journal* (1 review), and *Separation and Purification Technology* (1 review).

Enumeration of other significant service activities: I advised several undergraduate Paper Engineering (PE) and Environmental Science (ES) students on curricular matters during the course of the academic year. I am presently the academic advisor of 7 PE and 9 ES undergraduate students.

Awards

Chemical Weekly Award for the Best Paper published in the “Indian Chemical Engineer” in its issues for 2008

IICChE NRC Award Best Paper in “Indian Chemical Engineer” 2008

Klaus Doelle

Publications

Invention Disclosures:

1. NPKC-ycle Process with Dave Johnson, Emanuel Carter, Stewart Diemont, Terry Ettinger, Kenneth J. Tiss
2. Geothermal Heat Storage Device
3. Willow Paper Product with William Burry & Ray Appleby

Presentations

1. Mishra, K. Doelle, B. V. Ramarao (2009) "Consolidation and Dewatering of Pulps. Characterization of Fines and Highly refined Pulps using Sedimentation Measurements", Empire State Research Institute 131st Fall Meeting, October 8th, 2009, Double Tree Hotel, Syracuse, New York, USA.
2. Dölle, K., (2010) "Unabhängigkeit von Kohle, Erdgas und Erdöl", Hochschulreihe der Fachhochschule Brandenburg, March. 30, 2010, Fachhochschule Brandenburg, Brandenburg, Germany.
3. Dölle, K., (2010) "Technologietransfer und Innovationen in der Papierbranche" Zukunftsagentur Brandenburg, March. 31, 2010, IHK Potsdam, Potsdam, Germany.
4. Doelle, J.J. Amaya (2010) "Optimum Calcium Carbonate for Uncoated Eucalyptus Digital Printing Paper", Empire State Research Institute, 132nd Spring Meeting, May 21st, 2010, NewPage Research Center, Wisconsin Rapids, Wisconsin, USA.

Outreach and Service

Helped three international students to register and process their VISA work in SUNY-ESF (PBE) courses throughout the ESF-Outreach and Research Foundation.

This is quite time consuming getting the paper work done and act as the middle man.

I counted the time needed for one student is approximate 16 to 24 hours total. This includes answering e-mails, visa questions, tracking down people at ESF, etc.

1. Summary of editorial board service (by journal)

Reviewed 9 papers for Elsevier (ScienceDirect)

2. Enumeration of other significant service activities

- a. Self sponsored trip to Germany to final negotiate exchange program. With University of Munich.
- b. Set up exchange agreement with University of Munich for the Paper Program
- c. Worked in ESF Booth on State fair September 2009
- d. Science Judge March 12, 2009
- e. Marched in the Westscott Neiborhood Parade
- f. Marched In the March 16th St. Patrics day Parade for SUNY-ESF

- g. Helped to increase ESPRI/ESPRA Membership by:
Promoted ESPRA/ESPRI to BASF
- h. Submitted PBE Equipment Grant for a microwave ashing oven, bleaching pipe, digester upgrade and wood grinder upgrade.
- i. Wrote 10 students recommendation letters
- j. Guided Federal work study student
- k. Recruited 1 student from University of Munich for the PSE 468 Paper Processes course
- l. Hosted 2 German exchange students in department of the summer 2009
- m. Recruited 1 Student from University of Darmstadt for a summer intern ship
- n. Guided group with German visitors from the Syracuse American-German business chamber.
- o. Served in various meetings (4) and Involved in the Center of Excellence (COE) design and selection process with RF.
- p. Participated on 01/062010 Faculty mentoring colloquium as panelist "Drawing on New Faculty Perspectives" Panel January 6th

Awards

Awards and recognition for research.

- a. Received \$240,035 Doe Grant with a total budget of \$382,735 titled "New Manufacturing Method for Paper Filler and Fiber Material". The awards anticipated finalization date is September 2010.
- b. \$713,625 Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts Continuation grant. However, money was somehow already spend, so no funds and summer salary is available for my proposed research portion.
- c. Received UUP book Grant
- d. Received DAAD Scholarship August – September 2010, for two German Student interns.

John Fieschko

Publications

Presentations

Outreach and Service

Developed, organized and chaired the 2nd Annual CNY Biotechnology Conference. Over 160 people attended, more than 75 organizations participated and there were 19 sponsors/table top exhibits. The conference netted approximately \$6,500. A very large number of SUNY ESF, SUNY Upstate and SU students and faculty were provided free admission to the event.

I also assisted Sue Herrling, a Bioprocessing Certificate Graduate that way laid off from Bristol-Myers Squibb get a permanent job at BioSpherix, Ltd.

I provided contact information and/or introductions for Outreach to Bristol-Myers Squibb, Sunoco, O'Brien & Gere, InBev and other companies for Bioprocessing Certificate recruiting efforts.

Awards

Raymond C. Francis

Publications

Bose, S. K.; Omori, S.; Kanungo, D.; Francis, R. C.; Shin, N.-H. Mechanistic differences between kraft and soda/AQ pulping. Part 1. Results from wood and chips. *J. Wood Chem. Technol.* 2009, 29: 214-226

Kanungo, D.; Francis, R. C.; Shin, N.-H. Mechanistic differences between kraft and soda/AQ pulping. Part 2. Results from lignin model compounds. *J. Wood Chem. Technol.* 2009, 29: 227-240

Govender, M., Bush, T., Spark, A, Bose, S.K. and Francis, R.C., “An Accurate and Non-Labor Intensive Method for the Determination of Syringyl to Guaiacyl Ratio in Lignin”, *Bioresource Technology*, 100, 5834-5839 (2009).

Masingale, M. P., Alves, E. F., Korbhieh, T. N., Bose, S. K. and Francis, R. C., “An Oxidant to Replace Nitrobenzene in Lignin Analysis”, *BioResources*, 4 (3), 1139 – 1146 (2009).

Bose, S. K., Leavitt, A., Stromberg, B., Kanungo, D. and Francis, R. C. Inclusion of a lignin-carbohydrate hydrolysis stage in chemical pulp bleaching. Accepted with minor revisions by *J. Wood Chem. Technol.* (March 2010).

Francis K. Attiogbe, Samar K. Bose, Wei Wang, Alastair McNeillie, and Raymond C. Francis. The Peroxymonocarbonate Anions as Bleaching Agents. Part 1. Results with Lignin Model Compounds and Chemical Pulps. Accepted with minor revisions, *BioResources*, June 2010.

Francis K. Attiogbe, Wei Wang, Alastair McNeillie, and Raymond C. Francis. The Peroxymonocarbonate Anions as Bleaching Agents. Part 2. Mechanical Pulp Brightening and the Effects of Metal Ions. Accepted with minor revisions, *BioResources*, June 2010.

Presentations

Outreach and Service

Awards

Yuan-Zong Lai

Publications

Yang, R. and Lai, Y.-Z., “Characterization of the residual kraft pulp lignin in situ by sulfite treatments”, *J. Wood Chem. Technol.* 54: 29 (2):164-177 (2009).

Chien, S.-N., Ren, H., Aoyagi, M., Amidon, T., and Lai, Y.-Z., “Fractionation of wood polymers by carboxymethylation – Influence of reaction conditions”, *J. Biobased Mater. Bioenergy* Vol. 4 (1): 40-45 (2010).

Ohtani, Y. and Lai, Y.-Z., “The Fate of α -aryl ether structures in O₂ delignification” (in preparation for submission to *Holzforschung*).

Presentations

Chien, S.-N., Aoyagi, M., Amidon, T., Lai, Y.-Z. “Separation of major wood components by carboxymethylation”, in *Proceedings of 15th Symposium on Wood, Fibre, and Pulping Chemistry*”, Oslo, Norway 2009.

Ohtani, Y., Eom, T. J., Lai, Y.-Z., “On the involvement of benzylic oxidation in ozonation of lignin”, in *Proceedings of 15th International Symposium on Wood, Fibre, and Pulping Chemistry*”, Oslo, Norway 2009.

Chien, S.-N., Hao, R., Amidon, T. E., and Lai, Y.-Z. “An update on influence of pre-hydrolysis in fractionation of wood polymers *ESPRA Report 131*: (2009).

Ren, H., Funaoka, M., Amidon, T. E., and Lai, Y.-Z. “Potential of lignocellulosics as industrial raw materials”, *Abstracts of 239th ACS National Meeting*, March 22-25, 2010, San Francisco, California.

Outreach and Service

a. Enumeration of outreach activities

- ◆ Invited to serve as a reviewer for several journals
 - Journal of Wood chemistry and Technology
 - Holzforschung
 - Cellulose Chemistry and Technology
 - Journal of Industrial and Engineering Chemistry
 - Journal of Bio-based Materials and Bioenergy
- ◆ Keeping active contacts with paper companies in Japan (Oji and Nippon Paper) for potential membership of ESPRA
- ◆ Keeping active contacts with Nanjing Forestry University in China and National Taiwan University in Taiwan for student exchange and research Collaboration programs

b. Summary of grant panel service (by agency)

- c. Summary of editorial board service (by journal)
 - ◆ Served on the Editorial Advisory Board for the Journal of Wood Chemistry and Technology (JWCT)

- d. Enumeration of other significant service activities
 - ◆ Organized and hosted international visitors to PBE
 - A group of four professors from the Mid Sweden University (Htun, M., Engstrand, P., Björkqvist, O., and Norgren, M.), Nov. 12-13, 2009.
 - Dr. Nonaka, H., from Mie University, Japan, March 4-7, 2010.

- e. List of department governance/service activities
 - ◆ Committees served
 - Appointment, Promotion and Tenure (Chair)
 - Graduate Studies
 - Equipment
 - ◆ Submitted an equipment-purchased proposal for PBE
 - ◆ Coordination of the 2010 Faculty Retreat
- f. List of college governance/service activities
 - ◆ Served the Review Committee of Dr. S. Chatterjee's promotion
 - ◆ Chaired the Review Committee of Dr. B. Bujanovic's reappointment
 - ◆ Chaired the doctoral candidacy exam of Bo Zhang
 - ◆ Served on the doctoral candidacy exam for
 - D. Kanungo
 - S.-N. Chien
 - F. Attiobe
 - ◆ Served on the thesis defense committee of T. N. Korbieh

Awards

Invited to give a keynote lecture and also to chair a technical session at the 4th International Symposium on Emerging Technologies of Pulp and Papermaking (4th ISETPP) scheduled for November 8-10, 2010, in Guangzhou, China

Invited to write a chapter on Wood and Wood products for the Kent and Riegel's Handbook of industrial Chemistry and Biotechnology

Shijie Liu

Publications

Zhang, L. Lin, S. Liu, Z. Zhang. 2010 “Conversion of D-xylose into Furfural with Mesoporous Molecular Sieve MCM41 as Catalysts and Butanol as the Extracting Phase”, *J. Biomass Bioenergy*, (in press).

H. Lu, R. Hu, A. Ward, T. E. Amidon, B. Liang, S. Liu. 2010 “Effect of Hot-Water Extraction on Soda Pulping of Aspen Woodchips”, *J. Biomass Bioenergy*, (in press).

Y. Sun, B. Zhang, L. Lin, and S. Liu, 2010 “Clean Conversion to Fermentable Glucose from Wheat Straw”, *J. Biobased Mater. Bioenergy* 4, 27-34.

R. Hu, L. Lin, T. Liu, S. Liu, 2010 “Dilute sulfuric acid hydrolysis of sugar maple wood extract at atmospheric pressure”, *Bioresource Technology*, 101(10): 3586-3594. (doi:10.1016/j.biotech.2010.01.005)

J. Zhang, H. Deng, L. Lin, Y. Sun, C. Pan and S. Liu, 2010, “Isolation and characterization of wheat straw lignin with a formic acid process”, *Bioresource Technology*, 101, 2311-2316 (in press).

Z. Zhang, J. Zhang, L. Lin, T. Chen, J. Zhang, S. Liu, Z. Li, and P. Ouyang 2009 “Dissolution of microcrystalline cellulose in phosphoric acid – molecular changes and kinetics”, *Molecules*, 14: 5027-5041 (doi:10.3390/molecules14125027).

Z-p. Yan, L. Lin and S. Liu 2009 “Synthesis of γ -Valerolactone by Hydrogenation of Biomass-derived Levulinic Acid over Ru/C Catalyst”, *Energy & Fuel*. 23(8):3853-3858.

T. Liu, L. Lin, R. Hu, S. Liu 2009 “A Study on Strain Adaptation of Recombinant *E. coli* FBR5 Challenged by Concentrated Wood Hemicellulosic Hydrolysate”, *J. Biobased Materials and Bioenergy*, 3(3): 386-392.

S. Liu, G. Mishra, T.E. Amidon, K. Gratien 2009 “Effect of Hot-Water Extraction of Woodchips on the Kraft Pulping of Eucalyptus Woodchips”, *J. Biobased Materials and Bioenergy*, 3(3): 363-372.

J. Xu and S. Liu 2009 “Optimization of ethanol production from hot-water extracts of sugar maple chips”, *Renewable Energy*, 34: 2353-2356.

Presentations

>10 presentations

Outreach and Service

a. Enumeration of outreach activities

- 1) Organization of second International Biorefinery Conference, in particular – the technical program.
 - 2) CNY BRC committee (2006 – present)
 - 3) SUNY Bioprocess Certificate and MACNY Bioprocess Engineering Certificate Program (2005 – present)
 - 4) Co-Hosting visitors to the biorefinery pilot facility.
 - 5) Actively engaged in the establishment of a Biorefinery Research Institute.
- b. Summary of grant panel service (by agency)*
China NSF
- c. Summary of editorial board service (by journal)*
Executive editor - Journal of Biobased Materials and Bioenergy.
Guest Editor: Journal of Biomass and Bioenergy
Guest Editor: Journal of Biotechnology Advances
- d. Enumeration of other significant service activities*
- 1) AIChE Annual Meeting Program committee, Area 15c. Bioengineering, (2006 – to date)
 - 2) AIChE Annual Meeting Program committee, Area 20a. Reaction Engineering, (2007 – to date)
 - 3) AIChE Annual Meeting Program committee, Area 20b. Catalysis and Biocatalysis, (2006 – to date)
 - 4) Chair, TAPPI nonwood fibers committee (2009 – present)
- e. List of department governance/service activities*
- 1) Coordinated international collaborations with Chinese universities
 - 2) Writing of the BS assessments for middle state accreditation
 - 3) PBE Undergraduate Curriculum Coordinator
 - 4) PBE Graduate and Research Committee
 - 5) PBE Undergraduate Education Committee, chair
 - 6) PBE Student Recruitment Committee (2005 – present)
 - 7) CoE Committee
 - 8) CNY BRC committee
- f. List of college governance/service activities*
- 1) Coordinated international collaborations with Chinese universities.

Awards

Visiting Professor – 100 Outstanding Scholars, South China University of Technology, Guangzhou, China

Bandaru Ramarao

Publications

Duarte, G. V., Ramarao, B. V., T. E. Amidon. 'Polymer induced flocculation and separation of particulates from extracts of lignocellulosic materials.' *Bioresource Technology*, In Press, 2010.

Hasan, A., Yasarla, L. R., Ramarao, B. V., Amidon, T. E. 'Purification of lignocellulosic extracts using ceramic microfilters for downstream processing.' Submitted, 2010.

Duarte, G. V., Ramarao, B. V., Amidon, T. E., Ferreira, P. "Properties of Hot water extracted sugar maple pulps." Submitted, 2010.

Duarte, G. V., Ramarao, B. V., Amidon, T. E., Ferreira, P. "Properties of Hot water extracted sugar maple pulps." To appear in Proceedings of XXI TECNICELPA Conference/VI Congress CIADICYP - October 2010.

Lavrykov, S., Ramarao, B. V. "A 3D network representation of paper structure and its application to study paper mechanical and transport properties." *Progress in Paper Physics Seminar 2010, FP Innovations, Montreal, Quebec CANADA.*

Arthur, B., Lavrykov, S., Ramarao, B. V. "Penetration and spreading of drops in paper." *Progress in Paper Physics Seminar 2010, FP Innovations, Montreal, Quebec CANADA.*

Lavrykov, S., Mishra, G. K., Ramarao, B. V. " Characterization of Refined Papermaking Pulps Using Hydrodynamic Parameters from Filtration Analysis " *Tappi Proc. PAPERCON 2010, 192-201.*

Presentations

'3D Structural analysis of porous materials via XRMT and image processing.' Porous Materials Inc., Ithaca NY.

" Characterization of Refined Papermaking Pulps Using Hydrodynamic Parameters from Filtration Analysis " *Tappi PAPERCON 2010.*

Presentations at the ESPRI meetings (131 & 132)

Outreach and Service

Awards

Gary M. Scott

Publications

Amidon, T.E., Francis, R., Scott, G.M., Bartholomew, J., Ramarao, B.V., and Wood, C.D., 2009. New product and processes from an integrated forest biorefinery. Patent, Republic of South Africa, WO 2006/121634 A2.

Mittal, A., S. G. Chatterjee, G. M. Scott, and T. E. Amidon. 2009. Modeling xylan solubilization during autohydrolysis of sugar maple and aspen wood chips: Reaction kinetics and mass transfer. *Chemical Engineering Science* 64 (13): 3031-41.

Mittal, A., G. M. Scott, T. E. Amidon, D. J. Kiemle, and A. J. Stipanovic. 2009. Quantitative analysis of sugars in wood hydrolyzates with ¹H NMR during the autohydrolysis of hardwoods. *Bioresource Technology*.

Presentations

Chemistry, physics, and engineering: The secrets of money, July 2009. DEC camp, Warrensburg, NY. [presentation]

Chemistry, physics, and engineering: The secrets of money, March 2010. Illion High School. [presentation]

Paper Engineering Day, November 2009. Recruiting Event, Syracuse, NY. [presentation]

Engineering at SUNY-ESF, March 2010. Engineering Expo, Tappen Zee High School, , Orangeburg, NY [recruiting booth]

Outreach and Service

Chair, Department of Paper and Bioprocess Engineering

Undergraduate Education Committee

New Student Orientation Program

Chair, Committee on Instruction

SPPF Board of Directors

Joachim Seminar Organizer

Institutional Advancement

Biotechnology/Bioproducts Team

ABET Engineering Review Team

Editorial Advisory Board

Korean Tappi Journal

Progress in Paper Recycling

Scientific Advisory Board, Biopulping International

Board of Directors, Technical Association of the Pulp and Paper Industry

ABET Program Evaluator Training / Observation Visit

Middle States Steering Committee

Awards

Appendix E. *PBE Theses and Dissertations*

Ph.D. Dissertations

Blowers, Misty Karina (2010). Analysis of machine learning models and prediction tools for paper machine systems. (Scott)

M.S. Theses

Amaya, John Jairo (2010). Optimum calcium carbonate for uncoated eucalyptus digital copy paper. (Doelle)

Sameer, Nilay (2010). Recovery of Molybdate from Dilute Aqueous Solutions by Complexation with Cationic Surfactants and Extraction with Isobutanol. (Francis)

M.P.S. Students

Kordas, Dariusz (Scott)

Certificate Students (Bioprocessing: 2009 Cohort)

Askew-Brown, Miranda

Badgett, Jessica

Bishop, Robert

Dilmore, Gregory

Garver, Michael

Leuthauser, Adrienne Susan

McCormick, Mary J

Peluso, Catherine F

Saraceni, Theresa Tangredi

Zhang, Jennifer Yang

Appendix F. *Budget Information*

PBE's departmental budget comes from four main sources:

1. State budget allocations
2. Research Foundation incentive funds
3. Pilot plant funds
4. Funds through the Syracuse Pulp and Paper Foundation

A summary of the allocations from each source and the expenditures follows.

a) State budget allocations

The state budget allocations and expenditures are given in Table 19 and Table 20. Table 21 provides more details for the expenditures of the state account.

Table 19. State budget allocations.

Amount	Allocation Source
\$16,540.00	Initial allocation
\$1,000.00	Temporary services (transferred to OTPS)
\$2,970.00	Academic Equipment Replacement
\$20,510.00	TOTAL

Table 20. Summary of state budget expenditures (as of 30 June).

Amount	Description
\$9,771.12	Supplies
\$0.00	Travel
\$6,948.96	Contractual Services
\$3652.84	Equipment
\$20,372.92	TOTAL

Table 21. Detailed summary of state expenditures (as of 30 June)

Amount	Description
\$0.00	Building Improvements
\$59.18	Copy Services
\$5,196.10	Office Supplies
\$149.82	Research Services
\$132.50	Business Cards
\$107.20	Travel

\$5,792.71	Course Expenses
\$4,600.00	Equipment Repair
\$280.50	Immigration Services
4055.71	Academic Equipment
	Other
\$20,372.92	TOTAL

Table 22. Summary of state budget year-to-year.

Year	Budget Amount
2006-07	
2007-08	\$26,275
2008-09	\$21,891
2009-10	\$20,510

b) Research Incentive Funds

Table 23 summarizes the expenditures through the Research Incentive Funds. This funding was primarily used to support research projects through supplies, equipment and travel support.

Table 23. Summary of research incentive funds (1 July to 30 June).

Amount	Description
\$12,631.91	Carry over from previous year
\$21,500.00	Allocation
\$9,200.00	Allocation to individual researchers
\$4,528.04	Supplies
\$176.00	Travel
30.00	Postage
\$1,198.38	General Services
\$9,344.00	Equipment
	Campus Recharges
\$9,655.49	Balance

c) Pilot plant funds

Table 24 summarizes the income and expenditures through the pilot plant account. Table 25 summarizes the year-to-year balance of the account. While income did exceed expenses for this account, spending from this account was kept low in order to build up a reserve to handle large equipment repairs and replacement in the future. An allocation of \$10,000 from the pilot plant was used together with a \$10,000 allocation from the Research Incentive Funds to provide support for equipment and other purchases within the department. This money was used to support research with new equipment purchases, repairs of existing equipment, software for the computer laboratory, and new computers and furniture for the student computer laboratory maintained by the department.

Table 24. Summary of pilot plant funds (1 July to 30 June).

Amount	Description
\$102,951.20	Starting Balance
\$45,443.37	Income
\$9,717.66	Salaries and Wages
\$3,644.13	Fringe Benefits
\$12,683.96	Supplies
\$1,098.26	Travel
\$263.36	Conference and Training
	Tuition and Fees
\$85.87	Postage and Publishing
\$756.50	Office Supplies
\$645.72	General Services
\$20,577.00	Equipment
939.67	Campus Recharges
\$11,090.67	Indirect Costs
\$38,575.70	Encumbered
\$48,316.07	Balance

Table 25. Summary of pilot plant funds account balance year-to-year.

Fiscal Year Ending 30 June	Income	End-of-Year Balance
2006	\$43,734.87	\$1,673.00
2007	\$47,662.50	\$25,420.51
2008	\$81,600.57	\$72,548.05
2009	\$75,212.15	\$91,972.64
2010	\$45,443.37	\$48,316.07

d) Syracuse Pulp and Paper Foundation

The Syracuse Pulp and Paper Foundation (SPPF) budget is detailed in their annual report. Of this, the majority of the funds will be going to scholarships and student support and staffing and office expenses. The revenue sources include individual and corporate memberships (for operating expenses) and endowment income (for scholarships). Budget details for the year will be available in October during the annual meeting of SPPF.

Appendix G. ***Undergraduate recruitment efforts***

We continue to see steady growth of our incoming classes from several years ago. Although a large part of this growth was due to the new program in Bioprocess Engineering (Table 26), we are seeing a much more balanced class for the Fall 2010. The average number of new students over the past three years has been 29 as compared to 17 for the previous three-year period.

Table 26. Undergraduate recruitment history in Paper and Bioprocess Engineering.

Year	Freshman Admissions			Transfer Admissions			Total
	PEN	PSC	BPE	PEN	PSC	BPE	
	2010-11**	9	0	13	4	0	
2009-10	3	0	10	2	2	8	25
2008-09	9	0	19	2	0	3	33
2007-08	9	2	6	0	0	2	19
2006-07	11	2	0	0	1	1	15
2005-06	9	5		2	1		17
2004-05	11	1		2	1		15
2003-04*		4			7		11
2002-03		4			5		9
2001-02		9			7		16
2000-01		9			8		17
1999-00		5			11		16
1998-99		13			8		21
1997-98		4			22		26
1996-97		11			17		28

*Prior to the 2004-5 academic year, students were not required to immediately select an option upon admission. With the 2004-05 year, students must select a program immediately, but can easily change it during the first two years of study.

**Information available as of 13 July. Data includes only Fall expected admissions. Other years include both Fall and Spring admissions of that academic year.

One part of our development of a strategic plan for the department included the modeling and projection of the number of students in the program. This required an analysis of the retention rates of students in our programs, which is summarized in Table 27. Based on this information and projected enrollments of new students (Figure 2: the dotted line in the figure shows the projections of total new students), we project an increase in the total students in our undergraduate programs in the upcoming years as shown in Figure 3. From our low enrollment of 35 in 2005, we have doubled the number of undergraduate students in the department.

Table 27. Retention rates of students in the PBE department based on their year in the program.

Student Year	Retention Rate	Retention Rate	Graduation Rate
	1997-2007	2003-2007	
Freshman	70%	60%	
2 nd Year	70%	62%	
3 rd Year	85%	89%	1%
4 th Year	62%		30%
5 th Year+			93%
Overall Graduation Rate within PBE program			42%

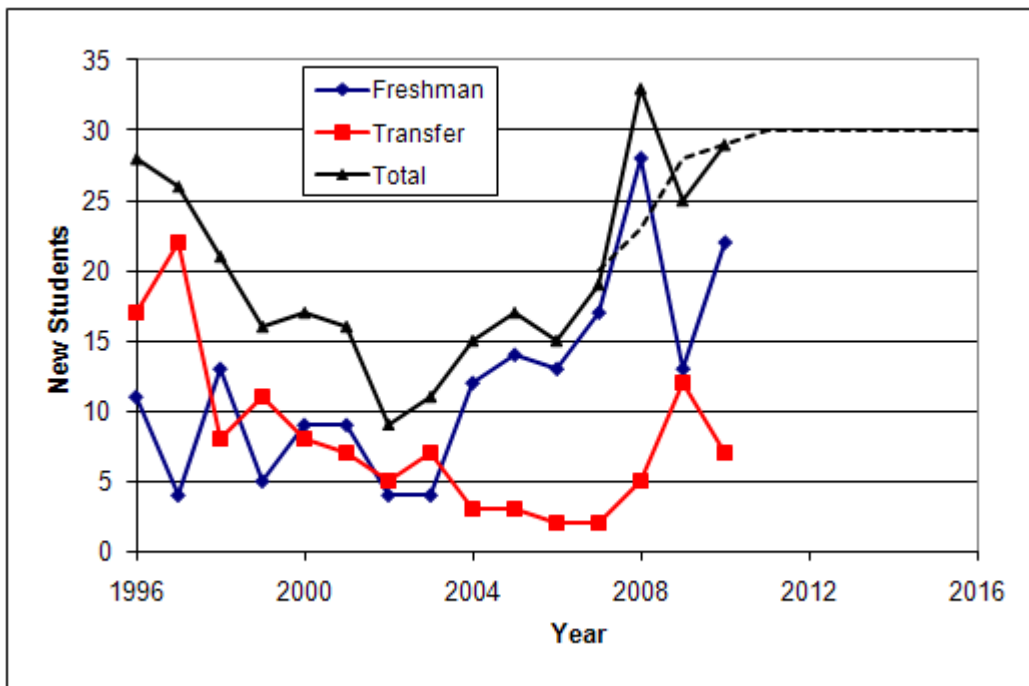


Figure 2. New students entering programs in PBE.

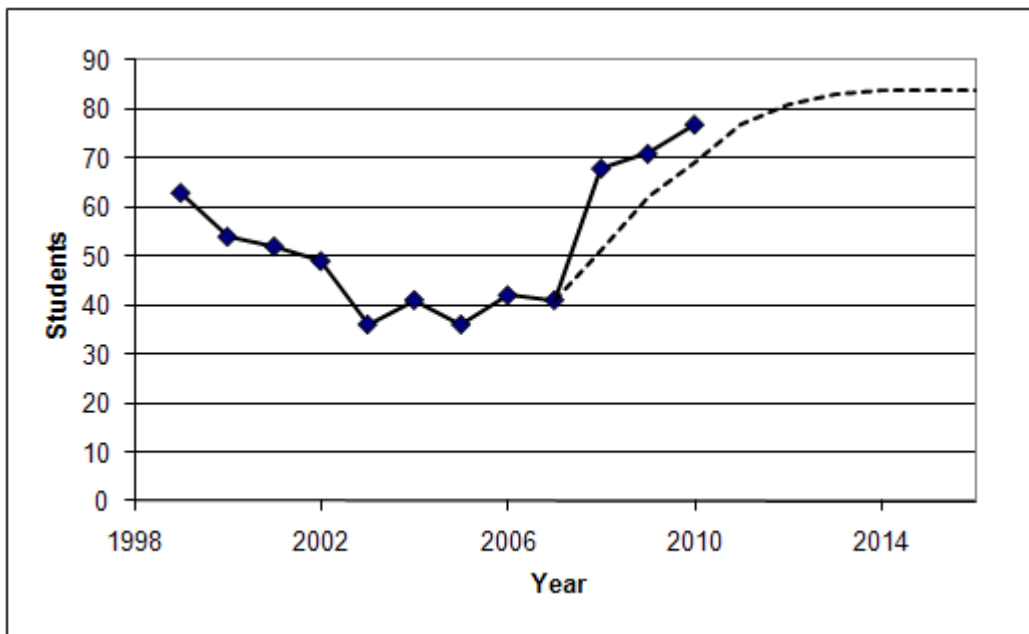


Figure 3. Total undergraduate enrollment in PBE.

Undergraduate recruiting efforts by the department are very important since our programs are significantly different from the majority of the programs offered at SUNY-ESF. Being more industrially oriented, our program seems to have a significantly different target population than the mainstream programs at the college (e.g., biology, forestry, etc.). While we as a department put an effort into contacting these populations, this is not something that the department can exclusively handle, nor should we be expected to. We believe that the college needs to consider the engineering programs separate from the other programs in designing their recruiting efforts. We will participate fully in the college programs, especially the open houses, transfer days, and accepted student receptions. We will also continue to meet with students during campus visits as necessary.

The Paper Science program could offer an opportunity for growth if it were marketed to the proper audience. Currently, the Paper Science program is marketed together with the other engineering programs to students that are primarily interested in engineering. The program would probably be better served by being marketed to prospective students that are more science focused (in particular, chemistry focused) as an industrially-focused science program.

The college could help improve the recruiting effort to the programs in PBE in a number of ways:

1. Bring the campus tours back through Walters Hall. Currently, the tours turn away from Walters after viewing the green roof.
2. Dedicate an admissions staff member to recruiting for the engineering programs in a balanced manner.
3. In conversation with constituents, use the full department name or program names. The term “Paper Science” as a shortened version to encompass the department is not appropriate and neglects the engineering portion of our program. The department name is “Paper and Bioprocess Engineering” and the programs are “Paper Engineering,” “Bioprocess Engineering,” and “Paper Science.”

Appendix H. ***Assessment Data Collected***

Faculty Course Assessment Reports (FCARs) for the 2009-2010 academic year can be found on the accompanying CD or electronically in the accompanying file. Table 28 lists the FCARs that are provided with this report.

Table 28. List of Faculty Course Assessment Reports provided.

Course Number	Course Title	Instructor	Filename
PSE 361/ERE 561	Thermodynamics	<i>Amato</i>	FCAR - PSE 361 -completed-2009-2010.doc
PSE 477/ERE 667	Process Control	<i>Amato</i>	FCAR - PSE 477 -completed-2009-2010.doc
PSE 456/ERE 676	Mgt/Paper Industry	<i>Amidon</i>	
BPE 335/ERE 534	Transport Phenomena	<i>Bujanovic</i>	FCAR_BPE335_2010.doc
PSE 465/ERE 677	Paper Properties	<i>Bujanovic</i>	FCAR_PSE465_2010.doc
PSE 466/ERE 678	Paper Coating/Converting	<i>Bujanovic</i>	FCAR_PSE466_2010.doc
PSE 201	The Art and History of Papermaking	<i>Burry</i>	
PSE 302	Paper skill Lab	<i>Burry</i>	
PSE 351	Pulp&Bleach Laboratory	<i>Burry</i>	
APM 485	Diff Equat/Engr&Scientist	<i>Chatterjee</i>	FCAR - APM 485 - Spring 2010.docx
ERE 441/ERE 691	Air Pollution Engr	<i>Chatterjee</i>	FCAR - ERE 441 - Fall 2009.docx
PSE 304	Summer Internship	<i>Chatterjee</i>	FCAR - PSE 304_305 - 2009.docx
PSE 305	Co-op Experience	<i>Chatterjee</i>	FCAR - PSE 304_305 - 2009.docx
PSE 305	Co-op Experience	<i>Chatterjee</i>	FCAR - PSE 304_305 - 2009.docx
PSE 480	Engr Design Economics	<i>Chatterjee</i>	FCAR - PSE 480 - Spring 2010.docx
PSE 481	Paper Eng. Design	<i>Chatterjee</i>	FCAR - PSE 481 - Fall 2009.docx
PSE 300	Intro Papermaking	<i>Doelle</i>	CAR PSE 300 Introduction to Papermaking Fall 2009.doc
PSE 468/ERE 679	Papermaking Processes	<i>Doelle</i>	FCAR PSE 46-ERE679 Papermaking Processes Spring 2010.doc
BPE 481	Bioprocess Engineering Design	<i>Fieschko</i>	FCAR - BPE 481 - Spring 2010.docx
PSE 436	Paper Unit Operations	<i>Francis</i>	FCAR PSE 436 2009.doc
BPE 441/ERE 641	Biomass Energy	<i>Francis/Volk</i>	FCAR BPE 441 2010.doc
BPE 336	Transport Phenomena Laboratory	<i>Liu</i>	FCAR-BPE336-S10.doc
BPE 421	Bioprocess Kinetics and System Engg.	<i>Liu</i>	FCAR-BPE421-F09.doc
BPE 440	Bioprocess & Systems Laboratory	<i>Liu</i>	FCAR-BPE440-S10.doc
PSE 132/BPE 132	PBE Orientation	<i>Liu</i>	FCAR-BPE132-F09.doc
BPE 310	Colloid and Interface Science	<i>Ramarao</i>	
BPE 420	Bioseparations	<i>Ramarao</i>	
PSE 371/ERE 571	Fluid Mechanics	<i>Ramarao</i>	
PSE 467/ERE 672	Papermaking Wetend Chem	<i>Ramarao</i>	
PSE 350	Pulp&Bleach Processes	<i>Schroeder</i>	
APM 153	Comp Meth/Engr & Phys Sci	<i>Scott</i>	FCAR - 0910S - APM 153.docx
PSE 370/ERE 570	Mass & Energy Balance	<i>Scott</i>	FCAR - 0910F - PSE 370.docx

Appendix I. ***Sponsored Programs***

Table 29. Summary of proposal activity by department.

No information received.

Table 30. Summary of proposal activity by PI.

No information received.

Table 31. Summary of proposal activity in PBE.

**Proposal Submission Activity
Fiscal Year 2009-10**

Department Name	Name	P/IC/PI	Title	Sponsor Name	Requested Start Date	Requested End Date	Credited Share Percentage	Total Request	Credited Amount	Application Type Description	IC:DC Ratio	Awarded(A) Pending (P) Rejected (R)	ORP Freaward ID
Paper and Bioprocess Engineering													
Paper and Bioprocess Engineering	Amikton, Thomas E.	P	Improving Black Liquor Processing Energy Efficiency in Kraft Pulp Mills Through Modification of Wood in Biorefinery Operations	US Department of Energy	10/1/2009	9/30/2010	50.00%	\$251,009.00	\$125,504.50	New Application	33.95%	R	5290
Paper and Bioprocess Engineering	Amikton, Thomas E.	P	The Biorefinery in New York - Bio Butanol from Biomass	US Department of Energy	6/1/2010	5/31/2011	66.67%	\$400,000.00	\$266,666.67	New Application	49.74%	A	5478
Paper and Bioprocess Engineering	Amikton, Thomas E.	P	ESPRI Budget 4/1/10 to 3/31/11	Empire State Paper Research Associates	4/1/2010	3/31/2011	50.00%	\$125,000.00	\$62,500.00	New Application	35.70%	A	6549
Paper and Bioprocess Engineering	Amikton, Thomas E.	P	Wheat Straw for Sustainable Fuels Integrated Processing Technologies to Capitalize on Sustainable Hybrid Poplar Biomass	Washington State University	8/15/2010	8/14/2013	100.00%	\$80,000.00	\$80,000.00	New Application	0.00%	P	6579
Paper and Bioprocess Engineering	Amikton, Thomas E.	P	MRI-R2 Acquisition of Essential Instrumentation for Determining Plant Cell Wall Construction During Sequential Deconstruction	Washington State University	1/1/2011	12/31/2015	100.00%	\$225,000.00	\$225,000.00	New Application	28.21%	P	6591
Paper and Bioprocess Engineering	Amikton, Thomas E.	C	Valorization of Lignin, Lignin Degradation Products, and Extractives within a Biorefinery Based on Hot Water Extraction of Northeastern Hardwood Biomass	National Science Foundation	2/1/2010	1/31/2011	20.00%	\$3,285,885.00	\$657,177.00	New Application	0.00%	R	6313
Paper and Bioprocess Engineering	Amikton, Thomas E.	C	Unrestricted Grant for Analysis of Low Molecular Weight Compounds in Acidic Biomass Extract	USDA - National Institute of Food and Agriculture	1/1/2011	12/31/2015	25.00%	\$1,000,000.00	\$250,000.00	New Application	28.21%	P	6581
Paper and Bioprocess Engineering	Bujanovic, Biljana	P	Valorization of Lignin, Lignin Degradation Products, and Extractives within a Biorefinery Based on Hot Water Extraction of Northeastern Hardwood Biomass	Andritz, Inc.	5/1/2010	8/31/2010	100.00%	\$6,000.00	\$6,000.00	New Application	20.00%	A	6562
Paper and Bioprocess Engineering	Bujanovic, Biljana	P	CAREER: Development of A Sequential Disassembly of Wood for Production to Chemicals, Materials, and Energy	USDA - National Institute of Food and Agriculture	1/1/2011	12/31/2015	50.00%	\$1,000,000.00	\$500,000.00	New Application	28.21%	P	6581
Paper and Bioprocess Engineering	Bujanovic, Biljana	P	Improving Black Liquor Processing Energy Efficiency in Kraft Pulp Mills Through Modification of Wood in Biorefinery Operations	National Science Foundation	3/1/2011	2/28/2016	100.00%	\$420,144.00	\$420,144.00	New Application	40.18%	P	6614
Paper and Bioprocess Engineering	Bujanovic, Biljana	C	MRI-R2 Acquisition of Essential Instrumentation for Determining Plant Cell Wall Construction During Sequential Deconstruction	US Department of Energy	10/1/2009	9/30/2010	25.00%	\$251,009.00	\$62,752.25	New Application	33.95%	R	5290
Paper and Bioprocess Engineering	Bujanovic, Biljana	C	Collaborative Research: Manipulation of the Soda-AQ Reaction Mechanism for Commercial Production of Non-Sulfur Lignin	National Science Foundation	2/1/2010	1/31/2011	20.00%	\$3,285,885.00	\$657,177.00	New Application	0.00%	R	6313
Paper and Bioprocess Engineering	Bujanovic, Biljana	C	Collaborative Research: Manipulation of the Soda-AQ Reaction Mechanism for Commercial Production of Non-Sulfur Lignin	Industrial Research Institute	1/1/2011	12/31/2011	33.33%	\$299,993.00	\$99,997.67	New Application	44.97%	P	6588
Paper and Bioprocess Engineering	Coelle, Klaus	P	Gasification of Lignocellulosics Feedstocks into Biofuels and Biorefinery	US Department of Agriculture-Cooperative State Research Education & Extension Service/McIntire-Stennis Program	8/15/2010	9/30/2010	100.00%	\$52,000.00	\$52,000.00	New Application	0.00%	R	6390
Paper and Bioprocess Engineering	Coelle, Klaus	P	Novel Hybrid Material for Functional Defense Application	US Department of Energy	10/1/2010	9/30/2011	100.00%	\$298,269.00	\$298,269.00	New Application	43.11%	R	5433
Paper and Bioprocess Engineering	Coelle, Klaus	P	Demonstrate the Extraction of Energy from Timber Harvesting Residues to Heat a 15,000 Square Foot Office and Maintenance Building in Upstate New York, by Utilizing a Composting Process and to Determine Feasibility for Future Expanded Uses	U.S. Endowment for Forestry and Communities	2/1/2010	6/30/2011	100.00%	\$150,000.00	\$150,000.00	New Application	17.00%	R	5457
Paper and Bioprocess Engineering	Coelle, Klaus	P	Wood Gasification Tar Reduction	Syracuse University	9/1/2010	5/31/2011	66.67%	\$5,000.00	\$3,333.33	New Application	0.00%	R	6514
Paper and Bioprocess Engineering	Coelle, Klaus	P	Career: Development, Manufacturing and Application of Ceramic Paper Product	National Science Foundation	1/1/2011	12/31/2015	100.00%	\$400,000.00	\$400,000.00	New Application	39.58%	P	6564

Proposal Submission Activity
Fiscal Year 2009-10

Department Name	Name	PI/CoPI	Title	Sponsor Name	Requested Start Date	Requested End Date	Credited Share Percentage	Total Request	Credited Amount	Application Type Description	IC/DC Ratio	Awarded(A) Pending (P) Rejected (R)	ORP Forward ID
Paper and Bioprocess-Engineering	Doelle, Klaus	C	Collaborative Research: Convergent Discourse Development and Negotiating Intended Meaning in the Scientific Writing of Non-Native English Speaking STEM Graduate Students	National Science Foundation	8/1/2010	7/31/2012	10.00%	\$431,638.00	\$43,163.80	New Application	58.00%	R	5367
Paper and Bioprocess-Engineering	Fieschko, John	P	Optimization of Ethanol Production from Cheese Whey Permeate at the H.P. Hood Manufacturing Facility in Vernon, NY	New York State Energy Research and Development Authority	1/1/2010	12/31/2010	66.67%	\$395,087.00	\$263,391.33	New Application	31.00%	R	5329
Paper and Bioprocess-Engineering	Fieschko, John	P	Demonstration of Commercial Ethanol Production from Waste Cheese Whey Permeate	Lactanod Biofuels Inc.	3/1/2010	8/31/2010	100.00%	\$25,000.00	\$25,000.00	New Application	26.00%	P	5402
Paper and Bioprocess-Engineering	Fieschko, John	P	Electron Beam Reduction in Lignocellulosic Biomass Recalcitrance and Subsequent Fermentation to Liquid Biofuels	New York State Energy Research and Development Authority	1/1/2011	12/31/2011	66.67%	\$75,000.00	\$50,000.00	New Application	31.00%	P	5608
Paper and Bioprocess-Engineering	Fieschko, John	C	Biofuels Development and Performance Testing Center	US Department of Commerce	1/1/2011	12/31/2011	25.00%	\$5,713,834.00	\$1,428,458.50	New Application	0.00%	P	5545
Paper and Bioprocess-Engineering	Franck, Raymond C.	P	An Investigation of Depolymerization and Condensation Reactions of Lignin Under Alkaline Conditions	Andritz, Inc.	3/1/2006	12/31/2010	100.00%	\$53,333.00	\$53,333.00	New Application	33.00%	A	5361
Paper and Bioprocess-Engineering	Franck, Raymond C.	P	Production of Biofuels at Non-sulfur Pulp Mills	Virginia Polytechnic Institute & State University	8/1/2010	6/30/2015	100.00%	\$988,792.00	\$988,792.00	New Application	46.96%	P	5406
Paper and Bioprocess-Engineering	Franck, Raymond C.	P	Collaborative Research: Manipulation of the Soda-AQ Reaction Mechanism for Commercial Production of Non-Sulfur Lignin	Industrial Research Institute	1/1/2011	12/31/2011	66.67%	\$290,993.00	\$199,995.33	New Application	44.97%	P	5588
Paper and Bioprocess-Engineering	Franck, Raymond C.	C	ESPR	Empire State Paper Research Associates	4/1/2010	3/31/2011	25.00%	\$125,000.00	\$31,250.00	New Application	35.70%	A	5549
Paper and Bioprocess-Engineering	Li, Shije	P	Genetic Engineering and Biochemical Approaches to Novel Qhovose-Containing Biofouling MNKYI	Oregon State University	10/1/2010	9/30/2013	100.00%	\$155,903.00	\$155,903.00	New Application	56.00%	P	5485
Paper and Bioprocess-Engineering	Li, Shije	P	Nano Crystalline Cellulose (NCC) and Environmentally Benign Production of Biodegradable Plastics PHBV	USDA - National Institute of Food and Agriculture	10/1/2010	9/30/2015	100.00%	\$1,000,000.00	\$1,000,000.00	New Application	51.52%	P	5503
Paper and Bioprocess-Engineering	Li, Shije	C	Improving Black Liquor Processing Energy Efficiency in Kraft Pulp Mills Through Modification of Wood in Biorefinery Operations	US Department of Energy	10/1/2009	9/30/2010	25.00%	\$251,009.00	\$62,752.25	New Application	33.95%	R	5290
Paper and Bioprocess-Engineering	Li, Shije	C	Science Master's Program: Creating a Well-Trained Workforce for Sustainable Engineering Management	National Science Foundation	9/1/2010	8/31/2013	16.67%	\$690,706.00	\$116,617.67	New Application	5.34%	R	5381
Paper and Bioprocess-Engineering	Li, Shije	C	The Biorefinery in New York - Bio Butanol from Biomass	US Department of Energy	6/1/2010	5/31/2011	33.33%	\$400,000.00	\$133,333.33	New Application	49.74%	A	5478
Paper and Bioprocess-Engineering	Ramano, Bandaru V.	P	Collaborative Research: Geotextile Tubes for the Sustainable Dewatering of Dredged Sediments	National Science Foundation	5/1/2010	5/1/2013	66.67%	\$181,295.00	\$120,863.33	New Application	46.80%	R	5347
Paper and Bioprocess-Engineering	Ramano, Bandaru V.	C	ESPR Budget	Empire State Paper Research Associates	4/1/2010	3/31/2011	25.00%	\$125,000.00	\$31,250.00	New Application	35.70%	A	5549
Paper and Bioprocess-Engineering	Scott, Gary M.	P	Science Master's Program: Creating a Well-Trained Workforce for Sustainable Engineering Management	National Science Foundation	9/1/2010	8/31/2013	33.33%	\$690,706.00	\$233,235.33	New Application	5.34%	R	5381
Paper and Bioprocess-Engineering	Scott, Gary M.	C	Hemicellulose Extraction and Conversion to Polymer Co-products: Synergies between e-beam Radiation, Biotransformation, and Aqueous Extraction	USDA - National Institute of Food and Agriculture	9/1/2010	8/30/2013	33.33%	\$552,933.00	\$184,311.00	New Application	28.21%	P	5577
Subtotal - Paper Science and Engineering				Credited-	-Number:	22.00	-Amount:	\$9,438,171	23.54%				

Table 32. Summary of sponsored program expenditure activity by department.

No information received.

Table 33. Summary of expenditures by PI.

No information received.

Table 34. Details of program expenditures for PBE Department.

Sponsored Program Expenditure Activity
Fiscal Year 2009-2010

Program Unit Name	Name	PI/CoPI	Title	Primary Sponsor Type	Primary Sponsor Name	Project Start Date	Project End Date	Credited Share Percentage	Total Expenditure Amount	Credited Expenditure Amount	IC:DC Ratio	Project Number
Paper and Bioprocess Engineering												
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	Biomass Combined Heat and Power Facility	Federal	USDA Forest Service	4/1/04	3/31/09	66.67%	(3,664.00)	(2,442.67)	0.0%	1042336
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	COE in Watershed Applications & Technology-Biomass Gasification Project	Nonfederal	New York City Dept of Environmental Protection	7/1/06	7/2/10	66.67%	9,126.30	6,084.20	30.8%	1058898
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	Overcoming the Recalcitrance of Cellulosic biomass by Value Prior to Pulping	Federal Flow Through	CleanTech Partners Incorporated	10/1/06	6/30/09	66.67%	5,877.06	3,918.04	360.8%	1063380
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	22.22%	577,983.07	128,440.68	44.7%	1066787
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	O'Brien-Biorefinery Pilot Research and Development	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	108,339.51	27,084.88	0.0%	1066965
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	301,463.91	75,365.98	0.0%	1066966
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	87,304.09	21,826.02	0.0%	1066967
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	142.55	35.64	0.0%	1066970
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	31,318.80	7,829.70	0.0%	1066971
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	Empire State Paper Research Institute 2009-2010	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	66.67%	142,321.80	94,881.20	35.7%	1078297
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	COE: Biomass Gasification Project	Federal	US Department of Energy	8/15/06	3/14/11	66.67%	17,218.28	11,478.85	30.4%	1081668
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	550-Amidon-O'Brien-3.1.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	17,905.68	4,475.42	0.0%	1082560
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	550-Amidon-O'Brien-3.2.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	16,660.71	4,165.18	0.0%	1082561
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	550-Amidon-O'Brien-3.1.e	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	809.51	202.38	0.0%	1082562
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	550-Amidon-O'Brien-3.1.f	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	25.00%	2,250.98	562.75	0.0%	1082563
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	Hot Water Extraction and Analysis and Separation of Extracted Sugars and Chemicals from Woody Biomass	Federal Flow Through	Washington State University	8/6/09	11/30/12	100.00%	34,041.89	34,041.89	0.0%	1082631
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	ESPRI	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	66.67%	10,220.50	6,813.67	0.0%	1083498
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	F	The Biorefinery in New York - Bio Butanol from Biomass	Federal	US Department of Energy	6/1/10	5/31/11	66.67%	26,556.10	17,704.07	56.0%	1087714
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	Forest Biorefinery - Establishing a path forward	Nonfederal	Multiple Sponsors	5/11/07	4/30/08	33.33%	(166.00)	(66.00)	0.0%	1063473
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	Reactor Design: Hot-Water Extraction of Woodchips and Hydrolysis to Produce biopolymer, Acetic Acid and Platform Chemical: Sugars	Nonfederal	NYS Energy Research and Development Authority	7/25/07	12/31/09	33.33%	12,474.20	4,158.07	30.8%	1086426
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	Value-Added Non-Carbohydrate Products from Hardwoods/Sugar Maple in the ESP Biorefinery	Federal	USDA Cooperative State Research Service	8/15/08	9/30/11	25.00%	29,988.30	7,497.08	0.0%	1073559
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	Environmentally Benign PHA Production from Hot-Water Wood Extracts	Nonfederal	NYS Energy Research and Development Authority	8/14/08	12/31/10	33.33%	32,066.97	10,688.99	31.0%	1075385
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	International Conference on Biorefinery (ICB 09)	Nonfederal	Multiple Sponsors	11/19/08	4/19/10	33.33%	32,839.86	10,946.62	22.0%	1076071
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	Renewable Fuels Roadmap and Sustainable Biomass Feedstock Supply for New York	Nonfederal	Pace University	9/21/09	12/31/11	11.11%	50,739.65	5,637.74	31.0%	1077217
Paper and Bioprocess Engineering	Bujanovic, Dr. Blijana	F	Value-Added Non-Carbohydrate Products from Hardwoods/Sugar Maple in the ESP Biorefinery	Federal	USDA Cooperative State Research Service	8/15/08	9/30/11	50.00%	29,988.30	14,994.15	0.0%	1073559
Paper and Bioprocess Engineering	Bujanovic, Dr. Blijana	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	44.7%	1066787
Paper and Bioprocess Engineering	Doelle, Dr. Klaus	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	44.7%	1066787

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Program Unit Name	Name	PI/CoPI	Title	Primary Sponsor Type	Primary Sponsor Name	Project Start Date	Project End Date	Credited Share Percentage	Total Expenditure Amount	Credited Expenditure Amount	IC:DC Ratio	Project Number
Paper and Bioprocess Engineering	Fleschko, John C	F	The Use of Microporous Ceramic Composite Membrane Technology in the Improvement of Biofuels & Bioproducts Production	Nonfederal	Hillard Corporation	7/27/07	4/30/11	40.00%	78,956.05	31,582.42	30.8%	1067440
Paper and Bioprocess Engineering	Fleschko, John C	F	Production and Evaluation of a Food Grade Yeast from Cheese Whey Permeate	Nonfederal	NYS Energy Research and Development Authority	6/2/08	10/3/09	50.00%	28,693.61	14,346.81	31.0%	1074631
Paper and Bioprocess Engineering	Fleschko, John C	F	Conversion of Dairy and Biodiesel Waste Products to Omega-3 Fatty Acids and Lipids for Biodiesel Production Using Mixotrophic Algae	Nonfederal	NYS Energy Research and Development Authority	6/1/09	3/31/11	66.67%	45,703.31	30,466.87	31.0%	1078247
Paper and Bioprocess Engineering	Fleschko, John C	F	Production and Evaluation of a Food Grade Yeast from Cheese Whey Permeate	Nonfederal	NYS Energy Research and Development Authority	6/2/08	10/3/09	100.00%	4,599.79	4,599.79	5.0%	1080943
Paper and Bioprocess Engineering	Fleschko, John C	C	Advances in Bioprocessing: Cultivating Economic Growth	Nonfederal	Multiple Sponsors	7/1/08	9/11/09	33.33%	2,905.15	968.72	349.5%	1074619
Paper and Bioprocess Engineering	Fleschko, John C	C	Biodegradable Plastics from Renewable Sources for Manufacturing Medical Products in CNY	Nonfederal	Blue Highway LLC	10/8/08	12/31/11	25.00%	129,201.29	32,300.32	31.0%	1076024
Paper and Bioprocess Engineering	Fleschko, John C	C	Central New York Biotechnology Symposium 2010 - Cultivating Economic Growth	Nonfederal	Multiple Sponsors	11/13/09	10/29/10	25.00%	9,388.46	2,347.12	55.3%	1084483
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	F	An Investigation of Depolymerization	Federal	National Science Foundation	3/1/06	2/29/10	100.00%	4,988.00	4,988.00	0.3%	1054293
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	F	Investigation of Depolymerization and Condensation Reactions of Lignin	Nonfederal	Andritz Inc	3/1/06	12/31/10	100.00%	74,234.09	74,234.09	20.0%	1057157
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	F	Peroxymonocarbonate Bleaching Reactions	Nonfederal	Solvay Chemicals Incorporated	10/1/07	9/30/09	100.00%	1,777.71	1,777.71	22.0%	1067370
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	F	Lignin Condensation During Soda/AQ Pulping	Nonfederal	Andritz Inc	1/1/08	12/31/10	100.00%	600.00	600.00	20.0%	1070052
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	F	Student Intern Research Scholarship to Ms. Naïma A. Abd	Nonfederal	Onondaga Community College	6/8/09	8/7/09	100.00%	1,800.00	1,800.00	0.0%	1080107
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	F	GOALI: An Investigation of Depolymerization and Condensation Reactions of Lignin Under Alkaline	Federal	National Science Foundation	8/1/09	7/31/11	100.00%	113,766.19	113,766.19	-40.4%	1081772
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Biomass Combined Heat and Power Facility	Federal	USDA Forest Service	4/1/04	3/31/09	33.33%	(3,664.00)	(1,221.33)	0.0%	1042336
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Novel Polyhydroxyalkanoates From New York State Renewable Resources	Nonfederal	NYS Energy Research and Development Authority	1/29/07	12/31/09	33.33%	2,879.80	959.93	28.7%	1061858
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	-44.7%	1066787
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Value-Added Non-Carbohydrate Products from Hardwoods/Sugar Maple in the E8F Biorefinery	Federal	USDA Cooperative State Research Service	8/15/08	9/30/11	25.00%	29,988.30	7,497.08	0.0%	1073559
Paper and Bioprocess Engineering	Lai, Dr. Yuan Z	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	-44.7%	1066787
Paper and Bioprocess Engineering	Liu, Dr. Shijie	F	Utilization of Wood Extracts	Nonfederal	Alberta Pacific Forest Industries Incorporated	2/1/07	12/31/12	100.00%	23,058.61	23,058.61	15.0%	1065955
Paper and Bioprocess Engineering	Liu, Dr. Shijie	F	Reactor Design: Hot-Water Extraction of Woodchips and Hydrolysis to Produce biopolymer, Acetic Acid and Platform Chemical Sugars	Nonfederal	NYS Energy Research and Development Authority	7/25/07	12/31/09	66.67%	12,474.20	8,316.13	30.8%	1066425
Paper and Bioprocess Engineering	Liu, Dr. Shijie	F	Butanol Production From Wood Extract Sugars	Nonfederal	NYS Energy Research and Development Authority	9/2/08	12/31/10	100.00%	19,900.19	19,900.19	31.0%	1075009
Paper and Bioprocess Engineering	Liu, Dr. Shijie	F	Environmentally Benign PHA Production from Hot-Water Wood Extracts	Nonfederal	NYS Energy Research and Development Authority	8/14/08	12/31/10	66.67%	32,066.97	21,377.98	31.0%	1075385
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	Overcoming the Recalcitrance of Cellulosic biomass by Value Prior to Pulping	Federal Flow Through	CleanTech Partners Incorporated	10/1/06	6/30/09	33.33%	5,877.06	1,959.02	360.8%	1063380
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	-44.7%	1066787
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	O'Brien-Biorefinery Pilot Research and Development	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	108,339.51	13,542.44	0.0%	1066955

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Program Unit Name	Name	PI/CoPI	Title	Primary Sponsor Type	Primary Sponsor Name	Project Start Date	Project End Date	Credited Share Percentage	Total Expenditure Amount	Credited Expenditure Amount	IC/DC Ratio	Project Number
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	301,463.51	37,682.99	0.0%	1066966
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	87,304.09	10,913.01	0.0%	1066967
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	142.55	17.82	0.0%	1066970
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	31,318.80	3,914.85	0.0%	1066971
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	The Use of Microporous Ceramic Composite Membrane Technology in the Improvement of Biofield's Bioproducts Production	Nonfederal	Hillard Corporation	7/27/07	4/30/11	20.00%	78,956.05	15,791.21	30.8%	1067440
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	Production and Evaluation of a Food Grade Yeast from Cheese Whey Fermentate	Nonfederal	NYS Energy Research and Development Authority	6/2/08	10/31/09	25.00%	28,693.61	7,173.40	31.0%	1074631
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	55D-Amidon-O'Brien-3.1.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	17,905.68	2,238.21	0.0%	1082560
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	55D-Amidon-O'Brien-3.2.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	16,660.71	2,082.59	0.0%	1082561
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	55D-Amidon-O'Brien-3.1.e	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	809.51	101.19	0.0%	1082562
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	55D-Amidon-O'Brien-3.1.f	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	2,280.98	281.37	0.0%	1082563
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	The Bio-Energy in New York - Bio-Bulana from Biomass	Federal	US Department of Energy	6/1/10	5/31/11	33.33%	26,596.10	8,952.03	56.0%	1087714
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	P	Relationship of a 3-D Structure of Pore Space to Manufacturing Process	Federal	USDA Cooperative State Research Service	1/15/05	1/14/10	100.00%	24,777.23	24,777.23	23.4%	1045894
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	P	Membrane Filtration for Separating Sugars for Fermentation into Bioethanol	Nonfederal	NYS Energy Research and Development Authority	1/29/07	12/1/09	100.00%	9,419.99	9,419.99	31.0%	1061860
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	P	Empire State Paper Research Institute-Task 5 - Ramarao	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	100.00%	119.65	119.65	35.7%	1088346
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	P	Empire State Paper Research Institute-Task 5-Ramarao	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	100.00%	2,892.23	2,892.23	35.7%	1088347
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	44.7%	1066787
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	O'Brien/Biorefinery Pilot Research and Development	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	108,339.51	13,542.44	0.0%	1066965
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	301,463.51	37,682.99	0.0%	1066966
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	87,304.09	10,913.01	0.0%	1066967
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	142.55	17.82	0.0%	1066970
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	31,318.80	3,914.85	0.0%	1066971
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	The Use of Microporous Ceramic Composite Membrane Technology in the Improvement of Biofield's Bioproducts Production	Nonfederal	Hillard Corporation	7/27/07	4/30/11	20.00%	78,956.05	15,791.21	30.8%	1067440
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	Empire State Paper Research Institute 2009-2010	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	33.33%	142,321.80	47,440.50	35.7%	1078297
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	55D-Amidon-O'Brien-3.1.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	17,905.68	2,238.21	0.0%	1082560
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	55D-Amidon-O'Brien-3.2.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	16,660.71	2,082.59	0.0%	1082561
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	55D-Amidon-O'Brien-3.1.e	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	809.51	101.19	0.0%	1082562
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	55D-Amidon-O'Brien-3.1.f	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	2,280.98	281.37	0.0%	1082563
Paper and Bioprocess Engineering	Ramarao, Dr. Bandaru V	C	ESPRI	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	33.33%	10,220.90	3,405.83	0.0%	1083498
Paper and Bioprocess Engineering	Scott, Dr. Gary M	P	Assessing the Forest Biorefinery Value-Prop-to-Pulping Business Concept	Federal	USDA Forest Service	6/29/07	12/2/10	100.00%	2,909.27	2,909.27	0.0%	1066614
Paper and Bioprocess Engineering	Scott, Dr. Gary M	P	PROFESSIONAL SCI MASTERS INITIATIVE AT SUNY	Nonfederal	Alfred P Sloan Foundation	6/1/07	7/31/10	100.00%	3,734.04	3,734.04	0.0%	1081145

Sponsored Program Expenditure Activity
Fiscal Year 2009-2010

Program Unit Name	Name	PI/CoPI	Title	Primary Sponsor Type	Primary Sponsor Name	Project Start Date	Project End Date	Credited Share Percentage	Total Expenditure Amount	Credited Expenditure Amount	IC/DC Ratio	Project Number
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	Electron Beam & X-Ray Irradiation of Lignocellulosic Biomass - Synergies w/ Biodegradation & Hemicellulose Removal in Reducing Recald	Federal	USDA Cooperative State Research Service	9/1/07	8/31/11	20.00%	144,264.00	28,852.80	25.0%	1066886
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood Extracts	Federal	US Department of Energy	10/1/07	9/30/10	11.11%	577,983.07	64,220.34	44.7%	1066787
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	O'Brien-Biorefinery Pilot Research and Development	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	108,339.51	13,542.44	0.0%	1066965
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	301,463.91	37,682.99	0.0%	1066966
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	87,304.09	10,913.01	0.0%	1066967
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	142.55	17.82	0.0%	1066970
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	31-MAR-2009	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	31,318.80	3,914.85	0.0%	1066971
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	Microwave Assisted Hemicellulose Extraction of Woody Biomass and Conversion to Fermentable Sugars	Nonfederal	Chesner Engineering	6/1/07	12/31/09	25.00%	10,324.70	2,581.18	30.8%	1072852
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	550-Amidon-O'Brien-3.1.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	17,905.68	2,238.21	0.0%	1082580
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	550-Amidon-O'Brien-3.2.d	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	16,660.71	2,082.59	0.0%	1082581
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	550-Amidon-O'Brien-3.1.e	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	809.51	101.19	0.0%	1082582
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	550-Amidon-O'Brien-3.1.f	Nonfederal	O'Brien and Gere Engineers	1/1/07	6/30/09	12.50%	2,260.98	281.27	0.0%	1082583
Subtotal - Paper Science and Engineering				Credited-	-Number:	38.67	-Amount:	1,728,870	26.8%			

Table 35. Summary of program award funding changes.

No information received.

Table 36. Summary of funding changes by PI.

No information received.

Table 37. Details of program funding changes in PBE.

Sponsored Program New Awards and Award Funding Changes
Fiscal Year 2010-11

Department Name	Name	PI/CoPI	Title	Sponsor Type	Sponsor Name	Award Start Date	Award End Date	Credited Share Percentage	Total Award Change Amount	Credited Award Change Amount	IG:DC Ratio	Award Number
Paper and Bioprocess Engineering												
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	P	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	16.18%	\$713,625.00	\$129,750.00	48.82%	44709
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	P	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	20.00%	\$30,976.69	\$6,195.34	35.70%	49967
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	P	Hot Water Extraction and Analysis and Separation of Extracted Sugars and Chemicals from Woody Biomass	Federal Flow Through	Washington State University	8/5/09	11/30/12	100.00%	\$42,000.00	\$42,000.00	0.00%	52183
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	P	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	20.00%	\$125,000.00	\$25,000.00	35.70%	52286
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	P	The Biorefinery in New York - Bio Butanol from Biomass	Federal	US Department of Energy	6/1/10	5/31/11	66.67%	\$400,000.00	\$266,666.67	49.74%	54165
Paper and Bioprocess Engineering	Amidon, Dr. Thomas E	C	Forest Bio-refinery - Establishing a path forward	Nonfederal	Multiple Sponsors	5/11/07	4/30/08	33.33%	(\$165.00)	(\$55.00)	0.00%	43184
Paper and Bioprocess Engineering	Appleby, Mr. Raymond J	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Appleby, Mr. Raymond J	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Paper and Bioprocess Engineering	Bujanovic, Dr. Biljana	P	Unrestricted Grant for Analysis of Low Molecular Weight Compounds in Acidic Biomass Extracts	Nonfederal	Andritz Inc	5/1/10	8/31/10	100.00%	\$6,000.00	\$6,000.00	20.00%	54630
Paper and Bioprocess Engineering	Bujanovic, Dr. Biljana	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Chatterjee, Dr. Siddharth G	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Chatterjee, Dr. Siddharth G	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Paper and Bioprocess Engineering	Doelle, Dr. Klaus	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Fleschko, John C	P	Conversion of Dairy and Biorefinery Waste Products to Omega-3 Fatty Acids Lipids for Biodiesel	Nonfederal	NYS Energy Research and Development Authority	5/1/09	3/31/11	66.67%	\$19,650.00	\$13,100.00	31.00%	50296
Paper and Bioprocess Engineering	Fleschko, John C	C	Advances in Bioprocessing: Cultivating Economic Growth	Nonfederal	Multiple Sponsors	7/1/08	9/11/09	33.33%	(\$25,271.12)	(\$8,423.71)	0.00%	48212
Paper and Bioprocess Engineering	Fleschko, John C	C	Central New York Biotechnology Symposium 2010 - Cultivating Economic Growth	Nonfederal	Multiple Sponsors	11/13/09	10/29/10	25.00%	\$9,388.46	\$2,347.12	55.28%	52744
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	P	An Investigation of Depolymerization and Condensation Reactions of Lignin Under Alkaline	Nonfederal	Andritz Inc	3/1/06	12/31/10	100.00%	\$53,333.00	\$53,333.00	20.00%	40362
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	P	ARRA - An Investigation of Depolymerization and Condensation Reactions of Lignin Under Alkaline	Federal	National Science Foundation	8/1/09	7/31/11	100.00%	\$188,006.00	\$188,006.00	49.24%	51353
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Francis, Dr. Raymond C	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Paper and Bioprocess Engineering	Lai, Dr. Yuan Z	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Lai, Dr. Yuan Z	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Lai, Dr. Yuan Z	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Liu, Dr. Shijie	C	The Biorefinery in New York - Bio Butanol from Biomass	Federal	US Department of Energy	6/1/10	5/31/11	33.33%	\$400,000.00	\$133,333.33	49.74%	54165

Sponsored Program New Awards and Award Funding Changes
Fiscal Year 2010-11

Department Name	Name	PI/CoPI	Title	Sponsor Type	Sponsor Name	Award Start Date	Award End Date	Credited Share Percentage	Total Award Change Amount	Credited Award Change Amount	IC:DC Ratio	Award Number
Paper and Bioprocess Engineering	Omorii, Mr. Shigetoshi	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Omorii, Mr. Shigetoshi	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Paper and Bioprocess Engineering	Ramarao, Dr. Sandaru V	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Ramarao, Dr. Sandaru V	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Ramarao, Dr. Sandaru V	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	Hot Water Extraction of Hardwood Chips and Utilization of the Residual Chips and Wood	Federal	US Department of Energy	10/1/07	9/30/10	9.09%	\$713,625.00	\$64,875.00	48.82%	44709
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	Empire State Paper Research Institute Budget 09/10	Nonfederal	Empire State Paper Research Associates	4/1/09	3/31/10	10.00%	\$30,976.69	\$3,097.67	35.70%	49967
Paper and Bioprocess Engineering	Scott, Dr. Gary M	C	Empire State Paper Research Institute Budget 10/11	Nonfederal	Empire State Paper Research Associates	4/1/10	3/31/11	10.00%	\$125,000.00	\$12,500.00	35.70%	52286
Subtotal - Paper and Bioprocess Engineering					Credited-	-Number:		8.20	-Amount:	1,420,681	44.9%	

Table 38. Summary of active sponsored grants.

<u>Award PI</u>	<u>Budget</u>	<u>Balance</u>	<u>Funding Source</u>	<u>Organization</u>
Department Allocations	\$6,950.29	\$2,100.33	BALANCE-MULTIPLE SPONSORS	550 VP for Academic Affairs and Provost
Department Allocations	\$1,675.00	\$1,675.00	BALANCE-MULTIPLE SPONSORS	550 VP for Academic Affairs and Provost
Department Allocations Total	\$8,625.29	\$3,775.33		
Individual RIF	\$1,880.57	\$1,264.64	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$800.00	\$84.75	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$6,608.49	\$7,384.49	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$800.00	\$508.43	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$4,601.37	\$2,796.00	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$2,380.57	\$1,309.38	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$4,036.85	\$2,310.85	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$3,684.03	\$824.19	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$4,026.57	\$3,843.92	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF	\$2,650.00	\$1,506.51	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Individual RIF Total	\$31,468.45	\$21,833.16		
Laboratory Maintenance	\$1.00	\$471.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$500.00	\$500.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$2,000.00	\$1,907.18	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$2,000.00	\$2,000.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$500.00	\$500.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1,500.00	-\$3,862.06	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$2,500.00	\$1,861.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1,500.00	\$1,305.53	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$2,403.00	CAMPUS SF ACCOUNTS MULTIPLE	550 Faculty of Paper Science and Engineering

			SPONSORS	
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$3,187.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$2,185.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$3,731.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$3,921.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$981.00	CAMPUS SF ACCOUNTS MULTIPLE SPONSORS	550 Faculty of Paper Science and Engineering
Laboratory Maintenance	\$1.00	\$1.00	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Laboratory Maintenance Total	\$10,514.00	\$21,097.65		
Outreach/Tech Services	\$6,543.04	\$6,543.04	BALANCE-MULTIPLE SPONSORS	550 VP for Academic Affairs and Provost
Outreach/Tech Services	\$1,076.71	\$1,076.71	BALANCE-MULTIPLE SPONSORS	550 VP for Academic Affairs and Provost
Outreach/Tech Services Total	\$7,619.75	\$7,619.75		
Pilot Plant	\$189,234.15	\$56,030.45	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Pilot Plant	\$23,532.25	\$4,670.63	MULTI FUNDING	550 Faculty of Paper Science and Engineering
Pilot Plant Total	\$212,766.40	\$60,701.08		
Research Incentive	\$16,074.00	\$44.90	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Research Incentive	\$21,050.00	\$10,008.90	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Research Incentive Total	\$37,124.00	\$10,053.80		
Amidon, Dr. Thomas E	\$130,769.00	\$102,749.19	NEW YORK CITY DEPT OF ENVIRONMENTAL PROTECTION	380 Office of the President
Amidon, Dr. Thomas E	\$1,735,273.51	\$2,994.35	US DEPARTMENT OF ENERGY	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$20,319.49	\$0.09	US DEPARTMENT OF ENERGY	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$383,643.77	\$0.65	O'BRIEN AND GERE ENGINEERS	550 Faculty of Paper Science and Engineering

Amidon, Dr. Thomas E	\$167,992.69	\$2,142.59	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$12,984.00	\$2,392.00	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$150,860.00	\$100,152.25	US DEPARTMENT OF ENERGY	380 VP Business & Finance
Amidon, Dr. Thomas E	\$42,000.00	\$4,016.33	WASHINGTON STATE UNIVERSITY	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$0.00	-\$12,725.84	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$16,033.00	\$11,815.00	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$10,192.00	\$7,511.00	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$10,144.00	\$7,475.00	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$10,187.00	\$6,797.02	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$31,181.00	\$8,531.34	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$10,734.00	\$7,788.50	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$6,492.00	\$4,784.00	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E	\$30,037.00	\$22,135.00	EMPIRE STATE PAPER RESEARCH ASSOCIATES	550 Faculty of Paper Science and Engineering
Amidon, Dr. Thomas E Total	\$2,768,842.46	\$278,558.47		
Bujanovic, Dr. Biljana	\$1,950.00	\$314.40	USDA COOPERATIVE STATE RESEARCH SERVICE	550 Research Administration
Bujanovic, Dr. Biljana	\$27,410.00	\$393.61	USDA COOPERATIVE STATE RESEARCH SERVICE	550 Research Administration
Bujanovic, Dr. Biljana	\$27,445.00	\$9,435.15	USDA COOPERATIVE STATE RESEARCH SERVICE	550 Research Administration
Bujanovic, Dr. Biljana	\$20,000.00	\$2,579.33	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Bujanovic, Dr. Biljana Total	\$76,805.00	\$12,722.49		
Doelle, Dr. Klaus	\$25,000.00	\$6,188.93	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Doelle, Dr. Klaus	\$8,000.00	\$1,316.63	RF ALLOCATION RESERVE ACCOUNT	550 VP for Academic Affairs and Provost
Doelle, Dr. Klaus Total	\$33,000.00	\$7,505.56		

Fieschko, John C	\$190,000.00	\$35,694.78	HILLIARD CORPORATION	550 Faculty of Paper Science and Engineering
Fieschko, John C	\$75,000.00	\$356.21	NYS ENERGY RESEARCH AND DEVELOPMENT AUTHORITY	550 Faculty of Paper Science and Engineering
Fieschko, John C	\$75,000.00	\$1,338.85	BLUE HIGHWAY LLC	550 Faculty of Paper Science and Engineering
Fieschko, John C	\$55,350.00	\$7,257.64	NYS ENERGY RESEARCH AND DEVELOPMENT AUTHORITY	550 Faculty of Paper Science and Engineering
Fieschko, John C Total	\$395,350.00	\$44,647.48		
Francis, Dr. Raymond C	\$108,363.00	\$147.12	USDA FOREST SERVICE	550 Faculty of Paper Science and Engineering
Francis, Dr. Raymond C	\$197,333.00	\$18,343.15	ANDRITZ INC	550 Faculty of Paper Science and Engineering
Francis, Dr. Raymond C	\$4,000.00	\$1,869.99	ANDRITZ INC	550 Faculty of Paper Science and Engineering
Francis, Dr. Raymond C	\$188,006.00	\$5,141.04	NATIONAL SCIENCE FOUNDATION	550 Faculty of Paper Science and Engineering
Francis, Dr. Raymond C Total	\$497,702.00	\$25,501.30		
Liu, Dr. Shijie	\$105,000.00	\$35,049.36	ALBERTA PACIFIC FOREST INDUSTRIES INCORPORATED	550 Faculty of Paper Science and Engineering
Liu, Dr. Shijie	\$62,917.00	\$11,599.33	NYS ENERGY RESEARCH AND DEVELOPMENT AUTHORITY	550 Faculty of Paper Science and Engineering
Liu, Dr. Shijie	\$12,083.00	\$4,612.00	NYS ENERGY RESEARCH AND DEVELOPMENT AUTHORITY	550 Faculty of Paper Science and Engineering
Liu, Dr. Shijie	\$70,200.00	\$14,634.81	NYS ENERGY RESEARCH AND DEVELOPMENT AUTHORITY	550 Faculty of Paper Science and Engineering
Liu, Dr. Shijie Total	\$250,200.00	\$65,895.50		
Ramarao, Dr. Bandaru V	\$39,403.95	\$1,151.48	NYS ENERGY RESEARCH AND DEVELOPMENT AUTHORITY	550 Faculty of Paper Science and Engineering
Ramarao, Dr. Bandaru V Total	\$39,403.95	\$1,151.48		
Schroeder, Dr. Leland	\$5,281.62	\$2,524.21	BALANCE-MULTIPLE SPONSORS	550 VP for Academic Affairs and Provost
Schroeder, Dr. Leland Total	\$5,281.62	\$2,524.21		
Scott, Dr. Gary M	\$31,000.00	\$13,722.40	USDA FOREST SERVICE	550 Faculty of Paper Science and Engineering
Scott, Dr. Gary M	\$15,000.00	\$6,157.00	ALFRED P SLOAN FOUNDATION	230 Director's Office - Graduate Div
Scott, Dr. Gary M Total	\$46,000.00	\$19,879.40		

Grand Total \$4,420,702.92 \$583,466.66