

EMPIRE STATE PAPER RESEARCH ASSOCIATES INC.



AN INTERNATIONAL ASSOCIATION DEDICATED TO RESEARCH IN RENEWABLE SUSTAINABLE RESOURCES

STATE UNIVERSITY OF NEW YORK

COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY

SYRACUSE, NEW YORK USA

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ESPR MISSION STATEMENT

ESPR VISION Effective commercial utilization by ESPRA member companies of technical innovations and core competencies at the SUNY College of Environmental Science & Forestry

ESPR Missions

- Provide an environment for open exchange of precompetitive information among academic and industry representatives on recent technical developments and future industry needs/opportunities
- Promote exploratory and applied research on innovative and commercially viable processes and products for more effective utilization of forest based resources
- Identify and prioritize sponsored research projects based upon the needs of member companies
- Provide financial support for high priority research and key basic technology projects
- Provide technical, industrial and economic guidance to principal investigators and graduate students
- Transfer promising technology to member companies for commercial evaluation

CONTENTS

Title	Page
Executive Board Members of ESPRA	1
Board of Directors, ESPRA	1
ESPRA Mission Statement	1
Addresses	2
ESPRA – A Brief Description	3
Member Benefits	3
ESRPA Member Companies 2005	4
ESPRA Annual Meetings	5
ESPRA By-Laws	6
ESPRI Budget	10
ESPRI Description	11
ESPRI – Research Projects	12
ESPRI – Principal Investigators	12
ESPRI – Staff & Graduate Students	14
ESPRI – Meetings	15
Publications 2004-2005	17

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A BRIEF DESCRIPTION OF ESPRA

The Empire State Paper Research Associates Inc, known by its acronym ESPRA is a non-profit corporation created for the purpose of fostering fundamental, precompetitive research for the benefit of its member companies and other constituents. The association provides funding for the Empire State Paper Research Institute (ESPRI) and helps steer research projects and communications between the faculty, staff and students of ESPRI and ESPRA members. It is one of the very few associations with international membership and scope fostered towards application of academic research in the forest products industry. ESPRA was founded in 1945 by ten US and Canadian companies and has established a solid reputation around the world as a lead forum for academic/industrial liaison.

ESPRA partners with the State University of New York College of Environmental Science and Forestry to jointly fund the research activities of the Empire State Paper Research Institute within the Faculty of Paper Science and Engineering (PSE). ESPRI is located in Walters Hall, the home of the PSE faculty on the campus of SUNY ESF in Syracuse NY. This building was constructed in 1969 and houses a modern pilot plant including two papermachines (PM1 & PM2 48" and 12" trim widths), pressurized 12" disk refiner, batch digesters, well equipped pulping, bleaching, papermaking and paper testing laboratories. An environmental engineering laboratory and a complete deinking pilot facility are also available.

ESPRI has a worldwide reputation for leading advances in pulping chemistry and lignins, bleaching including non-chlorine based bleach processes, water drainage and fines retention, physics of paper consolidation, moisture effects and diffusion, physics of paper materials, fiber mechanics, paper formation and surface properties. Recently, ESPRI has pioneered the concept of the biorefinery and development of new forest based materials to provide value prior to pulping of wood.

The College of Environmental Science and Forestry has many specialized faculties and institutes which collaborate closely with ESPRI researchers and staff. Prominent among these are the Cellulose Research Institute, the Polymer Research Institute and the Nelson C Brown Center for Ultrastructure Studies. The college has a global reputation for pioneering advances in wood chemistry, wood structure, chemistry and properties of natural polymers and cellulose.

MEMBER BENEFITS

Full knowledge of the detailed development of the research projects from their inception. Gives the ESPRA member the opportunity to adapt and build on this knowledge in its own laboratories, long before any results are released for publication or patenting.

ESPRI research is leveraged by contributions of the State University of New York & other Federal and State funding sources (see budget page for current details).

Members receive two research reports annually. These reports cover the project progress at the Empire State Paper Research Institute during the reporting period.

Members participate in the biannual technical meetings of ESPRA where the research results are orally presented and discussed.

Members participate in the development and direction of the research program.

Reduced royalty rates on patented inventions by ESPRA member companies of record on the date of the disclosure.

ESPRI trained graduate students and post-doctoral fellows are often employed by ESPRA member companies.

Member companies have the privilege of sending representatives to visit ESPRI in Syracuse to discuss problems of mutual interest and concern. Also, ESPRI staff members visit technical personnel of member companies, to discuss ESPRI research and other problems of interest to the member company.

Member company personnel enjoy access to a substantial research program. Through this program they have the opportunity of reviewing new ideas and developments with the scientists of ESPRI and the University and with the research leaders of the industry in various countries.

ESPRA MEMBER COMPANIES 2007

AMERICAN PROCESS INC, USA

ARACRUZ CELULOSA, BRAZIL

HERCULES INC, USA

INTERNATIONAL PAPER CO, USA

MEADWESTVACO CORP, USA

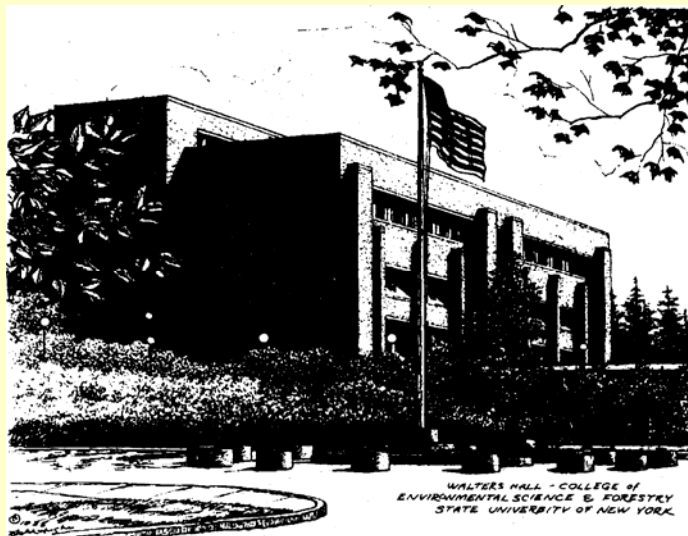
OJI PAPER CO LTD, JAPAN

SOLVAY CHEMICALS, BELGIUM

SPECIALTY MINERALS INC, USA

STORA ENSO OYJ, SWEDEN-FINLAND

WEYERHAEUSER CO, USA



ESPRA ANNUAL MEETINGS

1962	Norrkoping	Sweden	1986	Rio de Janeiro	Brazil
1964	London	England	1987	Charlotte, NC	USA
1966	Helsinki	Finland	1988	Falun	Sweden
1967	Jacksonville, FL	USA	1989	Portland, OR	USA
1968	Falun	Sweden	1990	Seville	Spain
1970	Luchon	France	1991	Virginia Beach, VA	USA
1971	Vancouver, BC	Canada	1992	Tsukuba	Japan
1972	Ornskoldsvik & Sundsvall	Sweden	1993	Princeton, NJ	USA
1974	San Remo	Italy	1994	Helsinki	Finland
1976	Helsinki, Varkaus & Pori	Finland	1995	Seattle, WA	USA
1977	Tomakomai & Kyoto	Japan	1996	Maastricht	Netherlands
1978	Mobile, AL	USA	1997	Cincinnati, OH	USA
1979	Maastricht & Brussels	Netherlands & Belgium	1998	Syracuse, NY	USA
1980	Tacoma, WA	USA	1999	Campos do Jordao	Brazil
1981	Rotorua	New Zealand	2000	Duluth, MN	USA
1982	Trois Rivieres, Quebec	Canada	2001	Bethlehem, PA	USA
1983	Helsinki	Finland	2002	Syracuse, NY	USA
1984	Wisconsin Rapids, WI	USA	2003	Syracuse, NY	USA
1985	Toronto, Ontario	Canada	2004	Syracuse, NY	USA
2006	Vancouver, BC	Canada	2005	Syracuse, NY	USA
			2007	New York, NY	USA

By-Laws of ESPRA

At STATE UNIVERSITY COLLEGE OF FORESTRY,
Syracuse, New York 13210.
November 1945 (Revised March 1964, March
24, 1971, October 19, 1976*, April 5, 1981*,
June 6, 1983*, May 21, 1984).

Approved by Board of Directors and by the
Associates at their meetings on October 19,
1976; April 5-6, 1981; June 6, 1983; and May
21, 1984.

ARTICLE 1 - Membership

SECTION 1 Members

Any person, firm or corporation may become a
member of this Association upon approval by
the Board of Directors of the membership
application and payment of the dues prescribed
by these By-Laws.

Section 2 Rights of Members

Each member shall have the equal right to vote
and to hold office through its Official
Representative.

Section 3. Official Representatives.

Official representatives shall include one person
and an alternate from each paid member of the
Association. Each member shall name its own
Official Representatives and shall inform the
Secretary in writing. The Secretary shall supply
the membership with an accurate list of
members and representatives each year at the
time of the annual meeting. Whenever a
representative to ESPRA leaves his company,
either by joining another member or a
nonmember company or for other reasons, he is
automatically dropped from representation and
any office he may hold. It will be the company's

responsibility to appoint a new representative.
Office vacancies will be filled in the normal manner
by action of the Nominating Committee and the
Board of Directors.

Section 4. Advance Notice of Resignation

Any member company contemplating withdrawal
from membership in ESPRA, shall give not less than
a one-year advance notice of intent to resign. Such
notice shall be sent by letter to the Secretary of
ESPRA.

ARTICLE II - Dues

Section 1. Annual Dues

Annual dues in the Association shall be
recommended annually by the Board of Directors
and approved by the membership at the Annual
Meeting.

Section 2. Date Payable

Dues shall be payable at such times as the Board of
Directors may prescribe.

Section 3. Failure to Pay

Failure to pay dues may, under such rules as the
Board of Directors may prescribe, be cause for loss
of membership.

ARTICLE III - Meetings

Section 1. Annual Meetings

There shall be an annual meeting of the
Association each year during the Spring (March-
June) on a day determined by the Board of
Directors, for election of members to the Board of
Directors and for receiving the annual reports of
officers, directors and committees and the
transaction of other business. Notice of such
meeting shall be mailed by the Secretary at least
forty two (42) days before the date of the meeting.
The Board of Directors may also designate an
Autumn meeting each year, preferably in October
for the receiving of semi-annual reports of officers,
directors, and committees and the transaction of
other business. Notice of such meeting shall be
mailed by the Secretary at least thirty (30) days
before the date of the meeting.

Section 3 Quorum.

The presence in person or by proxy of not less than one-tenth of the members of the Associates entitled to vote shall be necessary to constitute a quorum for the transaction of business at meetings of the Associates, provided an announcement and agenda of the meeting have been sent in writing by the Secretary to the qualified representatives of the Associates one month in advance of the meeting. Exceptions are special meetings called for the election of directors, as provided in former sections 22 and 23, now numbered Section 604 of the New York State Not-for-Profit Corporation Law, at which meetings those attending in person or by proxy shall conduct business. At regular meetings, a lesser number than one-tenth of the qualified members may adjourn to some later date and the Secretary shall thereupon mail notice of the adjournment and the date of the next meeting one month in advance of the meeting date.

Section 4 Inspectors of Election.

Two Inspectors of Election shall be chosen by vote of the members at the first annual meeting and at each subsequent annual meeting. It shall be their duty to act as Inspectors of Election at the next annual meeting and at all special meetings until the next annual meeting.

Section 5 Voting.

Every member company, through its Official representative or Alternate present at meetings, shall be entitled to one vote on all questions presented. All questions, the manner of deciding which is not otherwise prescribed, shall be decided by majority vote of the Official Representatives or Alternates present in person or by proxy.

ARTICLE IV - DirectorsSection 1 Number and Election.

The property, affairs, business and concerns of the Association shall be vested in a Board consisting of nine elected Directors. At each annual meeting of the Association, three of the nine members shall be elected by ballot, each to serve a three-year term of office. No limit is set on the number, of terms that a person may serve as Director, but no person may serve in this capacity for more than two full terms in immediate succession. An exception to this rule is in the case of a member of the Board who i

Elected President. Such a person may continue to serve on the Board during the time of his presidency up to a maximum of two terms of three years each, from the date of his election as President. The members of said Board shall, upon election, immediately enter upon the performance of their duties and shall continue in office until their successors shall be duly elected and qualified. The elected Officers of the Association shall be ex officio members of the Board but without the right to vote or be chairmen of committees of the Board, except for the President who is an elected member of the Board.

Section 2 Duties of Directors.

The Board of Directors shall have the power to hold meetings at such times and places as they may think proper, to elect the officers of the Association, to appoint committees on particular subjects from the members of the Board, or from other members of the Association; to audit bills and disburse funds of the Association; to employ agents, and to audience contracts and devise and carry into execution such other measures as they may deem proper and expedient to promote the objectives of the Association.

Section 3 Meetings of the Board.

Regular meetings of the Board of Directors shall be held within three (3) days of the date of the annual spring meeting and at such other times as the Board may designate. The President may, when he deems necessary, or the Secretary shall, at the request in writing of three members of the Board, issue a call for a special meeting of the Board. Seven (7) days' notice shall be required for such special meetings.

Section 4 Quorum.

One third of the elected members of the Board of Directors shall constitute a quorum for the transaction of business, provided an announcement and agenda of the meeting have been sent to the elected members of the Board one month in advance of the meeting. In the absence of the President and Vice-President, the quorum present may choose a Chairman for the meeting. If a quorum is not present a lesser number may adjourn the meeting to a later date.

Section 5 Vacancies.

Whenever any vacancy shall occur in the Board of Directors by death, resignation or otherwise, the same shall be filled by a majority vote by

ballot of the Official Representatives of the members at the next regular meeting of the Association. Alternatively, the vacancy may be filled by a majority vote by ballot of the remaining elected members of the Board. In the latter event, the person so chosen shall hold office until the next annual meeting or until his successor shall have been chosen at a special meeting of the members.

Section 6 Removal of Directors.

Any one or more of the Directors may be removed, either with or without cause, at any time, by a vote of two-thirds of the members present at any special meeting called for that purpose.

ARTICLE V-Officers

Section 1 Number.

The Officers of this Association shall consist of a President, one or more vice-presidents of equal rank, a Treasurer, and a Secretary or Executive Secretary. One vice-president is to be a resident of the United States or Canada. Other Vice Presidents may be elected upon the judgment of the Board to represent ESPRA members in other regions of the world (such as Europe or Asia). The term of office for the Officers of ESPRA is three years.

Section 2 Method of Election.

The Board of Directors shall elect all officers for a term of three years, the President being elected from the members of the Board of Directors. A majority of a quorum present shall be necessary to constitute an election. The Board of Directors may choose to appoint an Executive Secretary on an annual basis instead of electing a Secretary. Such an appointment shall be by a majority of a quorum present.

Section 3 Duties of Officers.

The duties and powers of the Officers of the Association shall be as follows:

President The President shall preside at the meetings of the Association and of the Board of Directors and shall be a member ex-officio, with right to vote, of all committees. He shall also, at the annual meeting of the Association and such other times as he shall deem proper, communicate to the Association or to the Board of Directors such matters and make such suggestions as may in his opinion tend to promote and increase the usefulness of the Association, and shall perform such other duties as are necessarily incident to the office of President of the Association.

Vice presidents In case of the absence of the President, or of his death or inability from any cause to act, the Vice president (determined by geographical needs)

shall perform the duties of his office until the President is able to reassume his duties or until an election has been held.

Secretary (or Executive Secretary) It shall be the duty of the Secretary to give notice of and attend all meetings of the Association and all committees and keep a record of the doings; to conduct official correspondence and to carry into execution all orders, votes and resolutions not otherwise committed; to notify the officers and members of the Association of the election; to notify members of the appointment on committees; to furnish the Chairman of each committee with a copy of the vote under which the committee is appointed, and at his request to give notice of the meetings of the committee; to prepare, under the direction of the Board of Directors, an annual report of the transactions and condition of the Association, and generally to devote his best efforts to forwarding the business and advancing the interests of the Association, In case of absence or disability of the Secretary, the Board of Directors may appoint a Secretary pro tern. The Secretary shall be the keeper of the Seal of the Association. The duties and powers of an Executive Secretary shall be the same as those described above for Secretary, together with such other duties as may be prescribed by the Board of Directors.

Treasurer The Treasurer shall keep an account of all moneys, received and expended for the use of the Association, and shall make disbursements only upon vouchers countersigned by such person designated by the Board of Directors. He shall deposit all sums received in a bank approved by the Board of Directors, and make a report at the annual meeting or when called upon by the President.

The funds, books and vouchers in his hands shall at all times be under the supervision of the Board of Directors and subject to its inspection and control; and at the expiration of his term of office, he shall deliver over to his successor all books, moneys and other property, or, in the absence of the Treasurer-elect to the President. In case of the absence or disability of the Treasurer, The Board of Directors may appoint a Treasurer pro tern. The office of Secretary and Treasurer may be held by the same person.

Section 4 Bond of Treasurer.

The Board of Directors shall take out a bond covering the Treasurer in such amount as the Board shall deem appropriate. The Board may also, if it deems desirable, bond all officers and agents of this corporation.

Section 5 Vacancies, How Filled.

All vacancies in any office shall be filled by the

Board of Directors without undue delay, at its regular meeting or at a meeting specially called for that purpose.

Section 6 Compensation of Officers.

The officers shall receive such salary or compensation as may be determined by the Board of Directors.

ARTICLE VI - Committees

Section 1 Committee on Nominations.

At the regular spring meeting each year, the Board of Directors shall appoint a Nominating Committee of three members, none of whom shall be a member of the Board, whose duty it shall be to nominate candidates for Directors to be elected at the next annual election. They shall notify the Secretary in writing at least ninety (90) days before the date of the annual meeting, of the names of such candidates, and the Secretary, except as herein otherwise provided, shall mail a copy of the Committee's report with a notice of the meeting.

Section 2 Independent Nominations.

Any member present in person or by proxy at the annual meeting may nominate candidates for directors to be elected at the meeting.

Section 3 Executive Committee.

There shall be an Executive Committee of the Board of Directors consisting of five to eight members. The President and Treasurer of this Association shall automatically become members of the Executive Committee. The appointments for the other members of this Committee shall be for terms of three years, one new member being appointed by the Board of Directors at each regular Spring meeting from among the membership of The Board of Directors. The Board of Directors may also appoint up to not more than three additional members from the Association to the Executive Committee, with staggered appointments of one per year. It shall be the responsibility of the Executive Committee to make recommendations to the Board of Directors.

Section 4 Other Committees.

The Board may, from time to time, also appoint other standing and/or temporary committees, including an Auditing Committee, which committees the Board may invest with such powers of the Board, and make subject to such conditions as the Board may see fit; provided, however, that no major powers of the Board shall be delegated to any such committee without the approval of at least seven-ninths of all the members then on the Board. Except for the Nominating Committee and the Executive Committee, the Board may delegate to the President the power to make appointments to committees, including the filling of vacancies.

Section 5 Committee Quorum.

Those present at any committee meeting of the Association shall constitute a quorum for the transaction of business.

ARTICLE VII-Seal

Section 1 Seal.

The seal of the Association shall be in the form of a circle containing the name of the Association and year of incorporation thus:



ARTICLE VIII- Fiscal Year

Section 1 Fiscal Year.

The fiscal year of the Association shall begin on April 1 and end on March 31.

ARTICLE IX - Amendments

Section 1 Amendments.

These By-laws may be amended, repealed or altered in whole or in part by a majority vote at any duly organized meeting of the Association, provided notice of the proposed change is included in the notice of the meeting which is to consider the change.

Section 2

These By-laws may also be amended, repealed, or altered in whole or in part by unanimous vote of the Board of Directors, but any By-laws made by the Board of Directors may be amended, repealed, or altered by the members at any annual meeting, or at any special meeting, providing notice thereof be included in the notice of the meeting.

ARTICLE X -Disposition of Assets on Dissolution

Section 1

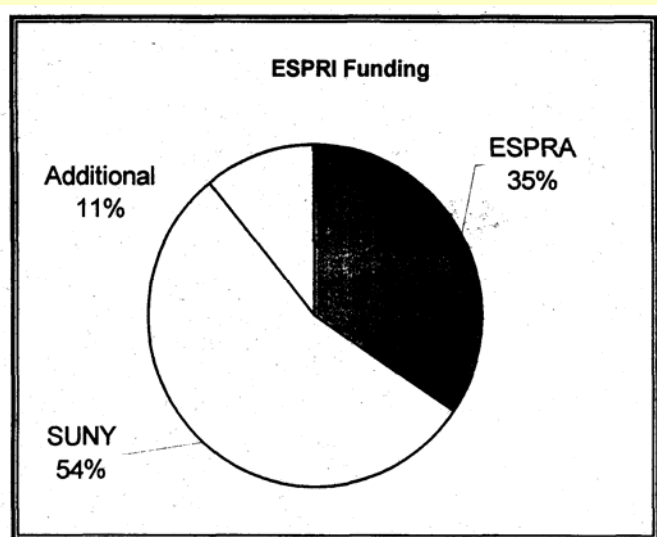
In the event of dissolution of the Association, the assets remaining after the payment of its just debts and obligations shall be transferred to the State University of New York College of Environmental Science and Forestry to complete any remaining obligations under the terms of any agreements or contract between this Association and the College. Any surplus after such obligations have been met, shall be used by the College for fellowship or

scholarship grants to graduate students in pulp and paper research.

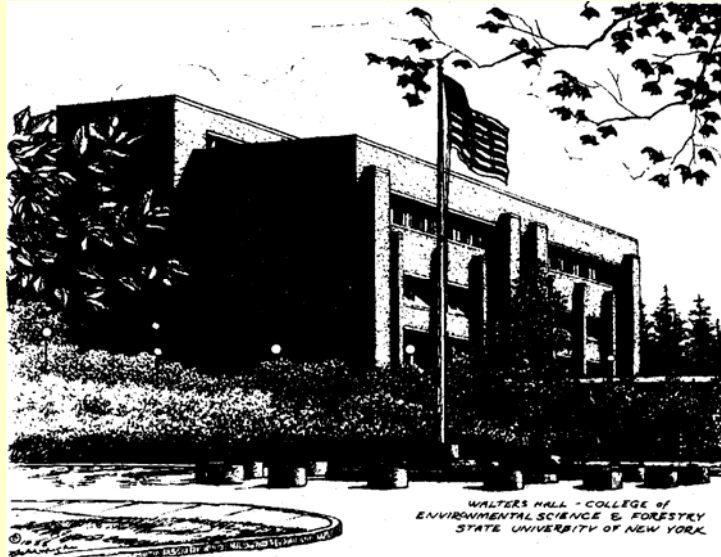
ESPRA BUDGET

ESPRA provides funding to ESPRI through the Research Foundation of SUNY. The ESPRA budget including its contribution towards the ESPRI budget, membership meetings and other expenses are reported & approved at the ESPRA annual meeting. Additional resources co-fund the annual budget of ESPRI. These include contributions towards personnel, equipment, indirect costs and other items as well as direct project research support. The primary sources of additional co-funding are SUNY ESF and outside federal and state funding agencies such as US National Science Foundation, US Department of Energy, US Department of Agriculture and New York State (NYSERDA).

The chart below shows an approximate distribution of ESPRI funding sources.



EMPIRE STATE PAPER RESEARCH INSTITUTE



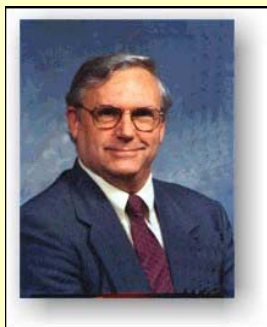
ESPRI MISSION

- To conduct scientific research for the development of new concepts and deeper insights into the basic nature of pulp and paper materials and processes which can be applied by ESPRA members to advance the growth and vitality of the industry.
- To educate and train competent scientists and engineers for the pulp and paper industry.

ESPRI RESEARCH PROJECTS 2007

Project No	Title	Principal Investigator*, Co Investigators
1	Chemistry of Kraft Lignin & Processes	Y Z Lai
2	Chemistry of AQ/MAQ and other pulping & bleaching processes	R C Francis
3	Yield improvement of HW pulping by DPM bleach process	R C Francis*, B V Ramarao
4	3 D Structure of Paper and Materials and its impact on Processes & Properties	B V Ramarao
5	Consolidation of fiber mats during dewatering/wet pressing	B V Ramarao
6	Hemicellulose extraction from wood	S Liu
7	Biorefinery - Extracting valuable products prior to pulping of wood	T E Amidon*, R C Francis G M Scott

Current Principal Investigators & Staff 2005



Thomas E. Amidon (joined 2000) Director, ESPRI, Professor & Chair, PSE. Tom has served as director of ESPRI since 2002. Tom has initiated pioneering research efforts to extract value from wood prior to pulping . He is the leader in investigating biorefinery processes and products. Prior to joining SUNY ESF, Tom was managing research and technical teams in primary process development and research laboratories for International Paper Company in Tuxedo NY. B. S. SUNY ESF (1972); M. S. & Ph. D. SUNY ESF (1976).



Raymond Francis (joined 1987) ESPRI, research associate. At ESPRI, Ray has undertaken numerous projects related to pulping, bleaching, and wood chemistry. These include Thermomechanical pulping process above the glass transition temperature, high-yield pulps from hybrid poplars, photo-yellowing of pulps, and delignification processes with carote. Most recently, Ray has been studying the effect of transition metals on bleaching and brightness reversion, and is continuing an extensive study on the composition of various lignins by the permanganate oxidation method. B.A.Sc, University of Toronto, 1982; Ph.D., 1987.

Shijie Liu (joined 2006). Assistant Professor, PBE. Shijie's research interests are in reaction engineering and mass transfer aspects with applications in pulping and bleaching as well as bioprocessing. He also has an interest in process modeling and optimization. His current research focus is in various biorefinery processes including extraction, hydrolysis, kraft pulping, refiner energy optimization, agriculture biomass/fiber utilization, and bioprocessing/biochemical engineering. B. Sc. (Chem. Eng.) Cheng-Du University of Science and Technology (now Sichuan University), China (1982); Ph. D. Chemical Engineering, University of Alberta, Edmonton (1992). Contact: sliu@esf.edu; 315-470-6501



Yuan-Zong Lai (joined 1981) ESPRI, senior research associate. In early work with ESPRI, Yuan-Zong worked on projects such as the improvement of alkaline pulping selectivity and the mechanisms involved in chemical modification of chemically pretreated mechanical pulps. Over the past ten years, his work has focused more on fundamental questions in wood chemistry. Yuan-Zong has used the measurement of free phenolic hydroxyl groups to determine the influence of chemical treatments on wood and wood lignin. He has also used this method in combination with phenyl nuclear exchange, and nitrobenzene oxidation to further analyze the structures of various lignins. Most recently, Yuan-Zong and his group have studied acidic delignification reactions and the role of phenolic and condensed units in oxygen bleaching. Senior Research Associate, ESPRI. B.S. National Taiwan University, 1963; M.S., University of Washington, 1966; M.S. 1967; Ph.D., 1968. Research Chemist, University of Montana (1970), Assistant Professor, Michigan Technological University (1975).



Bandaru V. Ramarao (joined 1988) Associate Director, ESPRI & Professor, PSE. Ram's background is in fluid mechanics, transport phenomena, thermodynamics and chemical engineering. His research interests are in pulp drainage, fine particle retention, dewatering and pulp consolidation, relationship of structure to papermaking processes and product properties. He also has an active interest in colloidal science applications in separations processes including hydrosol and aerosol filtration and adsorption. B. S. Ch. E. - University of Madras, India (1980); M. S. & Ph. D. - Chemical Engineering, Clarkson University, Potsdam NY (1986).

Gary M. Scott (joined 1997), Associate Professor & Associate Chair, PSE. Gary's research interests center in bio-pulping and biological processing of wood. He also has an interest in dynamic process simulation of pulp and paper industry processes. His current focus in research is in various biorefinery processes particularly using biological agents to enhance extraction and pulping processes. B. S. PSE - University of Wisconsin, Stevens Point (1990); M. S. - University of Wisconsin, Madison WI - Computer Science; Ph. D. - University of Wisconsin, Madison WI (Chemical Engineering) - 1994.



Sergei A. Lavrykov (joined 2002). Research Scientist. Sergei has research interests in the application of finite element methods in paper processes and paper deformation mechanics. He also is involved in studying paper mat formation and consolidation processes. B. S. M. E., National Technical University, Ukraine, Kiev (1979); M. S. (1979).

Samar K. Bose (joined 2004). Senior Research Scientist. Samar is investigating the kinetics of non-sulfur based pulping processes using anthraquinone and its derivatives. Another project he is involved with is derivatization of pulp fiber surfaces using oxidative polymerization chemistries. B. S. Forestry & Environmental Science, Dacca University, Bangladesh; M. S. & Ph. D. SUNY ESF, PSE (1995).

EMPIRE STATE PAPER RESEARCH INSTITUTE



WEDNESDAY, JUNE 6
EMPIRE STATE PAPER RESEARCH INSTITUTE
126th SPRING MEETING
CHAIR: D. BRUCE EVANS
8.00 -5.00 PM

SESSION W1: PULPING & BLEACHING – R FRANCIS 8 - 9.30 AM

'Mild Acid & Alkaline Pretreatments Before Kraft & SAQ Pulping'

R. Francis, T. E. Amidon, N. H. Shin, T. S. Bolton & D. Kanungo

'Modifications to ClO₂ Bleaching'

A. O. Jain, P. Parasuraman, S. K. Bose, R. C. Francis

PROJECT FORUM

Coffee Break

SESSION W2: PAPERMAKING & PAPER PHYSICS – B V RAMARAO 10 – 11.30 AM

'Heat and Moisture Transport in Paper Sheets'

S. Lavrykov & B. V. Ramarao

'Plasticity and Delamination in Scoring and Folding'

D. Choi, S. Lavrykov & B. V. Ramarao

'Permeability of Pulp and Filler Mats'

R. Singh, S. Lavrykov & B. V. Ramarao

PROJECT FORUM 11.30-Noon

LUNCH Noon – 1.30 PM

SESSION W3: PAPERMAKING & PAPER PHYSICS – Dr. Klaus Dolle 1.30 – 2.15 PM

A Green Future: Challenges for Researchers in the Papermaking and Paper Physics Field

PROJECT FORUM

Coffee Break

SESSION W4: PULPING & BIOREFINERY – Y Z Lai, T E Amidon & S Liu 2.45 – 4.00 PM

'Attempts to Evaluate the Significance of Lignin-Carbohydrate Complexes in Kraft Pulps'

Shiuli Mahmud and Yuan-Zong Lai

'Ethanol from Wood Extract Hydrolyzate – A Breakthrough'

J. Xu, T. Amidon and S. Liu

'Membrane Separation of Wood Extracts: Effect of Osmotic Pressure and Concentration'

C. Wood, T.E. Amidon, S. Liu

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www.esf.edu/outreach/pd/2007/joachim/

www.esf.edu/joachim/2007/

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RECENT PUBLICATIONS

Dr. B. V. Ramarao

1. Choi, D., S. Lavrykov & B. V. Ramarao. 'Simulation studies of delamination effects in the scoring and folding of paperboard.' Proceedings of International Paper Physics Conference, Gold Coast, Australia (2007).
2. Lavrykov, S. & B. V. Ramarao. 'Parameters for thermal and moisture transport in paper in response to a thermal pulse.' Proceedings of International Paper Physics Conference, Gold Coast, Australia (2007).
3. Liu, S., Amidon, T. E., Francis, R. C., Ramarao, B. V., Lai, Y.-Z., and Scott, G. M. From forest biomass to chemicals and energy. *Industrial Biotechnology* 2: 113-120 (2006).
4. 'Cake Filtration Approaches – A Criticism.' Letter to the Editor **AIChE** Journal, 52, 5, 1971 (2006).
5. Tien, C. & B. V. Ramarao. 'On Analysis of Cake Formation and Growth in Cake Filtration.' *J. Chin. Inst. Chem. Engrs.*, 37, 1, 81-94 (2006).
6. 'Water reuse and filtration using Phaze Box technology.' PIRA Conference on Wet End and Water Reuse, Charleston SC – December 2006.

Dr. R. C. Francis

1. Amidon, T.E., Francis, R.C., Scott, G.M., Bartholomew, J. et al. New product and processes from an integrated forest refinery. *PCT Appl. WO 2006/121634 (4/27/2006)*.
2. Francis, R. C.; Hanna, R. B.; Shin, S.-J.; Brown, A. F.; Riemenschneider, D. E. Papermaking characteristics of three *Populus* clones grown in the north-central United States. *Biomass and Bioenergy* (2006), 30(8-9), 803-808.
3. Liu, S., Amidon, T. E., Francis, R. C., Ramarao, B. V., Lai, Y.-Z., and Scott, G. M. From forest biomass to chemicals and energy. *Industrial Biotechnology* 2: 113-120 (2006).
4. Manning, M. S.; Henry, G. E.; Omori, S.; Francis, R. C. Addition of hydrogen peroxide and molybdate to chlorine dioxide bleaching stages. *Journal of Pulp and Paper Science* (2006), 32(2), 58-62.
5. Francis, R. C.; Shin, S.-J.; Omori, S.; Amidon, T. E.; Blain, T. J. Soda Pulping of Hardwoods Catalyzed by Anthraquinone and Methyl Substituted Anthraquinones. *Journal of Wood Chemistry and Technology* (2006), 26(2), 141-152.

Dr. Y. Z. Lai

1. S. L. Shin, L. R. Schroeder and Y. Z. Lai. "Impact of extractives on lignin determination in kraft pulps." *J. Wood Chem. Technol.*, 24, 139-151 (2004).
2. S. L. Shin, L. R. Schroeder and Y. Z. Lai. "Understanding contributing factors to a low oxygen delignification for hardwood kraft pulps." *J. Wood Chem. Technol.*, (In Press) 2005.

GRADUATE STUDENTS

No	Student Name	Program	ADVISOR	GRADUATION
1	Barber, Vincent	Ph D	T Amidon/G Scott	Completed
2	Bolton, Todd	Ph D	T Amidon/Francis	Completed
3	Branca, David	MS	D S Keller	Summer 07
4	Chaffee, Timothy	Ph D	B V Ramarao	
5	Chaiarrekij, S	Ph D	B V Ramarao	Summer 07
6	Duarte, Gustavo	Ph D	B V Ramarao	
7	Kanungo, Dipankar	Ph D	R Francis	
8	Mahmud, Shiuli	Ph D	Y Z Lai	
10	Marda, Swapnil	MS	S Chatterjee	Completed
11	Markwei, Marilyn	MS	R Francis	Summer 07
12	Massoquete, A	Ph D	B V Ramarao	Completed
13	Mishra, Kunal	M S	T Amidon	Completed
14	Mittal, Ashutosh	Ph D	T Amidon	Completed
15	Parasuraman, Prasanna	MS	R Francis	Summer 07
16	Singh, Ramesh	MS	B V Ramarao	Completed
17	Singh, Sharad	MS	B V Ramarao	Summer 07
18	Tahiliani, Dinesh	MS	S Liu	Summer 07
19	Xu, Haowen	Ph D	G Scott	Completed
20	Mishra, Gangesh	M S	S Liu	
21	Randall, Ray	M S	T Keenan	
22	Graves, Mitchell	M S	R Francis	
23	Chieng, Shan Ning	Ph D	Y Z Lai	
24	Manchiraju, V	Ph D	B V Ramarao	
25	Dhagumudi, Vetrivel	M S	S Chatterjee	
26	Shupe, Allan	M S	T Amidon	
27	Blowers, Misty	Ph D	T Amidon	
28	Wang, Yang	MS	S Liu	
29	Attigobe, Francis	MS	R Francis	
30	Allves, Erika	Ph D	R Francis	