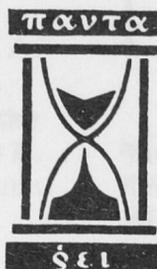


RHEOLOGY BULLETIN

Publication of The Society of Rheology, Inc.

Vol. 56, No. 2



July, 1987

59th ANNUAL MEETING October, 1987

Pierremont Plaza Hotel
590 W. Peachtree St NW
Atlanta, GA 30308
(404/881-6000)

Oct. 17 and 18: SHORT COURSE
Oct. 18-22: TECHNICAL MEETING

The program for the meeting is enclosed with this mailing. If there are questions, please contact the individuals in charge:

LOCAL ARRANGEMENTS

Chairman:

Gary W. Poehlein
Associate Vice President for
Graduate Studies and Research
and Professor of Chemical
Engineering
Georgia Institute of Technology
Atlanta, GA 30332

Telephone: For general inquiries contact the Department of Continuing Education, 404/894-2400

In case of emergency or special need, call Professor Poehlein whose numbers are:

mornings: 404/894-4826
afternoons: 404/894-3090
home: 404/231-9981

PROGRAM

Chairman:

Gregory B. McKenna
Polymers Division
A-209. Bldg. 224
National Bureau of Standards
Gaithersburg, MD 20899
301/975-6752

Co-Chairman:

James M. O'Reilly
Chemistry Division
Research Laboratories
Eastman Kodak Company
Rochester, NY 14650
716/477-4334

INSTRUMENTATION EXHIBIT

Plans are underway for an exhibit of modern rheological instrumentation to accompany the October short course and technical meeting.

SHORT COURSE

The detailed description and registration information are included in this mailing.

SOCIETY OF RHEOLOGY OFFICERS

President R. F. Landel
Vice President J. M. Dealy
Secretary D. G. Baird
Treasurer E. A. Collins
Editor A. B. Metzner
Past President W. R. Schowalter
Members-at-large R. C. Armstrong
W. B. Russell

COMMITTEES

Membership:

S. J. Armour, Chairman
R. H. Colby
H. L. Davis
Hamed Faridi
A. M. Kraynik
M. E. Ryan

Nonimaging:

L. J. Zapas, Chairman

Bingham Award:

L. L. Blyler, Chairman (for 1987 award)
S. J. Kurtz, Chairman (for 1988 award)

Education:

E. A. Collins, Chairman
M. M. Denn
D. Hunston
G. B. McKenna
J. L. Throne

Site Selection:

E. A. Collins, Chairman
D. Hunston
M. E. Ryan

1987 BINGHAM MEDALIST

The Bingham Medal for 1987 will be awarded to Professor Charles F. Curtiss of the University of Wisconsin. Professor Curtiss received his Ph.D. from the University of Wisconsin in 1948, working under J. G. Hirshfelder, and joined the Wisconsin faculty as an Instructor in that same year. He has held appointments in both the Physics and Chemistry Departments at Wisconsin and was promoted to Professor of Chemistry in 1960. He is also associated with the Institute for Theoretical Chemistry and the Rheology Research Center on the Wisconsin campus.

Chuck Curtiss is well-known for his contributions to theoretical physical chemistry, principally in the area of the statistical mechanics and molecular dynamics of small gas molecules. The classic text, *Molecular Theory of Gases and Liquids*, which he coauthored with J. G. Hirshfelder and R. B. Bird in 1954, still represents a bible for those concerned with molecular transport phenomena. In the early 1970's, his background in the kinetic theory of polyatomic gases led him to consider its analogies to the dynamics of polymer molecules, first in dilute solution, then in concentrated solutions and the melt. This insight enabled him to formulate a generalized phase-space kinetic theory of polymeric liquids which is regarded as the most complete and general description of polymer rheology ever produced. Virtually all earlier theories of polymer dynamics, including those of Kramers, Rouse, Zimm, Kirkwood and Doi-Edwards, are included as special cases of the generalized kinetic theory. The theory provides a formalism through which constitutive equations can be obtained rigorously from assumptions made in constructing the molecular model, which in turn allows expressions to be developed for rheological material properties such as viscosity, elongational viscosity and normal stresses. His many years of work in this field were done in close collaboration with R. B. Bird. The combination of Bird's rheological pragmatism and Curtiss' theoretical molecular physics rigor have produced a workable generalized theory which has culminated in the monumentally suc-

RHEOLOGY BULLETIN
Arthur B. Metzner, Editor
Center for Composite Materials
University of Delaware
Newark, DE 19716
302-451-2328

successful text, *Dynamics of Polymer Liquids, Volume II, Kinetic Theory* (coauthored with R. C. Armstrong and O. Hassager), which has just been revised and expanded. This lucid, high-quality textbook should set the standards in theoretical polymer rheology for at least the next decade. With his kinetic theory of polymer liquids Chuck Curtiss has provided polymer rheologists with a special gift. It is for this gift that he is honored as the 1987 Bingham Medalist of the Society of Rheology.

NOMINATIONS FOR 1988-89
OFFICERS OF THE SOCIETY OF RHEOLOGY

The nominating committee (L. J. Zapas, chairman) presents the following candidates for office (2-year terms):

<i>President</i>	John M. Dealy
<i>Vice-President</i>	Robert A. Mendelson
<i>Editor</i>	A. B. Metzner
<i>Secretary</i>	D. G. Baird
<i>Treasurer</i>	E. A. Collins
<i>Members-at-Large</i>	(vote for two)
	Barry Bernstein
	Joseph D. Goddard
	Gregory B. McKenna

MEETING SCHEDULE

Our next major technical meeting will be the TENTH INTERNATIONAL CONGRESS ON RHEOLOGY, AUGUST 14-20, 1988, in SYDNEY, AUSTRALIA. The first announcement, including the call for papers, should have been received by all members of our society several months ago. Abstracts were due by July 1; if anyone wishes to present a paper and has not yet sent an abstract, he should contact the meeting chairman immediately. He is:

Professor Roger I. Tanner
 Department of Mechanical Engineering
 University of Sydney
 Sydney, NSW 2006, Australia
 Telephone: (02) 692-2222
 Telex: AA 26169

The Australian Society has appointed Qantas as the official international carrier and Australian Airlines (formerly TAA) as internal official carrier. Separately, we can consider chartering an aircraft which would pick up passengers at 3 or so U.S. locations and then proceed to the South Pacific. A form concerning this is enclosed.

Following the International Congress our 60th Annual Meeting is scheduled for February, 1989, in Gainesville, Florida.

NOMINATIONS FOR THE 1988
BINGHAM MEDAL

Completed nominations should be in the hands of the award chairman, Dr. S. J. Kurtz, before FEBRUARY 15, 1988. His mailing address is: Polyolefins Division, Union Carbide Corporation, Weston Canal Center, CN 540, Somerset, NJ 08873. Guidelines for this award, with complete details on the format for a nomination, may be found in the January, 1987, bulletin and are not reprinted here. The salient features, however, are:

Nominations shall include the following information about the nominee.

- a. A brief scientific biography
- b. A review of those accomplishments upon which the nomination is based.
- c. A concise evaluation of the importance of the nominee's contribution in advancing the science of rheology.

The following item, if submitted, must be appended to the nomination.

- a. A list of publications.
- b. Reprints (no more than 3).
- c. Supporting letters from other rheologists which address the nominee's contributions.

Copies of the January bulletin are available from the editor's office if desired.

DUES INCREASE

The vote to increase our annual membership dues passed and the new schedule, which will be in effect for 1988 (October, 1987 billing), is as follows:

Regular members:	\$40.00
Student and retired members:	\$25.00

REPORT ON THE SYMPOSIUM,
"RHEOLOGY OF MECHANICAL FAILURE"
HELD AT THE WINTER MEETING OF THE SOCIETY
OF RHEOLOGY, SANTA MONICA, CA,
JANUARY 18-22, 1987

BY J. D. GODDARD AND S. L. PHOENIX

Recent years have seen intensive efforts in mechanics and materials science to formulate constitutive theories of mechanical damage and failure in various solids and composite materials. Many Society members are aware of such efforts, and the Society has from time to time recognized and fostered related activities (e.g., various sessions and papers at Society meetings on the failure of solid polymers; the 1978 Bingham Medal award to Thor L. Smith, in part for his work on rupture in solid polymers; and the symposium on geomaterials, at the 1982 Evanston SofR meeting, published as *J. Rheology*, 28:6, 1984).

The present symposium represents an attempt to further involve the Society in areas sometimes viewed as "solid mechanics" or "strength of materials". The idea for it was partly the outgrowth of a symposium on fracture in polymers and metals, held in the summer of 1986 by the newly established Mathematical Sciences Institute at Cornell University (co-organized by S. L. P.) and of subsequent discussions (of J. D. G.) with Robt. Landel as to suitable topics for a Winter Meeting, not only in 1987 but perhaps beyond. Some of his thoughts on this are reflected in the President's Message, in the SofR Bulletin 56, Jan., 1987, and need not be repeated here. Suffice it to say, the symposium was viewed as an opportunity generally to enhance and broaden the role of the Society as an important interface between materials science and continuum mechanics by bringing together workers interested in various micromechanical, phenomenological and statistical models of mechanical failure.

At the same time, it was a narrower goal to incorporate recent work from the field of statistical physics, where there is currently an exciting and rapid growth in the application of concepts such as percolation and fractal structure to electrical and mechanical breakdown. One of our objectives was to stimulate re-examination, in the light of modern statistical physics, of a number of older and more established statistical theories of failure.

In addition to the above focus, an effort was made to invite a broad variety of papers dealing with general aspects and constitutive models of material instability, yield and fracture. Following is a listing of papers actually presented:

- D1 "On Continuum Theories of Strain Localization" (Invited Lecture) Bernard D. Coleman, Carnegie-Mellon University.
- D3 "Dynamics of Adiabatic Shear Band Formation", T. W. Wright and J. W. Walter, U.S. Army Ballistic Research Laboratory.
- D5 "Sufficient Symmetry Conditions for Isotropy of the Elastic-Moduli Tensor", R. M. Christensen, Lawrence Livermore Laboratory.
- D6 "The Dissipative Simple Continuum as a Model for Yield and Fracture", J. D. Goddard, University of Southern California.
- D7 "Breakdown in Quenched Random Media: Percolation Models", P. M. Duxbury, Michigan State University, P. L. Leath, Rutgers University and P. D. Beale, University of Colorado, Boulder.
- D8 "A Percolation Model for Brittle Fracture", M. Sahimi, M. D. Stephens and J. D. Goddard, University of Southern California.

- D9 "A-Percolation Model for the Failure of Discontinuous Fiber Composites", D. G. Harlow, Lehigh University, and S. L. Phoenix, Cornell University.
- D10 "Scaling in Percolation Models of the Time Dependent Breakdown of Fibrous Materials", S. Leigh Phoenix, Cornell University.
- D11 "Stochastic Monte-Carlo Study of the Molecular Factors Limiting the Strength of Polymer Fibers", Paul Smith, University of California at Santa Barbara, and Yves Termonia, E. I. du Pont de Nemours and Company.
- D12 "Hysteresis, Incremental Collapse and Fatigue", S. A. Guralnick and T. Erber, Illinois Institute of Technology.
- D13 "A Finite Element Study of Stable Crack Growth Under Plane Stress Conditions in Elastic-Plastic Solids", R. Narasimhan, Ares J. Rosakis and J. F. Hall, California Institute of Technology.
- D14 "Failure Models for Liquid and Solid Forms", Andrew M. Kraynik and William E. Warren, Sandia National Laboratories.

With the exception of the Invited Lecture and Paper D5, (originally destined for a late inclusion in the general-papers session but substituted here for a withdrawn paper), the abstracts appear in the Winter Meeting Program and Abstracts booklet. Their order of presentation reflects a rough division into three categories: (1) continuum models, material instabilities and strain localization, papers D1 to D6; (2) statistical models, Papers D7 to D11; and (3) microstructural and discrete models, Papers D12-D14.

B. D. Coleman was a fitting choice for the invited lecturer, given his early works in the 1950's on statistical theories of failure in textile fibers and his recent works on strain-localization phenomena. While his lecture focussed mainly on cold drawing of polymeric fibers, it served well to illustrate many of the main features of strain localization: Material instability (or "non-convexity") leads to a spatial nonhomogeneity which, for quasi-static deformation of a simple material, has indeterminate structure. Higher-order ("non-simple" or "non-local") models or other manifestations of a material length scale are necessary to impart a well-defined spatial structure. Rheological rate effects and dynamics (inertia) add further complexity but may allow one to achieve processing conditions (i.e., draw ratios) not allowed by quasi-static deformation. The related work of Paper D3 shows in effect how thermal softening can lead to material instability, with thermal conduction now providing the requisite length scale for the resultant diffuse shear bands.

Originally intended for the general session, Paper D5 raised important questions about microstructural symmetry which are relevant beyond linear elasticity and, hence, to the final paper, D14. Paper D6 served as a final punctuation to the discussion of continuum models, showing how the idea of a purely dissipative material allows one to construct yield or fracture models for elastoplasticity or elastic fracture, which in general may not be equivalent to various hypoelastic models of plasticity and fracture.

As indicated above, Papers D7 to D11 reveal an important focus of the symposium. Since the published abstracts are fairly descriptive little commentary is needed here, except to say that the first three papers involve rate-independent failure models that do not generally conform to the classical (Weibull) statistics. The latter, based on extreme-value statistics and the "weakest link" hypothesis, may be defective when viewed in the light of percolation theory, since they exhibit a quasi-one-dimensional topology which does not allow properly for the effects of stress and disorder in higher dimensions. Such issues were pursued in D7 to D9, with D7 giving the derivation of a doubly exponential form in place of the Weibull, owing basically to percolation-cluster statistics and crack-tip stress enhancement. Questions were raised as to "cross-over" phenomena for sample-size dependence, whereby the classical statistics might be recovered, and also, as to the significance and sensitivity of empirical fits to various distributions. Papers D10 and D11 address the more difficult and practically important problem of rate-dependent failure, with D11 showing that one can simulate experimental data on highly drawn filaments by means of sufficiently detailed molecular models.

Papers D12 to D14 dealt with plastic and viscoplastic yield or collapse in elastic media or structures. In D14, the audience was treated to some striking computer-generated movies of 2-d periodic-cell models of foams which, not unpredictably, provoked a lively discussion of the underlying physics. As one of the several interesting features, serving to establish a kinship to Paper D12 on engineering structures, Paper D14 illustrates nicely how one can employ existing structural-engineering computer codes for computations on complex micromechanical lattice models.

Although the symposium on material failure was not heavily attended it is the overall assessment of the organizers that the sustained attendance and degree of audience participation indicate the topic to be sufficiently important and viable to merit coverage at future rheology meetings. In line with the introductory remarks, we believe it offers an opportunity to enhance the interaction of the Society with several important and newly emerging areas in the mechanics of materials.

ANNOUNCEMENTS

We are saddened to record the passing, on April 21, 1987, of **STANLEY GEORGE MASON** in Grand'Mere, Quebec. He was an accomplished rheologist whose standards of excellence served as a direct and strong inspiration to all who knew him as well as to the many who followed his work. He received the Bingham Medal in 1969 as well as the Kendall Award of the American Chemical Society; he was active professionally throughout his life in spite of severe health problems for several years.

A short course, "Methods in Viscoelastic Polymers and Composites Engineering" will be offered July 6-10 at Massachusetts Institute of Technology. Contact: summer session office (617/253-2101).

A symposium, "Recent Advances in Polyimides and other High Performance Polymers", sponsored by the Division of Polymer Chemistry of the American Chemical Society will be held in Reno, Nevada, July 13-16. The Chairman is P. M. Hergenrother (804/865-3041).

An international conference on Liquid Crystal Polymers will be held in Bordeaux, France, July 20-24. The general secretary of the conference is F. Hardouin, Centre de Recherche Paul Pascal, Domaine Universitaire, 33405 Talence Cedex, France, Telex: 560706 CNRSCRPP TALEN

A short course "Rheological Measurements" will be offered at University of Minnesota August 24-28. For further information contact Theresa Duty, University of Minnesota, 315 Pillsbury Dr. SE, Minneapolis, MN 55455 or telephone 612/625-5886.

A conference entitled "ENTRANCE AND EXIT EFFECTS: PRACTICAL, THEORETICAL AND COMPUTATIONAL ASPECTS OF FLOW INTO AND OUT OF DUCTS", organized by the Belgian Group of Rheology and the British Society of Rheology, will be held at the University of Kent in Canterbury on September 2 and 3 to be followed by the annual British conference on September 4, 1987. The organizers are Dr. J. L. Leblanc, Monsanto Europe S.A. Avenue, de Tervuren 270-272, Letter Box No. 1, B-1150 Brussels, Belgium or Dr. C.J.S. Petrie, Department of Engineering Mathematics, The University, Newcastle upon Tyne, NE1 7RU, United Kingdom.

The Hungarian Chemical Society has scheduled an International Conference on the Rheology of Petroleum and Petroleum Products in Sopron in western Hungary, for September 8-10, Information is available from the society, H-1061 Budapest, Anker Kőz 1, Hungary.

The Royal Society of Chemistry is sponsoring a Residential School on Applied Rheology September 14-18. Contact Ms L. A. Hart, Royal Society of Chemistry, 30 Russell Square, LONDON WC1B 5DT.

The Society of Rheology, Japan will hold its 35th Rheology Symposium in Osaka October 14-16. Contact the secretary: Prof. Toshiro Masuda, Research Center for Medical Polymers and Biomaterials, Kyoto University, Shogoin, Sakyo-ku, Kyoto 606, Japan.

The Groupe Francais de Rheologie has scheduled its 22nd annual colloquium on the subject "Rheologie des Fluides Industriels" for November 16-18 in Toulouse. Contact M. Remi Gaudu (Tel. 61 58 82 19) or Mme. Dominique Anne-Archard (Tel. 61 58 83 60) at the Institut Mecanique des Fluides de Toulouse, 2, rue Charles-Camichel, 31071, Toulouse Cedex.

The second Chinese National Congress on Rheology will be held in November, 1987, in Chengdu, Sichuan Province. Contact: Professor Han Shifang, Institute of Mathematical Sciences, Chengdu Branch, Academia Sinica, Chengdu, P. R. China.

The Warren Spring Laboratory of the British Department of Trade and Industry will offer a 5-day course in fluid rheology November 16-20. Contact: Miss Purnima Madhvi, Warren Spring Laboratory, Gunnels Wood Road, Stevenage, Hertfordshire SG1 2BX, United Kingdom Tel. Stevenage (0438) 313388 Telex: 82250.

An International Conference on Extensional Flow will be held in Chamonix, France, January 18-22, 1988, Contact: Professor K. Walters, Department of Mathematics, University College of Wales, Penglais, Aberystwyth, Dyfed SY23 3BZ, United Kingdom or Dr. J. Ferguson, Department of Chemistry, University of Strathclyde, Thomas Graham Building, 295 Cathedral Street, Glasgow G1 1XL.

A conference on Flow Processes in Composite Materials, sponsored by the British Society of Rheology, will be held in April, 1988. Offers of papers should be addressed before September 1, 1987, to F. N. Cogswell, The Materials Centre, ICI, P.O. Box No. 90, Wilton Centre, Middlesbrough, Cleveland TS6 8JE, United Kingdom.

An International Conference On Composite Interfaces will be held in Cleveland June 13-17, 1988. Abstracts should be submitted to Professor H. Ishida, Department of Macromolecular Science, Case-Western Reserve University, 10900 Euclid Avenue, Cleveland, Ohio 44106-1712.

The 17th International Congress Of Theoretical And Applied Mechanics will be held in Grenoble, France, August 21-7, 1988. Information may be obtained from, and abstracts submitted to, Dr. R. M. Christensen, Lawrence Livermore Laboratory, P.O. Box 808 L-338, Livermore, CA 94550 for U.S. authors. Others contact Prof. D. Callerie, Institut de Mecanique de Grenoble, Domain Universitaire - B.P. 68, 38402, Saint Martin D'Herès Cedex, France.

Application for Membership in the SOCIETY OF RHEOLOGY

I hereby desire to apply for membership in THE SOCIETY OF RHEOLOGY dating from
January 19 _____

Name _____
Please print)

Mail Address _____

Professional Affiliation _____

Position _____

Please indicate in the boxes provided below the code letter from the list to the right, which best describes your areas of interest in order of decreasing importance.

- PRIMARY
- SECONDARY
- TERTIARY

INTEREST AREA	CODE
Biological Materials	A
Foods and Natural Products	B
Inorganic Materials	C
Oils and Lubricants	D
Soils	E
Synthetic Polymers	F
Fluids (Including Solutions)	G
Solids	H
Suspension and Particulate Systems	J
Engineering	K
Experimental Techniques	L
Mechanics	M
Phenomenology	N
All of the above	Y
None of the above	Z

I understand that my regular member's subscription to the **Journal of Rheology** is for my personal use, and not for library use.

Signature

Date

Enclose remittance of \$40 for Regular Annual Dues, \$25 for Student and Retired Members or \$200 for Sustaining Annual Dues (1988) and mail to:

THE SOCIETY OF RHEOLOGY
c/o American Institute of Physics
335 East 45th Street
New York, New York 10017



Department of Continuing Education
(404) 894-2400

59th Annual Meeting of the Society of Rheology

Atlanta, Georgia • October 18-22, 1987

General Information

Dates: October 17-22, 1987
Short Course: October 17-18
Meeting: October 18-22

Location: All sessions of the meeting will be held at the Pierremont Plaza Hotel and Conference Center, which is conveniently located a few blocks east of the Georgia Tech campus on North Avenue and West Peachtree Street.

Accommodations: A block of rooms has been reserved for meeting attendees at the Pierremont Plaza Hotel, 590 West Peachtree Street, NW, Atlanta, GA 30308 (404/881-6000). Special room rates are \$55/single or double occupancy. When making reservations, be sure to mention the Society of Rheology Annual Meeting sponsored by Georgia Tech to be assured the discounted room rate. Please make reservations directly with the hotel by September 17, 1987.

Transportation: From Hartsfield International Airport: Taxi -- \$14.00 (approximately) Airport Shuttle -- \$6.00 (one-way). Access to the MARTA subway is located directly across the street from the hotel. The current fare is \$.60 one way.

Parking: The Pierremont Plaza Hotel and Conference Center offers parking in the attached garage for registered hotel guests. The current rate of \$6.00 per day is paid directly to the garage attendant. There are also open parking lots within close walking distance of the hotel ranging from \$1.50 per day.

Sunday Evening Reception: There will be a get acquainted reception on Sunday, October 18 from 7 to 10 p.m.

Beer Session/Open Forum: This year's beer session/open forum will be held on Monday, October 19 from 8:00 to 10:00 p.m. There will be a panel discussion on the topic, Open Questions in Chain Dynamics--Reptation, etc.

General Business Meeting: The business meeting will be held at 5:30 p.m. on Monday, October 19.

Banquet: The Bingham Award Banquet will be held on Tuesday, October 20 at 7:00 p.m. A cocktail hour will precede the banquet at 6:00 p.m. Please check the line for the banquet on the registration form if you plan to attend the banquet. The charge for the banquet is \$20.

Registration: A registration form is enclosed. Please return the form to the indicated address prior to September 25, 1987 in order to obtain the discounted registration fee. The registration fees are as follows:

<u>Members</u>	<u>Non-Members</u>	<u>Students</u>
Early registration \$60 up to September 25.	\$85 (\$100 fee includes membership dues) with no late registration fee	\$25 up to September 25
Late registration \$70 after September 25.		\$30 after September 25
Retired members \$30 with no late registration fee.		

To register by mail, please complete the attached registration form and return it to Continuing Education with payment or purchase order number. To register by phone, please call 404/894-2400. Payment should be mailed immediately to ensure receipt before the program begins. If you must register less than 10 days before the program starts, please do not mail payment, but bring it with you on the first day of class. If you must cancel your registration, a refund can be made only if we receive notice of withdrawal on or before 10 days prior to class start; however, we gladly accept substitutions.

REGISTRATION FORM

59th Annual Meeting of the Society of Rheology • October 18-22, 1987

Name _____ Position _____

Organization _____ Organization Phone _____

Organization Address _____

Home Telephone _____ Business Telephone _____

Hotel in Atlanta _____

- Program Fees:
- _____ \$60 (Members before September 25)
 - _____ \$70 (Members after September 25)
 - _____ \$30 (Retired Members)
 - _____ \$85 (Non-Members)
 - _____ \$100 (Non-Members including membership dues)
 - _____ \$25 (Students before September 25)
 - _____ \$30 (Students after September 25)
 - _____ \$20 - Bingham Award Banquet Ticket

_____ Payment enclosed _____ Purchase Order # _____

Make check payable to Georgia Institute of Technology.

Return to: Department of Continuing Education-R
 Georgia Institute of Technology
 Atlanta, Georgia 30332-0385
 Phone: 404/894-2400

TWO-DAY SHORT COURSE

COMPOSITE MATERIALS

By

S. S. Sternstein, Course Director

Lecturers:

Professor R. Farris
Univ. of Massachusetts

Professor L. Nicolais
Univ. of Naples Italy

Professor J. Seferis
Univ. of Washington

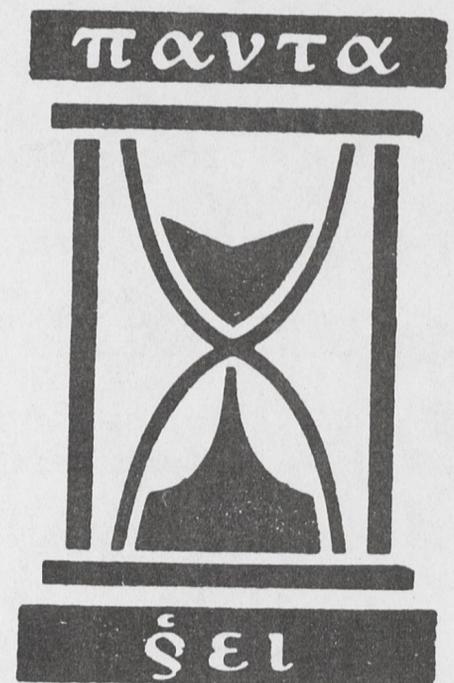
Professor S. S. Sternstein
Rensselaer Polytechnic Institute

To be held Saturday and Sunday
October 17 and 18, 1987

Pierremont Plaza Hotel
590 West Peachtree St. N.W.
Atlanta, GA 30308

In Conjunction with the
59th Annual Meeting of the Society of Rheology

**THE
SOCIETY
OF
RHEOLOGY**



COURSE DESCRIPTION

This course is intended for scientists and engineers entering the composites field with emphasis primarily on the application of rheology to processing of multi-phase systems and composite materials. Topics to be covered include, Rheology of particulate filled systems, chemorheology of reactive systems, viscoelastic characterization of curing systems, analysis of prepregging and the viscoelastic characterization of composite solids.

The course is under the direction of Prof. S. S. Sternstein (RPI) and the lecturers are Prof. R. Farris (Univ. of Mass.), Prof. L. Nicolais (Univ. of Naples), Prof. J. Seferis (Univ. of Washington)

SPECIAL SYMPOSIA

In conjunction with the short course, several symposia on solids behavior will be held at the Society of Rheology Meeting (Oct. 19-22). Registration for this annual meeting will be handled separately.

PREREQUISITES

The presentations will be introductory in nature. Participants who have completed a bachelor's degree in science or engineering should have little difficulty with the course.

The fee for the course and lecture notes is \$250 prior to Sept. 15, 1987. A late registration fee of \$275 is acceptable thereafter. Student rates are 1/2 of the above. Checks should be made payable to "The Society of Rheology" and sent with the registration form to Dr. Edward A. Collins, 255 Glenview Dr., Avon Lake, Ohio 44012. Further information can be obtained from Dr. E. A. Collins (216) 933-6308.

Reservations for lodging at the Pierremont Plaza Hotel in Atlanta, Georgia (404) 881-6000 should be made by the participants. A block of rooms has been reserved so mention the Society of Rheology when making reservations.

COURSE OUTLINE

- I. Micromechanics and Viscoelastic Characterization of Composites (Sternstein)
- II. Rheology of Particulate Filled Polymers (Farris)
- III. Rate Phenomena in Polymer Composites-Rheological Characterization (Seferis)
- IV. Chemorheology of Reactive Systems (Nicolais)
- V. Viscoelastic Characterization of Curing Systems (Farris)
- VI. Rheology of Suspensions (Nicolais)
- VII. Characterization and Analysis of Prepregging (Seferis)

The course will consist of 12 intensive hours of instruction and 2 hours general discussion over a two-day period.

REGISTRATION FORM

Rheology Short Course

*Saturday/Sunday, October 17 and 18, 1987
Pierremont Plaza Hotel
590 West Peachtree St. N.W.
Atlanta, Georgia 30308
(404) 881-6000*

NAME _____

RESIDENCE ADDRESS _____

COMPANY AFFILITATION _____

ADDRESS _____

BUSINESS PHONE () _____
 area code

RESIDENCE PHONE NUMBER () _____
 area code

DATE OF ARRIVAL _____

*Please return this registration form together with payment to:
Dr. Edward A. Collins
255 Glenview Dr.
Avon Lake, Ohio 44012*

*Please send registration information for
the Society of Rheology*

TO Society of Rheology Members

FROM Edward A. Collins - Treasurer

We are looking into the possibility of organizing a charter and receive special rates for the 1988 International Congress on Rheology to be held in Sydney, Australia August 14-20, 1988. In order to determine the very best arrangements that we can make we need to have some idea as to the number of potentially interested individuals. The arrangements would be made by a fully BONDED Travel Agency with no involvement by the Society of Rheology except to provide the guide lines.

Arrangements could be made for 2, 3, 4 or more weeks stay with special rates for travel from specific United States cities to the initial embarking site.

Please complete the questionnaire and return before Sept. 15, 1987.

Return To: Frida Wolverson
International Tours of Northern Ohio
Midway Mall
Elyria, Ohio 44035

- I definitely plan to attend - YES NO
- I will be accompanied by - Persons
- I plan to stay - 2 3 4 or weeks
- I would like to stop in: - Hawaii
- Cairns
- Other

NAME _____

ADDRESS _____

TELEPHONE NO. _____

AMERICAN INSTITUTE OF PHYSICS INCORPORATED
FOR
THE SOCIETY OF RHEOLOGY

Statement of Receipts and Disbursements
Year Ended December 31, 1986

Balance in Account - December 31, 1985*		\$72,482.77
Receipts (January 1 - December 31, 1986)		
Dues Collections-1985	\$ 20.00	
-1986	8,303.02	
-1987	12,000.00	\$20,323.02
Sales of Mailing Lists:		
Receipts	\$ 165.29	
Less: Postage and Data Processing Costs	-16.98	148.31
Interest		3,967.42
Journal Page Charges		9,207.69
Short Course (Tulsa)		5,305.00
Refund Kent Post Office		125.88
Membership And Meeting Registration		412.00
Tulsa Meeting Contributions		1,500.00
Ann Arbor Meeting		711.68
		<u>\$41,701.00</u>
TOTAL		\$114,183.77
Disbursements (January 1 - December 31, 1986)		
Charges for Dues Billing and Collection (\$2.25 per Item Billed-Annual Charge)	\$ 2,668.50	
Charge for Preparation and Maintenance of Member Record File (\$2.75 per Member Record-Annual Charge)	3,267.00	
Financial Handling Charge-Year 1986 (5/8 of 1% of Business Handled)	350.00	
Member Society Dues - Year 1986 (\$2 per Member per Year)	2,500.00	
Renewal Billing - Materials and Postage	1,229.36	
Short Course Announcement Mailing	588.96	
Short Course Expense (Tulsa)	2,738.31	
The Journal of Rheology:		
Subscription Expense-Vol. 29 #1-6	\$14,009.26	
Printing Mailing Labels	46.00	14,055.26
Editorial Charges		3,646.99
		<u>\$31,044.38</u>
Other:		
Administrative Services	\$ 2,100.00	
Membership Directory (Printing and Mailing)	3,460.33	
Postage	317.90	
Printing New Letterhead and Membership Materials	459.73	
United Parcel Service	10.68	
Data Processing	30.00	
Xerox Charges	39.35	
Membership Labels for Bulletin Mailings	30.76	
Commercial Press Bulletin & Abstracts	2,490.46	
Liability Insurance	117.00	
Council of Presidents Society Dues	75.00	
Postage Kent State (Editor)	533.87	
President & Treasurer Discretionary	613.73	
Miscellaneous	80.61	<u>\$41,403.80</u>
Balance in Account December 31, 1986**		<u>\$72,779.97</u>

* Adjusted to include 1985 Final Receipts & Disbursements Variance
(** Not Adjusted For Final 1986 4th Qtr Variance)

Dr. Edward A. Collins
Treasurer
March 3, 1987

