



THE SOCIETY OF RHEOLOGY

69TH ANNUAL MEETING PROGRAM

Hyatt on Capitol Square
Columbus, Ohio
October 19-23, 1997

Program Committee:

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Ohio State University
Kurt Koelling (Co-Chair)
Ohio State University

Steve Bechtel
Ohio State University
Bob Brodkey
Ohio State University

Abstract Book Editor and Webmaster: Albert Co, *University of Maine*

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Plenary Lectures

8:30 AM Governor's Ballroom

- Monday, October 20** **Granular Gases, Fluids And Solids**
Sidney Nagel
University of Chicago
- Tuesday, October 21** **Optical Rheometry Of Complex Liquids And Interfaces**
Bingham Lecture
Gerald G. Fuller
Chemical Engineering, Stanford University
- Wednesday, October 22** **"Rheo NMR": Rheological Insights By Means Of NMR Microscopy**
Paul T. Callaghan
Department of Physics, Massey University

Social Program

- Sunday, October 19** **Welcoming Reception**
7:00 PM Legislative Foyer
Sponsored by T. A. Instruments
- Monday, October 20** **Society Reception**
7:00 PM Ohio Statehouse Atrium
Sponsored by Rheometrics, Inc. and The Society of Rheology
- Tuesday, October 21** **Business Meeting**
5:30 PM Legislative
- Awards Reception**
7:00 PM Governors Foyer AB
Wine sponsored by Haake, Inc.
- Awards Banquet**
8:00 PM Governors AB
Wine sponsored by Haake, Inc.
- Wednesday, October 22** **Poster Session Refreshments**
5:30 PM Legislative
Sponsored by PAAR Physica USA

Meeting Schedule

Monday, October 20, 1997					Tuesday, October 21, 1997					Wednesday, October 22, 1997					Thursday, October 23, 1997				
8:30		S. Nagel (PL1)			8:30		G. G. Fuller (PL2)			8:30		P. T. Callaghan (PL3)			8:05	BL1	LC9	FM22	NP5
9:20		Coffee			9:20		Coffee			9:20		Coffee			8:30	BL2	LC10	FM23	NP6
9:45	SL1	MT1	HT1	SP1	9:45	FI1	MT14	SL10	SP14	9:45	FI10	MT27	FM9	BS9	8:55	BL3	LC11	FM24	NP7
10:10	SL2	MT2	HT2	SP2	10:10	FI2	MT15	SL11	SP15	10:10	FI11	MT28	FM10	BS10	9:20	BL4	LC12	FM25	
10:35	SL3	MT3	HT3	SP3	10:35	FI3	MT16	SL12	SP16	10:35	FI12	MT29	FM11	BS11	9:45		Coffee		
11:00	SL4	MT4	HT4	SP4	11:00	FI4	MT17	SL13	SP17	11:00	FI13	MT30	FM12	BS12	10:10	MX5	LC13	SL15	GN3
11:25	SL5	MT5	HT5	SP5	11:25	FI5	MT18	SL14	SP18	11:25	FI14	MT31	FM13	BS13	10:35	MX6	LC14	SL16	GN4
11:50		Lunch			11:50		Lunch			11:50		Lunch			11:00	MX7	LC15	SL17	GN5
1:30	SL6	MT6	HT6	SP6	1:30	FI6	MT19	FM1	SP19	1:30	FI15	LC1	FM14	BS14	11:25	MX8	LC16	SL18	GN6
1:55	SL7	MT7	HT7	SP7	1:55	FI7	MT20	FM2	SP20	1:55	FI16	LC2	FM15	BS15	11:50	MX9	LC17	SL19	GN7
2:20	SL8	MT8	HT8	SP8	2:20	FI8	MT21	FM3	SP21	2:20	FI17	LC3	FM16	BS16	12:15		End		
2:45	SL9	MT9	HT9	SP9	2:45	FI9	MT22	FM4	SP22	2:45	FI18	LC4	FM17	BS17					
3:10		Coffee			3:10		Coffee			3:10		Coffee							
3:35	BS1	MT10	HT10	SP10	3:35	MX1	MT23	FM5	BS5	3:35	FI19	LC5	FM18	NP1					
4:00	BS2	MT11	HT11	SP11	4:00	MX2	MT24	FM6	BS6	4:00	FI20	LC6	FM19	NP2					
4:25	BS3	MT12	GN1	SP12	4:25	MX3	MT25	FM7	BS7	4:25	FI21	LC7	FM20	NP3					
4:50	BS4	MT13		SP13	4:50	MX4	MT26	FM8	BS8	4:50	FI22	LC8	FM21	NP4					
5:15		End			5:15		End			5:15		End							
7:00		Society Reception			5:30		Business Meeting			5:30		Poster Session & Refreshments							
					7:00		Awards Reception												
					8:00		Awards Banquet												

Session Codes

BL = Biological Systems
 BS = Rheology and Flow-Induced Structure of Blends and Solutions
 FI = Melt Flow Instabilities and Wall Slip
 FM = Non-Newtonian Fluid Mechanics

GN = General Session
 HT = Heterogeneous Systems
 LC = Liquid Crystals: Structure and Rheology
 MT = Molecular Theories for Polymer Dynamics
 MX = Rheology and Mixing

NP = Novel Polymer Systems
 PL = Plenary Lectures
 SL = Rheology of Solids
 SP = Suspensions

Monday, October 20

Morning

- 8:30 Granular gases, fluids and solids (PL1) *S. Nagel* Governor's Ballroom
- 9:20 COFFEE
- Rheology of Solids** *G. B. McKenna, R. Shay and O. A. Hasan* Senate
- 9:45 Thermoviscoelastic constitutive models for describing enthalpy relaxation in amorphous polymers (SL1) *M. R. Hooker, P. Shirkhande and J. M. Caruthers*
- 10:10 Volume and enthalpy recovery of polystyrene (SL2) *S. L. Simon and D. J. Plazek*
- 10:35 The effect of local density fluctuations on volume relaxation in the glass to rubber transition region (SL3) *G. A. Medvedev, R. Bhatia, H. S. Lackritz and J. M. Caruthers*
- 11:00 Structural recovery in plasticized epoxy: first evidence of a moisture induced memory effect (SL4) *W. H. Han and G. B. McKenna*
- 11:25 Prediction of three-dimensional deformations for polymer solids in the glass transition region using a nonlinear thermoviscoelastic constitutive equation (SL5) *R. S. Chambers, J. M. Caruthers and D. B. Adolf*
- Molecular Theories for Polymer Dynamics** *R. H. Colby and M. Rubinstein* Executive
- 9:45 Theory of spin correlations in polymeric networks and entangled liquids (MT1) *S. V. Panyukov, M. Rubinstein and A. G. Deshkovski*
- 10:10 Kinetics of solvent absorption in a highly swellable elastomeric network (MT2) *B. Barriere and L. Leibler*
- 10:35 Elasticity of polymer networks (MT3) *M. Rubinstein and S. Panyukov*
- 11:00 On the elasticity of polysoaps (MT4) *A. Halperin and O. H. Borisov*
- 11:25 Peristaltic instability of cylindrical gels (MT5) *B. Barriere, L. Leibler and K. Sekimoto*
- Heterogeneous Systems** *J. Goddard and A. M. Kraynik* Judicial
- 9:45 Light scattering and rheology of a model foam (HT1) *U. Nobbmann, F. Dorri-Nowkoorani and B. J. Ackerson*
- 10:10 Micromechanics of closed-cell foams (HT2) *A. M. Kraynik and M. K. Neilsen*
- 10:35 Analysis of an emulsion yielding with a new position echo technique (HT3) *P. Hebraud, F. Lequeux, J. P. Munch and D. J. Pine*
- 11:00 Elastoplastic arching in 2d granular heaps (HT4) *J. Goddard, F. Cantelaube and A. K. Didwania*
- 11:25 Pressure distribution in silos and deep earth: the Jacki law from quasi static rheology of soil (HT5) *P. Evesque*
- Suspensions** *R. Phillips and T. Ladd* Legislative
- 9:45 Nonlinear structural time response of a magnetic suspension in a two-dimensional pulsed field (SP1) *A. S. Silva and D. Wirtz*
- 10:10 Mechanisms controlling yield and flow in ER materials (SP2) *F. E. Filisko, S. Henley, G. Quist and C. Aronson*
- 10:35 Electrohydrodynamic instabilities in suspensions of DNA, colloids and charged gels in high electric fields (SP3) *J. L. Viovy, B. Ladoux, H. Isambert, J.-F. Léger and S. O. Magnusdottir*
- 11:00 Polymer solution dispersed ER active suspensions (SP4) *G. Quist and F. E. Filisko*
- 11:25 On the role of interparticle gap properties in electrorheological suspensions (SP5) *I. A. Shkel and D. J. Klingenberg*
- 11:50 LUNCH

Afternoon

- Rheology of Solids** *G. B. McKenna, R. Shay and O. A. Hasan* Senate
- 1:30 Monotonicity of response for nonlinear viscoelasticity with a strain clock (SL6) *A. S. Wineman*
- 1:55 The use of generalized strain measures in a thermoviscoelastic constitutive equation for amorphous polymers (SL7) *P. Shirkhande, M. R. Hooker and J. M. Caruthers*
- 2:20 Adiabatic creep and recovery in shear (SL8) *J. M. Wiest*
- 2:45 Viscoelastic and physical aging responses in amorphous pen films (SL9) *M. L. Cerrada and G. B. McKenna*
- Molecular Theories for Polymer Dynamics** *R. H. Colby and M. Rubinstein* Executive
- 1:30 Influence of the chain length between branch points on randomly branched polymer structure and rheology (MT6) *C. P. Lusignan and R. H. Colby*
- 1:55 Dynamic rheology of branched (and unbranched) polymers: inspiration from the stars. (MT7) *S. T. Milner and T. B. McLeish*
- 2:20 Evolution of the relaxation processes during the gel formation (MT8) *D. Durand, T. Nicolai and F. Prochazka*

- 2:45 Theory of chain breakage in ultrasonically treated rubbers (MT9) *V. V. Yashin and A. I. Isayev*
Heterogeneous Systems *J. Goddard and A. M. Kraynik* Judicial
- 1:30 Quasi-static statistical mechanics and plasticity of rigid sphere assemblies (HT6) *J. Goddard, K. Ledniczky and A. K. Didwania*
 1:55 Grain rotation, convection and diffusion in a 2-d embankment under quasi static cyclic deformation (HT7) *P. Evesque and V. T. Minassian*
 2:20 Impact-wavy phenomena in heterogeneous systems (HT8) *L. M. Hadjnikov*
 2:45 Steady relief generation at a sand-liquid interface due to horizontal vibration (HT9) *A. Ivanova, P. Evesque, V. Kozlov, D. Lyubimov and B. Roux*
Suspensions *R. Phillips and T. Ladd* Legislative
- 1:30 Optical rheology of charged disc-like colloidal particle gels (SP6) *V. Viasnoff, J. L. Harden and D. Wirtz*
 1:55 On the relative motion of two sedimenting spheres in a viscoelastic fluid (SP7) *E. Bot, M. Hulsen and B. van den Brule*
 2:20 Nonlinear rheology of a concentrated spherical silica suspension (SP8) *H. Watanabe, M.-L. Yao, K. Osaki, T. Shikata and Y. Morishima*
 2:45 Non linear viscoelastic behavior of fumed silica suspensions (SP9) *F. Yziquel, P. J. Carreau and P. A. Tanguy*
 3:10 COFFEE
- Rheology and Flow-Induced Structure of Blends and Solutions** *J. van Egmond* Senate
- 3:35 Microrheological measurements of poly(acrylic acid) gel moduli using optical tweezers (BS1) *M. Beck, K. Vischer, S. M. Block and R. K. Prud'homme*
 4:00 Junction dynamics and rheology of model wormlike micellar solutions (BS2) *M. Kroger and A. Ben-Shaul*
 4:25 Inhomogeneous shear flow of wormlike micelles (BS3) *J.-F. Berret, G. Porte, J. L. Harden and J.-P. Decruppe*
 4:50 Gelation, slip, phase separation, and coexistence in sheared micellar solutions (BS4) *Y. Hu, P. Boltzenhagen, E. F. Matthys and D. J. Pine*
Molecular Theories for Polymer Dynamics *R. H. Colby and M. Rubinstein* Executive
- 3:35 Rheology of breaking and healing of block copolymer gels (MT10) *A. Turc, W. Wedler and H. H. Winter*
 4:00 Rheology of the miscible polymer blends polystyrene/poly(vinyl methyl ether) and poly(methyl methacrylate)/poly(styrene-co-acrylonitrile) (MT11) *J. A. Pathak, R. H. Colby, G. Floudas, R. Jerome and R. Stadler*
 4:25 Bulk and interfacial contributions to adhesion of pressure sensitive adhesives (MT12) *K. R. Shull, A. J. Crosby, C. F. Creton and H. Lakrout*
 4:50 Microscopic theory of diffusion and relaxation in diblock copolymer materials (MT13) *K. S. Schweizer, M. Guenza and H. Tang*
Heterogeneous Systems *J. Goddard and A. M. Kraynik* Judicial
- 3:35 Particle interaction time and stress relaxation mechanism in dense granular flows (HT10) *D. Z. Zhang and R. M. Rauenzahn*
 4:00 Compressible flow of granular materials (HT11) *T. Astarita, R. Ocone and G. Astarita*
General Session *R. L. Powell* Judicial
- 4:25 Representing polyolefin melt viscoelasticity data with Carreau-Yasuda models: some industrial experience (GN1) *J. Janzen, D. C. Rohlffing and M. J. Hicks*
Suspensions *R. Phillips and T. Ladd* Legislative
- 3:35 Rheological behavior of silica-filled polymer melts: effect of interfacial adhesion (SP10) *D. P. Rucker and S. G. Biko*
 4:00 Exploiting surface chemistry and rheology to produce high density low viscosity liquids (SP11) *P. J. Scales, T. W. Healy and D. V. Boger*
 4:25 Effects of gradual destabilization in polymerically stabilized suspensions (SP12) *J. Mewis and G. Ourieva*
 4:50 Using creep measurements to predict the physical stability of a beta-Cyfluthrin suspension concentrate (SP13) *H. Barnett and G. Otis*
 5:15 END
- 7:00 SOCIETY RECEPTION Ohio Statehouse Atrium

Tuesday, October 21

Morning

- 8:30 Optical rheometry of complex liquids and interfaces (PL2) *G. G. Fuller* Governor's Ballroom
- 9:20 COFFEE
- Melt Flow Instabilities and Wall Slip** *S.-Q. Wang and J. M. Dealy* Senate
- 9:45 Melt flow instabilities of polyethylene on the multipass rheometer (FI1) *M. Ranganathan, M. R. Mackley and P. H. Spitteler*
- 10:10 Extrudate swell simulations-effect of wall slip (FI2) *K.-J. Ang, I. Manas-Zloczower and S.-Q. Wang*
- 10:35 Deformation in converging flow with stick or slip boundary conditions (FI3) *C. E. Chaffey*
- 11:00 Extrudate swell due to stress buildup at die exit and influence of wall slip [1] (FI4) *X. Yang and S.-Q. Wang*
- 11:25 Entrance pressure oscillations in the capillary flow of branched polyethylene melts. (FI5) *L. de Vargas, J. Pérez-González, L. Pérez-Trejo and O. Manero*
- Molecular Theories for Polymer Dynamics** *R. H. Colby and M. Rubinstein* Executive
- 9:45 Polyelectrolyte solution viscosity (MT14) *R. H. Colby, D. C. Boris, W. E. Krause and J. S. Tan*
- 10:10 The dynamics and rheology of dilute polyelectrolyte solutions (MT15) *N. C. Andrews, A. J. McHugh and J. D. Schieber*
- 10:35 Structure and rheology of dilute solutions of rod-like polyelectrolytes (MT16) *S. B. Chen and D. L. Koch*
- 11:00 Bound state of two polyelectrolyte molecules (MT17) *S. Obukhov, N. Lee and M. Rubinstein*
- 11:25 Simulation of polyelectrolyte dynamics (MT18) *M. J. Stevens*
- Rheology of Solids** *G. B. McKenna, R. Shay and O. A. Hasan* Judicial
- 9:45 Characterizing the frequency, temperature, and plasticizer effects on the dynamic moduli of crosslinked polymers using the tube-junction model (SL10) *P. P. Simon and H. J. Ploehn*
- 10:10 The rheology of polystyrene nanoparticles (SL11) *P. G. Santangelo and C. M. Roland*
- 10:35 Viscoelastic response of polyurethane elastomers (SL12) *V. Rouiller and G. B. McKenna*
- 11:00 Plane deformation in an incompressible neo-Hookean material (SL13) *E. Varley and A. Oztekin*
- 11:25 Mesoscale modeling of bimodal elastomer networks (SL14) *P. von Lockette and E. M. Arruda*
- Suspensions** *R. Phillips and T. Ladd* Legislative
- 9:45 An analysis of constitutive equations for shear-induced migration (SP14) *D. T. Leighton*
- 10:10 LDV measurements of particle velocity fluctuations in a concentrated suspension (SP15) *N. Shapley, R. C. Armstrong and R. A. Brown*
- 10:35 Particle migration in tube flow of suspension (SP16) *C. Kim, M.-S. Han, S.-K. Kim, M.-C. Kim and S.-C. Lee*
- 11:00 Conditionally averaged hydrodynamic interaction functions in concentrated suspensions (SP17) *R. A. Lionberger*
- 11:25 Colloidal surface charge determination in concentrated dispersions through rheological measurement (SP18) *N. J. Wagner, J. Bergenholz and N. Willenbacher*
- 11:50 LUNCH

Afternoon

- Melt Flow Instabilities and Wall Slip** *S.-Q. Wang and J. M. Dealy* Senate
- 1:30 The use of flow birefringence to assess slip in the flow of LLDPE (FI6) *D. G. Baird and H. Moynihan*
- 1:55 Studies on sharkskin melt fracture on extrusion of polybutadiene (FI7) *M. T. Shaw, Y. W. Inn, D. E. Packard and R. J. Fisher*
- 2:20 A mechanical interpretation of the sharkskin defect (FI8) *C. Venet and B. Vergnes*
- 2:45 Experimental investigation of molecular and spatial origins of sharkskin phenomenon in linear polyethylene extrusion [1] (FI9) *N. Plucktaveesak, J. Barone and S.-Q. Wang*
- Molecular Theories for Polymer Dynamics** *R. H. Colby and M. Rubinstein* Executive
- 1:30 Scaling theory of the solutions of associative polyelectrolytes. (MT19) *A. V. Dobrynin and M. Rubinstein*
- 1:55 Drift and deformation of heterogeneously charged chains in electric fields (MT20) *D. Long, A. V. Dobrynin, M. Rubinstein and A. Ajdari*
- 2:20 Brownian dynamics simulations of DNA molecules in extensional flow (MT21) *R. G. Larson*

- 2:45 Structure and dynamics of concentrated pastes (MT22) *R. Borrega, M. Cloitre, L. Leibler, I. Betremieux and B. Ernst*
Non-Newtonian Fluid Mechanics *G. L. Leal and F. Baaijens* Judicial
- 1:30 Transient extensional flow and tack characteristics of a terpolymer adhesive. (FM1) *J. Ferguson, J. F. Forsyth and N. Granville*
- 1:55 The rheology of fiber spinning (FM2) *M. H. Wagner and A. Bernnat*
- 2:20 Brownian dynamics simulations of polymers in solvents of varying quality: startup and relaxation in extensional flow (FM3) *T. B. Kwan and E. G. Shaqfeh*
- 2:45 Fluid dynamics of weakly strain-hardening fluids in filament stretching (FM4) *M. Yao, S. H. Spiegelberg and G. H. McKinley*
Suspensions *R. Phillips and T. Ladd* Legislative
- 1:30 Flow of rigid particles in viscoelastic media (SP19) *J. Azaiez*
- 1:55 Orientational drift of a fiber suspended in a polymer solution subject to oscillatory shear flow (SP20) *O. G. Harlen and D. L. Koch*
- 2:20 Dynamics of isolated flexible fibers and fiber suspensions (SP21) *C. F. Schmid, P. Skjetne, M. D. Graham and D. J. Klingenberg*
- 2:45 Dynamic oscillations of a filled compound under cure reaction (SP22) *R. Ding and A. I. Leonov*
- 3:10 COFFEE
- Rheology and Mixing** *D. Doraiswamy and I. Manas-Zloczower* Senate
- 3:35 The effect of shear thinning fluids on mixing in mechanically agitated tanks (MX1) *A. W. Etchells, R. K. Grenville and J. G. Wood*
- 4:00 3D modelling of Boger fluid flows in helical ribbon mixers (MX2) *P. A. Tanguy, F. H. Bertrand and P. J. Carreau*
- 4:25 Viscosity model for polydisperse polymers (MX3) *D. Nichetti and I. Manas-Zloczower*
- 4:50 Agglomeration and migration effects in pipe flow of particulate suspensions (MX4) *S. Agarwal, D. Doraiswamy and R. K. Gupta*
Molecular Theories for Polymer Dynamics *R. H. Colby and M. Rubinstein* Executive
- 3:35 Dynamic properties of semidilute solutions at the theta point (MT23) *M. Adam, B. Farago, D. Lairez and E. Raspaud*
- 4:00 Comparison of dielectric and viscoelastic behavior of polyisoprene solutions: coherence in subchain motion (MT24) *H. Watanabe, M.-L. Yao and K. Osaki*
- 4:25 Viscoelasticity and diffusion in concentrated polymer solutions (MT25) *T. P. Lodge, H. Tao and E. von Meerwall*
- 4:50 Dynamics of coil-globule collapse transition: theoretical conjectures and experimental situation (MT26) *A. Y. Grosberg*
Non-Newtonian Fluid Mechanics *G. L. Leal and F. Baaijens* Judicial
- 3:35 Fast channel flows of polyisobutylenes (FM5) *V. B. Birman, A. I. Leonov and J. Padovan*
- 4:00 Dynamics of a cylindrical viscoelastic drop in periodic arrays of cylinders (FM6) *D. J. Backes and K. Jayaraman*
- 4:25 Entry flow and constitutive modelling for fluid s1 (FM7) *J. A. Byars, R. J. Binnington and D. V. Boger*
- 4:50 Surface instabilities during extrusion of linear low density polyethylene (FM8) *R. P. Rutgers, M. R. Mackley and D. Gilbert*
Rheology and Flow-Induced Structure of Blends and Solutions *J. van Egmond* Legislative
- 3:35 Rheo-optical investigations of viscoelastic micellar solutions (BS5) *E. K. Wheeler, P. Fischer and G. G. Fuller*
- 4:00 Flow and structure of associating hydrophobically modified polymers and rod-like surfactant micelles (BS6) *S. Panmai, R. K. Prud'homme and D. Peiffer*
- 4:25 Anomalous stress in phase separating polymer solutions (BS7) *J. W. van Egmond*
- 4:50 Mechanisms for stress relaxation in immiscible polymer blends (BS8) *P. Moldenaers and I. Vinckier*
- 5:15 END
- 5:30 BUSINESS MEETING Legislative
- 7:00 AWARDS RECEPTION Governors Foyer AB
- 8:00 AWARDS BANQUET Governors AB

Wednesday, October 22

Morning

- 8:30 "Rheo NMR": rheological insights by means of NMR microscopy (PL3) *P. T. Callaghan* Governor's Ballroom
- 9:20 COFFEE
- Melt Flow Instabilities and Wall Slip** *S.-Q. Wang and J. M. Dealy* Senate
- 9:45 Dynamic wall slip of molten polyethylene on fluoropolymer surfaces (FI10) *J. M. Dealy and R. S. Jeyaseelan*
- 10:10 Viscoelastic instability of flow with slip (FI11) *W. B. Black and M. D. Graham*
- 10:35 Comparison of slip and no-slip spurt models with experiments (FI12) *C. F. J. den Doelder, R. J. Koopmans, J. Molenaar and A. A. F. van de Ven*
- 11:00 Wall slip in polymer melts: a pseudo-chemical model. (FI13) *D. A. Hill*
- 11:25 Material instabilities and internal discontinuities (FI14) *D. S. Malkus*
- Molecular Theories for Polymer Dynamics** *R. H. Colby and M. Rubinstein* Executive
- 9:45 The role of the orientation tensor in the nonlinear viscoelasticity of flexible polymers (MT27) *M. H. Wagner*
- 10:10 Path dependence of the viscosity-temperature relationship in polymer melts: fragility and time-pressure-temperature equivalence (MT28) *D. M. Colucci and G. B. McKenna*
- 10:35 Doi-Edwards theory with partial strand extension (MT29) *V. R. Mhetar and L. A. Archer*
- 11:00 Examination of the tube model in highly nonlinear transient flows (MT30) *D. W. Mead and M. K. Lyon*
- 11:25 Determination of molecular weight distributions from complete linear viscoelastic rheological data (MT31) *T. J. Van Dyke and D. W. Mead*
- Non-Newtonian Fluid Mechanics** *G. L. Leal and F. Baaijens* Judicial
- 9:45 Measurement of viscoelasticity for polymer solutions in porous media (FM9) *N. M. Henderson and G. B. Thurston*
- 10:10 Self-similar flows of Oldroyd fluids (FM10) *A. Oztekin and E. Varley*
- 10:35 A new closure approximation for the FENE dumbbell kinetic theory of dilute polymeric solutions (FM11) *G. Lielens, P. Halin, I. Jaumain, R. Keunings and V. Legat*
- 11:00 Stress boundary layers in viscoelastic fluids (FM12) *M. Renardy and T. Hagen*
- 11:25 A thermoviscoelastic constitutive model for describing the melt flow and solidification for amorphous polymers (FM13) *P. Shirkhande and J. M. Caruthers*
- Rheology and Flow-Induced Structure of Blends and Solutions** *J. van Egmond* Legislative
- 9:45 Study of flow-induced structural changes and phase behavior of polymer blends (BS9) *Z. Hong, M. T. Shaw and R. A. Weiss*
- 10:10 Deformation of interfacially modified polymer drops (BS10) *L. Levitt and C. W. Macosko*
- 10:35 Rheology and dispersed phase morphology in immiscible blends containing a liquid-crystalline polymer (BS11) *W. A. Kernick and N. J. Wagner*
- 11:00 Viscoelasticity and flow birefringence of block copolymer solutions in the fluctuation regime (BS12) *T. P. Lodge and X. Jin*
- 11:25 A spectroscopic study of flow induced conformational changes in poly-l-lysine (BS13) *A. Immaneni and A. J. McHugh*
- 11:50 LUNCH

Afternoon

- Melt Flow Instabilities and Wall Slip** *S.-Q. Wang and J. M. Dealy* Senate
- 1:30 Effect of molecular mass on the wall slip behaviour of monodisperse polystyrene (FI15) *E. M. Weisser, Y. Park and M. E. Mackay*
- 1:55 A high pressure sliding plate rheometer and its use to study the wall slip and rheology of an elastomer (FI16) *F. Koran and J. M. Dealy*
- 2:20 Wall slip behavior in capillary flow: an explanation for absence of stick-slip transition and flow oscillation in various polymer melts [1] (FI17) *X. Yang and S.-Q. Wang*
- 2:45 Slip in entangled polymer melts (FI18) *V. R. Mhetar and L. A. Archer*
- Liquid Crystals: Structure and Rheology** *D. A. Hill and L. Walker* Executive
- 1:30 Flow-induced structures forming during the shear relaxation of liquid crystalline polymers (LC1) *P. Harrison and P. Navard*
- 1:55 Texture and light scattering from nematic solutions of a rodlike polymer during creep and recovery (LC2) *S. Vijaykumar, G. C. Berry and Z. Tan*
- 2:20 Conoscopic observations of shear induced rotations in nematics (LC3) *D. Boudreau, R. Stein, P. Lillya and H. H. Winter*
- 2:45 Time-temperature and time-concentration shift factors for a semi-flexible liquid crystal polymer (LC4) *J. J. Magda, C.-M. Huang and R. G. Larson*
- Non-Newtonian Fluid Mechanics** *G. L. Leal and F. Baaijens* Judicial

- 1:30 Relaxation and extension of dilute polymer solutions in a four-roll mill with abrupt changes in the roller speed (FM14) *J. Feng and L. G. Leal*
- 1:55 A numerical scheme for solving viscoelastic flow problems (FM15) *S. Acharya, J. Padovan and A. I. Leonov*
- 2:20 Computational modeling of viscoelastic driven lid cavity flows (FM16) *B. Yang and B. Khomami*
- 2:45 Numerical and experimental assessment of viscoelastic flows of polymer solutions and melts (FM17) *F. P. Baaijens, J. F. Schoonen, G. W. Peters and H. E. Meijer*
- Rheology and Flow-Induced Structure of Blends and Solutions** *J. van Egmond* Legislative
- 1:30 Viscoelastic jets of polymer solution discharging from a capillary (BS14) *R.-C. Liang, A. Oztekin and S. Neti*
- 1:55 Gel-inhibitor assisted dissolution properties of the electrically conductive polymer polyaniline (BS15) *D. Yang, H.-L. Wang and B. R. Mattes*
- 2:20 The effect of concentration, temperature and molecular weight on the dynamics of rigid-rod molecules in semi-dilute solutions (BS16) *A. Immaneni and A. J. McHugh*
- 2:45 Optical rheology of wormlike micelles (BS17) *K. Rufenner, J. van Zanten and D. Wirtz*
- 3:10 COFFEE
- Melt Flow Instabilities and Wall Slip** *S.-Q. Wang and J. M. Dealy* Senate
- 3:35 'Fracture' phenomena in shearing flow of viscous liquids (FI19) *R. G. Larson, L. A. Archer and D. Ternet*
- 4:00 Extrusion instabilities driven by flow-induced phase transitions (FI20) *M. Cloitre, B. Ernst and L. Leibler*
- 4:25 Wall slip of shear thickening guar:borate polymer gels (FI21) *S. Kesevan and R. K. Prud'homme*
- 4:50 Rheology and extrusion properties of the natural rubber compounds (FI22) *A. Mesec, Z. Susteric and M. Zimmer*
- Liquid Crystals: Structure and Rheology** *D. A. Hill and L. Walker* Executive
- 3:35 Mesoscopic models for liquid crystalline polymers (LC5) *M. N. Kawaguchi, M. M. Denn and G. Marrucci*
- 4:00 Closure approximations for the Doi theory in simulating complex flows of LCPs (LC6) *J. Feng, C. V. Chaubal and L. G. Leal*
- 4:25 Generalized modeling of nematic liquid crystalline flows (LC7) *T. Tsuji and A. D. Rey*
- 4:50 Molecular orientation in certain nonlinear flows of liquid crystal polymers (LC8) *Q. Wang*
- Non-Newtonian Fluid Mechanics** *G. L. Leal and F. Baaijens* Judicial
- 3:35 The motion of small particles in viscoelastic Boger fluids (FM18) *H. Binous and R. J. Phillips*
- 4:00 Effect of the rheology on polymer-induced drag reduction (FM19) *R. Sureshkumar, C. D. Dimitropoulos and A. N. Beris*
- 4:25 Flow simulations using a single vector approximation to reptation models with chain stretch (FM20) *J. Remmelgas and L. G. Leal*
- 4:50 Simulations of flows of polymer melts by an unstructured control volume method (FM21) *R. I. Tanner, X. Huang and N. Phan-Thien*
- Novel Polymer Systems** *M. Mackay and A. J. McHugh* Legislative
- 3:35 Particle-tracking microrheology of a concentrated DNA solution in the presence of topoisomerase type II (NP1) *D. Wirtz and T. G. Mason*
- 4:00 Rheo-optical study of elastomeric polypropylene (NP2) *E. D. Carlson, G. G. Fuller and R. M. Waymouth*
- 4:25 Carbon-black network creation in polymers: new results (NP3) *V. Bouda and J. Mikesova*
- 4:50 Rheology of dendritic polymers (NP4) *M. E. Mackay, P. J. Farrington, C. J. Hawker and J. M. Frechet*
- 5:15 END
- 5:30 POSTER SESSION & REFRESHMENTS Legislative

Thursday, October 23

Morning

Biological Systems *C. Shoemaker* Senate

- 8:05 Magnetic trapping and micromanipulation of biological macromolecules (BL1) *C. Haber and D. Wirtz*
 8:30 Microrheology of the cell (BL2) *S. Yammada, S. C. Kuo and D. Wirtz*
 8:55 Oscillatory pressure-to-flow relations and viscoelasticity of human blood in tubes and in porous media (BL3) *G. B. Thurston*
 9:20 A fractal analysis of the erythrocyte sedimentation rate (BL4) *L. C. Cerny and E. R. Cerny*

Liquid Crystals: Structure and Rheology *D. A. Hill and L. Walker* Executive

- 8:05 Effect of the molecular weight on the rheological behavior of thermotropic liquid crystalline polymer (LC9) *W. Zhou and J. A. Kornfield*
 8:30 Orthogonal superposition measurements of lyotropic liquid crystal polymer solutions during and after shear flow (LC10) *L. M. Walker, J. Vermant, J. Mewis and P. Moldenaers*
 8:55 Structure and linear viscoelastic behaviour of thermotropic polymers. Influence of molecular weight (LC11) *A. Romo-Uribe, T. J. Lemmon and A. H. Windle*
 9:20 Frank-elasticity-induced interparticle forces in liquid crystals: squeezing flow and "nematic levitation". (LC12) *A. Schwendt and D. A. Hill*

Non-Newtonian Fluid Mechanics *G. L. Leal and F. Baaijens* Judicial

- 8:05 Viscoelastic instabilities of recirculation flows near solid surfaces and interfaces (FM22) *A. M. Grillet and E. G. Shaqfeh*
 8:30 Purely elastic instability of pipe flows (FM23) *H. J. Wilson and J. M. Rallison*
 8:55 Dynamics and stability of viscoelastic flows: a time-dependent simulations approach (FM24) *R. Sureshkumar, M. D. Smith, R. A. Brown and R. C. Armstrong*
 9:20 Role of fluid elasticity and dynamic modulation on stability of multilayer viscoelastic flows (FM25) *C. T. Huang and B. Khomami*

Novel Polymer Systems *M. Mackay and A. J. McHugh* Legislative

- 8:05 Dynamics of multiarm star polymer solutions (NP5) *D. Vlassopoulos, G. Petekidis, G. Fytas, J. Roovers and A. N. Semenov*
 8:30 Rheology of hybrid styryl-polyhedral oligomeric silsequioxane polymers (NP6) *A. Romo-Uribe, P. T. Mather, T. S. Haddad and J. D. Lichtenhan*
 8:55 Polymerized gels templated using surfactant cubic phases (NP7) *E. Paul, A. Sommer-Grosse, J. Hittle, R. K. Prud'homme, D. Perahia and G. G. Warr*
 9:45 COFFEE

Rheology and Mixing *D. Doraiswamy and I. Manas-Zloczower* Senate

- 10:10 Structure and chosen mechanical properties of polymer blend fibres (MX5) *A. Vlochowicz and M. Linek*
 10:35 Polymer migration based on the two fluid mixture theory (MX6) *P. N. Kaloni*
 11:00 Rheology of immiscible polyethylenes (MX7) *I. A. Hussein and M. C. Williams*
 11:25 The rheology of visbroken reactor produced impact copolymers (MX8) *C. Lee, R. Shroff and M. Shanker*
 11:50 The dynamics of mixing and mechano-chemistry in an organo-ceramic composite (MX9) *J. A. Walberer and A. J. McHugh*

Liquid Crystals: Structure and Rheology *D. A. Hill and L. Walker* Executive

- 10:10 Rheo-optical response of biphasic solutions of PHIC (LC13) *S. K. Siddiquee and J. W. van Egmond*
 10:35 Suppression of the Rayleigh capillary instability by rigid-rod microstructure (LC14) *G. M. Forest and Q. Wang*
 11:00 Investigation of near-wall structure evolution in tumbling 8cb by microdielectrometry. (LC15) *D. A. Hill and V. Sequeira*
 11:25 Mechanical rheometry study of a polymer liquid crystal monolayer (LC16) *C. F. Brooks, J. S. Hur, G. G. Fuller, C. W. Frank and C. R. Robertson*
 11:50 Optical rheology and a flow-induced nematic string phase in wormlike micelle solutions (LC17) *I. A. Kadoma, S. G. Kalogrianitis and J. W. van Egmond*

Rheology of Solids *G. B. McKenna, R. Shay and O. A. Hasan* Judicial

- 10:10 Using the spin tensor in constitutive equations for polymeric liquids (SL15) *W. E. VanArsdale*
 10:35 A second plateau in dynamic moduli at low frequency region for polymers containing multiple branched molecules (SL16) *N. Nakajima and J. P. Varkey*
 11:00 Sub-T_g response of polycarbonate: deviations of the equilibrium response from WLF expectations. (SL17) *P. A. O'Connell and G. B. McKenna*
 11:25 Electrostatic forces in viscoelastic solids (SL18) *Y. M. Shkel and D. J. Klingenberg*
 11:50 Particle-tracking microrheology of actin gels (SL19) *A. F. Palmer, T. G. Mason, D. Wirtz and S. C. Kuo*

General Session *R. L. Powell* Legislative

- 10:10 Flow properties of "hairy-rod" monolayers formed by cellulose derivatives with and without attached chromophores (GN3) *P. Fischer, A. M. Ritcey and G. G. Fuller*
 10:35 The invalidity of strain-time separability at short time scales (GN4) *M. V. Simhambhatla*
 11:00 A thin-filament melt spinning model with radial resolution of temperature and stress (GN5) *G. M. Henson, D. Cao, S. E. Bechtel and G. M. Forest*

11:25 A standard reference nonlinear fluid standard: a progress report (GN6) *C. R. Schultheisz and G. B. McKenna*
11:50 Determination of the molecular weight distribution with incomplete linear viscoelastic rheological data (GN7) *J. J. Driscoll IV and D. W. Mead*
12:15 END

Updates of Abstract Book

- Paper SP7 is replaced with:

Monday 1:55 Legislative

SP7

ON THE RELATIVE MOTION OF TWO SEDIMENTING SPHERES IN A VISCOELASTIC FLUID

Edwin Bot, Martien Hulsen, Ben van den Brule

Delft University of Technology, Laboratory for Aero and Hydrodynamics, Rotterdamseweg 145, 2628 AL Delft, The Netherlands

We will show experimental results on the motion of two spheres along the axis of a cylinder filled with a polyacrylamide in glucose and water solution. The spheres are released at a pre-set initial distance with zero initial velocity. The release mechanism is such that it causes minimum disturbance of the surrounding fluid. The results show that when the spheres are released close to each other they will separate and when released far apart they move towards each other. In both cases they move to the same, more or less stable, arrangement.

- For Paper FM8 (Tuesday, 4:50, Judicial), the author information should read:

M.R. Mackley*, R.P.G. Rutgers* and D.G. Gilbert**

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- For Paper MT28 (Wednesday, 10:10, Executive), the author information should read:

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- Paper GN2 (Monday, 4:50, Judicial) is cancelled.
- Paper NP8 (Thursday, 9:20, Legislative) is cancelled.