

# **Simha Symposium on Polymer Physics**

*To celebrate the 95<sup>th</sup> birthday of Prof. Robert Simha*

October 17-18, 2007

and

## **Polymer Nanocomposites 2007**

*Fourth International Symposium on  
Polymer Nanocomposites Science and Technology*

October 18-19, 2007

National Research Council Canada – Industrial Materials Institute  
Boucherville, Quebec, Canada

Information and registration: [www.nanocomposites2007.com](http://www.nanocomposites2007.com)

Advance registration deadline: **August 24, 2007**

### Summary of Program (Details Following)

<b>Simha Symposium</b>		Wed., Oct. 17, AM	4 oral presentations
		Wed., Oct. 17, PM	6 oral presentations
<b>Polymer Nanocomposites 2007</b>		Thu., Oct. 18, AM	9 oral presentations
		Thu., Oct. 18, PM	7 oral presentations
		Thu., Oct. 18, 17:00 – 18:30	18 poster presentations
		Fri., Oct. 19, AM	10 oral presentations
		Fri., Oct. 19, PM	9 oral presentations

# Simha Symposium on Polymer Physics

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## Wednesday Morning, October 17, 2007

Chairmen: L. A. Utracki, *National Research Council Canada (IMI)*  
G. McKenna, *Texas Tech University*

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- 08:00 – 08:30 Registration
- 08:30 – 08:40 Opening Remarks
- 08:40 – 09:00 **Introduction of Prof. Simha**  
A. M. Jamieson  
*Case Western Reserve University (USA)*
- 09:00 – 09:45 **Volume Relaxation and Lattice-Hole Model**  
R. Simha\* and R. E. Robertson\*\*  
\**Case Western Reserve University*, \*\**University of Michigan (USA)*
- 09:45 – 10:15 Coffee Break
- 10:15 – 11:00 **Fluid Mechanics Revisited: On the Historical Misconception of Fluid Velocity**  
H. Brenner  
*Massachusetts Institute of Technology (USA)*
- 11:00 – 11:45 **Intrinsic Miesowicz Viscosities of Hyperbranched Liquid Crystal Polymers in a Nematic Solvent**  
S. Dong\*, Y.Q. Zhao\*, S. J. Rowan\*, S. Nazarenko\*\*, A. M. Jamieson\*  
\**Case Western Reserve University*, \*\**University of Southern Mississippi (USA)*
- 11:45 – 12:30 **High Polymer and Surfactant Drag Reduction in Turbulent Flows**  
J. L. Zakin, W. Ge  
*Ohio State University (USA)*
- 12:30 – 13:30 Lunch

# Simha Symposium on Polymer Physics

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## Wednesday Afternoon, October 17, 2007

Chairmen: A. M. Jamieson, *Case Western Reserve University*  
J. L. Zakin, *Ohio State University*

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- 13:30 – 14:00 **Bulk and Surface Properties of Random Copolymers in View of Simha-Somcynsky's Equation-of-State**  
H. W. Kammer, J. Kressler  
*Martin-Luther-University Halle-Wittenberg (Germany)*
- 14:00 – 14:30 **Concentration vs. Temperature Glasses: Volume States Compared**  
G. B. McKenna  
*Texas Tech University (USA)*
- 14:30 – 15:00 **Thermodynamic Studies of Main-Chain Liquid Crystals - Stepwise Crystallization of Chain Molecules via a Nematic Conformation**  
A. Abe  
*Tokyo Polytechnic University (Japan)*
- 15:00 – 15:30 Coffee Break
- 15:30 – 16:00 **Estimation of Free Volume Holes in Amorphous Polymers by Means of Positron Annihilation Lifetime Spectroscopy**  
G. Consolati, F. Quasso  
*Politecnico di Milano (Italy)*
- 16:00 – 16:30 **Probing the Liquid State of Polymers by Ortho-Positronium**  
F. H. J. Maurer, P. Winberg, M. Eldrup  
*Lund University (Sweden)*
- 16:30 – 17:00 **Probing the State of Amorphous Phase in Semicrystalline Polyesters**  
S. Nazarenko\*, J. Lin\*\*, B. G. Olson\*, A. M. Jamieson\*\*  
*\*University of Southern Mississippi, \*\*Case Western Reserve University (USA)*
- 17:00 – 17:10 Closing Remarks
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## Wednesday Evening, October 17, 2007

**Simha Symposium Speakers' Dinner, 18:00 – 21:00**

**Restaurant Auberge Le Saint-Gabriel, Old Montreal**

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# Simha Symposium on Polymer Physics and Polymer Nanocomposites 2007 Symposium

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**Thursday Morning, October 18, 2007**

Chairmen: K. C. Cole, *National Research Council Canada (IMI)*  
S. Nazarenko, *University of Southern Mississippi*

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- 08:00 – 08:30 Registration
- 08:30 – 09:15 **Keynote Lecture: Dr. A. Okada**  
**Two-Decade Review of Polymer-Clay Nanocomposites**  
A. Okada, A. Usuki  
*Toyota Central R&D Labs (Japan)*
- 09:15 – 09:40 **Dynamics of Nanocomposites**  
C. Sender, J. F. Capsal\*, A. Bernès, E. Dantras\*, L. Laffont-Dantras\*\*, P. Demont, J. Dandurand\*, C. Lacabanne\*  
*\*Université Paul Sabatier, \*\*Université Jules Verne (France)*
- 09:40 – 10:05 **Free Volume of Molten and Glassy Polystyrene and Its Nanocomposites**  
L. A. Utracki  
*National Research Council (Canada)*
- 10:05 – 10:30 **The Role of Surface Interactions in the Processing and Behaviour of Polymer Nanocomposites**  
M. R. Kamal, J. Uribe-Calderon  
*McGill University (Canada)*
- 10:30 – 10:50 Coffee Break
- 10:50 – 11:15 **Thermochromism in Polymeric Nanocomposites**  
L. Nicolais, G. Carotenuto  
*National Research Council (Italy)*
- 11:15 – 11:40 **Rheological Properties of Nano-Fiber Networks**  
C. Friedrich  
*Albert-Ludwigs-University Freiburg (Germany)*
- 11:40 – 12:05 **Rheology of Polymers with Nano-Fillers**  
M. Sepehr, L. A. Utracki  
*National Research Council (Canada)*
- 12:05 – 12:30 **Morphology Development and Deformation in Nanocomposites Containing Layer Silicates**  
J. Kressler  
*Martin Luther University Halle-Wittenberg (Germany)*
- 12:30 – 12:55 **The Effects of Nano-Clay on the Extrusion Foaming of Wood Fiber/Polyethylene Nanocomposites**  
Y. H. Lee, T. Kuboki, C. B. Park, M. Sain  
*University of Toronto (Canada)*
- 12:55 – 13:00 **Closing of Simha Symposium**  
L. A. Utracki  
*National Research Council (Canada)*
- 13:00 – 14:00 Lunch

# Polymer Nanocomposites 2007 Symposium

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Thursday Afternoon, October 18, 2007

## Carbon and Non-Clay Nanocomposites

Chairmen: P. Hubert, *McGill University*  
J. Kressler, *Martin-Luther-University Halle-Wittenberg*

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- 14:00 – 14:45 **Keynote Lecture: Dr. Cheol Park**  
**Carbon Nanotube Polymer Nanocomposites for Multifunctional and Structural Aerospace Applications**  
C. Park  
*National Institute of Aerospace (USA)*
- 14:45 – 15:05 **Three-Dimensional (3D) Microstructures of SWCNT-Polymer Nanocomposites by Means of UV-Assisted Direct-Writing**  
L. Laberge-Lebel\*, B. Aissa\*\*, M. A. El Khakani\*\*, D. Therriault  
*\*École Polytechnique de Montréal, \*\*INRS-EMT (Canada)*
- 15:05 – 15:25 **Study on Steady Shear, Electrical and Mechanical Properties of the Linear Low Density Polyethylene / Carbon Nanotube Nanocomposites**  
J. Aalaie, A. Rahmatpour  
*Research Institute of Petroleum Industry (Iran)*
- 15:25 – 15:40 Coffee Break
- 15:40 – 16:00 **Thermal Conductivity of Polymer Nanocomposites Made with Carbon Nanofibers**  
S. Agarwal, M. M. K. Khan, R. K. Gupta  
*West Virginia University (USA)*
- 16:00 – 16:20 **Improvement of Electrical Conductivity of Carbon/Epoxy Nanocomposites Using Carbon Nanofibers**  
A. Allaoui, S. V. Hoa, M. D. Pugh  
*Concordia University (Canada)*
- 16:20 – 16:40 **Bioceramic Nanoparticle Reinforced Biopolymers**  
A. Woesz\*, I. Mackay\*, K. P. Andriano\*\*, S. M. Best\*, R. E. Cameron\*  
*\*University of Cambridge, \*\*Inion Ltd. (UK)*
- 16:40 – 17:00 **Relaxation Dynamics Study of PVDF/BaTiO<sub>3</sub> Nanocomposites**  
C. V. Chanmal, J. P. Jog  
*National Chemical Laboratory (India)*

# Polymer Nanocomposites 2007 Symposium

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Thursday Afternoon, October 18, 2007

Poster Session and Mixer, 17:00 – 18:30

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- (1) **Structure of Polypropylene-Clay Nanocomposites**  
S.-Y. A. Shin\*, A. Finkle\*, L. C. Simon\*, J. B. P. Soares\*, W. Rodgers\*\*, P. Fasulo\*\*, G. Scholz\*  
*\*University of Waterloo (Canada), \*\*General Motors Corporation (USA)*
- (2) **Potential of Ball Milling to Improve Clay Dispersion in Nanocomposites**  
F. Perrin-Sarazin, M. Sepehr, S. Bouaricha, J. Denault  
*National Research Council (Canada)*
- (3) **Tensile Properties of Clay-Reinforced Polypropylene Nanocomposites**  
H. Ben Daly\*, H. Ben Hadj Salah\*, A. Dogui\*, K. C. Cole\*\*, J. Denault\*\*  
*\*École Nationale d'Ingénieurs de Monastir (Tunisia); \*\*National Research Council (Canada)*
- (4) **Poly(1-butene) Nanocomposites: Crystallization and Phase Transformation Studies**  
S. D. Wanjale, K. Remya, J. P. Jog, A. B. Gaikwad  
*National Chemical Laboratory (India)*
- (5) **Microstructural Analysis of Semi-Crystalline Polymer Clay Nanocomposites**  
A. Vermogen, K. Masenelli-Varlot, G. Vigier, J. Duchet, J.-F. Gérard  
*INSA de Lyon (France)*
- (6) **Kinetics and Thermodynamics of Intercalation of Rubber-Clay Nanocomposites**  
A. Vermogen\*, E. P. Giannelis\*, A. Wang\*\*, T. Hodge\*\*  
*\*Cornell University; \*\*Michelin Americas Research Corp. (USA)*
- (7) **Oxygen Barrier LDPE/LLDPE/Organoclay Nanocomposite Films for Food Packaging**  
S. Dadbin\*, M. Noferesti\*\*, M. Frouchi\*\*  
*\*Atomic Energy Organization of Iran; \*\*Sharif University of Technology (Iran)*
- (8) **Nanocomposites Based on Water Soluble Dendritic Polyols and Montmorillonite**  
S. Nazarenko\*, J. J. Decker\*, G. Chigwada\*, B. Olson\*, S. N. Chvalun\*\*  
*\*University of Southern Mississippi (USA), \*\*Russian Academy of Sciences (Russia)*
- (9) **Polypropylene Microfibers with Filler in Nano State**  
M. V. Tsebrenko, V. G. Rezanova, I. A. Tsebrenko  
*Kiev National University of Technologies and Design (Ukraine)*
- (10) **Thermal Stability of Polystyrene-Clay Nanocomposite**  
S. Shaghghi  
*Iran Polymer and Petrochemical Institute (Iran)*
- (11) **Rheological Studies of PMP/MWCNT Nanocomposites**  
P. A. Patil, S. D. Wanjale, J. P. Jog  
*National Chemical Laboratory (India)*
- (12) **Thermo-Mechanical and Rheological Characterization of Various Epoxy-Based Nanocomposites for High Performance Composites**  
I. Ortega, C. Billotte, E. Ruiz  
*École Polytechnique de Montréal (Canada)*
- (13) **PS Smectitic Clay Nanocomposites by Melt Intercalation Technique**  
T. Sanches Valera, C. Coelho, N. R. Demarquette  
*Universidade de São Paulo (Brazil)*

- (14) **Preparation and Properties of Epoxy Nanocomposites. Part 2. The Effect of Dispersion and Intercalation/Exfoliation of Organoclay on Mechanical Properties**  
T.-D. Ngo\*, M.-T. Ton-That\*\*, S. V. Hoa\*, K. C. Cole\*\*  
*\*Concordia University, \*\*National Research Council (Canada)*
- (15) **Anti-Static Optical Thin Films from Poly(acrylic) and Monodispersed Colloidal Zinc Antimony Oxide**  
W.-Y. Teng, W.-J. Wang, W.-K. Chin  
*National Tsing Hua University (Taiwan, ROC)*
- (16) **The Study of Structure and Tribological Properties of Nano-Doped Polymer Coatings**  
S. E. Tesker\*, S. C. Veldhuis\*, E. I. Tesker\*\*  
*\*McMaster University (Canada); \*\*Volgograd State Technical University (Russia)*
- (17) **Clay-Based Acrylate Nanocomposites for Wood Flooring**  
V. Landry\*, B. Riedl\*\*, P. Blanchet\*\*\*  
*\*Université Laval; FPIInnovations Forintek Division (Canada)*
- (18) **Formation of Heteropolyacid/Saponite-like Clay Complexes and Their Incorporation in Chemically Modified SEBS**  
P. Y. Vuillaume, L. Robitaille, A. Mokrini  
*National Research Council (Canada)*

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**Thursday Evening, October 18, 2007**  
**Symposium Banquet, 18:30 – 22:00**  
**Manoir Rouville-Campbell**

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# Polymer Nanocomposites 2007 Symposium

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Friday Morning, October 19, 2007

## Formulation and Processing

Chairmen: R. Gupta, *West Virginia University*  
L. Simon, *University of Waterloo*

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- 08:00 – 08:30 Registration
- 08:30 – 09:15 **Keynote Lecture: Prof. R. Mülhaupt**  
**Polymer Nanocomposites: Prospects and Challenges**  
R. Mülhaupt  
*Albert-Ludwigs-University Freiburg (Germany)*
- 09:15 – 09:35 **Effect of Polymerization Condition on Particle Morphology of Polyethylene Clay Nanocomposites**  
A. Maneshi, L. C. Simon, J. B. P. Soares  
*University of Waterloo (Canada)*
- 09:35 – 09:55 **Modification of Polystyrene in Order to be Compatible with Clay and Preparing Nanocomposite**  
S. Shaghghi  
*Iran Polymer and Petrochemical Institute (Iran)*
- 09:55 – 10:15 **Effects of LLDPE Grafted Copolymers on the Structures and Mechanical Properties of LLDPE/Organoclay Nanocomposites**  
B. Eriman, N. Uyanik  
*Istanbul Technical University (Turkey)*
- 10:15 – 10:30 Coffee Break
- 10:30 – 10:50 **Estimation of Stresses Required for Exfoliation of Clay Particles in Polymer Nanocomposites**  
N. K. Borse\*, M. R. Kamal\*\*  
*\*Nova Chemicals; \*\*McGill University (Canada)*
- 10:50 – 11:10 **Elongational Flow of Polymeric Nanocomposites**  
P. Sammut  
*National Research Council (Canada)*
- 11:10 – 11:30 **Fundamental Understanding of Morphology Evolution in a Clay/Polymer System Submitted to Shear Flow**  
A. Reyna-Valencia, Y. Deyrail, M. Bousmina  
*Laval University (Canada)*
- 11:30 – 11:50 **Effects of Nanoparticle Feed Location during Nanocomposite Compounding**  
A. Ashter, S.-J. Tsai, J. S. Lee, M. J. Ellenbecker, J. L. Mead, C. F. Barry  
*University of Massachusetts Lowell (USA)*
- 11:50 – 12:10 **PLA / Thermoplastic Starch / Montmorillonite Nanocomposites**  
O. H. Arroyo-Fernandez\*, M. A. Huneault\*\*, B. D. Favis\*, M. N. Bureau\*\*  
*\*École Polytechnique de Montréal; National research Council (Canada)*
- 12:10 – 12:30 **Nanosilica-Modified Carbon/Epoxy Composites - Manufacturing and Characterization**  
E. Ruiz, I. Ortega, C. Abdellaoui, P. Trudeau  
*École Polytechnique de Montréal (Canada)*
- 12:30 – 13:30 Lunch

# Polymer Nanocomposites 2007 Symposium

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Friday Afternoon, October 19, 2007

## Properties and Characterization

Chairmen: M. Kamal, *McGill University*  
J. Vuorinen, *Tampere University of Technology*

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- 13:30 – 13:50 **Study on Nano-Composite Biodegradable Emulsion as the Coating of Fertilizer**  
Z. Huang, C. Kan, Y. Du, D. Liu  
*Tsinghua University (China)*
- 13:50 – 14:10 **Characterization of Twin Screw Extruder Compounded Polycarbonate Nanoclay Composites**  
K. Nevalainen, J. Vuorinen, V. Villman, R. Suihkonen, P. Järvelä, J. Sundelin, T. Lepistö  
*Tampere University of Technology (Finland)*
- 14:10 – 14:30 **Gas Barrier Behavior of Polymer Clay Nanocomposites: Effect of Mineral Layer Aggregation**  
S. Nazarenko\*, B. Olson\*, S. Qutubuddin\*\*  
*\*University of Southern Mississippi, \*\*Case Western Reserve University (USA)*
- 14:30 – 14:50 **Gas Barrier PET Nanocomposites for Beverage Packaging**  
A. Doorbash, M. Frounchi  
*Sharif University of Technology (Iran)*
- 14:50 – 15:10 **Influence of the Processing on the Microstructure of Polyethylene Clay Nanocomposites: Relationship with Their Properties**  
A. Vermogen\*, K. Masenelli-Varlot\*, G. Vigier\*, J. Duchet\*, J.-F. Gérard\*, E. Picard\*\*, E. Espuche\*\*  
*\*INSA de Lyon; \*\*Univ. Claude Bernard Lyon I (France)*
- 15:10 – 15:30 Coffee Break
- 15:30 – 15:50 **Polypropylene-Based Nanocomposite**  
R. S. Mauler, S. A. Liberman, M. S. Oviedo, K. Santos, L. Furlan  
*Federal University of Rio Grande do Sul (Brazil)*
- 15:50 – 16:10 **Investigation of Water Absorption in Clay-Reinforced Polypropylene Nanocomposites**  
H. Ben Daly\*, A. Ladhari\*, H. Ben Hadj Salah\*, K. C. Cole\*\*, J. Denault\*\*  
*\*École Nationale d'Ingénieurs de Monastir (Tunisia); \*\*National Research Council (Canada)*
- 16:10 – 16:30 **Molecular Dynamics of Copolyester/Clay Nanocomposites as Investigated by Viscoelastic and Dielectric Analysis**  
R.A. Kalgaonkar, J. P. Jog  
*National Chemical Laboratory (India)*
- 16:30 – 16:50 **Preparation and Properties of Epoxy Nanocomposites. Part I. The Effect of Pre-Mixing on Dispersion of Organoclay**  
T.-D. Ngo\*, M.-T. Ton-That\*\*, S. V. Hoa\*, K. C. Cole\*\*  
*\*Concordia University, \*\*National Research Council (Canada)*
- 16:50 – 17:00 Closing Remarks
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