

## André Bénard

### List of Research Works:

#### 1. Books co-Edited

- CAE and Related Innovations for Polymer Processing MD -Vol. 90 Published: 2000, Edited by: L.S. Turng, H.P. Wang, K. Ramani, and A. Bénard.
- Processing and Design of Multicomponent Material Systems, MD- Vol. 94, Published: 2000. Edited by: C. Altan, A. Bénard, and M. Erdal.

#### 2. Book Section/Chapters:

- Guell, D.C. and Bénard, A. , “Overview of Flow-Induced Alignment as Applied to Composite Materials: Current Applications and Future Prospects”, in *Flow-Induced Alignment in Composite Materials*, Woodhead Publishing Limited, Cambridge, 1997
- Bénard, A. and Advani, S.G. “Morphology and Microstructure of Semicrystalline Polymers and Composites: Modeling Concepts” in *Advanced Polymeric Materials: Structure Properties Relationships*, Shonaike, G.O. and Advani<sup>2</sup>, S.G., Editors, (to appear, May 2003).

#### 3. Reviewed Journal Papers

- Diaz, A.R. and Benard, A. “Designing Materials with Prescribed Elastic Properties Using Polygonal Cells”, *Int. J. for Numerical Methods in Engineering*, to appear
- Zheng, G., Wichman, I.S., and A. Bénard, A. “Energy Balance Analysis of Ignition Over a Melting Polymer Subjected to a High Radiation Heat Flux in a Channel Cross Flow”, *Fire Safety Journal*, to appear.
- Zheng, G., Wichman, I.S., and Bénard, A. “The Influence of Solid Anisotropy on Flame Spread over Melting Composite Layers”, *Combustion Theory and Modeling* , 6:317-337, June 2002.
- Bénard, A. and Diaz, A.R. “On the Discretization of Problems Involving Periodic Planar Tilings”, *Communications in Numerical Methods in Engineering*, 17:543-549, 2001.
- Bénard, A. “Modelling the Effects of Reinforcements on the Crystallization of Polymers”, *J. Thermoplastic Composites*, 14, 116-128, 2001.
- Zheng, G, Wichman, I.S., and Bénard, A. “Modeling Flame Spread Over Polymeric Surfaces”, *Combustion and Flame*, 24 (3): 387-408, 2001.
- Pillai, K.M., Advani , S.G., Bénard, A., et al. “Numerical simulation of crystallization in high density polyethylene extrudates” *Polym. Eng. Sci.* 40: (11) 2356-2373 November 2000
- Kaiser, E.J., McGrath J.J., Bénard, A., “Directional solidification of isotactic and atactic polypropylene blends.” *J Appl. Polym. Sci.* 76: (10) 1516-1528 June 6 2000.
- Bénard, A. and Advani S.G., “An Analytical Model for the Spherulitic Growth in Fiber Reinforced polymers”, *Journal of Applied Polymer Science*, Vol. 70, 1677-1687, 1998.
- Bénard, A., “A Model for Phase Change Kinetics in Polymer Composites with Significant Fiber Surface Nucleation”, *Acta Materialia*, Vol. 46, 5259-5270, 1998.
- Bénard, A., Advani, S. G., and Schultz J. M., “Solidification of Semicrystalline Polymers Using a Variable Interface Temperature Model”, *Journal of Polymer Science B, Polymer Physics*, V 34, p.471, 1996
- Bénard, A. and Advani, S.G., “A Cell Model to Describe the Spherulitic Growth in Semicrystalline Polymers”, *Polym. Eng. Sci.*, V 36, p.520,1996
- Bénard, A. and Advani, S.G., “Energy Equation and Crystallization Kinetics of Semicrystalline Polymers”, *Int. J. of Heat and Mass Transfer*, V38, p.819, March 1995
- Bénard, A., Boukhili, R. and Gauvin, R., “Mechanical Behavior of Bidirectional Intraply Hybrid Laminates”, *Sampe Quarterly*, Vol. 22, 1991.

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### 5. Conference Proceedings Papers

- Li, Y. and Benard, A. “A Method for Reducing the Errors in Fictitious Domain Methods Applied to Heat Transfer Problems”, 6<sup>th</sup> ASME-JSME Thermal Engineering Joint Conference, Hawaii, May, 2003
- Zheng, G., Wichman, I.S., and Bénard, A., “Influence of a Periodic Radiation Heat Source on Polymer Ignition”, IMECE’01, New York, NY, November 2001.
- Nguyen, C.T., Kim, Y.C., Parks, S.M., Petty, C.A., Mandal, D. and Bénard, A. paper 235e, Symposium on Polymer Processing and Rheology # 3, AIChE Annual Meeting, Reno, NV November 7, 2001.
- Kim, Y.C., Bénard, A., Mandal, D., Nguyen, C.T., Parks, S.M., and Petty, C.A., “Rheological and Alignment Properties of Liquid Crystalline Polymers and Fiber Suspensions”, Y. C., poster paper 228ad, Poster Session: Materials Engineering and Science Division, AIChE Annual Meeting, Reno, NV, November 5, 2001.
- Nguyen, C.T., Parks, S.W., Bénard, A. and C.A. Petty, “Predictions of Low\_Order Orientation Statistics for Alignment of Liquid Crystalline Polymers in Homogeneous Shear”, Proceedings of the International Conference on Composite Materials, (ICCM XIII), Beijing, China, June 25-29, 2001.
- Mandal, D., Parks, S.W., Petty, C.A. and A. Bénard, “Discussion of a Closure Model for Fiber Orientation, Proceedings of the Seventeenth Annual Meeting of the Polymer Processing Society, Montreal, Canada, May 21-24, 2001.
- Zheng, G., Bénard, A. and Wichman, I.S. “Opposed-Flame Development over Melting Polymers – Modeling and Global Energy Balance Analysis,” Proceedings of the 34<sup>th</sup> National Heat Transfer Conference 2000, Pittsburgh, PA, August 20-22, 2000.
- Zampaloni, M., Pourboghrat, F. and Bénard, A., “Experimental Study of Hydroforming for Complex Composite Parts”, Proceedings of the Americal Society for Composites 15<sup>th</sup> Technical Conference, Technomic Publishing, Lancaster, PA, p. 206, 2000.
- Zampaloni, M., Pourboghrat, F. and Bénard, A., “A Study of Hydroforming for Composites”, Proceedings of the International Mechanical Engineering Conference and Exhibit, IMECE ‘ 2000, Orlando, FL, 2000.
- Imhoff, A., Parks, S., Petty, C. and A. Bénard, “Validation of a New Closure Model for Flow-Induced Alignment of Fibers”, Proceedings of the International Mechanical Engineering Conference and Exhibit, IMECE ‘ 2000, Orlando, FL, 2000.
- Somerton, C.W., Benard, A., Genik, L., Hoke, P., Schroeder, J., and Vance, R. “Design Competitons Come to Heat Transfer,” Proceedings of IMECE ’99, November, Nashville, TN, 1999.
- Bénard, A. “Modeling the Effects of Reinforcements on the Crystallization of Polymers”, Proceedings for the American Society for Composites, Fourteenth Technical Conference, J.M. Whitney Ed., ASC, pp 785-794, 1999.
- Sowayan, A.S. , Bénard, A., and Diaz, A.R., “Using Wavelets to Solve Differential Equations with Dirichlet Boundary Conditions: Comparison of Two Methods” , Proceedings of the IMECE’99, Heat Transfer Division, November 1999.
- Zheng, G., Wichman, I.S. and Bénard, A. “Modeling of Ignition, Transition and Steady Flame-Spread Over Non-Isotropic Solid Polymers”, *Proceedings of the 1999 Joint Technical Meeting of the United States sections: The Combustion Institute*, Washington, DC, March 1999.
- Wirtz, K., Koochesfahani, M., McGrath, J.J. and Bénard, A. “Molecular Tagging Velocimetry Applied To Buoyancy-Driven Convective Phenomena During Solidification”, *Proceedings of the ’98 International Mechanical Engineering Conference and Exhibit*, Anaheim, CA, November, 1998.
- Bénard, A. and Advani S.G., “Simulation of Microstructure Development During the Solidification of Semicrystalline Polymers and Composites”, *Proceedings of the 1997 National Heat Transfer Conference*, ASME, Baltimore, August 1997.
- Bénard, A., Lovalenti, P., Montalbano, E., Tullock, D.C , “Three-dimensional Finite Element Simulation of Viscoelastic Fluid Flows Using the EVSS-G., *Proceedings of the Joint PPS/ AiChe Meeting*, November 1996, Chicago, IL
- Bénard, A. and Advani, S.G., “Linking Microscopic and Macroscopic Effects during Solidification of Semicrystalline Polymers”, *Simulation of Materials Processing Theory, Methods and Applications, Numiform ’95*, Ithaca, NY June 1995.

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- Bénard, A. and Advani, S.G., "Nonisothermal Crystallization of Polymers: Regimes of Coupling", *Proceedings of the 51<sup>st</sup> Annual Technical Conference (ANTEC '93)*, 1993.
- Bénard, A., Boukhili, R. and Gauvin, R., "Mechanical Behavior of Bidirectional Intraply Hybrid Laminates", *22<sup>nd</sup> International Sampe Conference*, 1990.

### 6. Conference Abstracts

- Bénard, A. and Advani, S.G., "A Cell Model to Describe the Spherulitic Growth in Semicrystalline Polymers", *Proceedings of the 208<sup>th</sup> ACS Meetings*, Polymer Science Division, pp. 600-603, 1994.
- Bénard, A. and Advani, S.G., "A Model for the Spherulitic Growth in Semicrystalline Polymers", *PPS Meeting of the Americas*, pp. 91-93, 1993.

### 7. Presentations

- Benard, A., Mandal, D.K., Parks, S.M., and Petty., C.A. "A Closure Model for Fluids with Microstructures", Poster Session 3.3, World Congress Computational Mechanics, Vienna, Austria, July 7-12, 2002.
- Bénard, A , "Modeling Microstructure Development in Polymers and Composites", IMECE'01, New York, NY, November, 2001.
- Bénard, A and Advani, S.G., "Modeling the Cure and Solidification of Polymer Composites", IMECE'01, New York, NY, November, 2001.
- Bénard, A Mandal, D., Parks, S.M., and Petty<sup>3</sup>, C.A., "Formulation of Moment Closure Models for Flow-Induced Orientation of Fibers", IMECE'01, New York, NY, November, 2001
- Bénard, A and Balagangadhar, D. , "Finite Element Modeling of Mold Filling Processes Using a Fictitious Domain Approach", IMECE'01, New York, NY, November, 2001
- Conrad, S. and Bénard, A. "Finite Element Modeling of Mold-Filling Processes Using a Fictitious Domain Method", IMECE'00, Orlando, FL, November, 2000.
- Zheng, G., Wichman, I.S. and Bénard, A. "Investigation of Flame Spread Over Polymeric Surfaces," Seminar at the Building and Fire Research Laboratory, NIST, November, 2000.
- Bénard, A., McGrath, J.J., Koochesfahani, M.M.K., and Diaz, A.R. "Experimental and Numerical Investigation of Solidification Processes with Convection", NASA PI Meeting, Huntsville AL, June, 2000.
- Bénard, A. "Introduction to Fuel Cells", MSU Summer CFD Workshop, East Lansing, MI, June, 2000.
- Diaz, A.R. and Bénard, A. "Wavelets and the Numerical Solution of Engineering Problems: A Path to Rapid Image-Based Analysis", Alcoa Technical Center, Dec 4<sup>th</sup>, 1998.
- Bénard, A. and Advani, S.G., "Modeling Microstructure Development in Semicrystalline Polymers and Composites", National Heat Transfer Conference 1997, Baltimore, August, 1997.
- Bénard, A., Beck, J.V. and Dowding, K. "Design and Simulations of Brakes", GM Milford Proving Grounds, March 28<sup>th</sup>, 1997.
- Bénard, A. and Advani, S.G. "Simulation of the Evolving Microstructure in Semicrystalline Polymers and Composites", Design and Manufacturing NSF Grantee Conference (poster), Albuquerque, NM, January, 1996.
- Bénard, A. "Microstructure Development in Semicrystalline Polymers and Composites", invited speaker, AMP Incorporated, Harrisburg, PA, July, 1995.
- Bénard, A. "Heat Transfer and Microstructure Development in Semicrystalline Polymers", ASME GSTC Region III, Newark, DE, March, 1995.
- Bénard, A. and Advani, S.G. "A Cell Model to Describe the Spherulitic Growth in Polymers," American Chemical Society, Polymer Science and Engineering Division, Washington, DC, August, 1994.
- Bénard, A. "Transport Phenomena and Microstructure Development in Semicrystalline Polymers and Composites", University of Sherbrooke, Sherbrooke, PQ, December, 1994.
- Bénard, A. and Advani, S.G. "A Model for the Spherulitic Growth in Semicrystalline Polymers," Polymer Processing Society North-Atlantic Meeting, Morgantown, WV, August, 1993.
- Bénard, A. and Advani, S.G. "Transport Phenomena and Microstructure Development in Semicrystalline Polymers", invited speaker, E.I. DuPont de Nemours, Experimental Station, Wilmington, DE, May, 1993.

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### **9. Papers in preparation**

- Petty, C.A, Parks, S., and Benard, A. “A Theory of Flow-Induced Alignment of Suspensions”, *in preparation for Journal of Fluid Mechanics*.
- Chunduru, S., Benard, A. and Somerton, C. W. “ Analytical Solutions for Convective Heat Transfer in Core-Annular Flows”, *in preparation for J. of Heat Transfer*.
- Vasam, P., Benard, A. and Wichman, I.S. “Simulation of Bubble Growth in a Confined Volume”, *in preparation for Int. J. Multiphase Flows*.