

**Gregory Beaucage, Professor**

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- 1980 University of Rhode Island, Kingston, RI 02881 *B.S. Zoology*; Highest Distinction. (National Merit Scholar Finalist, Elected to Phi Beta Kappa)
- 1982 University of Rhode Island, Kingston, RI 02881 *B.S. Chemical Engineering*; High Distinction. (Elected to Phi Kappa Phi)
- 1991 University of Massachusetts, Amherst, MA 01003 *Ph.D. Polymer Science and Engineering*. Advisor: *Richard S. Stein*. *A Morphological, Mechanical and Thermodynamic Investigation of the Isotactic-PVME/PS Polymer Blend*.
- 1991 Sandia National Laboratory, Albuquerque, NM 87185; *Post Doctoral Fellow*, Organic Materials Group *Characterization of nanomaterials using scattering & scattering theory*.

**Appointments**

University of Cincinnati, Cincinnati, OH, 45221 *Professor*, Department of Chemical and Materials Engineering, 2008-present.

University of Cincinnati, Cincinnati, OH, 45221 *Associate Professor*, Department of Chemical and Materials Engineering, 2000-2007.

ETHZ, Zurich Switzerland *Visiting Professor* Funded by Swiss National Science Foundation and Dupont Corporation. 8/2003-8/2004.

University of Cincinnati, Cincinnati, OH, 45221 *Assistant Professor*, Department of Materials Science and Engineering, 1994-2000.

Sandia National Laboratory, Albuquerque, NM 87185, *Staff Member*, Organic Materials Group 1815. Cooperative research agreements with U.S. industrial partners. 1993-1994.

US Patent and Trademark Office, Arlington, VA. Patent Examiner Biomedical Materials. 1982-1986.

**Other Experience and Professional Memberships**

2008 Fellow American Physical Society

2000-2008 Advisory Board Intense Pulse Neutron Source, Argonne National Laboratory.

2003-present Founding Member of LENS Neutron Scattering Facility at Indiana University

2000-present Founding Member of LSU Synchrotron CAMD SAXS User Group

1980-present Member American Institute of Chemical Engineers

1990-present Member American Physical Society

1992-present Member American Crystallographic Society

2004-2005 Chair of the Small Angle Scattering Special Interest Group ACryS.

2003-2004 Program Chair Small Angle Scattering Special Interest Group ACryS

1995-present Panel and Individual Referee for NSF/PRF/DOE/Commerce Proposals.

**10 Related Publications (from 113 peer reviewed)**

- 1) *Towards resolution of ambiguity for the unfolded state*. Beaucage G *Biophysical J.* **95** 503-509 (2008).
- 2) *Probing the dynamics of nanoparticle growth in a flame using synchrotron radiation*. Beaucage G, Kammler HK, Mueller R, Strobel R, Agashe N, Pratsinis SE and Narayanan T, *Nature Mater.* **3**, 370-373 (2004).
- 3) *In situ studies of nano-particle growth dynamics in premixed flames*. Kammler HK, Beaucage G, Kohls DJ, Agashe N, Ilavsky J., *J Appl. Phys.* **97**(5) 2005 (Article 054309).
- 4) *3D Hierarchical orientation in polymer-clay nanocomposite films*. Bafna A, Beaucage G, Mirabella F *Polymer* **44**, 1103-1115 (2003).
- 5) *A structural model for equilibrium swollen networks*. Sukumaran SK, Beaucage G *Europhysics Letters* **59** 714-720 (2002).
- 6) *Approximations leading to a unified exponential/power-law approach to small-angle scattering*. Beaucage G, *J. Appl. Crystallogr.* **28**, 717-728 (1995).
- 7) *Small-Angle Scattering from Polymeric Mass Fractals of Arbitrary Mass-Fractal Dimension*.

Beaucage G, *J. Appl. Crystallogr.* **29**, 134-146 (1996).

8) *Determination of branch fraction and minimum dimension of mass-fractal aggregates.* Beaucage G, *Phys. Rev. E*, **70**, 031401 (2004).

9) *Quantification of branching in disordered materials.*

#### **Synergistic Activities**

1) *Creation:* Development of scattering theories (the unified function) to describe aggregate nanostructures, biopolymers, branched structures [1-4,6-10]. *Integration:* Pioneered application of x-ray scattering in situ to pyrolytic synthesis of nanomaterials [2,3]. *Transfer of Knowledge:* Developed and co-developed user software for the analysis of scattering data using the unified function with Jan Ilavsky.

2) *Creation:* Developed aero-sol-gel reactor for room temperature aerosol synthesis.

3) *Transfer of Knowledge:* Chairman of small-angle scattering group American Crystallographic Association, Organizer for annual meeting of ACA.

4) *Transfer of Knowledge:* Organizer for characterization session in particle technology for AIChE meeting Fall 2005, and Spring (World Particle Congress) 2006. Organizing session on in situ characterization for Fall 2006 AIChE meeting in San Francisco. Organized three sessions for AIChE in Philadelphia 100<sup>th</sup> Anniversary Annual Meeting 2008.

5) *Transfer of Knowledge:* 12 web courses (9 pertaining to polymers) extensive notes, lab experiments and data. 210,000 different IP#'s have hit this course suite since 2000 (averaging >70 IP hits/day).

#### **Collaborators & Other Affiliations (past 48 months)**

Dr. J. A. van Bokhoven, Professor, ETH, Chem. and Bioengineering, Zurich, Switzerland.

Dr. J. Ilavsky, UNICAT, APS, Argonne National Laboratories, Argonne Illinois.

Dr. F. Mirabella, Independent Consultant, Fort Myers Florida.

Dr. T. Narayanan, ESRF ID02, Grenoble France.

Dr. S. E. Pratsinis, Process Engineering, ETHZ, Zurich, Switzerland.

Kulkarni A, Beaucage G *J. Polym. Sci. Polym. Phys.* **44** 1395-1405 (2006).

10) *Persistence Length of Short-Chain Branched Polyethylene* Ramachandran R, Beaucage G, Kulkarni AS, McFaddin D, Merrick-Mack J, Galiatsatos V *Macromolecules* In Press (11/2008).

#### **Graduate & Postdoctoral Advisors**

**Dr. Richard S. Stein**, Emeritus Professor of Polymer Science and Engineering, University of Massachusetts, Amherst, MA. Member NAS and NAE.

**Dr. D. W. Schaefer**, Professor of Engineering (Formerly Dean of Engineering), U. Cincinnati. Post-doc was with Schaefer and Curro at Sandia National Laboratory.

**Dr. J. G. Curro**, Former Head of Polymer Group, Sandia National Laboratory, Albuquerque NM.

#### **Thesis Advisor and Postgraduate-Scholar Sponsor (PhD: 7, MS: 8, Post Doc: 2)**

**Current Students: (4 Graduate Students, 2 Funded REU Undergraduate, 1 funded RET High School Teacher, 2 Unfunded Undergraduates)**

**Hao Liu**, Senior Project: In situ SAXS studies of Diesel Exhaust at the CHESS Synchrotron.

**Kurt Woodford**, Senior Project: *Orientation in Polyolefin Films.*

**Undergraduate Research Assistant (NSF REU Students): Stephanie Berger**, Carbon coated silica for solar cell applications.

**Robin Holland** (Minority REU Student) In situ studies of diesel exhaust nanoparticulates using synchrotrons.

**High School Teacher (NSF RET Participant):** Edwin Segbefia Princeton High School Physics Department (Minority teacher). Flame-made hematite nano-particles for arsenic remediation in drinking water.

**Ramnath Ramachandran:** PhD studies branching and persistence effects on rheology in polyolefins. Funded by LyondellBasell.

**Mangesh Champhekar:** (MS 11/2008) Studies of ultra oriented polyolefin/clay nano-composites.

**Sachit Chopras:** PhD studies flame-made nanoparticles for nano-catalysts and other applications. Funded by NSF CTS.

### **Select Past Graduated Students/Post Doc**

**Amit Kulkarni** (MS 2004; PhD 2007): *Spinodal decomposition in hybrid materials, PDMS/Silica nanocomposites.* PhD *Branching in disordered materials, polymers and ceramics.* Funded by P&G, Intel, Equistar. Currently Research Engineer GE Plastics Evansville IN (10/2007).

**Doug Kohls**, (MS 2002; PhD 2006) *In situ studies of silica synthesis in flames.* (PhD 2006) Currently Assistant Professor Dept. Materials Science and Engineering University of Cincinnati.

**Hashard Chavan** (MS 2006) *Bioplastics San Jose CA.*

**Ayush Bafna** (PhD 2004, MS 2002) *Research Engineer, Extrusion Technologies, Phil. PA*

**Nikhil Agashe** (PhD 2004, MS 2001) *Research Engineer GE Plastics, Evanston IN.*

**Suresh Murugesan** (PhD Chemistry 2003) *Scientist Texas Research Institute.*

**S. Sukumaran** (PhD 2002) *Max Planck Institute for Polymer Research, Mainz, Germany.*

**G. Skillas** (Post-Doc from ETH Zurich 2001) *Research scientist, GMX Degussa, Hanau Germany.*

**J. Hyeon-Lee** (PhD 1998) *Research Scientist, Samsung Research Institute, Seoul, South Korea.*

**Ling Guo** (MS 1997) *P&G Miami Valley Laboratories (Central Research Division).*

**S. Rane** (PhD 1999) *Senior Research Engineer, Procter& Gamble Beckett Ridge Technical Center Cincinnati.*