

# Michael G. Benton

## *Residence*

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## *Office*

110 Chemical Engineering  
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Baton Rouge, LA 70803  
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## **Education**

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University of Wisconsin-Madison Madison, WI  
Ph.D., Chemical and Biological Engineering, August 2007

University of Alabama Tuscaloosa, AL  
M.S., Chemical Engineering, August 2002

The University of South Carolina Columbia, SC  
B.S., Biology, May 1994

## **Research and Employment History**

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Associate Professor August 2013 to present  
Assistant Professor August 2007 to August 2013  
Cain Department of Chemical Engineering  
Louisiana State University Baton Rouge, LA

- current research topics: genomics, bioengineering, metabolic engineering, biosensors, biofuels

Research Assistant September 2002 to August 2007  
Department of Chemical and Biological Engineering  
University of Wisconsin-Madison Madison, WI

- used photolithographic oligonucleotide microarray technology and bioinformatics to identify *S. cerevisiae* genes with a dose-dependent sensitivity to genotoxicity
- constructed genotoxin-detecting yeast strains through genetic manipulation and assessed their performance

Teaching Assistant September 2003 to May 2004  
Department of Chemical and Biological Engineering  
University of Wisconsin-Madison Madison, WI

- assisted in teaching lectures, led a weekly discussion section, and graded exams and homework for Chemical Process Thermodynamics I (CBE 211) and Process Synthesis (CBE 250). General topics covered include energy balances, chemical reaction equilibria, mass balances, large scale processing, and economics

Research Assistant September 2000 – August 2002  
Department of Chemical Engineering  
University of Alabama Tuscaloosa, AL

- investigated the use of room temperature ionic liquids as alternatives to traditionally used volatile polymerization solvents

Teaching Assistant January 2001 to December 2001  
Department of Chemical Engineering  
University of Alabama Tuscaloosa, AL

- assisted in teaching lectures and graded homework for Chemical Engineering Thermodynamics (ChE 255) and Polymer Materials Engineering (ChE 412). General topics covered included energy balances, polymerization reactions, and polymer rheology.
- laboratory teaching assistant for Operations Laboratory (ChE 320) specializing in evaporator operation

Undergraduate Research Assistant March 2000 to September 2000  
Department of Chemical Engineering  
University of Alabama Tuscaloosa, AL

- engineered polymer hydrogels for use as drug delivery vehicles

Sales Manager July 1997 to January 2000  
Best Buy Inc. Hickory, NC

- hired and trained a sales staff of approximately 50 employees
- responsible for product, warranty, and accessory sales of \$20 million per year
- supervised approximately 100 employees

Operations Manager March 1993 to July 1997  
Sports and Recreation Inc. Charlotte, NC

- hired and trained a store staff of approximately 75 employees
- responsible for revenue and day to day operations of a \$5 million per year store

### **Laboratory Technical Skills**

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#### Molecular Biology

- polymerase chain reaction, gel electrophoresis, enzymatic assays, fluorescence microscopy, spectrophotometry, recombinant DNA manipulation, reverse transcription, in vitro transcription, and Northern blots

#### Genomics

- spotted and oligonucleotide microarray hybridization and analysis, K-means clustering algorithms, and hierarchical clustering algorithms

#### Materials

- free radical and emulsion polymerization, hydrogel protein encapsulation, size exclusion chromatography, and high performance liquid chromatography

## **Publications**

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Lane, Goodwin, McNaughton, and Benton, "Modeling of PhaE/PhaC expression in cyanobacteria", *Yeast*, submitted October 2015

Lane, C.E., Hulgan, D., O'Quinn, K., and M.G. Benton, "CEMASuite: open source PCR primer design", *Bioinformatics* doi:10.1093/bioinformatics/btv420

Lane, C.E. and M.G. Benton, "A Rapid PCR Assay for Potential Polyhydroxyalkanoate Production in Cyanobacteria", *Molecular and Cellular Probes* doi: 10.1016/j.mcp.2015.07.001

Ainsworth, W.B., B.T. Hughes, W.C. Au, S. Sakelaris, O. Kerscher, M.G. Benton, and M.A. Basrai, "Cytoplasmic localization of Hug1p, a negative regulator of the MEC1 pathway, coincides with the compartmentalization of Rnr2p-Rnr4p", *Biochem Biophys Res Commun* 2013 439(4) 443-448. (DOI: 10.1016/j.bbrc.2013.08.089)

Bai, R., A.G. Silaban, M.T. Gutierrez-Wing, M.G. Benton, and K.A. Rusch, "Silver nanofiber assisted lipid extraction from biomass of a Louisiana *Chlorella vulgaris/Leptolyngbya sp.* co-culture", *Chemical Engineering Journal* 2013 225 (1) 100-108 (<http://dx.doi.org/10.1016/j.cej.2013.03.075>)

Ainsworth W.B., C.M. Rome, M.A. Hjortso, and M.G. Benton, "Construction of a Cytosolic Luciferase Reporter Cassette for Use in PCR-mediated Gene Deletion in *Saccharomyces cerevisiae*", *Yeast* 2012 29 (12) 505-517 (DOI: 10.1002/yea.2931)

Tate, J.J, M.T. Gutierrez-Wing, K.A. Rusch, and M.G. Benton, "The effects of plant growth substances and mixed cultures on growth and metabolite production of green algae *Chlorella sp.*: a review", *Journal of Plant Growth Regulation* 1-12 (doi 10.1007/s00344-012-9302-8)

Lane, C.E., M.T. Gutierrez-Wing, K.A. Rusch, and M.G. Benton, "Homogeneous Detection of Cyanobacterial DNA via Polymerase Chain Reaction", *Letters in Applied Microbiology* 2012 55 (5) 376-373 (<http://onlinelibrary.wiley.com/doi/10.1111/j.1472-765X.2012.03304.x/full>)

Tate, J.J, M.T. Gutierrez-Wing, K.A. Rusch, and M.G. Benton, "Gene expression analysis of a Louisiana native *Chlorella vulgaris* (Chlorophyta) / *Leptolyngbya sp.* (Cyanobacteria) co-culture using suppression subtractive hybridization", *Engineering in Life Sciences* 2013 13 (2) 185-193 (<http://doi.wiley.com/10.1002/elsc.201200063>)

Benton, M.G., Glasser, N.R., and S.P. Palecek, "Deletion of MAG1 and MRE11 enhances the sensitivity of the *Saccharomyces cerevisiae* HUG1P-GFP promoter-reporter construct to genotoxicity", *Biosensors and Bioelectronics* 24 (2008)

Benton, M.G., N. R. Glasser, and S.P. Palecek, "The utilization of a *Saccharomyces cerevisiae* HUG1P-GFP promoter-reporter construct for the selective detection of DNA damage," *Mutat. Res.* 633 (2007) 21-34.

Benton, M.G., S. Somasundaram, J.D. Glasner, and S.P. Palecek, "Analyzing the dose-dependence of the *Saccharomyces cerevisiae* global transcriptional response to methyl methanesulfonate and ionizing radiation," *BMC Genomics* (2006) 7:305

Benton, M.G. and C.S. Brazel, "An Investigation of the Degree and Rate of Polymerization of Poly(methyl methacrylate) in the Ionic Liquid 1-Butyl-3-Methylimidazolium Hexafluorophosphate," *Polymer International* 53 (2004) 1113-1117.

Rahman, M., M.G. Benton, M.P. Scott and C.S. Brazel, "Room Temperature Ionic Liquids as Environmentally Benign Plasticizers and Reaction Media for Polymerization Reactions," *Proceed. Green Chem. Eng. Conf.* 7 (2003) 180-183.

Scott, M.P., M.G. Benton, M. Rahman, and C.S. Brazel, "Plasticizing Effects of Imidazolium Salts in PMMA: High Temperature Stable Flexible Engineering Materials," in Rogers, R.D., and K.R. Seddon, eds. *Ionic Liquids as Green Solvents: Progress and Prospects*, Washington, DC: American Chemical Society Symposium Series, 856 (2003) 468-477.

Scott, M.P., C.S. Brazel, M.G. Benton, J.W. Mays, J. D. Holbrey, and R.D. Rogers, "Application of Ionic Liquids as Plasticizers for Poly(methyl methacrylate)," *Chem. Comm.*, 2002 (2002) 1370-1371.

Benton, M.G. and C.S. Brazel, "Comparison of Kinetics For Solution Polymerization of Poly(methyl methacrylate) in Green Ionic Liquid Solvents Versus Traditional Volatile Solvents," *Polym. Prepr.* 43 (2002) 881-882.

Brazel, C.S., G.S. Maddox, M.F. Garcia, L.M. Savoy, M.G. Benton, and A.M. Thornton, "Fundamental Chemical Differences between Polyacidic and Polybasic Materials for the Design of pH-Responsive Systems," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, 29 (2002) #007.

Benton, M.G. and C.S. Brazel, "Effect of Room Temperature Ionic Liquids as Replacements for Volatile Organic Solvents in Free Radical Polymerization," in Rogers, R.D. and K.R. Seddon, eds., *Ionic Liquids: Industrial Applications for Green Chemistry*, Washington, DC: American Chemical Society Symposium Series 818 (2002) 125-133.

### **Research Presentations**

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Ainsworth, B.A. and **M.G. Benton** "Hug1p's role as a negative regulator of the Mec1 pathway", ECI Biochemical Engineering XIX, Puerto Vallarta, Mexico, July 2015.

**Lane, C.E.**, Hulgan, D., O'Quinn, K.R., and M.G. Benton, "CEMASuite: open source degenerate PCR primer design", LBRN Annual Louisiana Conference on Bioinformatics, Baton Rouge, LA, April 2015.

**Lane, C.E.**, O'Quinn, K.R., and M.G. Benton, "CEMASuite: Consensus Primer Design with Quality", LBRN Annual Louisiana Conference on Bioinformatics, Baton Rouge, LA, May 2014.

Lane, C.E., Ainsworth, W.A., and **M.G. Benton**, "Practical Applications of Microbial Genomics: from Plastics to Cancer", Brigham Young University, Chemical Engineering Department Seminar, Provo, UT, April 2014 (**invited talk**)

**Lane, C.E.** and M.G. Benton, "High-Throughput Screening of Cyanobacteria Cultures for Maximized PHA Production", AIChE Annual Meeting, San Francisco, CA, Nov 2013

**Ainsworth, W.A.** and M.G. Benton, "Creation of a Firefly Luciferase Reporter Cassette for Use in PCR-Mediated Gene Deletion and Fusion in *Saccharomyces cerevisiae*", AICHE Annual Meeting, San Francisco, CA, Nov 2013

Evans, R.L. and **M.G. Benton**, "Better Chemical Engineers are Just a Click Away?!", ASEE Chemical Engineering Summer School, Orono, ME, July 2012

Lane, C.E. and **M.G. Benton**, "BRIGE: Enhanced Bioplastic Production in Aquatic Microorganisms", NSF CBET Grantees Conference, Baltimore, MD, June 2012

**Lane, C.E.** and M.G. Benton, "Alternative Fuels", HSTEAP 2012 Workshop, Baton Rouge, LA, June 2012

Bai, R, Gutierrez-Wing, M.T., **Benton, M. G.**, and K. A. Rusch, "Optimization of a locally isolated microalgal co-culture for enhanced biofuel production" Mississippi State University, Chemical Engineering Department Seminar, Starkville, MS, Mar 2012 (**invited talk**)

Bai, R, Gutierrez-Wing, M.T., **Benton, M. G.**, and K. A. Rusch, "Optimization of a Louisiana Native Algal Co-Culture for Biofuel Production" Xavier University, Chemistry Department Seminar, New Orleans, LA, Dec 2011 (**invited talk**)

**Bai, R**, Gutierrez-Wing, M.T., Benton, M. G., and K. A. Rusch, "Comparison of Lipid Productivity and Fatty Acid Composition of a Louisiana Native Microalgal Co-culture" 2011 Algal Biomass Summit, Minneapolis, MN, Oct 2011

Bai, R, Gutierrez-Wing, M.T., **Benton, M. G.**, and K. A. Rusch, "Optimization of a Louisiana Native Algal Co-Culture for Biofuel Production" AICHE Annual Meeting, Minneapolis, MN, Oct 2011

Koneru, M, Benton, M.G., and **Hjortso, M.A.**, "An In-Silico Evolution Algorithm for Obtaining Parameter Values in Stochastic Cell Cycle Models" AICHE Annual Meeting, Minneapolis, MN, Oct 2011

Lane, C.E. and **M.G. Benton**, "Enhanced Bioplastic Production in Aquatic Microorganisms", BRIGE Grantees Conference, Aug 2011.

Ainsworth, W.B., Hjortso, M.A., and **M.G. Benton**, "Using the Hug1 Promoter in the Construction of Novel Biosensors", NIH – National Cancer Institute, July 2011 (**invited talk**)

**Benton, M.G.** "The Current State of Alternative Fuels", HSTEAP 2011 Workshop, Baton Rouge, LA, June 2011

**Bai, R**, Gutierrez-Wing, M.T., Benton, M. G., and K. A. Rusch, "Lipid Yield, Composition, and Fatty Acid Profile of a Louisiana Native Algal Co-Culture for Biofuel Production", Aquaculture America 2011, New Orleans, LA, March 2011

Hjortso, M.A., W.B. Ainsworth, and **M.G. Benton**, "Parameter Assessment for a Stochastic Cell Cycle Model", International Conference on Biomolecular Engineering, San Francisco, CA, Jan 2011

**Benton, M.G.** and M.A. Hjortso, "Modeling Drug Target Screening and Drug Treatments Using a Stochastic Cell Cycle Model", AICHE Annual Meeting, Salt Lake City, UT, Nov 2010

**Hjortso, M.A.** and M.G. Benton, "Mechanistic Modeling of the Breakage Function in Eukaryotic Cell Populations", AIChE Annual Meeting, Nashville, TN, Nov 2009

**Benton, M.G.** and M. A. Hjortso, "A Stochastic Model of the Eukaryotic Cell Cycle", AIChE Annual Meeting, Nashville, TN, Nov 2009

**Benton, M.G.**, "A Stochastic Model of the Eukaryotic Chemical Oscillator", Biochemical Engineering XVI, Burlington, VT, July 2009

**Benton, M.G.**, Glasser, N.R., and S.P. Palecek, "A Novel Yeast-Based Mutagenicity Screen", AIChE Annual Meeting, Philadelphia, PA, Nov 2008

**Benton, M.G.**, N.R. Glasser, and S.P. Palecek, "Utilizing Variation in Gene Expression to Quantify DNA Damage," AIChE Annual Meeting, Salt Lake City, UT, November 2007

**Benton, M.G.** and S.P. Palecek, "Assessing the Dose-Dependence of the Global Transcriptional Response of *Saccharomyces cerevisiae* to Genotoxicity," Biology of Genomes, Cold Spring Harbor, NY, May 2007

**Benton, M.G.** and S.P. Palecek, "Systematic Design of Cell-Based Biosensors for Sensitive and Selective Detection of DNA-Damaging Agents," AIChE Annual Meeting, San Francisco, CA, November 2006

**Benton, M.G.** and S.P. Palecek, "An Analysis of the Dose-Dependent Global Transcriptional Response of *Saccharomyces Cerevisiae* to Multiple DNA-Damaging Agents," AIChE Annual Meeting, San Francisco, CA, November 2006

**Benton, M.G.** and S.P. Palecek, "Measuring the Dose-Dependent Global Transcriptional Response of *Saccharomyces cerevisiae* to various DNA-Damaging Agents," Biology of Genomes, Cold Spring Harbor, NY, May 2006

**Benton, M.G.** and S.P. Palecek, "The utilization of *Saccharomyces cerevisiae* as living biosensors," Genomic Sciences Training Program Seminar Series, Madison, WI, February 2006

**Benton, M.G.**, and S.P. Palecek, "*Saccharomyces cerevisiae* as living biosensors for the detection of genotoxicity," Biology of Genomes, Cold Spring Harbor, NY, May 2005

**Benton, M.G.** and S.P. Palecek, "*Saccharomyces cerevisiae*-based biosensors for the detection of DNA damage," Genomic Science Training Program Seminar Series, Madison, WI, April 2005

**Rahman, M.**, M. G. Benton, M. P. Scott, and C. S. Brazel, "Room Temperature Ionic Liquids as Environmentally Benign Plasticizers and Reaction Media for Polymerization Reactions," Green Chemistry and Engineering Conference, Washington, DC, June 2003

Benton, M.G., J.D. Holbrey, R.D. Rogers, J.W. Mays, and **C.S. Brazel**, "Ionic Liquids as Environmentally-Benign Solvents for Synthesis of PMMA in [bmim][PF6]: Kinetic, Thermal and Mechanical Analysis," AIChE Annual Meeting, Indianapolis, IN, November 2002

Scott, M.P., M. Rahman, M.G. Benton, and **C.S. Brazel**, “Plasticizing Effects of Imidazolium Salts in PMMA: High and Low Temperature Stable Flexible Engineering Materials,” invited talk, Ionic Liquids as Green Solvents: Progress and Prospects Session, Industrial and Engineering Chemistry Division, American Chemical Society Fall National Conference, Boston, MA, August 2002

Benton, M.G. and **C.S. Brazel**, “Comparison of Kinetics for Solution Polymerization of PMMA in Green Ionic Liquid Solvents Versus Traditional Volatile Solvents,” Green Polymer Chemistry Session, Polymer Chemistry Division, American Chemical Society Fall National Conference, Boston, MA, August 2002

**Brazel, C.S.**, G.S. Maddox, M.F. Garcia, L.M. Savoy, M.G. Benton, and A.M. Thornton, “Fundamental Chemical Differences between Polyacidic and Polybasic Materials for the Design of pH-Responsive Systems,” 29th International Symposium on Controlled Release of Bioactive Materials, Seoul, South Korea, July 2002

Benton, M.G., M.P. Scott, J.D. Holbrey, R.D. Rogers, and **C.S. Brazel**, “A New Class of Plasticizing Agents: Room Temperature Ionic Liquids in Poly(methyl methacrylate) and Polystyrene,” American Institute for Chemical Engineers National Conference, Structure and Properties of Polymers II (Crystals and Glasses) Session, Reno, NV, November 2001

**Benton, M.G.** and C.S. Brazel, “The Feasibility of Room Temperature Ionic Liquids as Replacement Solvents in Free Radical Polymerization Reactions,” American Institute for Chemical Engineers National Conference, Reno, NV, November 2001

**Scott, M.P.**, M.G. Benton, C.S. Brazel, and R.D. Rogers, “Ionic Liquids in Polymer Processing: Greener Solvent-Based Polymerizations and Improved Lifetime of Plasticized Materials,” American Institute for Chemical Engineers National Conference, Reno, NV, November 2001, 1st Prize, Student Poster Presentations, Environmental Division

**Benton, M.G.** and C.S. Brazel, “Use of Room Temperature Ionic Liquids As Environmentally Benign Solvents for Free Radical Polymerizations,” Air and Waste Management Association National Conference, Orlando, FL, June 2001

**Benton, M.G.** and C.S. Brazel, “Effectiveness of Room Temperature Ionic Liquids as Solvents for Free Radical Addition Polymerization,” American Chemical Society, San Diego, CA, April 2001

Benton, M.G. and **C.S. Brazel**, “Effect of Immobilized Proteins on Polymer Gel Structures Used as Drug Delivery Vehicles,” American Institute for Chemical Engineers National Conference-Biomimetic Materials Symposium, Los Angeles, CA, November 2000

### **Honors and Awards**

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Longwell Award for Instructor Excellence – 2015

LSU Council on Research Summer Stipend Grant – 2013

Dow Chemical Excellence in Teaching Award – 2013, 2014, 2015

Donald W. Clayton Mentor Award – 2011

Tiger Athletic Foundation Undergraduate Teaching Award – 2010

Ralph Powe Jr. Faculty Enhancement Award – ORAU – 2009

NIH sponsored Genomic Sciences Training Program Fellowship – 2004 - 2007

Ragatz Teaching Assistant Award – University of Wisconsin – Madison - Spring 2004

American Institute of Chemists Graduate Award – University of Alabama – 2002

Travel Grant to attend ACS conference – University of Alabama – Spring 2001

Dean's List – University of South Carolina – 1990-1991

Academic Scholarship – University of South Carolina – 1990-1994