

## CURRICULUM VITA

### BRIAN H. DAVISON

Oak Ridge National Laboratory  
Post Office Box 2008, MS 6038  
Oak Ridge, TN 37831-6038  
865-574-0955 – Phone  
865-576-5332 – Fax  
davisonbh@ornl.gov

#### RESEARCH INTERESTS:

Systems Analysis of Microbes (Cultivation and Proteomics), Bioconversion of Renewable Resources into Chemicals (ethanol, organic acids, solvents), Non-Aqueous Biocatalysis, Biofiltration of VOCs, Bioremediation of Chlorinated Organics, Bioreactor Modeling (Mass Transfer and Kinetics), Immobilization of Microbes and Enzymes, Biosorption of Metals, Extractive Fermentations.

#### PROFESSIONAL EXPERIENCE:

**Oak Ridge National Laboratory, Chief Scientist for Systems Biology and Biotechnology** 2006-present:  
Lead Lab-wide initiatives in Systems Biology and in Bioenergy. Manage internal investment portfolio and develop new programs, staff and teams in these focus areas. Research in microbial cultivation and nonaqueous enzymes. Serve as Chair of the Institutional Biosafety Committee since 2001.

**Oak Ridge National Laboratory, Director, Life Sciences Division**, 2004-2005: Management of active research division consisting of 100 staff members in addition to students and subcontractors (Additional information about the Life Science Division can be found at [www.bio.lsd.ornl.gov](http://www.bio.lsd.ornl.gov)). Assist in multiple initiatives for genomics, national biosecurity, and sensors.

**Oak Ridge National Laboratory, Senior Biochemical Engineer & Group Leader**, 1995-2001,  
**Distinguished Researcher & BioChemical Engineering Research Group Leader**, 2002-2003:  
Research and Development (R&D) activities and duties expanded in areas listed with programmatic responsibilities, supervision, and support of 5 to 15 research staff members including investigators, postdocs, technicians, and students. Managed in excess of ten research projects. Project Team Leader of the Alternative Feedstocks Program which involved collaboration with four other national laboratories, including coordination for interdisciplinary multilab teams with industrial partners for demonstration of an economic process to convert renewable resources into commodity chemicals (i.e., succinic acid). Other projects include: biofiltration and ethanol fermentation with both experimental planning and modeling and nongaseous biocatalyses. Served as co-Chair of the 15<sup>th</sup> to 26<sup>th</sup> *Symposia on Biotechnology for Fuels and Chemicals*. Assisted in several lab-wide initiatives (e.g., The National Bioenergy/Bioproducts Center, chemical warfare decontamination, biological carbon dioxide sequestration). Manager for ORNL Bioprocessing User Facility 1992-2003. Operated a 500-L fermentor and other equipment for outside users.

**Oak Ridge National Laboratory, Biochemical Engineer II**, 1990-1995: R&D on bioprocessing with increased supervisory duties. Projects included immobilized-cell bioreactors, extractive fermentation of butanol, biomethanogenesis, conversion of wastepaper, and collaborations with outside researchers and private industry. Assisted in the development of a predictive model for the fluidized-bed bioreactor. Responsible for interface of research and maintenance staff in preparation for major

**BRIAN H. DAVISON**  
Page 2

external Environmental Safety and Health inspection while serving as Local Facility Supervisor for two years.

## **BRIAN H. DAVISON**

Page 3

### **Oak Ridge National Laboratory, Biochemical Engineer I, 1985-1990:**

Research emphasized experiments and modeling of immobilized-cell fluidized-bed bioreactors. Designed and tested bioreactors and simultaneous fermentation and separation of organic acids including production of ethanol. Scope of work included scaleup (to a 10-ft column) and the use of industrial feedstocks.

### **University of Tennessee-Knoxville, Adjunct Professor of Chemical Engineering, 1988- Present:**

Instructor of graduate courses in Biochemical Engineering including supervision of one Ph.D. student and four Masters students.

### **EDUCATION:**

- Ph.D.** Chemical Engineering, California Institute of Technology, Pasadena, CA, 1985.  
Thesis topic: "*Dynamics and Coexistence of Mixed Microbial Cultures.*" Stable coexistence of competing microorganisms (*E. coli* and *S. cerevisiae*) in chemostats.  
Thesis Advisor: Dr. Gregory N. Stephanopoulos
- B.S.E.** Chemical Engineering, with honors, University of Rochester, Rochester, NY, 1979.

### **AWARDS and HONORS:**

- Charles D Scott Award for distinguished contributions to the field of biotechnology for fuels and chemicals, Society for Industrial Microbiology, Symp. Biotechnology for Fuels and Chemicals, 2006.  
College of Fellows, American Institute for Medical and Biological Engineering (AIMBE), 2006.  
R&D100 Award for "Production of Chemicals from Biologically Derived Succinic Acid," *Research & Development Magazine*, 1997.  
Management Achievement Award, Life Sciences Division, ORNL, 2002.  
Significant Event Award for "Expression of Lignin Peroxidase in Yeast," ORNL, 2000.  
Significant Event Award for "Dry Enzyme Catalysis," ORNL, 2000.  
Technology Maturation Award for Succinic Acid Process, ORNL, 1999.  
Technical Achievement Award for "Innovative Research Leading to the Development of the Biparticle Fluidized-Bed Bioreactor," Martin Marietta Energy Systems, Inc., 1992.  
Distinguished Writing Award for Scholarly Articles (First place) by the Society for Technical Communication - East Tennessee, 1991.  
Significant Event Award for "High Productivity, Ethanol Fermentation," Martin Marietta Energy Systems, Inc., 1987.  
Outstanding Graduating Engineer, University of Rochester, 1979.  
Wilson Scholar, University of Rochester, 1975 – 1979.  
AIChE Outstanding Junior Chemical Engineer, University of Rochester, 1978.  
National Merit Scholarship, 1975.

### **PROFESSIONAL AFFILIATIONS:**

- American Institute of Chemical Engineers  
American Chemical Society (chaired symposia and sessions and served on several BIOT committees)  
Society for Industrial Microbiology  
Professional Engineer Intern  
Tau Beta Pi  
Chair of Symposium on Biotechnology for Fuels and Chemicals and served as editor of Proceedings in *Appl. Biochem. Biotechnol.* (1994 – 2005). The Symposium grew from 150 to 400 attendees during my twelve years as Chair and co-chair.

### **OTHER SKILLS:**

- Basic Spanish and French

## BRIAN H. DAVISON

Page 4

### PUBLICATIONS:

Davison, BH, AJ Ragauskas, R Templer, T Tschaplinski, JR Mielenz. Response to Browner letter: "Measuring the Efficiency of Biomass Energy," *Science* **312**(5781):1744-1745 (2006).

VerBerkmoes, NC, MB Shah, PK Lankford, DA Pelletier, MB Strader, David L. Tabb, WH McDonald, JW Barton, GB Hurst, L Hauser, BH Davison, JT Beatty, CS Harwood, FR Tabita, RL Hettich, and FW Larimer, "Determination and Comparison of the Baseline Proteomes of the Versatile Microbe *Rhodospseudomonas palustris* under its Major Metabolic States," *J. Proteome Res.* **5**:287-298 (2006).

Arthur J. Ragauskas, AJ, CK Williams, BH Davison, G Britovsek, J Cairney, CA Eckert, J Frederick, JP Hallett, D Leak, CL Liotta, JR Mielenz, R Murphy, R Templer, T Tschaplinski, "The Path Forward for Biofuels and Biomaterials," *Science* **311**(5760):484-489 (2006).

Davison, B.H., Drescher, S.R., Tuskan, G.A., Davis, M.F., and Nghiem, N.P., "Variation of S/G Ratio and Lignin Content in a Populus Family Influences the Release of Fermentable Sugars by Dilute Acid Hydrolysis," *Appl. Biochem. Biotechnol.*, **129-132**:427-435 (2006).

Davison, B. H., Evans, B., McMillan, J.D., and Finkelstein, M., (Eds.), Proceedings of the 26<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Chattanooga, TN, May, 2004. *Appl. Biochem. Biotechnol.*, **121-124** (2005).

Strader MB, VerBerkmoes NC, Tabb DL, Connelly HM, Barton JW, Bruce BD, Pelletier DA, Davison BH, Hettich RL, Larimer FW, and Hurst GB, "Characterization of the 70S ribosome from *Rhodospseudomonas palustris* using an integrated "top-down" and "bottom-up" mass spectrometric approach," *J. Proteome Res.* **3**: 965-978 (2004).

Borole, A.P., Cheng, C.L., and Davison, B.H., "Substrate Desolvation as a Governing Factor in Enzymatic Transformations of PAHs in Aqueous-Acetonitrile Mixtures," *Biotechnol. Prog.*, **20**: 1251-1254 (2004).

Davison, B.H., Nghiem, N.P., Richardson, G.L., "Succinic Acid Adsorption from Fermentation Broth and Regeneration," *Appl. Biochem. Biotechnol.*, **113-116**: 653-669 (2004).

Borole, A.P., Dai, S., Cheng, C.L., Rodriguez, Jr., M., and Davison, B.H., "Performance of Chloroperoxidase Stabilization in Mesoporous Sol-gel Glass Using In Situ Glucose Oxidase Peroxide Generation," *Appl. Biochem. Biotechnol.*, **113-116**: 273-285 (2004).

McKeown, C.K., and Davison, B.H., "A Simplified Method to Create Quantitative 'Fixed' Uranyl-Contaminated Metal Coupons," *Health Physics*, **86**: Supplement 2: S113-S115, (May, 2004).

Finkelstein, M., McMillan, J.D., Evans, B., and Davison, B.H., (Eds.), Proceedings of the 25<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Breckenridge, CO, May 2003. *Appl. Biochem. Biotechnol.*, **113-116** (2004).

Barton, J.W., Kuritz, T., O'Connor, L.E., Ma, C.Y., Maskarinec, M.M., and Davison, B.H., "Reductive Transformation of Methyl Parathion by Cyanobacterium *Anabaena* sp. PCC7120," *Appl. Microbiol. Biotechnol.*, **65**: 330-335 (2004).

**BRIAN H. DAVISON**

Page 5

Klasson, K.T. and Davison, B.H., "A General Methodology for Evaluation of Carbon Dioxide Sequestration Activities," Submitted for publication in *Environmental Modeling and Assessment*, (2003).

Borole, A.P., Cheng, C.L., and Davison, B.H., "Substrate Partitioning as a Controlling Factor in Enzymatic Transformations in Organic Media," *Biotechnol. Lett.*, (In prep., 2003).

Barton, J.W., Vodraska, C.D., Jones, S.A., and Davison, B.H., "Partitioning of BTEX and Chloroorganics in High-Biomass Systems," *Environmental Progress* **22** (2):95-102 (2003).

Davison, B. H., Lee, J.W., McMillan, J.D., and Finkelstein, M., (Eds.), Proceedings of the 24<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Gatlinburg, TN, May, 2002. *Appl. Biochem. Biotechnol.*, **105-108** (2003).

Klasson, K.T. and Davison, B.H., "A General Methodology for Evaluation of Carbon Sequestration Activities and Carbon Credits," Oak Ridge National Laboratory, ORNL/TM-2002/235, (November 2002).

Klasson, K.T. and Davison, B.H., "A General Methodology for Evaluation of Carbon Dioxide Sequestration Activities," 19<sup>th</sup> Annual International Pittsburgh Coal Conference Proceedings, Pittsburgh Coal Conference, Pittsburgh, PA (2002).

Barton, J.W., Vodraska, C.D., Jones, S.A., and Davison, B.H., "Enhanced Solubility of Priority Contaminants in High-Biomass Systems and Associated Impacts on Biofilter Operation," Proceedings of the 2002 USC-TRG Conference on Biofiltration, Newport Beach, CA, October 30, 2002 – November 1, 2002.

## BRIAN H. DAVISON

Page 6

Davison, B.H., Nghiem, N.P., Donnelly, M., Tsai, S.P., Frye, J., Landucci, R., and Griffin, M., "Production of Chemical Derivatives from Renewables," CRADA Final Report, C/ORNL/96-0407 (2002).

Cameron, P.A., Davison, B.H., Frymier, P.D., and Barton, J.W., "Gas Phase Enzyme Catalysis For Transesterification Reactions Using Immobilized Lipase," *Biotechnol. Bioeng.*, **78**:251-256 (2002).

Finkelstein, M., Davison, B.H., and McMillan, J.D., (Eds.), Proceedings of the 23<sup>rd</sup> Symposium on Biotechnology for Fuels and Chemicals, Breckenridge, CO, May 2001. *Appl. Biochem. Biotechnol.*, **98-100** (2002).

Wang, P., Dai, S., Waezsada, S.D., Tsao, A.Y., and Davison, B.H., "Enzyme Activation and Stabilization by Covalent Binding in Mesoporous Sol-gel Glass for Nonaqueous Biocatalysis," *Biotechnol. Bioeng.*, **74**:24-255 (2001).

Borole, A.P., Kuritz, T., Rodriguez, Jr., M., and Davison, B.H., "Improving Expression of Lignin Peroxidase in *Pichia Pastoris* via Directed Evolution," SIM Annual Meeting, St. Louis, MO, July 29 - August 2, 2001.

Kuritz, T., Borole, A.P., Rodriguez, Jr., M., and Davison, B.H., "Extracellular Expression of Functional Lignin Peroxidase in the Yeast *Pichia Pastoris*." American Society for Microbiology General Meeting, Orlando, FL, May 20 – 24, 2001.

Davison, B.H., Barton, J.W., Klasson, K.T., and O'Connor, L., "Removal and Destruction of CWA Simulants Using 'Dry' Enzyme Impregnated Fabrics and Coatings," Proceedings of ENZYME: International Symposium on Applications of Enzymes in Chemical and Biological Defense, Orlando, FL, May 13 – 18, 2001.

Rodriguez, Jr., M., Klasson K.T., and Davison, B.H., "Enhancement of the Conversion of Toluene by *Pseudomonas Putida* F1 using Organic Cosolvents," *Appl. Biochem. Biotechnol.*, **91-93**:195-204 (2001).

Klasson, K.T. and Davison, B.H., "Effect of Temperature on Biofiltration of Nitric Oxide," *Appl. Biochem. Biotechnol.*, **91-93**:205-211 (2001).

Davison, B.H., McMillan, J.D., and Finkelstein, M., (Eds.), Proceedings of the 22<sup>nd</sup> Symposium on Biotechnology for Fuels and Chemicals, Gatlinburg, TN, May, 2000. *Appl. Biochem. Biotechnol.*, **91-93** (2001).

Krishnan, M.S., Taylor, F., Davison, B.H., Nghiem, N.P., "Economic Analysis of Fuel Ethanol Production from Corn Starch Using Fluidized-Bed Bioreactors," *Bioresource Technology* **75**: 99-105 (2000).

Davison, B.H. and Kuritz, T., "Peeling Off Contamination", *Initiatives in Environmental Technology Investment* **7** (Fall 2000)12.

Davison, B.H., Barton, J.W., Klasson, K.T., and Francisco, A., "Influence of High Biomass on Alkane Solubilities," *Biotechnol. Bioeng.*, **68**:279-284 (2000).

Finkelstein, M. and Davison, B.H., (Eds.), Proceedings of the 21<sup>st</sup> Symposium on Biotechnology for Fuels and Chemicals, Ft. Collins, CO, May2 – 6, 1999. *Appl. Biochem. Biotechnol.*, **84-86** (2000).

## BRIAN H. DAVISON

Page 7

Davison, B.H., Barton, J.W., Klasson, K.T., and Francisco, A.B., "Effect on the Measured Solubility of Sparingly Soluble Organics in Aqueous Bioremediation Systems," Proceedings of the 2000 USC-TRG Conference on Biofiltration, October 19, 2000, Los Angeles, CA, p. 183 (2000).

Barton, J.W., Davison, B.H., Klasson, K.T., and Gable III, C.C., "Estimation of Mass Transfer and Kinetics in Operating Trickle-Bed Bioreactors for Removal of VOCs," *Environ. Progress* **18**: 87-92 (1999).

Klasson, K.T., Barton, J.W., Davison, B.H., Thorp, S.C., and Aaron, J.M., "Performance of Propane-Degrading Bacterium," Proceedings of Air & Waste Management Association's 92<sup>nd</sup> Annual Meeting & Exhibition, (1999).

Davison, B.H. and Nghiem, N.P., "Novel Immobilized-biocatalyst Bioreactors for Production of Fuels and Chemicals." Prepr. Symp. - Am. Chem. Soc., Div. Fuel Chem. **44**(2), 215-218 (1999).

Krishnan, M.S., Nghiem, N.P., and Davison, B.H., "Ethanol Production from Corn Starch in a Fluidized-bed Bioreactor," *Appl. Biochem. Biotechnol.*, **77-79**: 359-372 (1999).

Barton, J.W., Zhang, X.S., Klasson, K.T., and Davison, B.H., "Predictive Mathematical Modeling of Trickle Bed Biofilters for Elucidating Mass Transfer and Kinetic Effects," Proceedings of the 91<sup>st</sup> Annual Meeting of the Air and Waste Management Association, San Diego, CA, June 1998. Paper 98-WAA.13P.

Davison, B.H. and Finkelstein, M., (Eds.), Proceedings of the 20<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Gatlinburg, TN, May, 1998. *Appl. Biochem. Biotechnol.*, **77-79** (1999).

Barton, J.W., Hartz, S., Klasson, K.T., and Davison, B.H., "Microbial Removal of Alkanes from Dilute Gaseous Waste Streams: Mathematical-Modeling of Advanced Bioreactor Systems," *J. Chem. Technol. Biotechnol.*, **72**: 93-98 (1998).

Barton, J.W., Zhang, X.S., Davison, B.H., and Klasson, K.T., "Predictive Mathematical Modeling of Trickle Bed Biofilters" Proceedings of the USC-TRG Conference on Biofiltration, October 22-23, Los Angeles, CA (1998).

Klasson, K.T., Davison, B.H., Barton, J.W., and Jacobs, J.E., "Removal of Chlorinated and Nonchlorinated Alkanes in a Trickle Bed Biofilter," Proceedings of the 91<sup>st</sup> Annual Meeting of the Air and Waste Management Association, San Diego, CA, June 1998, Paper 98-WAA.06P.

Finkelstein, M., and Davison, B.H., (Eds.), Proceedings of the 19<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Colorado Springs, CO, May 4 – 8, 1997. *Appl. Biochem. Biotechnol.*, **70-72** (1998).

Sun, M.Y., Nghiem, N.P., Davison, B.H., Webb, O.F., and Bienkowski, P.R., "Production of Ethanol from Starch by Co-Immobilized *Zymomonas mobilis*-Glucoamylase in a Fluidized Bed Reactor," *Appl. Biochem. Biotechnol.*, **70-72**, 429-439 (1998).

Scott, C.D., Scott, T.C., and Davison, B.H., "Apparatus for the Production of Gel Beads containing a Biocatalyst," U.S. Pat. 5,725,888, March 10, 1998.

Scott, C.D., Scott, T.C., and Davison, B.H., "Apparatus and Method for the Production of Gel Beads containing a Biocatalyst," U.S. Pat. 5,712,212, January 27, 1998.

## BRIAN H. DAVISON

Page 8

Davison, B.H., Barton, J.W., and Petersen, G., "Nomenclature and Methodology for Classification of Nontraditional Biocatalysis," *Biotechnol. Prog.*, **13**: 512-518 (1997).

Barton, J.W., Klasson, K.T., and Davison, B.H., "Extended Operation and Control of Biomass Overgrowth in Biofilters Designed for VOC Removal," Proceedings of Air and Waste Management Association's 90<sup>th</sup> Annual Meeting & Exhibition, Toronto, Ontario, Canada, (1997).

Barton, J.W., Klasson, K.T., Koran, Jr., L.J., and Davison, B.H., "Microbial Removal of Volatile Organic Contaminants from Dilute Gaseous Waste Streams," *Biotechnol. Prog.*, **13**: 814-821 (1997).

Barton, J.W., Reed, E.K., and Davison, B.H., "Gas-Phase Enzyme Catalysis using Immobilized Lipase for Ester Production," *Biotechnol. Techniques* **11**: 747-750 (1997).

Davison, B.H., Finkelstein, and M., Wyman, C.E., (Eds.), Proceedings of the 18<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Gatlinburg, TN, May 5 – 9, 1996. *Appl. Biochem. Biotechnol.*, **63-65** (1997).

Scott, T.C., Scott, C.D., Faison, B.D., Davison, B.H., and Woodward, J., "Enhanced Attrition Bioreactor for Enzyme Hydrolysis of Cellulosic Materials," (CIP) U.S. Pat. 5,637,502, June 10, 1997.

Nghiem, N.P., Davison, B.H., Suttle, B.E., and Richardson, G.L., "Production of Succinic Acid by *Anaerobiospirillum Succiniciproducens*," *Appl. Biochem. Biotechnol.*, **63-65**: 565-576 (1997).

Sun, M.Y., Bienkowski, P.R., Davison, B.H., and Webb, O.F., "Performance of Co-Immobilized Yeast and Glucoamylase in a Fluidized Bed Reactor for Fuel Ethanol Production," *Appl. Biochem. Biotechnol.*, **63-65**, 483-493 (1997).

Scott, T.C., Scott, C.D., Faison, B.D., Davison, B.H., and Woodward, J., "Enhanced Attrition Bioreactor for Enzyme Hydrolysis of Cellulosic Materials," U.S. Patent 5,508,183, April 16, 1996.

Wyman, C.E., and Davison, B.H. (Eds.), Proceedings of the 17<sup>th</sup> Symposium on Biotechnology for Fuels and Chemicals, Vail, CO, May 7-11, 1995. *Appl. Biochem. Biotechnol.*, **57-58** (1996).

Webb, O.F., Davison, B.H. and Scott, T.C., "Modeling Scale-up Effects on a Small Pilot-Scale Fluidized-Bed Reactor for Fuel Ethanol Production," *Appl. Biochem. Biotechnol.*, **57-58**, 639-647 (1996).

Nghiem, N.P., Davison, B.H., Thompson, J.E., Suttle, B.E., and Richardson, G.L., "The Effect of Biotin on the Production of Succinic Acid by *Anaerobiospirillum Succiniciproducens*," *Appl. Biochem. Biotechnol.*, **57-58**, 633-638 (1996).

Petersen, J.N. and Davison, B.H., "Development of a Predictive Description of an Immobilized-Cell Three-Phase Fluidized-Bed Bioreactor," *Biotechnol. Bioeng.*, **46**, 139-146 (1995).

Harshbarger, D., Bautz, M., Davison, B.H., Scott, T.C., and Scott, C.D., "Economic Assessment of Ethanol Production Comparing Traditional and Fluidized-Bed Bioreactors," *Appl. Biochem. Biotechnol.*, **51-52**, 593-604 (1995).

Davison, B.H. and Wyman, C.E., (Eds.), Proceedings of the 16<sup>th</sup> Symposium on Biotechnology for Fuels & Chemicals, Gatlinburg, TN, May 9 – 13, 1994. *Appl. Biochem. Biotechnol.*, **51-52** (1995).

## BRIAN H. DAVISON

Page 9

Webb, O.F., Davison, B.H., Scott, C.D., and Scott, T.C., "Design and Demonstration of an Immobilized-Cell Fluidized-Bed Reactor for the Efficient Production of Ethanol," *Appl. Biochem. Biotechnol.*, **51-52**, 559-568 (1995).

Scott, C.D., Faison, B.D., Davison, B.H., and Woodward, J., "Process for Converting Cellulosic Materials into Fuel or Chemicals," U. S. Patent 5,348,871, September 20, 1994.

Davison, B.H. and Kaufman, E.N., "Enhanced Fermentation Systems with Continuous Removal of Inhibitory Products," Proceedings of Corn Utilization Conference V, St. Louis, MO, June 8 – 10, 1994.

Harshbarger, D. and Bautz, M. (Fluor Daniel) and Davison, B.H., Scott, T.C., and Scott, C.D., (ORNL), "Economic Assessment of Ethanol Production Comparing Traditional and Fluidized-Bed Bioreactors," Oak Ridge National Laboratory, Oak Ridge, TN, February, 1994.

Scott, C.D., Davison, B.H., Scott, T.C., Woodward, J., Dees, C., and Rothrock, D.S., "An Advanced Bioprocessing Concept for the Conversion of Waste Paper to Ethanol," *Appl. Biochem. Biotechnol.*, **45-46**, 641-653 (1994).

Kaufman, E., Stanley, N., Cooper, P., and Davison, B.H., "Screening of Resins for Use in a Biparticle Fluidized-Bed Bioreactor for the Continuous Fermentation and Separation of Lactic Acid," *Appl. Biochem. Biotech.*, **45-46**, 545-554 (1994).

Davison, B.H. and Thompson, J.E., "The Removal of Alkanes in a Liquid-Continuous Gas-Phase Bioreactor: Preliminary Considerations," *Appl. Biochem. Biotechnol.*, **45-46**, 917-923 (1994).

Davison, B.H., Knopp, S.A., Godia, F., and Solá, C., "Stability Characterization and Comparison of Two Fluidized-Bed Bioreactors," *Bioproc. Engr.*, **10**, 1-3 (1994).

Davison, B.H., Scott, C.D., and Kaufman, E.N., "Three Immobilized-Cell Bioreactors for Enhanced Production of Chemicals," Proceedings of the First Biomass Conference of the Americas: Energy Environment Agriculture and Industry, Burlington, VT, August 30 - September 2, 1993, **Vol. II**, 1249-1258.

Davison, B.H. and Scott, C.D., "Advanced Bioreactors for Enhanced Production of Chemicals," Proceedings of the Division of Petroleum Chemistry," American Chemical Society, **38 (2)** 304-307 (1993).

Scott, C.D., and Davison, B.H., "Attrition Reactor System," U.S. Patent 5,248,484 September 28, 1993.

Davison, B.H., and Thompson, J.E., "Sustained Degradation of *n*-Pentane and Isobutane in a Gas-Phase Bioreactor," *Biotech. Letters*, **15/6**, 633 – 36 (1993).

Davison, B.H., and Thompson, J.E., "Continuous Direct Solvent Extraction of Butanol in a Fermenting Fluidized-Bed Bioreactor with Immobilized *Clostridium acetobutylicum*," *Appl. Biochem. Biotechnol.*, **39-40**, 415-426 (1993).

Davison, B.H., and Thompson, J.E., "Simultaneous Fermentation and Separation of Lactic Acid in a Biparticle Fluidized-Bed Reactor," *Appl. Biochem. Biotech.*, **34-35**, 431-439 (1992).

Davison, B.H. and Scott, C.D., "A Proposed Biparticle Fluidized-Bed for Simultaneous Fermentation and Separation," *Biotechnol. Bioeng.*, **39**, 365-368 (1992).

## BRIAN H. DAVISON

Page 10

Petersen, J.N., Davison, B.H., and Scott, C.D., "Minimizing the Errors Associated with the Determination of Effective Diffusion Coefficients when Using Spherical Cell Immobilization Matrices," *Biotechnol. Bioeng.*, **37**, 386-388 (1991).

Petersen, J.N., Davison, B.H., Scott, C.D., and Blankinship, S.L., "Size Changes Associated with Metal Adsorption onto Modified Bone Gelatin Beads," *Biotechnol. Bioeng.*, **38**, 923-929 (1991).

Busche, R.M., Scott, C.D., Davison, B.H., and Lynd, L.R., "The Ultimate Ethanol: Technoeconomic Evaluation of Ethanol Manufacture, Comparing Yeast Vs *Zymomonas* Bacterium Fermentations," ORNL/TM-11852, Oak Ridge National Laboratory, Oak Ridge, TN (August, 1991).

Petersen, J.N., and Davison, B.H., "Modeling of an Immobilized Cell, Three-Phase Fluidized-Bed Bioreactor," *Appl. Biochem. Biotech.*, **28-29**, 685-698 (1991).

Petersen, J.N., Davison, B.H., Scott, C.D., and Blankinship, S.L., "Accumulation of  $\text{Cu}^{++}$  onto Bone Gelatin Derived Beads," *Biotechnol. Techniques* **4**, 436-440 (1990).

Bajpai, R., Thompson, J.E., and Davison, B.H., "Gas Holdup in Three-Phase Immobilized-Cell Bioreactors," *Appl. Biochem. Biotech.*, **24-25**, 485-496 (1990).

Davison, B.H., Nicklaus, D.M., Misra, A., Lewis, S.N., and Faison, B.D., "Utilization of Microbially Solubilized Coal: Preliminary Studies on Anaerobic Conversion," *Appl. Biochem. Biotech.*, **24-25**, 447-456 (1990).

Godia, F., Adler, H.I., Davison, B.H., and Scott, C.D., "Use of Immobilized Microbial Membrane Fragments to Reduce Oxygen Content and Enhance the Acetone-Butanol Fermentation," *Biotechnol. Prog.*, **6**, 210-213 (1990).

Davison, B.H., "Phase Holdup and Dispersion in a Three-Phase Fluidized-Bed Bioreactor with Low-Density Gel Beads," Proceedings of Biochemical Engineering VI, Santa Barbara, California, October 2 – 7, 1988, *Ann. NY Acad. Sci.*, **589**, 670-677 (1990).

Key, L., Eberhardt, J.J., Allen, B.R., Scott, C.D., and Davison, B.H., "Improved Production of Ethanol and N-Butanol in Immobilized Cell Bioreactors," Physiology of Immobilized Cells," Proceedings of an International Symposium held at Wageningen, the Netherlands, December 10 – 13, 1989, p. 539-543 (1989).

Davison, B.H., "Dispersion and Holdup in a Three-Phase Fluidized-Bed Bioreactor," *Appl. Biochem. Biotech.*, **20**, 449-460 (1989).

Davison, B.H., and Scott, C.D., "Operability and Feasibility of Ethanol Production by Immobilized *Zymomonas Mobilis* in a Fluidized-Bed Bioreactor," *Appl. Biochem. Biotech.*, **18**, 19-34 (1988).

Davison, B.H., and Donaldson, T.L., "Periodicity in Substrate Concentration in Three-Phase Fluidized-Bed Bioreactors," p. 254 – 258 in *Biotechnology Processes: Scale-Up and Mixing*, (Eds.) C. S. Ho and J. Y. Oldshue, AIChE Publ., New York, NY (1987).

Davison, B.H., "Fermentation Kinetics of Immobilized *Zymomonas mobilis* in a Fluidized Bed under Mass Transfer Limitations," Presented at American Chemical Society Meeting, September, 1986.

## **BRIAN H. DAVISON**

Page 11

Davison, B.H., and Scott, C.D., "Ethanol Production from an Industrial Feedstock by Immobilized *Zymomonas Mobilis* in a Fluidized-Bed Bioreactor," *Biotech. Bioeng. Symp.*, **17**, 629-632 (1986).

Davison, B.H. and Stephanopoulos, G.N., "Stability and Coexistence due to Inhibition in a Continuous Competing Mixed Culture," *Biotech. & Bioeng.*, **28 (11)**, 1742-1752 (1986).

Davison, B.H. and Stephanopoulos, G.N., "Effect of pH Oscillations on the Experimental Stability of a Competing Mixed Culture," *Biotech. & Bioeng.*, **28 (8)**, 1127-1137 (1986).

Davison, B.H., San, K.Y., and Stephanopoulos, G.N., "Stable Competitive Coexistence in a Continuous Fermentor with Size Selective Properties," *Biotech. Prog.* **1 (4)**, 260-268 (1985).

San, K.Y., Davison, B.H., and Stephanopoulos, G.N., "A Novel Bioreactor for High Productivities by Cell Retention Using Enhanced Sedimentation," *Biotech. Prog.*, **1 (4)**, 250-259 (1985).

Friedly, J. and Davison, B.H., "Dynamic Behavior of a Natural Circulation Loop for a Solar Collector," *AIChE Symp. No. 198*, **76**, 69-79 (1980).

## **PATENTS**

Scott, C.D., Scott, T.C., and Davison, B.H., "Apparatus and Method for the Production of Gel Beads Containing a Biocatalyst", U.S. Patent No. 5,712,212, January 27, 1998.

Scott, T.C., Scott, C.D., Faison, B.D., Davison, B.H., and Woodward, J., "Enhanced Attrition Bioreactor for Enzyme Hydrolysis of Cellulosic Materials," (CIP) U.S. Pat. 5,637,502, June 10, 1997.

Scott, C.D., Petersen, J.N., and Davison, B.H., "Continuous Fluidized-Bed Contactor with Recycle of Sorbent," U.S. Patent 5,534,153, July 9, 1996.

Scott, T.C., Scott, C.D., Faison, B.D., Davison, B.H., and Woodward, J., "Enhanced Attrition Bioreactor for Enzyme Hydrolysis of Cellulosic Materials," U. S. Patent 5,508,183, April 16, 1996.

Scott, C.D., Faison, B.D., Davison, B.H., and Woodward, J., "Process for Converting Cellulosic Materials into Fuels and Chemicals," U. S. Patent 5,345,871, September 20, 1994.

Scott C.D., and Davison, B.H., "Attrition Bioreactor System," U. S. Patent 5,248,484, September 28, 1993.

## **Submitted**

Davison, B.H., Scott, C.D., and Scott, T.C., "A High Productivity Fluidized-Bed Bioreactor," (disclosure submitted March, 1994).

Method to produce succinic acid from raw hydrolysates (6,743,610)

## **BRIAN H. DAVISON**

Page 12

### **Selected Invited Presentations (1999-Present)**

Davison, B.H., "Nontraditional Biocatalysis," BIO 2001 (Annual Meeting of the Biotechnology Industry Organization), June 24 – 27, 2001, San Diego, CA.

Davison, B.H., Mulchandani, A., Borole, A., Cheng, C., and Rodriguez, Jr., M., "Perioxodase-Catalyzed Epoxidation of Alkenes," 221<sup>st</sup> ACS National Meeting, American Chemical Society, San Diego, CA, April 1 – 5, 2000.

Nghiem, N.P., Donnelly, M.I., and Davison, B.H., "Production of Succinic Acid from Lignocellulosic Materials," 221<sup>st</sup> ACS National Meeting, American Chemical Society, San Diego, CA, April 1 – 5, 2001.

Davison, B.H., Barton, J.W., Klasson, T.K., and O'Connor, L.E., "Removal and Destruction of CWA Simulants Using "Dry" Enzyme-Impregnated Fabrics & Coatings," Booz-Allen & Hamilton, Inc., International Symposium on Applications of Enzymes in Chemical and Biological Defense, Orlando, FL, May 13, 2001.

Davison, B.H., Barton, J.W., Francisco, A.B., and Klasson, K.T., "The Effect of Biomass on the Measured Solubility of Sparingly Soluble Organics in Aqueous Bioremediation Systems," 2000 USC-TRG Conference on Biofiltration, Los Angeles, CA, October 18 – 20, 2000.

Nghiem, N.P., Davison, B.H., and Cofer, T.M., "Comparison of Ethanol Production from Lignocellulosic Sugars by Two Chromosomally Integrated Microbial Strains in a Fluidized-Bed Reactor," 23<sup>rd</sup> Symposium on Biotechnology for Fuels and Chemicals, Breckenridge, CO, May 6 – 9, 2001.

Davison, B.H., Kuritz, T., and McKeown, C.K., "Green Biopolymer for Decon of Contaminated Surfaces," Presentation delivered at *Decontamination, Demolition and Restoration (DD&R) Topical Meeting on Site Restoration of Government and Commercial Facilities*, Knoxville, TN, September 12 – 16, 1999.

Davison, B.H., Kuritz, T., Barton, J.W., and McKeown, C. K., "Green Biopolymers for Decontamination of metals from Surfaces," Oral and Poster presentation at AEMSP Review Meeting", Atlanta, GA, April 2000.

Davison, B.H., Kuritz, T., McKeown, C.K., and Barton, J.W., "Green Biopolymer Coatings for Improved Decontamination of Metals from Surfaces," Platform presentation at 13<sup>th</sup> Annual Technical Information Exchange (TIE) Workshop, Albuquerque, NM, November 13 – 15, 2001.

### **Invited Panels (selected)**

2006 American Academy of Microbiology Colloquy on "Microbial Production of Bioenergy"

2005 DOE EERE and SC workshop on "Biomass to Biofuels"

**BRIAN H. DAVISON**

Page 13

Usda SBIR panels

GTL bioenergy breakout for GTL mission workshop 2003?

DOE OIT Biocatalysis workshop 1991, oco-organizer