

A. BRENT STRONG

Brigham Young University
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University of Utah Ph.D. 1971 Physical Chemistry (Minor: Physics)

University of Utah B.A. (Cum Laude) 1967 Chemistry

Professional Experience and Employment

Brigham Young University, Provo, UT

- 1999-present **Lorin Farr Professor of Entrepreneurial Technology**
1986-present **Professor** – Manufacturing Engineering Technology
2006 **Editor-in-chief** – Journal of Advanced Materials (JAM)
2003 **Karl G. Maeser Distinguished Faculty Lecturer Award** – BYU’s most prestigious faculty award (for clear superiority in both scholarship and teaching)
2002 **Fellow** – Society for the Advancement of Materials and Process Engineering
2001-2004 **Alcuin Fellow** – BYU award for contributions to General Education
1991-present **Outstanding Faculty Award** – School of Technology (1991, 1997, 2002, 2005)
1993, 2000 **Outstanding College Researcher**
1992-1995 **Dept. Chair** – Manufacturing Engineering and Engineering Technology

Research areas:

- Composite materials – new manufacturing processes, matrix/fiber interface, machining and finishing, new resin characterization.
- Plastics – in-use performance, recycling, improved manufacturing processes, resin adaptation to end-uses.
- Methods for sensing resin cures and other material properties.
- Creativity development and pedagogy.
- Manufacturing for entrepreneurs and small businesses.

Classes taught at BYU:

Plastics Materials and Processing, Composites Materials and Processing, History of Creativity, Creating and Managing New Ventures, Materials Science, Quality Control, Process Planning and Estimating, Capstone (Senior project class), Quantitative Reasoning, University Foundation, Introduction to Manufacturing

- 2005-present **Founding Director** – Innovation and Creativity Initiative
Established a laboratory and coursework to promote creativity learning in undergraduates and to study the processes of creativity.
- 1999-present **Founding Director** – Manufacturing Leadership Forum (MLF)
Facilitated the development of leadership skills in manufacturing students through seminars, cooperative work assignments, and research
- 1996-1997 **Director** – Rapid Product Realization (RPR) Center
Assisted inventors and companies in the development of new products, especially in prototyping. Developed methods to reduce the time for product development.
- 1990-1996 **Founding Director** – Advanced Composite Mfg. & Eng. (ACME) Center
Coordinated technical assistance to over 150 companies in Utah in advanced materials (composites and plastics) resulting in over \$32 million in related business and over 400 new jobs. Center sponsored 5

conferences. 5 patents and licenses granted for Center technology.

Eyring Research Institute, Provo, UT

1984-1986 **Vice President** – Supervised launching of new software products, new military antenna and process for coal liquefaction.

Hardie Irrigation Systems, El Cajon, CA

1979-1984 **President** – Supervised all US and South American operations with full profit/loss responsibilities. Directed manufacturing (principally extrusion and injection molding) throughout the world. Increased sales from \$5 to \$18 million and profits from \$1 million (loss) to \$1.6 million (gain).

1978-1979 **Technical Mgr** – Certified new resin materials for various irrigation product uses. Supervised use of electron irradiation and laser drilling. Established QC and reliability testing procedures.

E. I. DuPont, Wilmington, DE

1976-1978 **Field Service Engineer** – Field service and marketing of drip irrigation tubing.

1973-1976 **Senior Manufacturing Engineer** – Devised and implemented procedures for production of an inflated, foamed fiber material. Set QC standards.

1972-1973 **Senior Research Chemist** – Supervised testing of new uses for foamed fiber material. In-use testing.

1971-1972 **Research Chemist** – Modified a new membrane material used in electro-chemical cells and built a test cell to evaluate membrane efficiency. Formulated new composites, defined their moldability, and determined their impact strength, flammability, weatherability, and other properties.

Professional Societies

- Society for the Advancement of Material and Processing Engineering (SAMPE) – trustee membership
- Composites Fabricators Association (CFA) – honorary membership
- Association of Rotational Molders (ARM) – honorary membership
- Society of Plastics Engineers (SPE) – senior membership
- Society of Manufacturing Engineers (SME)
- American Society for Engineering Education (ASEE)
- Phi Kappa Phi — Honorary Scholastic Society
- Sigma Xi — Honorary Science Research Society

Recognitions and Honors

- Selected member of Fellows Selection Committee, SAMPE, 2006
- Selected General Co-Chairman, International SAMPE show and exhibition, 2006
- Elected Trustee of Provo Board of Economic Development, February 2006.
- Selected speaker at Convocation services, Ira A. Fulton College of Engineering and Technology, Brigham Young University, August 2005.
- Elected Fellow of the Society for the Advancement of Material and Process Engineering (SAMPE), 15 May 2002.
- Utah Engineering Educator of the Year Nominee, 2002, Utah Engineering Council.
- Selected as member of Advisory Committee of NASCOMP – 2001, ISAMPE-SAMPE Seminar on Composites, Bangalore, India, 5-6 February 2001.

- Program Chair, International SAMPE Symposium and Exhibition, Long Beach, CA, May 21-25, 2000.
- Selected as peer reviewer for the state of Indiana 21st Century technology awards program, April 2000.
- Recipient of the Student Honor Association award for supporting BYU students in living the honor code, 2000
- Named the Lorin Farr Professor of Entrepreneurial Technology, 1999
- Winner of the 1997 Padnos Design Competition of the American Society of Mechanical Engineers (ASME) for Environmentally Progressive Projects
- Winner of the M. Eugene Merchant Manufacturing Textbook Award, 1997, awarded by the Education Foundation of the Society of Manufacturing Engineers (SME)
- International President, SAMPE, 1997-98
- Contributing Editor, *Composites Fabrication*, 1996-present
- Editorial Board, *Journal of Advanced Materials*, 1989-present
- Editorial Board, *SAMPE Journal*, 1989-present
- International Executive Cabinet (SAMPE) 1992-1999
- Editorial Board, *Journal of Thermoplastic Composite Materials*, 1991-1993
- Proposer of national standards for performance of trash carts, 1993
- Organizing committee, workshop for Certified Prosthetists and Orthotists on Composite Devices, Aug. 1992
- Board member, Utah Manufacturing Extension Partnership (holding company), 1997-present
- Elected International Director (SAMPE), 1990-1997
- Elected Member Phi Kappa Phi Honorary Society, 1991
- Award Speaker and Elected Member, Sigma Xi, Honorary Research Society, 1991
- Member, Center for Advanced Materials (U of U), 1989
- Member, SME Composites Technical Council, 1988
- Organizing committee, National Technology Workshop, Provo, UT, May 1991
- International Academic Advisory Committee, SAMPE, 1989
- Organizing committee and program moderator, Composite Materials in Medical Devices Conference, Salt Lake City, UT, November 1991

Books

- Strong, Brent, and Mark Davis, *The History of Creativity, 1500-Present*, Dubuque, IA: Kendall/Hunt Publishing Company, 2006, 502 pages.
- Strong, Brent, and Mark Davis, *The History of Creativity, Pre-1500*, Dubuque, IA: Kendall/Hunt Publishing Company, 2005, 430 pages.
- Strong, A. Brent, *Plastics: Materials and Processing*, 3rd Edition, Englewood Cliffs: New Jersey, Prentice-Hall, Inc., 2006, 917 pages.
- Strong, A. Brent, Editor, *History of Creativity in the Arts, Science, & Technology, 1500-present, Supplement*, Dubuque, IA: Kendall/Hunt Publishing Company, 2005, 332 pages.
- Strong, A. Brent, Editor, *History of Creativity in the Arts, Science, & Technology, Pre-1500 Supplement*, Dubuque, IA: Kendall/Hunt Publishing Company, 2004, 165 pages.
- Hawks, Val D. and A. Brent Strong, *Introduction to Engineering Technology and Engineering*, Englewood Cliffs: New Jersey, Prentice-Hall, Inc., 2001, 271 pages.
- Strong, A. Brent, *Plastics: Materials and Processing*, Englewood Cliffs: New Jersey, Prentice-Hall, Inc., 2nd Edition, 2000, 811 pages.
- Strong, A. Brent, *Plastics: Materials and Processing*, Englewood Cliffs: New Jersey, Prentice-

- Hall, Inc., 1996, 675 pages.
- Strong, A. Brent, *Fundamentals of Polymer Resins*, Arlington, VA: Composites Fabricators Association (CFA), 1995, 74 pages.
 - Strong, A. Brent, *High Performance and Engineering Thermoplastic Composites*, Lancaster, Pennsylvania: Technomics Publishing Co., 1993, 202 pages.
 - Strong, A. Brent, Editor, *Composites In Manufacturing: Case Studies*, Dearborn, Michigan: Society of Manufacturing Engineers (SME), 1991, 326 pages.
 - Strong, A. Brent, *Fundamentals of Composites Manufacturing: Materials, Methods, and Applications*, Dearborn, Michigan: Society of Manufacturing Engineers (SME), 1989, 252 pages.

Patents

- Isham, William R., Stephen N. Webber, A. Brent Strong, and James Liechty, "Lightweight Composite Ladder Rail Having Supplemental Reinforcement in Regions Subject to Greater Structural Stress," Foreign applications, Filed 14 August 2005.
- McCormick, Chris E., A. Brent Strong, Mike D. Ridges, Kevin A. Plumb, and Jeff Smith, "Protective Laminate for Windshields," US Patent Application 10/993,619 November 19, 2004.
- Isham, William R., Stephen N. Webber, A. Brent Strong, and James Liechty, "Lightweight Composite Ladder Rail Having Supplemental Reinforcement in Regions Subject to Greater Structural Stress," US Patent Application.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Determination of the Extent of Crosslinking Prior to the Intentional Curing of Polymers," Canadian Patent No. 2144766, September 20, 2003.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Determination of the Extent of Crosslinking Prior to the Intentional Curing of Polymers," European Patent No. 0729573, October 28, 2003.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Device and Method for Measuring Charge Carrying Activity in Generally Non-conductive Materials," European Patent No. 93 921 656.0, November 25, 2002.
- Ridges, Michael D. and A. Brent Strong, "Method of forming integrally molded ribs and internal reinforcement structures in rotomolded plastic parts," filed 19 April 2002.
- Kirkham, Thomas L., David V. Kirkham, Perry W. Carter, and A. Brent Strong, "Gas Over Liquid Metal-Spraying Apparatus", filed January 8, 2002.
- Greep, Darcy W., A. Brent Strong, and William G. Pitt, "Plasma Polymerized Dual-Layered Coating," filed June 2000.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Detection of Cross-Linking in Pre-cure Stage Polymeric Materials by Measuring Their Resistance," Patent No. 5,635,845, June 3, 1997.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Method and Apparatus for Determining Extent of Cure in Polymers," Patent No. 5,596,268, January 21, 1997.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Device and Method for Measuring Charge Carrying Activity in Generally Non-conductive Materials," Patent No. 5,572,115, November 5, 1996.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Detection of Cross-linking in Pre-Cure Stage Polymeric Materials by Measuring their Impedance," Patent No. 5,432,435, July 11, 1995.
- Garrison, Donald L., Larry E. Page, Ronald Scott Merrell, and A. Brent Strong, "Cell Collection Apparatus," 1996, patent 5,422,273.
- Hauwiller, Paul and A. Brent Strong, inventors. "Incremental Forming of Thermoplastic Composites." Patent No. 5,026,514, June 25, 1991.

Scholarly Writing (Reviewed/Invited)

- Strong, A. Brent and Thomas L. Erekson, "Out Love-Hate Relationship with Technology," *Composites Manufacturing*, June 2006, pp. 20-25.
- Smoot, Daniel C. and A. Brent Strong, "Product and Process Innovation—A Review," *Journal of Advanced Materials*, Vol. 38, No. 2, April 2006, pp. 64-79.
- Strong, A. Brent, "Don't know much about history: Why exploring the past is critical to good engineering today," *Composites Manufacturing*, May 2006, pp. 28-33.
- Strong, A. Brent and John E. Green, "FRP and Advanced Composites: Synergy is the Message for Europe in 2006," *Composites Manufacturing*, January 2006, pp. 34-36.
- Strong, A. Brent and Scott W. Beckwith, "FRP and Advanced Composites: Bridging the Gap," *Composites Manufacturing*, October 2005, pp. 46-51.
- Strong, A. Brent and Michael Miles, "Metals and Composites: Breaking down the elements," *Composites Manufacturing*, September 2005, pp. 24-34, 100.
- Strong, A. Brent and Michael Ridges, "Will 'Spray-on' Vacuum Bags Save the Aerospace Industry Millions?," *Composites Manufacturing*, May 2005, pp. 28-33.
- McCarvill, William T. and A. Brent Strong, "Epoxy Resin Formulation Made Simple," *Composites Manufacturing*, March 2005, pp. 22-27.
- Strong, A. Brent and Frédérique Mutel, "Composites Market in Europe," *Composites Manufacturing*, January 2005, p.38-42, 95.
- Spencer, Mark G., A. Brent Strong and William G. Pitt, "Advancements in the Rotational Molding of ABS Polymers and Blends," *Rotation*, Volume XIII, issue 5, September-October 2004, p. 18-24.
- Strong, A. Brent, "Breakthroughs in Aerospace Composites Manufacturing," *Composites Fabrication*, October 2004, p. 68-71.
- Harrell, Charles and A. Brent Strong, "Simulation in Composites Manufacturing," *Composites Fabrication*, May 2004, pp. 8-15, 33-34.
- Strong, A. Brent and John E. Green, "Wind, Automobiles, Aircraft drive composites markets in Europe," *Composites Fabrication*, January 2004, pp. 22-23.
- Strong, A. Brent, "Rotational Molding for Small Marine Craft" *Composites Fabrication*, October 2003, pp. 22-24.
- Strong, A. Brent, "Plastics Flammability," *Proceedings of the Electrical Insulation Conference/Electrical Manufacturing & Coil Winding Expo 03*, September 22-25, 2003, proceedings on CD ROM.
- Lunt, Barry M. and A. Brent Strong, "Conductive Plastics," *Proceedings of the Electrical Insulation Conference/Electrical Manufacturing & Coil Winding Expo 03*, September 22-25, 2003, proceedings on CD ROM.
- Strong, A. Brent, "UV Weathering—Theory, Practice, and Meaning of Results" *Rotation*, July-August 2003, pp. 20-27.
- Strong, A. Brent, "Make the Cut: What's the right cutter for your application?" *Composites Fabrication*, August 2003, pp. 14-23.
- Strong, A. Brent, "Lost in Space: Creating an Environment on Earth for Building Safe and Effective Space Structures, What are your products' critical characteristics?" *Composites Fabrication*, June 2003, pp.14-19.
- Strong, A. Brent, "Core Materials – Part I: The Meat of the Sandwich," *Composites Fabrication*, April 2003, pp.12-19.
- Strong, A. Brent, "The Value of Dissent," *Composites Fabrication*, April 2003, pp.24-27,38-39.
- Strong, Brent, Mark Davis, and Val Hawks, "Self-Grading in Large General Education Classes: A Case Study," *College Teaching*, accepted January 2003.

- Strong, A. Brent, "Why Engineers Should Read Shakespeare," *Composites Fabrication*, February 2003, pp.24-42.
- Strong, A. Brent and John E. Green, "FRP Global Market Report – Europe, Asia, Latin America," *Composites Fabrication*, January 2003, pp.32-36.
- Richards, John E. and A. Brent Strong, "If It Don't Make ¢ent\$, It don't Make Sense: Can the Internet Help you Profit?," *Composites Fabrication*, October 2002 pp.28-44.
- Spencer, Mark G. and A. Brent Strong, "Searching for Viability: Recent Advances in the Rotational Molding of ABS Resins," Proceedings of the Association of Rotational Molders 27th Annual Fall Meeting, October 6-9, 2002, Toronto, pp.105-112.
- Al-Zubi, Raed, A. Brent Strong, and Marshall Lampson, "Understanding Environmental Stress Crack Resistance (ESCR) in Rotomoulded Polyethylene Tanks," *Rotation*, Volume XI, Issue 4, July/August 2002, pp.20-25
- Strong, A. Brent, "Planning Amidst Change," *Composites Fabrication*, September 2002, pp.69-76.
- Strong, A. Brent, "From R and D to Commercialization: Lessons in Product Flow," *Composites Fabrication*, September 2002, pp.40-47.
- Strong, A. Brent and David W. Jensen, "The Ultimate Composite Structure," *Composites Fabrication*, August 2002, pp. 22-27.
- Strong, A. Brent, "Microspheres: Self-Help Composites," *Composites Fabrication*, June 2002, pp.28-33.
- Strong, A. Brent, "Motivating in Service," *Impact*, Winter 2002, pp.15-16.
- Strong, A. Brent, "Composites in Weapons and Armor," *Composites Fabrication*, March 2002, pp.26-31.
- Strong, A. Brent, Val D. Hawks, and Scott Beckwith, "World Market for FRP: Asia, Latin America and Europe," *Composites Fabrication*, January 2002, pp. 28-34.
- Strong, A. Brent, "3-Dimensional Reinforcement: Useful and Unusual," *Composites Fabrication*, November/December 2001, pp. 26-31.
- Beckwith, Scott and Brent Strong, "After September 11th: The Composites Industry's Crystal Ball," *Composites Fabrication*, November/December 2001, pp. 10-17.
- Strong, A. Brent and Val D. Hawks, "Ethics," *Composites Fabrication*, October 2001, pp. 16-24.
- Strong, A. Brent, "Managing Product Innovations," *Composites Fabrication*, September 2001, pp. 32-39.
- Strong, A. Brent, "Corporate Creativity," *Composites Fabrication*, July 2001, pp. 28-33.
- Strong, A. Brent and Barry M. Lunt, "Conductive Polymers: Why They Were Worth the Nobel Prize," *Composites Fabrication*, March 2001, pp. 14-23.
- Hawks, Val D. and A. Brent Strong, "Quality Principles (Progressing from Level to Level)," *Composites Fabrication*, April 2001, pp. 20-27, 37.
- Strong, A. Brent and David W. Jensen, "Smart Structures, Damage Prevention, and Repair," AERO INDIA 2001, 7-9 February 2001, Bangalore, India.
- Strong, A. Brent, "Using Improved Resins to Solve Composite Problems," ISAMPE-SAMPE Seminar on Composites, NASCOMP 2001, 5-6 February 2001, Bangalore, India.
- Strong, A. Brent and Val D. Hawks, "World Markets for FRP: Asia, Latin America and Europe," *Composites Fabrication*, January 2001, pp. 14-19.
- Hawks, Val D. and A. Brent Strong, "Going Global with FRP? The Quality Challenge: What Other Industries have Learned," *Composites Fabrication*, January 2001, pp. 20-27, 36.
- Strong, Brent and Thomas Erekson, "Yankee Ingenuity: Still a Vital Tool," *Composites Fabrication*, October 2000, pp. 60-67, 92.
- Strong, Brent and Perry Carter, "Rapid Prototyping: From Virtual to Reality," *Composites*

- Fabrication*, October 2000, pp. 10-19, 24-27.
- Strong, A. Brent, “Analyzing? Creating?: Would that be Art or Engineering?,” *Composites Fabrication*, August 2000, pp. 20-27.
 - Strong, A. Brent, “Damage Control,” International Encyclopedia of Composites – 2nd Edition (Dr. Stuart M. Lee, Editor), SAMPE, 2000, pp. 181-184.
 - Strong, A. Brent, “Manufacturing,” International Encyclopedia of Composites – 2nd Edition (Dr. Stuart M. Lee, Editor), SAMPE, 2000, pp. 486-496.
 - Strong, A. Brent, “Molding,” International Encyclopedia of Composites – 2nd Edition (Dr. Stuart M. Lee, Editor), SAMPE, 2000, pp. 613-627.
 - Strong, A. Brent, “Shelf Life Monitoring,” International Encyclopedia of Composites – 2nd Edition (Dr. Stuart M. Lee, Editor), SAMPE, 2000, pp. 977-980.
 - Strong, A. Brent, “UV Weathering: Theory, Practice, and Meaning of Results,” *Composites Fabrication*, July 2000, pp. 8-13, 18-27.
 - Strong, A. Brent, “New Elastomers: Products of Precision Polymerization,” *Composites Fabrication*, May 2000, pp. 32-35.
 - Strong, A. Brent, “The Precarious Entrepreneur: Where’s the Help?,” *Composites Fabrication*, March 2000, pp. 9-10, 16-19
 - Strong, A. Brent, “Thermoplastic Composites – Something Old, Something New,” *Composites Fabrication*, October 1999, pp.12-16.
 - Strong, A. Brent and David W. Jensen, “Smart Structures – Inevitable or Impractical,” *Composites Fabrication*, September 1999, pp.30-35.
 - Helps, C. Richard G., A. Brent Strong, Ra'ed Al-Zubi, Val D. Hawks, and Kent E. Kohkonen, “The Use of Artificial Neural Networks in the Prediction of Machine Operational Settings for Injection Molded Parts,” *Journal of Injection Molding Technology*, Vol 3/No 4, December 1999, pp. 201-211.
 - Helps, C. Richard, A. Brent Strong, Ra'ed Al-Zubi, Barry M. Lunt, and Kent E. Kohkonen, “Generalization of a Method Using Neural Networks to Predict Part Quality Control During Injection Molding,” *Journal of Injection Molding Technology*, Vol 3/No 4, December 1999, pp. 212-225.
 - Helps, C. Richard G. and A. Brent Strong, “Innovations in Control of Injection Molding Processes,” *Electrical Manufacturing and Coil Winding Association Proceedings*, October 1999.
 - Strong, A. Brent, “Automatic Sensing of Changes in Transformer Dielectrics,” *Electrical Manufacturing and Coil Winding Association Proceedings*, October 1999.
 - Strong, A. Brent, “Composite Armor – A Difficult but Huge Market,” *Composites Fabrication*, April 1999, pp. 8-11, 18-19.
 - Strong, A. Brent, “Sizings and Coupling Agents – The ‘Magic’ of Composite Performance,” *Composites Fabrication*, March 1999, pp. 12-19, 27, 40.
 - Strong, A. Brent and Christopher A. Rotz, “Damping in Composites — It’s There But Is It Understood?,” *Composites Fabrication*, February 1999, pp.30-37.
 - Strong, A. Brent, “Molecular Design — Advances in Resin Chemistry,” *Composites Fabrication*, November/December 1998, pp.12-18.
 - Strong, A. Brent and Thomas E. Blair, “New Methods to Assess the Performance of Prototype Form-Fill-Seal Packages,” *Medical Plastics and Diagnostic Industry*, January 1999, pp.124-137.
 - Strong, A. Brent, “Strategies for Low Styrene Resins,” *Composites Fabrication*, June 1998 pp. 20-23, 38.
 - Strong, A. Brent, “Manufacturing FRP Tanks,” *Composites Fabrication*, May 1998, pp.12-17.
 - Strong, A. Brent, “Flammability Testing,” *Composites Fabrication*, February 1998, pp.8-11.
 - Strong, A. Brent, “Understanding Epoxies,” *Composites Fabrication*, November/December 1997,

pp.20-23.

- Strong, A. Brent, "Copolymers, Alloys and Blends," *Composites Fabrication*, August 1997, pp.17-21.
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Unique Monitoring of Cure and Shelf Life of Polymeric Materials, 29th International SAMPE Technical Conference, Orlando, FL, October, 1997, pp.28-31.
- Mansure, Brian S. and A. Brent Strong, "Optimization of Rotational Molding of Acrylic Filled with Ethylene Methyl Acrylate," *Rotomolding*, Volume VI, Issue 3, Fall 1997, pp 21-28.
- Strong, A. Brent and Scott W. Beckwith, "Joining Composite Materials," *Composites Fabrication*, June 1997, 9-15.
- Strong, A. Brent, "The Place of Silicones in FRP," *Composites Fabrication*, May 1997, pp.17-21.
- Strong, A. Brent, "New Affordable Prepregs," *Composites Fabrication*, March 1997, pp.9-15.
- Strong, A. Brent, "Polymeric Reinforcing Fibers — Kevlar, Spectra, and Others," *Composites Fabrication*, January 1997, pp.9-13.
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- Strong, A. Brent, "Polyurethanes Take Big Steps," *Composites Fabrication*, October 1996, pp.40-47.
- Strong, A. Brent, "In the Beginning: A History of Composites," *Composites Fabrication*, August 1996, pp.9-15.
- Strong, A. Brent, "Versatility in Pultrusion," *Composites Fabrication*, June 1996, pp.9-13.
- Strong, A. Brent, "Using Prepreg Materials," *Composites Fabrication*, June 1996, pp.25-28.
- Strong, A. Brent, "What Determines the Strength and Stiffness of a Reinforced Plastic Part?," *Composites Fabrication*, March 1996, pp.23-26.
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- Lee, Norman C., A. Brent Strong and Ronald L. Walling, "Performance Evaluation of Blow Molded Refuse Carts Using Post Consumer Recycled Material," *ANTEC 93*, Society of Plastics Engineers (SPE), May 9-13, 1993.
- Barron, William R., Brian Halverson, Cris S. Stevens, A. Brent Strong and Robert H. Todd, "Development of a Continuous Liquid Molding Process and Prototype Process Machine," *Journal of Advanced Materials*, October 1994, pp.54-61.
- Turley, Roger Scott and A. Brent Strong, "Using Carbon Black to Protect Linear Low Density Polyethylene from Ultraviolet Light Degradation," *Journal of Advanced Materials*, April 1994, pp.53-59.
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- Strong, A. Brent, "Manufacturing," *Handbook of Composite Reinforcements*, New York: VCH Publishers, Inc. 1992, pp.310-343.
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- Bertrand, R.D., D.M. Grant, E.A. Allred, J.C. Hinshaw, and A.B. Strong. "Orbital Hybridization in Small Fused Rings." *J. Am. Chem. Soc.* Vol.94, 1972, pp.997-999.
- Strong, A.B. "Calculation of Carbon-13 Chemical Shift.", PhD diss., University of Utah, 1971.

Scholarly Presentations and Other Scholarly Outputs

- Strong, A. Brent, "Resin Technologies for Composites," Composites and Polycon 2006, St. Louis, MO, October 18-20, 2006.
- Beckwith, Scott W. and A. Brent Strong, "Composites versus Metals," Composites and Polycon 2006, St. Louis, MO, October 18-20, 2006.
- Strong, A. Brent, "Rethinking and Repositioning Engineering Technology," ETLI Conference, Salt Lake City, Utah, October 8, 2006.
- Berrett, Jared and A. Brent Strong, "Increasing Creativity and Innovation Across the Curriculum: An Engineering Imperative?" ASEE Annual Conference, Chicago, Jun 2006.
- Strong, A. Brent, "Composites in Utah – a growing sector," The Governor's Office of Economic Development, Panel member at the Technology Breakfast, February 24, 2006.
- Strong, A. Brent, "Composites Engineers: Preparing to Enter the '06 Job Market? Take These Words on the Link Between Business and Engineering With You," *Composites Manufacturing*, January 2006, pp. 8-9.
- Strong, A. Brent, Commencement Speech, College of Engineering and Technology, August 2005.
- Strong, A. Brent, "Entrepreneurs must take care not to kill creativity," *Deseret News*, Sunday, 27 March, 2005.
- Strong, A. Brent, Book reviews: "Block Copolymers: Synthetic Strategies, Physical Properties, and Applications;" "Plastics Materials and Processes: A Concise Encyclopedia;" "Modern Styrenic Polymers: Polystyrenes and Styrenic Copolymers;" "Radiation Technology for Polymers;" *SAMPE Journal*, Vol. 39, No. 6, November/December 2003, 88-90.
- Strong, A. Brent, "Why Engineers Should Read Shakespeare and Why Humanists Should Understand Einstein," Maeser Distinguished Faculty Lecture, Brigham Young University, October 28, 2003.
- Strong, A. Brent, "Bonding between Coal and Polymers," Research Report for Covol, Inc., October 2003.
- Strong, A. Brent, "Learn from Wrights' mistakes," *Deseret News*, Sunday, 21 September 2003.
- Strong, A. Brent, Invited speaker on "Composite Resins" and "Entrepreneurship and Creativity," Composites Institute of Australia, at Melbourne, Gold Coast, and Sydney, Australia, August 18-24, 2003.
- Strong, A. Brent, "Entrepreneurs should brush up on the Bard," *Deseret News*, Sunday, 1 June 2003 and *The Daily Herald*, 19 June 2003.
- Strong, A. Brent, Guest Editorial *SAMPE Journal*, "Creative People," submitted Mar 2003.
- Strong, A. Brent and Andy George, Technical Report for Superyacht Solutions on the nature of UV and oxidative degradation in FRP gelcoats, Gold Coast Australia, March 2003.
- Strong, A. Brent, Keynote speaker: "Why Engineers Should Read Shakespeare," 10th Annual Filament Winding and Pultrusion Workshop, Entec Composite Machines, Inc., Salt Lake City, UT, February 27, 2003.
- Strong, A. Brent, "Dissent is critical to a company's success," *Deseret News*, Sunday, 2 February 2003.
- Strong, A. Brent, "Assistance is at hand for entrepreneurs," *Deseret News*, Sunday, 24 November 2002.
- Strong, A. Brent, "Perspectives of Creativity," Mississippi Valley Technology Teacher Education Conference, St. Louis, MO, October 31-November 1, 2002.
- Strong, A. Brent, "Going it alone? Help is available," *Deseret News*, Sunday, 1 September 2002.
- Strong, A. Brent, "Planning for the future is possible," *Deseret News*, Sunday, 26 May 2002.
- Strong, A. Brent, "The Effects of HF on Plastic Containers," Corrosion 2002, National Association of Corrosion Engineers (NACE), 57th Annual Conference & Exposition, April 7-11,

Denver, CO.

- Strong, A. Brent, "Does Your Company Kill Creativity?" 11th Annual Filament Winding Workshop, Entec Composite Machines, Inc., Salt Lake City, Utah, March 20-22, 2002.
- Strong, A. Brent, "Seeing entire picture is vital," *Deseret News*, Sunday, 3 March 2002.
- Strong, Brent and Michael Miles, "Thinking lean is good for business," *Deseret News*, Sunday, 16 December 2001.
- Strong, A. Brent, "Train, reward good work," *Deseret News*, Sunday, 30 September 2001.
- Strong, A. Brent, "New Product, new risk," *Deseret News*, Sunday, 5 August 2001.
- Strong, A. Brent, "Corporate creativity," *Deseret News*, Sunday, 15 April 2001.
- Strong, A. Brent, "The Development of Acrylonitrile-butadiene-styrene (ABS) Resins for Rotomolding," ARM 25th Annual Spring Meeting, San Diego, CA, 20 March 2001.
- Hawks, Val D. and A. Brent Strong, "Ethics, choices lead to quality," *Deseret News*, Sunday, 21 January 2001.
- Strong, A. Brent, "Thermoplastic Composites," National Workshop on Composite Materials and Processing, 10 February 2001, Trivandrum, India.
- Strong, A. Brent, "Controlling Cure of Thermoset Resins," National Workshop on Composite Materials and Processing, 10 February 2001, Trivandrum, India.
- Brough, Chris and A. Brent Strong, "Recycling of Plastic Materials through Thermokinetic Processing," RETEC National Recycling Conference, Society of Plastics Engineers, Dearborn, MI, November 7-9, 2000.
- Strong, A. Brent, "Expert Report on Plastic Materials involved in the accident in Turkey between a bus and a truck," for Collision Safety Company, October 2000.
- Strong, A. Brent and Val D. Hawks, "Prepare for the snags abroad," *Deseret News*, Sunday, 22 October 2000.
- Strong, Brent and David Bedell, "Rotomolding of ABS Resins," Association of Rotational Molding Conference, Atlanta, GA, 14-16 October 2000.
- Strong, Brent and Thomas Erikson, "Yankee Ingenuity is still a vital tool," *Deseret News*, Sunday, 16 July 2000, and *Daily Herald*, Tuesday, 18 July 2000.
- Bedell, David and A. Brent Strong, "Development of ABS Resin for Rotational Molding," Association of Rotational Molding Conference, San Antonio, TX, April 2000.
- Strong, A. Brent, "Creativity for Entrepreneurs," *Deseret News*, Sunday, 7 May 2000.
- Wilkerson, Lee P. and A. Brent Strong, "Self Unloading Agricultural Products Trailer with Positive Drive," The Collegiate Inventors Competition, April 2000.
- Strong, A. Brent, "Resources galore for fledgling ventures," *Deseret News*, Sunday, February 27, 2000.
- Strong, A. Brent, "Utah innovators benefit from rural work ethic," *The Daily Herald*, Tuesday, February 1, 2000.
- Eatough, Craig N., Robert E. Jackson, and A. Brent Strong, "Evaluation of Mason Industries 14" Safeflex Pipe Expansion Joints," Report to Intel Corporation, January 2000.
- Strong, A. Brent, "Business booming around rural Utah," *Deseret News*, Sunday, December 26, 1999.
- Strong, A. Brent, "Composite-Related Educational Issues," Advanced Composites: Strength of Our Future," Phoenix, AZ, 9 September 1999.
- Strong, A. Brent, "Current University Research on Advanced Materials," Advanced Composites: Strength of Our Future, Phoenix, AZ, 9 September 1999.
- Strong, A. Brent and Kyle B. Kinghorn, "Development of ABS Resins for Use in Rotational Molding," Report to the ARM Materials Committee, January 7, 1999.
- Strong, A. Brent and Scott W. Beckwith, "Manufacturing of Magazines for Chaff and Flares, K-

Tech, Salt Lake City, UT, 9 March 1999.

- Eatough, Craig N., Robert E. Jackson, and A. Brent Strong, "Butyl Sealant Material and Metallized Tape Evaluation," Report to Intel Corporation, February 1999.
- Al-Zubi, Raed and A. Brent Strong, "Artificial Neural Networks to Control Injection Molding," SPE Utah Meeting, January 20, 1999.
- Strong, A. Brent, "Making Molecules Work for You," Composites '98 (Composites Fabricators Association Conference and Exposition), October 21-23, 1998, San Antonio, Texas.
- Strong, A. Brent, "State of SAMPE," 43rd ISSE, May 31-June 4, 1998, Anaheim, California.
- Eatough, Craig N. and A. Brent Strong, "Analysis of Butyl Rubber Duct Sealant Materials," Report to Intel Corporation (Bennet, Tueller and Johnson), May 20, 1998.
- Strong, A. Brent and Jeremy Ripley, "Bottle Cap Problem Remediation," report to Essential Oils, Inc., April 1998.
- Strong, A. Brent, "Composites as a Key to Progress," Arizona Conference for Composites In Industry, Gilbert, AZ, March 4, 1998.
- Strong, A. Brent, "Composites: The State of the Industry," Rocky Mountain SAMPE chapter initiation meeting, Denver, CO, 27 February 1998.
- Strong, A. Brent, "Understanding Molecules," Polycon '98 (International Cast Polymer Association), February 1998, Orlando, Florida.
- Strong, A. Brent, "State of Composite Materials," Keynote Address, Indian Society for Advancement of Materials and Process Engineering Eleventh Annual General Meeting, 12 August 1997, Bangalore, India.
- Strong, A. Brent and Brian S. Mansure, "Optimization of Rotational Molding of Acrylic Filled with Ethylene Methyl Acrylate," Association of Rotational Molders Research report, June, 1997.
- Strong, A. Brent and Brian S. Mansure, "Tough Rotational Molding Materials," Association of Rotational Molders International Meeting, Vienna, Austria, June, 1997.
- Strong, A. Brent, "Foundation of Polymers," American Academy of Orthotists and Prosthetists Annual Conference, November 15, 1997, Tampa, FL.
- Strong, A. Brent, "Understanding Molecules," Composites '97, Annual Conference of the Composites Fabricators Association, October 1997, Orlando.
- Strong, A. Brent, Fourth Annual Padnos Design Competition Award, Grand Prize, "Mobile Water Remediation Unit for Petroleum-Fouled Process Water," 1997 (refereed design competition).
- Strong, A. Brent, R. Scott Merrell, and Barry M. Lunt, "Development of a New Technique for Monitoring Cure and Shelf Life of Polymeric Materials," Fourth International Conference on Composites Engineering (ICCE/4), July 6-12, 1997, Hawaii.
- Strong, A. Brent, "Fundamentals of Pultrusion," *Composites '97*, SME Conference, January 20, 1997, Anaheim.
- Lunt, Barry M., R. Scott Merrell, A. Brent Strong, and Mark R. Cox, "Electrical Sensing of Properties of Polymeric Materials," 6th International Workshop on Moisture in Microelectronics, Rome Laboratory, NIST, October 15-17, 1996.
- Strong, A. Brent, "Engineering and Technology: From Artificial Legs to Stealth Fighters," August 23, 1996, Education Week, BYU.
- Strong, A. Brent, "Training in Resin Technology," In-plant classes given for Aqua Glass, Inc., Adamsville, TN, Jan. 1996.
- Strong, A. Brent, "Making Molecules Work for You," *Composites '96*, Conference of the Composites Fabricators Association, October 1996.
- Mansure, Brian and A. Brent Strong, "Resin Development for Abrasion Resistance," *ARM Conference*, October 1996, Vienna.
- Strong, A. Brent, "Training in Resin Technology," Annual conference of the Composites

- Fabricators Association, October 18-21, 1995, Anaheim, CA.
- Strong, A. Brent, "Is Engineering or Technology in Your Future? From Artificial Legs to Stealth Fighters," Education Week, Brigham Young University, August 1995.
 - Alliance with Industry, "Everything is Made of Something," Brigham Young University, April 1995.
 - Lunt, Barry M., A. Brent Strong, and R. Scott Merrell, "Electrical Sensing of Properties of Polymeric Materials," *Proceedings of Adhesives in Electronics '96*, the Second International conference on Adhesive Joining and Coating Technology in Electronics Manufacturing, Stockholm, Sweden, June 1996, pp 84-101.
 - Strong, A. Brent, "Advanced Composites with New Technologies in Damped Structures," Intermountain Technology Alliance Inaugural Meeting, March 21, 1994, Hill Air Force Base, Utah.
 - Strong, A. Brent, "Composites Education at Brigham Young University," *Composites and Tooling '94*, Conference and Exhibit, Society of Manufacturing Engineers, January 17-20, 1994.
 - Quality and Process Improvement for Small Manufacturing Firms, "Case Study: Hardie Irrigation," August 15, 1994, BYU.
 - Composites '94, Orlando, FL, sponsored by Composites Fabricators Association (CFA), "Composite Resins," 21 October 1994.
 - University of Jordan, "Trends in Modern Manufacturing," and "Trends in Manufacturing Education," Amman, Jordan, April 25-26, 1994.
 - Dennis D. Olcott, Christopher A. Rotz, and A. Brent Strong, "Improved Vibration Damping in Composite Structures Using A Unique, New Design Concept," *Ninth International Conference on Composite Materials (ICCM-9)*, July 12-15, 1993.
 - Lee, Norman C. and A. Brent Strong, "The 'Three P's' of Recycling: Pragmatics, Processability, and Profits," *Plastics USA Conference*, October 13-15, 1992.
 - Strong, A. Brent, "Fabrication Methodologies for Trash Carts," *Proceedings of the 30th Annual Solid Waste Association of North America (SWANA)*, International Solid Waste Exposition August 3-6, 1992, 515-533.
 - Pitt, William G., John E. Lakenan, David M. Fogg, and A. Brent Strong, "A Novel Plasma Treatment Improves Adhesion of Polyaramid Fibers to Polycarbonate," *13th International SAMPE European Conference and Exhibition*, May 11-13, 1992.
 - Kohkonen, Kent. E., Scott Anderson, and A. Brent Strong. "Machining Graphite Composites With Polycrystalline Diamond End Mills." *International SAMPE Technical Conference (October 1991): 1036-1046*.
 - Ashton, L.J., S.D. Huntsman, M.G. Allman, A.B. Strong, and C.A. Rotz. "Filament Winding of Composite Isogrid Fuselage Structures." *Composites in Manufacturing: Case Studies*, edited by A.B. Strong. Dearborn, MI: Society of Manufacturing Engineers (SME), (1991).
 - Education Week, Brigham Young University, "Is Manufacturing Engineering in Your Future? -- Stealth Aircraft to Artificial Legs", Aug. 1991.
 - Composites Seminar Instructor, Society of Manufacturing Engineers (SME) (1991).
 - Winegar, J.S., W.K. Johnson, J.M. Streeter, and A.B. Strong. "All Composite Compressed Natural Gas Cylinders for Vehicular On-Board Storage," *Composites in Manufacturing: Case Studies*, edited by A.B. Strong. Dearborn, MI: Society of Manufacturing Engineers (SME), (1991).
 - Merrell, R.S. and A.B. Strong. "Electronic Sensing of Prepreg Out-times." *International SAMPE Symposium and Exhibition* (April 1991).
 - Strong, A.B., S.R. Black, and D.D. Olcott. "Electron Beam Crosslinking of Thermoplastic Composites." *36th International SAMPE Symposium and Exhibition* (April 1991): 173-186.

- National Technology Workshop on Polymer Composites, "Injection Molding of Composites", May 17, 1991.
- BYU Research Office, Funding Seminar Speaker, March 7, 1991.
- Aerospace Contract Manufacturers, Anaheim, CA, "Fundamentals of Composite Manufacturing", Apr. 1991.
- Sigma Xi, Brigham Young University, "Composites -- An Olympic Material", Feb. 1991.
- Merrell, R.S. and A.B. Strong. "Electronic Sensing of Prepreg Out-times." SAMPE Utah Chapter (April 3, 1991).
- Crockett, Todd and A. Brent Strong. "Machining of Cured Epoxy/Carbon Fiber Composites Using Electrical Discharge Machining (EDM)." SAMPE Utah Chapter (April, 20, 1990).
- Strong, A. Brent. "Composites in Manufacturing 9", SME conference review, *SAMPE Journal*, 26 no. 3 (1990): 103-104.
- Snyder, David L. and A. Brent Strong. "Postform Bending of Thermoplastic Composite Structural Sections." *35th International SAMPE Symposium and Exhibition* (April 1990): 1928-1940.
- Strong, A. Brent. "Composite Education at Brigham Young University." *35th International SAMPE Symposium and Exhibition*, Supplement (April 1990): 7-20.
- Howarth, Steven G. and A. Brent Strong. "Edge Effects with Waterjet and Laser Beam Cutting of Advanced Composite Materials." *35th International SAMPE Sym. and Exhibition* (April 1990): 1684-1697.
- Huntsman, Steven D. and A. Brent Strong. "Fabrication and Operation of a Small Prepreg Machine for In-Line Tape Winding." *35th International SAMPE Sym. and Exhibition* (April 1990): 835-845.
- Human Affairs International, Austin, TX, "Employee Motivation", Feb. 1990.
- Carlson Enterprises, Deer Valley, UT, "Motivation of Employees", Jun. 1989.
- Utah Roofing, Salt Lake City, UT, "Motivation of Employees", Mar. 1989.
- "Small system shapes long parts." *American Machinist* (review of SAMPE paper on Incremental Forming of Thermoplastic Composites)(October 1989): 76.
- Strong, A.B. and P. Hauwiller. "Incremental forming of large thermoplastic composites." *Advanced Composites* (Sept 1989): 56.
- Strong, A.B. and P. Hauwiller. "Cantilever Loading of Fiber-Reinforced Pultruded Rods." *21st International SAMPE Technical Conference* (1989): 514-525.
- Gunn, David F. and A. Brent Strong. "Procurement of Automated Containers for Municipal Solid Waste Systems." *Waste Age* (September 1989): 142-148.
- Strong, A.B. and P. Hauwiller. "Manufacturing Process for Fiber Reinforced Thermoplastics." *34th International SAMPE Symposium and Exhibition* (May 8-11, 1989): 43-54.
- Snyder, David and A. Brent Strong. "Postforming of Thermoplastic Composite I-Beams." SAMPE Utah Chapter, (April, 1989).
- Annual College Research Meeting, College of Engineering and Technology, Brigham Young University, "Research Review", January 10, 1989.
- College Showcase Lecture, Brigham Young University, "Plastics: Artificial Lungs to Airplane Wings," Apr. 1988.
- Human Affairs International, Salt Lake City, UT, "Employee Motivation," Nov. 1988.
- Strong, A.B. "Micro-Irrigation Manufacturing: Past, Present and Future." Keynote address at the *4th International Micro-Irrigation Conference*, Albury-Wodonga, Australia (October 23-28, 1988).
- International Drip Irrigation Conference, Keynote Speaker, Albury-Wodonga, Australia, Oct. 23-28, 1988.

- Strong, A.B. and R. Turley. "Weathering of Polyethylene Tubing." *Micro-Irrigation Conference*, Albury-Wodonga, Australia (Oct 1988).

Expert Witness

- Fresenius/Baxter, September 2006. This is a patent case involving a plastic medical device.
- Unicep v. Branson Ultrasonics, Inc., September 2006. This case involves failure of an ultrasonically sealed plastic product.
- Callaway Golf Co. v. Acushnet Co., April 2006. This involves patents on golf balls.
- Browning Arms v. Hogue, December 2005. A case concerning a patent for a rifle stock.
- Ultradent Products, Inc. v. Britesmile, Inc., August 2005. This case involves patent litigation over polymers used in dental treatments.
- Viking Yacht and Post Marine v. Cook Composites and Polymers, June 2005. A case involving cracking of boat parts.
- Jordan v. Fins Raw Bar, March 2005. A case involving personal injury possibly resulting from the collapse of a plastic chair.
- VEC v. Acrylon and Burgess, et al., August 2004. A case involving possible patent infringement in a method for molding parts made of composite materials.
- Headwaters, Inc. v. AJG, Inc., April 2004. A case involving payment of royalties for a licensed manufacturing technology involving, in part, plastics resins.
- Sepehri-Nik v. State Farm, May 2004. A case involving analysis of a liquid contaminant material which may have contributed to an automobile accident.
- Dalton v. Ecowater, November 2004. A case involving water damage to a home which might have arisen from a broken plastic filter housing.
- Microtherm, Inc., et al. v. Puget Plastics Corporation, et al., March 2004. A case involving manufacturing and eventual failures in a plastic water heating device.
- Clay-Locust Condominiums Home owners Association v. Reggie Cabal, et al., March 2004. A case involving fire in which a plastic trash cart may have been involved.
- Simmons v. Bombardier, March 2004. A case involving patent infringement of a snowmobile ski design.
- Garner v. City of Houston and Plastic Omnium Zarn, November 2003. A case involving personal injury from an accident with a trash cart.
- Headwaters, Inc. v. Nalco Chemical Company, August 2002. A case involving patent infringement on a material made from coal fines bound with polymers to create a fuel product.
- James Chien-Min Sung v. Minnesota Mining and Manufacturing Company, October 2002. A case involving patent infringement on a process to make abrasive articles.
- Minnesota Mining and Manufacturing Company v. Avery-Dennison, 2001. A case involving patent infringement on a process to make embossed plastic sheets.
- Beall v. Scimed and Merit Medical, 2001. A case involving plastic parts used in a device for medical treatment.
- Madisonville Boat Yard, et al Individually v. Minnesota Mining and Manufacturing Company, 2001. A case involving a composite water proof repair material applied to boats.
- Brody Chemical Co. v. Hydro Engineering, 2001. A case involving possible chemical attack on plastic parts in a pump assembly.
- 3M Company v. Kinik Co., 2001. A patent infringement matter involving composite preforms used to make abrasive grinding materials.
- Turkish Republic v. Mercedes Benz, et al, 2000. A case involving a truck-bus collision and subsequent fire. Flammability of plastics was a key issue.
- Keller v. Accurate Arms, et al., 2000. A case involving the explosion of a plastic container

containing gun powder.

- Rotational Molding, et al. v. Nu-Plast, Inc., et al., 1998. A case involving explosion in a rotational molding manufacturing plant.
- Zarn v. City of Shreveport, 1998. A bid dispute.
- Johnson v. Toter, Inc, 1998. A personal injury case from a trash cart.
- Langley, et al v. Maytag Corporation, 1998. A personal injury case from a fire in which the flammability of plastics components was a major issue.
- FlexFoot v. Springlite, 1998. A patent infringement case on composite prosthetics.
- MegaDyne Medical Products, Inc. v. Aaron Medical Industries, Inc., 1997. A case involving patent infringement of applying a plastic coating to electrosurgical blades.
- EDA, Inc. v. Porter, Inc., 1997. A case involving the manufacture of composite parts for the ground transportation market, especially concerning issues of flammability.
- Zyvax, Inc. v. Alcoa Composites, Inc., 1997. A case involving the composition of a mold release for composite materials.
- Fiberglass Component Products v. Reichhold Chemicals, Inc., 1997. A case involving
 - fabrication and warranty on composite parts looking specifically at the flammability performance of the composites and the resins used to make them.
- Heil v. DuPont of Canada, Inc., 1996. A case involving in-use failure of plastic trash carts and explosions in rotomolding plants.
- Park v. AlliedSignal, Corp., 1996. A case involving manufacture of composite products using preforms.
- MegaDyne Medical Products, Inc. v. Aspen Laboratories, Inc., 1993. A case involving patent infringement of applying a plastic coating to electrosurgical blades.
- Ferguson v. Otto Industries, et al, 1993. A case involving personal injury from use of a plastic trash cart.
- Taylor v. Zarn, Inc., 1994. A case involving personal injury from use of a plastic trash cart.
- Magic Toppers v. Monsanto, 1994. A case involving failure of a plastic thermoformed product being used for truck camper shells.

Graduate Students Advised (Completed)

Student		Thesis/Project Title
Jonathan Shipley	MS 2006	Incorporating Wireless Power Transfer in an LED Lighting Application
Lee Wilkerson	MS 2006	A Solution for Commodity Field Hauling with Self-Unloading Semi-Trailers
Daniel Smoot	MS 2006	The Art and Science of Discontinuous Innovation: A Case Study in Product Reinvention
Mark Spencer	MS 2003	Rotational Molding of Acrylonitrile-Butadiene-Styrene Polymers and Blends (on committee, major director or research)
Chris Brough	MS 2001	Thermal Kinetic Compounding in Recycling of Thermoplastic and Thermoset Materials
David Bedell	MS 2000	New ABS Materials for Rotational Molding

David Sorensen	MS 1999	Manufacturing Process Control Using Graphical Analysis Techniques and Limited Data Sets
Kyle Kinghorn	MS 1999	Development of ABS and ABS-related Materials for Use in Rotational Molding
Ra'ed Al-Zubi	PhD 1998	The Use of Artificial Neural Networks in the Prediction of Machine Operational Machine Settings for Injection Molded Parts
Tom Blair	MS 1998	New Test Methods to Assess the Performance of Prototype Form-Fill-Seal Packages
Trudy Thiele	MS 1998	An Analysis of the Use of Supercritical Carbon Dioxide in Removing Index-Matching Fluid from Quartz Rods Used in Manufacturing Fiber Optics
Scott Merrell	PhD 1997	Development and Application of an Ultra-Low Frequency AC Resistance Measurement Device
Brian Mansure	MS 1997	Development of a Medium Performance Rotational Molding Material
Alan Boardman	MS 1997	Optimization of Specialized Polyurethane Coating Mixture for Adhesion and Environmental Resistance
Darcy Greep	MS 1997	Thin Film Non-stick Coatings by Plasma Polymerization
Anthony Harris	MS 1995	Electron Beam Irradiation Crosslinking of Polypropylene Panels
Rodney Leland Steiner	MS 1993	Construction of a State-of-the-Art Continuous Composite Pultrusion Machine
Daren Cole	MS 1993	Design of a State-of-the-Art Continuous Composite Pultrusion Machine
Scott Merrell	MS 1993	Crosslink Sensing of Prepreg Resins During Pre-Cure Stage
Rodney W. Burgess	MS 1993	Tensile and Impact Strengths of Epoxy Composites Reinforced with Ultra High Molecular Weight Polyethylene Fibers Over a Broad Temperature Range
Michael Johnston	MS 1993	Mechanical Properties of Carbon Fiber Reinforced Composites as a Function of Fiber Length
Douglas G. Lee	MS 1993	An Experimental Evaluation of the Strength of Damped Composite Structures
Larry J. Budge	MS 1992	Prediction of In-Use Failure of Plastic Trash Carts Using Finite Element Analysis
Timothy O. McLaughlin	MS 1992	Elements of an Improved Technical Personnel Performance Appraisal System Using Quality Function Deployment (QFD)
James R. Bick	MS 1992	Determination of an Acceleration Factor for Electronic Equipment Due to Environmental Stress Testing

Douglas Cokely	MS 1992	Improvement of a Manufacturing Company Through Implementation of Continuous Improvement Practices in All Facets of Management
Beverly N. Shorey	MS 1992	Application and Analysis of Manufacturing Interval Reduction in a Telecommunications Equipment Panel Shop
William K. Guest	MS 1992	Using Simulation Techniques and Designed Experiments to Analyze Capacity Requirements of Complex Processes
Donald D. Ratliff	MS 1992	On-line Help System for Circuit Board Assembly CAM Software System
Scott R. Beer	MS 1992	Restructuring of a Flexible Manufacturing System to Accommodate Expansion and Improvement
Kenneth W. Wolenski	MS 1992	Integrating an Electronic Manufacturing Facility Using Focused Factory Concepts
Robert E. McAnnany	MS 1992	An Improved Splice Using Conductive Adhesives for Reel-to-Reel Plating of Flexible Circuits
Kenneth M. Yasinski	MS 1992	Design of Plastic Snap-Latches with Bending Efficient Cantilevers by Numerical Integration
Don H. Larsen	MS 1992	Identifying Process Variables in Wet Filament Winding Using Designed Experimentation
Mark H. Gessel	MS 1991	Fracture Damage Patterns in Thick BMI/Carbon Laminates and Sandwich Structures
Kevin A. Greer	MS 1991	Structural Repair of Thermoplastic Composite Repair Materials
Roger S. Turley	MS 1991	Using Carbon Black to Protect Linear Low Density Polyethylene from Ultraviolet Light Degradation
David M. Fogg	MS 1991	Improved Filament-Matrix Adhesion in Glass-Polycarbonate Composites
Steven R. Black	MS 1990	Electron Beam Crosslinking of Thermoplastic Composites
David E. Saunders	MS 1990	Determination of Physical Properties in Injection Molded Composites Using the Designed Experiment Method
David L. Snyder	MS 1990	Press Postforming of Thermoplastic Composite Structural Sections
Paul B. Hauwiller	MS 1989	Incremental Forming of Large Fiber-Reinforced Thermoplastic Parts
Michael C. Graff	MS 1989	Macromechanical Properties Characterization of an Advanced Polymeric Composite Made by Filament Winding
Lori R. Nelson	MS 1991	Determination of Product Costs in Highly Optioned, Diverse, Electronic Manufacturing
Benjamin Kant	MS 1991	Panelization and Depanelization of Printed Wiring Boards

Roger P. Begin	MS 1991	A Software Program for Designing Circuit Pack Shelves
Thomas J. Allocco	MS 1991	Development of Software to Convert Text Based Manufacturing Data into Computer Graphics
David A. Ierardi	MS 1991	Development of a Failure Mode Analysis System for Production Equipment
Michael P. Bonadies	MS 1991	Activity-Based Costing to Achieve Improve Factory Floor Space Utilization and Productivity
Maria S. Green	MS 1991	Using Computer Integrated Manufacturing to Improve Factory Floor Space Utilization and Productivity
Jeffrey A. Mitchell	MS 1991	Improving Quality Inspection Methods by Grouping Process Related Dimensions
Paul J. Daigle	MS 1991	The Development of a Hybrid Integrated Circuit Lot Integrity and Traceability System
Robert L. Sargent	MS 1991	Computer Simulation of Surface Mount Component Assembly Machines
Jerry L. Glenn	MS 1991	Robust Manufacture of Copper Wire and Cable
Serge G. Minassian	MS 1991	Development of a Software Package for Assisting On-Premise Fiber Optic Backbone Network Design
Gary F. Dieker	MS 1990	Defining Process Variability of Cord Let-off Equipment in Rubber Products Manufacturing
Arthur J. O'Dea	MS 1990	Improvement of the Vapor Phase Solder Reflow Process Using Statistical Process Control
John R. Horwedel	MS 1990	Configuration Analysis of a Complex Production Environment
John G. Spadafora	MS 1990	Improved Robot Accuracy by Using a Joint Mapping Technique
Stephan C. Russell	MS 1990	Development of an Improved Numerical Control Language for Drilling Printed Wiring Boards
Kenneth C. Pulliam	MS 1989	Improvement in a Pin-Straightening Process Through Automated Statistical Quality Control
Dale K. Price	MS 1989	Clean Room Performance Characteristics

Programs and Courses Attended for Teaching or Professional Improvement

- Numeracy Across the Curriculum Conference, BYU, 1996.
- Polyurethane Coatings, Atlanta, GA, Technomics, 1996.
- Incorporating Science in the History of Civilisation Courses, BYU
- Writing Across the Curriculum Conference, BYU

- How to give better essay exams, BYU
- College of Engineering and Technology Integrated Learning System (ILS) teacher improvement program, 1989-1990.
- Developed short course on Composites Manufacturing for the Society of Manufacturing Engineers (SME). Presented short course in 1990, 1991, 1992, 1993.
- Developed curriculum for a course in Composite Technician Training for Utah Valley Community College (UVCC), 1989.
- Developed equipment requirements for course in Composite Technicians for Salt Lake Community College (SLCC), 1990.

External Research Fund and other contributions

Agency	Amount (\$)	Subject	Year
ATK Space Systems	90,353.43	Carbon fiber prepreg	2005
Nyal McMullin	100,000	Creativity center (pledged)	2003
Nyal McMullin	10,000	Creativity lab	2003
Nelson Abell III	20,000	DCPD development	2000
Poly Processing	11,869	Develop predictive tests for field performance of rotomolded tanks	1999
Assn of Rotomolding	17,500	Develop ABS rotomolding	1999
Becton Dickinson	16,700	Investigation of packaging materials	1998
Enviroglass	20,000	Investigation of a new filler material for plastics	1997
Association of Rotational Molding	15,320	Investigation of the feasibility of rotomolding ABS	1997
Automated Teller Sys.	10,000	Design and construction of composite parts	1997
HyPerComp	10,000	Joint development of testing system for composite pressure vessels	1996
Association of Rotational Molding	10,800	Continuation of previous project on development of new resins for rotational molding	1996
Automated Teller Accessories	10,000	Development of fiberglass shrouds for ATM machines	1996
AquaGlass	10,000	Improvement in fiberglass manufacturing methods	1996
Tiffany Marble	10,000	Method for manufacturing new cultured marble/plastic product	1996
M&M Plants	10,000	Development of device for joining plastics	1995
Association of Rotational Molding	15,320	Development of new materials for rotational molding	1995

State of Utah	125,000	ACME Center of Excellence	1995
O.C. Tanner Co.	5,000	Manufacturing assistance	1994
State of Utah	150,000	ACME Center of Excellence	1994
Merit Medical	10,000	Manufacturing assistance	1994
HK Composites	10,000	Product development	1993
Red Hawk, Inc.	10,000	Product development	1993
Megadyne	10,000	Product development	1993
Utah Rocketry	10,000	Prototype development	1993
General Dynamics	48,828	Donation of composite pultrusion materials	1993
Northern Outfitters	31,687	Donation of camera and heat equipment	1993
American Polymer	10,000	Product testing	1993
Composite Machines Co.	13,657	Donation on software	1993
PPG Industries	2,566	Donated materials	1993
Curecrete, Inc.	10,000	Product testing	1993
Temple Grounds, Inc.	10,000	Product design and prototyping	1993
Ridgway and Foutz	10,000	Plastic product prototyping and packaging	1993
Zarn, Inc.	30,000	Product design and testing	1993
Mountain Land Support	10,000	Composite product testing	1993
Baal Medical Devices	10,000	Medical device testing and development	1993
State of Utah	150,000	State Center of Excellence (ACME)	1993
Aldila	100,000	Composite golf club shaft research	1992
State of Utah	150,000	State Center of Excellence (ACME)	1992
Synergy	10,000	Plastics product development	1992
Fisher Co.	10,000	Composite part research/testing	1992
Akzo Fortafil Fibers	540	Carbon fibers	1991
Cascade Engineering	2,880	Test equipment	1991
Schaefer	8,435	Test equipment	1991
Rocky Mountain Engineering	10,000	Product development	1991
Automated Refuse Equipment, Inc. and Otto, Inc.	9,405	Test equipment	1991
Strong and Assoc.	3,500	Test equipment	1991

TRA	10,000	Product development	1991
McDonnell Douglas	975,216	Composite materials	1991
UP International	10,000	Composite testing	1991
State of Utah	165,000	Center of Excellence (3 contracts)	1991,1 990
Tooele Army Depot	14,850	Composite vehicle repair (3 contracts)	1991,1 990
Advanced Laminate Technology	10,000	Composite part development	1991
Evolution Skis	10,000	New sports product testing and development	1991
Delta Fiberglass	2,500	Composite structure testing	1991
AeroTrans	27,000	Testing fixtures and materials	1991
Fibertek	8,987	Composite materials	1991
Terra Tek	10,000	Prototype plastic tester development	1990
Polymer Dist. Corp.	10,000	Plastic products development	1990
Zarn, Inc.	10,000	Trash container development	1990
Westscot	38,500	Artificial limb development (2 contracts)	1990,1 989
Van Patten Family	6,000	Safety balloon	1990
AeroTrans (Winding Tech)	28,000	Testing and development for aircraft composite parts (3 contracts)	1991- 1988
U of U Center for Advanced Materials	42,500	Autoclave, filament winding machine, tensile tester (3 contracts)	1990- 1988
Vectra Industries	10,000	Plastic part testing	1990
Minnesota Chippewa Tribe	8,000	Eng. studies for composite truck body	1990
Haelan Medical	3,000	Testing for composite medical device	1990
Fiber Dynamics	2,000	Composite pressure tanks development	1990
Hardie Irrigation	2,000	Use of facilities	1990
Smith Megadiamond	3,000	Cutting of composites	1989
Optical Recording Corp.	5,720	Compact disc development	1987
Vinyl consortium	200	Weatherability study	1988
Grumman Aircraft	6,850	Composite I-beam study	1987
Shell Chemical	33,668	Environmental resistance of resins	1987
Northrup	200	Electrical stimulation of composites	1987

MIDSIX	20,000	Purchase of plasma reactor	1987
Plasma Science	40,000	Purchase of plasma reactor	1987

Research Grants from BYU

Purpose	Amount (\$)	Year
General Education Development	3,000	2004
Development of Civilization media presentation	10,000	2002
New patent development (from Technology Transfer)	10,000	2002
Development of media presentation for Civilization	16,000	1998
Development of Civilization class	5,000	1996
Pultrusion Machine	13,000	1992
Resin Transfer Molding	8,000	1991
Filament Winding Machine	30,000	1990
Composite cure sensor	5,000	1990
Crosslinking of Composites Using Electron Beam Irradiation	4,000	1989
Incremental Composite Forming	11,500	1988
Tensile Test Machine	47,010	1988