

STEVEN BRYAN SHOOTER, Ph.D., P.E.

Home

37 James Road
Lewisburg, Pennsylvania 17837
(570) 523-6919

Office

Department of Mechanical Engineering
Bucknell University
Lewisburg, Pennsylvania 17837
(570) 577-1913
email: shooter@bucknell.edu
web page: www.facstaff.bucknell.edu/shooter/

SUMMARY

Dr. Shooter is a Professor of Mechanical Engineering at Bucknell University where he has taught since 1995. At Bucknell he teaches the capstone senior design course, mechanical design, and mechatronics. His research interests involve information management for design and the design of mechatronic systems and products. Integral to this research is the exploration of approaches for the capture, storage and retrieval of product development information. He also explores techniques for enhancing innovation and leveraging assets in developing new products and systems. He is a registered Professional Engineer in the state of Pennsylvania and has been the PI on numerous projects with industry involving new product development and the design of production infrastructure. During the summer of 1997 and the year of 1998/99 he was a research faculty fellow at the National Institute of Standards and Technology (NIST) in the Design Engineering Technologies Group where he developed knowledge-based protocols for a multi-university-based project called the Open Assembly Design Environment. Prior to graduate study he was a Process Engineer for Sony Corporation where he contributed to the start-up of their first compact disc manufacturing plant. He has consulted extensively with the Pennsylvania Small Business Development Center (SBDC) to assist entrepreneurs with new product development enterprises. He developed and implemented an award-winning product development process adopted by all 17 of the state SBDCs. During the academic year 2002/03 he was a Visiting Professor at the Swiss Federal Institute of Technology in Lausanne (EPFL). He has been a PI on a multi-university NSF ITR project to explore information management approaches for product platforms and mass customization and is currently PI on a multi-university NSF Cyberinfrastructure Teams project to develop techniques for product dissection.

EDUCATION

Ph.D., Mechanical Engineering, August, 1995

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg Virginia
Dissertation: Information Modeling in Mechanical Design: With Application to Cam Mechanism Design, Advisor: Charles F. Reinholtz, Professor

M.S., Mechanical Engineering, December, 1990

Virginia Tech, Blacksburg, Virginia
Thesis: Conceptual Design of Manipulators for Limited Access Workspaces
Advisor: Charles F. Reinholtz, Professor

B.S., Mechanical Engineering, May, 1988

Virginia Tech, Blacksburg, Virginia
Graduated Cum Laude

REGISTERED PROFESSIONAL ENGINEER, State of Pennsylvania

HONORS AND AWARDS

- Co-author of paper selected as one of the most influential papers in computers and information in engineering 1980-2000 by CIE division of ASME.
- Best Paper Award for Design Theory and Methodology at 2000 ASME Design Technical Conferences.
- Proctor and Gamble Award of Merit and the George Wood Award for Best Applied Work for paper at the 1991 ASME Design Technical Conferences.
- Nominated for the Engineering Education Excellence Award by the National Society of Professional Engineers, 2000.
- Star Performer Award for Innovation, Presented by the Pennsylvania Small Business Development Center in Recognition for the Development and Implementation of the Stage-Gate Product Development Process that was adopted by all of the centers. 1999.
- Star Performer Award for Innovation, Presented by the Pennsylvania Small Business Development Center in Recognition of efforts on the Dimension Snowboard Development Project, 2000.

ACADEMIC EXPERIENCE

Professor, April 2007 to Present

Associate Professor, April 2001 to April 2007

Assistant Professor, August 1995 to April, 2001

Bucknell University, Lewisburg, Pennsylvania

Courses Taught

- Senior Design I and Senior Design II
- Exploring Engineering (First year Introduction to Engineering course)
- Mechatronics (Interdisciplinary with Electrical Engineering)
- Mechanical Engineering Design I (Machine Design)
- Product Design and Development
- Mechanics I (Statics)
- Automotive Systems
- Advise the Mini-baja team that designs and builds an off-road vehicle for national competition sponsored by the Society of Automotive Engineers

Masters Theses Advised

- Design and Development of an Animatronic Eye - John Sanders, 1997.
- Design and Development of Packaging Technology for Soap Production - Jason Sundberg, 1999.
- Manufacturing Process Design and Analysis: Application of Automated Gluing Technologies to the Production of Structural Wood Floor Bridging Units - Joseph Hahn, 2000.
- Exploration into CAD Combined PLC Simulation - Xiaoying Zhong, 2000.
- Development of a Decision Support System for Aircraft Cable Design - Ken Kapashinski, 2000.
- Development of a Knowledge-based Design for Assembly Assistant - Mike O'Donnell, 2001.
- Development of A System for Managing Product Development for Small Businesses - Matt Laszewski, 2002.
- Informal Visual Information in Conceptual Product Design - Tim Hoffman, 2002.
- Design and Development of an Expressive Animatronic Face - Chris Nowakowski, 2002.

- Development of Specifications to Enhance User Adoption for an Information System for Product Family Planning and Mass Customization, Bethany Byron, 2006.
- The Development and Implementation of an Assessment Instrument and Frameworks for System Design and Exercise Creation for Engineering Design and Education, Kathleen Hart, 2008.

Ph.D. Dissertation Committees

- New Concepts of Locomotion for All-terrain Robotic Vehicles – Michel Lauria, 2003, Swiss Federal Institute of Technology in Lausanne (EPFL), in French.
- Autonomous Micro-robots: Applications and Theory – Gilles Caprari, 2003, Swiss Federal Institute of Technology in Lausanne (EPFL).
- A Framework for Product Platform Knowledge Management Using the Semantic Web Paradigm – Jyotirmaya Nanda, 2006, Penn State University.
- Development of Methodologies for Conceptual Design of Product Platforms, Tucker Marion, 2007, Penn State University.
- A Data Clustering Approach to Support Modular Product Family Design, Asli Sahin, 2007, Virginia Tech.

Select List of Supervised Independent Studies or Student Projects

- SAE Minibaja All-terrain Vehicle, 1995, 1996, 1997, 1998, 2000, 2001, 2002
- Design and Development of a Chocolate Tempering Machine, 1996 (externally funded).
- Design and Development of an Innovative Soldering Device, 1996 (externally funded).
- Design of the Mechatronics for an Animatronic Bison, 1996.
- Design and Development of an Innovative Exercise Machine, 1997 (externally funded).
- Innovations in Mechatronics, 1997, 1998.
- Design and Development of the PikRite Chile Pepper Harvester, 1997/98 (externally funded).
- Design and Manufacturing Snowboard Research and Development, 1999/2000 (externally funded)
- Characterization of Performance of the Powershift Transmission, 2000/01 (externally funded).
- Examination of Risk Assessment in Product Development, 2001
- Development of Automation for Producing Lollipops, 2003/04 (externally funded).
- Exploration of Fluidic Muscles for Animatronic Applications, 2003/04 (externally funded).
- Exploration of Innovative Delivery Systems for Concrete Mixer Trucks, 2004/05 (externally funded).
- Development of an Animatronic Face for Diagnosis and Treatment of Children with Autism, 2004/05, 06/07.
- Exploration of Application of the Web Ontology Language for Product Platforms, 2005/06, 06/07 (externally funded).
- Development of educational demonstration of themepark technologies for Universal Studios Orlando, 2005/06 (externally funded).
- Development of Image Stabilizing Carrier for Immersimap, Inc., 2007/08 (externally funded).

Leadership and Service Positions

- Chair, College of Engineering Graduate Program Committee
- Director, Department of Mechanical Engineering Graduate Program
- Coordinator, Senior Design Curriculum
- Member, College of Engineering Strategic Planning Committee
- Member, Faculty Development Committee

- Advisor, Student Chapter of Society of Automotive Engineers
- Member, Engineering College Strategic Planning Committee
- Member, University Committee on Academic Freedom and Tenure
- Member, International Education Committee
- Member, Engineering College Computing Committee
- Member, Promotion Committee for department faculty
- Member, University Faculty Development Committee
- Review Coordinator –ASME Design Automation Conference

Accomplishments

- Nominated by department chair for a national Engineering Education Excellence Award by the National Society of Professional Engineers
- Developed four new courses for the engineering curriculum
- Developed the Senior Design curriculum
- One of 9 faculty on the NSF-supported Project Catalyst to introduce cooperative learning across the curriculum.

Visiting Research Scientist, August 2008 to present

Florida Institute for Human and Machine Cognition, Pensacola, Florida

- Develop platforming strategies for the design of robots for urban environments.

Visiting Professor, appointed for August 2002 to July 2003

Swiss Federal Institute of Technology in Lausanne (EPFL), Lausanne, Switzerland

- Conducted research in the Autonomous Systems Laboratory on mechatronics and mobile robotics. I delivered multiple seminars on aspects of design and product development. I also sat on two Ph.D. committees.

Instructor (full-time faculty position), August 1992 to July 1995

Virginia Tech, Blacksburg, Virginia

- Taught junior-level course on Kinematics and Dynamics of Machinery. Taught two sections each semester with an average of 100 students.
- Recognized by the College of Engineering for teaching evaluations in the top 10%.

Graduate Project Assistant, January 1990 to August 1992

Virginia Tech, Blacksburg, Virginia

- Led a project sponsored by Framatome (formerly B&W Nuclear Services) to develop a robot for steam generator maintenance in nuclear power plants named COBRA.
- Twenty-seven models of the COBRA robot have been placed into operation since 1991. The URSULA robot has been in operation since 1995.

INDUSTRIAL/NON-ACADEMIC EXPERIENCE

Faculty Research Fellow Summer of 1997 and August 1998 to August 1999

National Institute of Standards and Technology (NIST), Gaithersburg, Maryland

- Developed knowledge based protocols for design-for-assembly applications as part of a multi-agency, multi-university project called the Open Assembly Design Environment

Process Engineer July, 1988 to July, 1989

Sony Music Corporation, Pitman, New Jersey

- Contributed to the start-up of their first compact disk plant.
- Responsible for troubleshooting and improving equipment involved in the manufacture of compact disks.
- Installed, adapted and maintained the automation equipment for handling compact disks in this fully automated plant.

SELECT CONSULTING EXPERIENCE And PROJECTS WITH INDUSTRY

Bucknell Small Business Development Center, Lewisburg, Pennsylvania

- Developed and implemented a product development process for the SBDC to manage the progress of projects with their clients.

Efforts resulted in recognition by the state with an agency Star Performer Award to the SBDC.

- Involved in numerous product development projects for entrepreneurs and small businesses.

US Army ARDEC at Picatinny Arsenal, New Jersey

- Examination of product platforming approaches for improved armor systems.
- Support of Network Centric Manufacturing approach for configurable supply chains.

Industrial Modernization Center, Montoursville, Pennsylvania

- Facilitator for roundtable discussions with local technology firms to explore collaborative efforts to improve competitiveness.

Gladstone Candies, Hummelstown, Pennsylvania

- Development of automation technologies for lollipop production.

Immersimap, Erie, Pennsylvania

- Development of technologies to support immersive mapping of buildings.

Powershift, Inc., Montgomery, Pennsylvania

- Developed an automated testing system for an innovative bicycle transmission.

Dimension Snowboards, Inc., York, Pennsylvania

- Developed automated equipment and processes for technically characterizing the performance of snowboards.

Bassett Manufacturing, Sunbury, Pennsylvania

- Developed technologies and processes for manufacturing floor-bridging units for pre-fabricated construction elements.

PikRite, Inc., Lewisburg, Pennsylvania

- Development of technologies for harvesting chili peppers.

KOCO, Inc., Harrisburg, Pennsylvania

- Development of a tempering system for producing chocolate.

PUBLICATIONS

Recognized and Award-Winning Papers

Szykman, S., S.J. Fenves, W. Keirouz, and S.B. Shooter, "A Foundation for Interoperability in Next-generation Product Development Systems," *The Most Influential CIE Papers: 1980-2000*, ASME, New York, 2005.

Shooter, S.B., W. Keirouz, S. Szykman, and S. Fenves, "A Model for Information Flow in Design," *Proceedings of the ASME Design Engineering Technical Conferences*, September, 2000.

* Won the Best Paper Award for Design Theory and Methodology

Sutton, E.B., "Better Snowboards by Design," *Proceedings of the ASME Annual International Conference and Exposition*, Orlando, FL, November, 2000.

* This paper won the national ASME Student Design Paper Competition for a project I advised.

Tidwell, P.H., S.W. Glass, J.J. Hildebrand, C.F. Reinholtz, and S.B. Shooter, "Cobra - Design and Development of a Manipulator for Nuclear Steam Generator Maintenance", *Proceedings of Second National Applied Mechanisms and Robotics Conference*, Vol1, November, 1991 pp IVB1-1 to IVB1-10. * Won the Proctor and Gamble Award of Merit and the George Wood Award for Best Applied Work.

Journal Papers

Alizon, F., C. Williams, S.B. Shooter and T.W. Simpson, "Merge-based Design: A New Method for Managing Variety and Improving Customization", *International Journal of Mass Customization*, in press (accepted August, 2008).

Alizon, F., Shooter, S. B., and Simpson, T. W., Assessing and Improving Commonality and Diversity, *Research in Engineering Design*, in press.

Alizon, F., S.B. Shooter and T.W. Simpson, "Recommending a Platform Leveraging Strategy Based on the Homogeneous or Heterogeneous Nature of a Product Line", *Journal of Engineering Design*, in press (accepted April 2008).

Ye, Xiaoli; Thevenot, Henri; Alizon, Fabrice; Gershenson, J K; Khadke, Kiran; Simpson, Timothy W; Shooter, S. B., "Using Product Family Evaluation Graphs in Product Family Design" *International Journal of Production Research*, in press (accepted April, 2008).

Alizon F, Shooter SB, and Simpson TW, "Improving an Existing Product Family based on Commonality/Diversity, Modularity, and Cost," *Design Studies*, Vol. 28, No. 4, July, 2007, pp. 387-409.

Nanda, J., H. Thevenot, T. Simpson, R. Stone, M. Bohm and S. Shooter, "Product Family Design Knowledge Representation, Aggregation, Reuse and Analysis," *Journal of Artificial Intelligence in Design and Manufacturing*, Vol. 21:2, 2007, pp. 173-192.

H. Thevenot, T. Simpson, F. Alizon, and S. Shooter, "An Index-based Method to Manage the Tradeoff Between Diversity and Commonality During Product Family Design," *Journal of Concurrent Engineering: Research & Applications – Special Issue on Managing Modularity and Commonality in Product and Process Development*, Vol 15, No. 2, 2007, pp. 127-139.

Alizon, F., K. Khadke, H. Thevenot, J. Gershenson, T. Marion, S. Shooter, and T. Simpson, "Frameworks for Product Family Design and Development," *Journal of Concurrent Engineering: Research & Applications – Special Issue on Managing Modularity and Commonality in Product and Process Development*, Vol 15, No. 2, 2007, pp. 187-199.

Shooter, S.B. , C.M. Evans and T.W. Simpson, "Building a Better Icescraper – A Case in Product Platforms for the Entrepreneur," *Journal of Intelligent Manufacturing, Special Issue on Product Family Design and Development*, No. 18, 2007 pp. 159-170.

Alizon, F., S. Shooter and T. Simpson, "Reuse of Manufacturing Knowledge to Facilitate Platform-based Product Realization," *Journal of Computing and Information Science in Engineering*, Vol. 6, No. 2, June 2006 pp. 170-178.

Nanda, J., T. Simpson, S. Kumara and S. Shooter, "A Methodology for Product Family Ontology Development Using Formal Concept Analysis and Web Ontology Language," *Journal of Computing and Information Science in Engineering*, Vol. 6, No. 2, June 2006, pp. 103-113.

Shooter, S.B., T.W. Simpson, S.R.T. Kumara, R. Stone, J. Terpenney, "Toward a Multi-Agent Information Management Infrastructure for Product Family Planning and Mass Customisation," *International Journal of Mass Customisation*, Vol. 1, No. 1, 2005, pp. 134-155.

Shooter, S.B. and M. McNeill, "Interdisciplinary Collaborative Learning in Mechatronics at Bucknell University," *Journal of Engineering Education*, Vol 91, No. 3, 2002, pp. 339-344.

Buffinton, K.W., Shooter, S.B., Thorpe, I.J., and Krywicki, J.J., 2001, "Laboratory, Computational, and Field Study of Snowboard Dynamics," *Sports Engineering*, Volume 6, No. 3, 2003 pp. 129-137.

Politis, J.L. and S.B. Shooter, "Enhancing Engineering Education: The Bucknell Product Development Center," *Industry & Higher Education*, Vol. 15, No. 5, October, 2001, pp. 341-347.

Szykman, S., S. Fenves, W. Keirouz, and S. Shooter, "A Foundation for Interoperability in Next-Generation Product Development Systems," *Journal of Computer Aided Design*, Vol. 33, 2001, pp. 545-559.

Shooter, S.B., W. Keirouz, S. Szykman, and S. Fenves, "A Model for the Flow of Design Information in Product Development," *Journal of Engineering with Computers*, Vol. 16, 2000, pp. 178-194.

Shooter, S.B., C.F. Reinholtz, R.L. West, "A Unified Approach to Teaching Analytical Cam Design Using Conjugate Geometry", *International Journal of Mechanical Engineering Education*, Vol 23, Number 2, April 1995, pp 145-156.

Tidwell, P.H., S.W. Glass, J.J. Hildebrand, C.F. Reinholtz, and S.B. Shooter, "Cobra - Design and Development of a Manipulator for Nuclear Steam Generator Maintenance", *Journal of Applied Mechanisms and Robotics*, Vol 1, No. 2, March 1994, pp 7-14.

Book Chapters

Shooter, S.B., "Product Platform Development at Innovation Factory," textbook chapter in *Product Platform and Product Family Design: Methods and Applications*, Simpson, T.W., Z. Siddique, and J. Jiao editors, Kluwer Academic/Plenum Publishers, 2006.

Lauria, M., Shooter, S., Siegwart, R. , "Topological Analysis of Robotic N-Wheeled Ground Vehicles", *Springer Tracts in Advanced Robotics*, Vol. 24, 2006.

Peer-Reviewed Conference Proceedings

Shooter, S.B., S. Cohen, C. Williams, 2008, "Assessing Commonality and Differentiation for Packaging Family Planning with Application to Medication Labels," *Proceedings of ASME Design Engineering Technical Conferences - Design Theory and Methodology Conference*, New York, August 3-6, 2008, ASME Paper No. DETC2008/DTM-49815.

Alizon, F.J., S.B. Shooter and T.W. Simpson, 2008, "Henry Ford and the Model T: Lessons for Product Platforming and Mass Customization," to appear in *Proceedings of ASME Design Engineering Technical Conferences - Design For Manufacturing and Lifecycle Conference*, New York, August 3-6, 2008, ASME Paper No. DETC2008/DFMLC-49420.

Alizon, F.J., Jing Fu, T. W. Simpson S. B. Joshi and S.B. Shooter, 2008, "Assessing Functional and Shape Differentiation Within a Family of Products," *Proceedings of ASME Design Engineering Technical Conferences - Design Automation Conference*, New York, August 3-6, 2008, ASME Paper No. DETC2008/DAC-49428.

Alizon, F.J., T.J. Marion, S.B. Shooter and T.W. Simpson, 2008, "Product Family Design: Strategic Principles to Choose Between Product-Driven and Platform Driven Processes," to appear in *Proceedings of ASME Design Engineering Technical Conferences - Design Automation Conference*, New York, August 3-6, 2008, ASME Paper No. DETC2008/DAC-49429.

Shooter, S.B., 2008, "Reverse Engineering to Design Forward: An Introduction to Engineering Experiential Learning Module with Video Podcasts," to appear in *Proceedings of the ASEE*

International Conference on Engineering Education, Pittsburgh, PA, June 21-24, ASEE Paper No. AC2008-1170.

West, T., A. Feurstein and S. Shooter, 2008, "Using Cyber-Infrastructure Enhanced Product Dissection to Introduce Engineering to Middle School Students," to appear in *Proceedings of the ASEE International Conference on Engineering Education*, Pittsburgh, PA, June 21-24, ASEE Paper No. AC2008-590.

Alizon, F., J. Nanda, S.B. Shooter and T.W. Simpson, 2007, "Ontology-Based Models for Design Retrieval and Analysis," *Proceedings of the International Conference on Engineering Design*, ICED'07, Paris, France, August 28-31, Paper No. 397.

Alizon, F., T.J. Marion, S.B. Shooter and T.W. Simpson, 2007, "Tools for the Platform Designer's Toolbox," *Proceedings of the International Conference on Engineering Design*, ICED'07, Paris, France, August 28-31, Paper No. 398.

Ye, Xiali, H. Thevenot, G. Alizon, J. Gershenson, and S. Shooter, 2007, "A Quantitative Representation of the Tradeoff between Commonality and Variety in Product Family Design," *Proceedings of the International Conference on Engineering Design*, ICED'07, Paris, France, August 28-31, Paper No. 409.

Hart, K.M., S.B. Shooter and T.W. Simpson, 2007, "Application of a Product Platform Knowledge Management Methodology Using the Semantic Web Paradigm to a Playground System," *Proceedings of ASME Design Engineering Technical Conferences – Computers and Information in Engineering Conference*, Las Vegas, NV, September 4-7, ASME Paper No. DETC2007/CIE-34598.

Alizon, F., Moon, S. K., Shooter, S. B. and Simpson, T. W., 2007, "Three Dimensional Design Structure Matrix with Cross-Module and Cross-Interface Analysis," *Proceedings of ASME Design Engineering Technical Conferences - Design Automation Conference*, Liou, F., ed., Las Vegas, NV, September 4-7, ASME, Paper No. DETC2007/DAC-34510.

Alizon, F., Shooter, S. B. and Simpson, T. W., 2007, "Recommending a Platform Leveraging Strategy Based on the Homogeneous or Heterogenous Nature of a Product Line," *Proceedings of ASME Design Engineering Technical Conferences - Design Automation Conference*, Liou, F., ed., Las Vegas, NV, September 4-7, ASME, Paper No. DETC2007/DAC-34507.

Alizon, F., Williams, C., Shooter, S. B. and Simpson, T. W., 2007, "Merge-Based Design: A New Method for Managing Variety and Improving Customization," *Proceedings of ASME Design Engineering Technical Conferences - Design Automation Conference*, Liou, F., ed., Las Vegas, NV, September 4-7, ASME, Paper No. DETC2007/DAC-34541.

Alizon F., Shooter S.B., Simpson T.W., 2006, "Provide Relevant Knowledge to Specify the Product Design Project Needs," *Proceedings of IEEE International Conference on Information Reuse and Integration*, September.

Alizon F., Nanda, J. Shooter S.B., Simpson T.W., 2006, "Increasing Design Search Relevancy using Statistical Methods in Conjunction with Ontologies," *Proceedings of IEEE International Conference on Information Reuse and Integration*, September.

Alizon, F., S. Shooter and T. Simpson, "Assessing and Increasing Product and Family Differentiation in the Market," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-99538.

Alizon, F., S. Shooter and T. Simpson, "Improving an Existing Product Family Based on Commonality/Diversity, Modularity and Cost," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-99536.

Alizon, F., S. Shooter and T. Simpson, "Assessing and Improving Commonality and Diversity within a Product Family," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-99499.

Alizon, F., S. Shooter and H. Thevenot, "Design Structure Matrix-Flow for Improving Identification and Specification of Modules," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-99524.

Byron, B. and S. Shooter, "Case Study: User Adoption of a Product Configuration Management System at a Modular Playground Equipment Producer," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-9925.

Simpson, T., T. Marion, O. de Weck, K. Holtta-Otto, M. Kokkolaras, S. Shooter, "Platform-based Design and Development: Current Trends and Needs in Industry," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-99229.

Sahin, A., J. Terpenney, S. Shooter, R. Stone and T. Simpson, "Evaluating Relative Instructional Effectiveness and Efficiencies of Design Activities for Product Platform Planning," *Proceedings of the ASME Design Engineering Technical Conferences*, Philadelphia, Pennsylvania, September 2006, DETC2006-99517.

Sahin, A., Terpenney, J. P., Shooter, S. B., Stone, R. B. and Simpson, T. W., 2006, "A Conceptual Method to Evaluate Relative Instructional Efficiencies of Case Studies in Product Platform Planning," *IIE Annual Conference & Exposition*, Orlando, FL, IIE.

Lukman, H., S. Shooter, F. Alizon, J. Terpenney, T. Simpson, R. Stone and S. Kumara, "Experiences with an Inter-University Collaborative Undergraduate Research/Learning Experience for Product Platform Planning," *Proceedings of the ASEE International Conference on Engineering Education*, Chicago, Illinois, June, 2006.

A. Sahin, J. Terpenney, S. Shooter, R. Stone, and T. Simpson, "A Method to Evaluate Relative Instructional Efficiencies of Design Activities for Product Platform Planning," *Proceedings of the ASEE International Conference on Engineering Education*, Chicago, Illinois, June, 2006.

Fledderjohn, M., S. Shooter and R. Stone, "Augmenting a Design Repository to Facilitate Product Family Planning," *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, November, 2005, IMECE2005-81846.

Byron, B. and S. Shooter, "An Introduction to Innovation Adoption Theories for Design of a Product Family Information Management Infrastructure," *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, November, 2005, IMECE2005-79933.

Alizon, F., S. Shooter and T. Simpson, (2005) "Introduction to the REUSE Method: Retrieving Knowledge from Existing Module Designs," *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, IMECE2005-80929.

Nanda, J., T. Simpson, S. Shooter and R. Stone, "A Unified Information Model for Product Family Design Management," *Proceedings of the ASME Design Engineering Technical Conferences*, Long Beach, California, September 2005, DETC2005/DAC-84869.

Byron, B. and S. Shooter, "A Review of Software Solutions for the Management of New Product Development and Product Family Planning," *Proceedings of the ASME Design Engineering Technical Conferences*, Long Beach, California, September 2005, DETC2005/DAC-84454.

Srinivasan, A., Terpenney, J., Shooter, S., Stone, R., Simpson, T., and Kumara, S. (2005) "Online Case Studies and a Process Description for Product Platform Planning," *Proceedings of ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, DETC2005-85338.

Van Wie, M., R. Stone, A. Sahin, J. Terpenney, F. Alizon, S. Shooter, and T. Simpson, "A Qualitative Modeling Method for Platform Design", *IEEE International Conference on Information Reuse and Integration*, August 2005, IEEE IRI-2005-123.

Simpson, T.W., Stone, R.B., Shooter, S.B., Terpenney, J.B., Kumara, S.R.T., "An Inter-University Collaborative Undergraduate Research/Learning Experience for Product Platform Planning," *Proceedings of 2005 ASEE International Conference*.

Srinivasan, A., Terpenney, J.B., Shooter, S.B., Stone, R.B. and Simpson, T.W., "An Online Learning Tool for Product Platform Planning," *Proceedings of 2005 ASEE International Conference*.

Shooter, S.B., T.W. Simpson, S.R.T. Kumara, R. Stone, J. Terpenney, "Toward an Information Technology Infrastructure for Product Family Planning and Mass Customization," *Proceedings of the ASME Design Engineering Technical Conferences*, Salt Lake City Utah, September, 2004 .

Nanda, J., H.J. Thevenot, T.W. Simpson, S.R.T. Kumara and S.B. Shooter, "Exploring Semantic Web Technologies for Product Family Planning," *Proceedings of the ASME Design Engineering Technical Conferences*, Salt Lake City Utah, September, 2004.

Lamon, P., A. Krebbs, M. Lauria, S. Shooter, and R. Siegwart, "Wheel Torque Control for a Rough Terrain Robot Rover," *Proceedings of the IEEE International Conference on Robotics and Automation*, New Orleans, April, 2004.

Nowakowski, C. and S.B. Shooter, "Design and Development of an Animatronic Face," *Proceedings of the International Conference on Advanced Robotics*, Coimbra, Portugal, June 2003.

Lauria, M., S. Shooter, and R. Siegwart, "Topological Analysis of Robotic N-wheeled Ground Vehicles," *Proceedings of the IEEE International Conference on Robotics and Automation*, Taiwan, August, 2003.

Hoyt, B., M. Prince, S. Shooter, M. Hanyak, E. Mastascusa, W. Snyder, M. Toole, M. Higgins, D. Hyde, M. Wagner, and M. Vigeant, "Engineering Engineering Education - A Conceptual Framework for Supporting Faculty in Adopting Collaborative Learning," *Proceedings of the Annual ASEE Engineering Education Conference*, Nashville, Tennessee, June 2003.

Shooter, S.B., "Design of a Robotic Rig for Testing Bicycle Transmissions," *Proceedings of the 2002 International Conference on Intelligent Robots and Systems*, Lausanne, Switzerland, September, 2002.

Hoffman, T.J., S.B. Shooter, C.J. Zappe, and M.R. O'Donnell, "A Study of Risk Communication in Engineering and Management Curricula," *Proceedings of the Annual ASEE Engineering Education Conference*, Montreal, June 2002.

Prince, M., M. Hanyak, B. Hoyt, D. Hyde, E. Mastascusa, W. Snyder, T. Toole, M. Higgins, S. Shooter, M. Wagner, M. Vigeant, M. Aburdene, "A Conceptual Framework for Progressively Developing Students' Team and Problem Solving Skills Across the Curriculum," *Proceedings of the Annual ASEE Engineering Education Conference*, Montreal, June 2002.

Hoffman, T.J., S.B. Shooter, S. Szykman and S. Fenves, "An Investigation of Catalogued Product Development Information at a Major Consumer Products Company," *Proceedings of the ASME 2001 Design Engineering Technical Conferences*, Pittsburgh, Pennsylvania, September, 2001.

Buffinton, K.W., Shooter, S.B., Thorpe, I.J., and Krywicki, J.J., 2001, "Laboratory, Computational, and Field Study of Snowboard Dynamics," *Proceedings of the 2001 TMS Materials and Science in Sports Symposium*.

Politis, J.L. and S.B. Shooter, "Enhancing Engineering Education with the Bucknell Product Development Center," *Proceedings of the Conference on Industry and Education Collaboration*, San Diego, CA, January, 2001.

Szykman, S., S. Fenves, W. Keirouz, and S. Shooter, "A Foundation for Interoperability in Next-Generation Product Development Systems," *Proceedings of the ASME Design Engineering Technical Conferences*, September, 2000.

Sundberg, J.S. and S.B. Shooter, "Investigating Design Methods through the Design of an Automated Soap Wrapper," *Proceedings of the ASME Design Engineering Technical Conferences*, September, 2000.

Latchford, W., S. Shooter, A. Spak, J. Spangler, D. Wagner, and S. Wenner, "Reinforcing High School Physics by Designing and Fabricating a Scale Model Roller Coaster," *Proceedings of the ASME Annual International Conference*, Orlando, Florida, November, 2000.

Shooter, S.B. and C.A. Shooter, "Enhancing Design Education By Processing the Design Experience," *Proceedings of the ASEE Annual Engineering Education Conference*, Saint Louis, Missouri, June, 2000.

Shooter, S.B. and M. McNeill, "Interdisciplinary Collaborative Learning in Mechatronics at Bucknell University," *Proceedings of the ASEE Annual Engineering Education Conference*, Saint Louis, Missouri, June, 2000.

Shooter, S. B., W. Keirouz, P. Hart, and K. Lyons, "The Open Assembly Design Environment: An Architecture for Design Agent Interoperability," *Proceedings of the ASME Design for Manufacturing Conference*, Las Vegas, Nevada, September, 1999.

Shooter, S. B., "Design and Development of the PikRite Chili Pepper Harvester," *Proceedings of the 1999 Frontiers in Education Conference*, Puerto Rico, November, 1999.

Shooter, S. B., "Automated Motion Program Formulation for Cam Mechanism Design", *Proceedings of the 24th Biennial ASME Mechanisms Conference*, Atlanta, Georgia, September, 1998.

Sanders, J. and S.B. Shooter, "Design of an Animatronic Eye", *Proceedings of the 24th Biennial ASME Mechanisms Conference*, Atlanta, Georgia, September, 1998.

Shooter, S.B., "A Proposed Model for Decision Support Systems in Mechanical Design", *Proceedings of the International Conference on Engineering Design and Automation*, Maui, Hawaii, August, 1998.

Shooter, S.B. and C.F. Reinholtz, "AutoCam - A Modular Decision Support System for the Design of Cam Mechanisms", *Proceedings of the 1997 ASME Design Automation Conference*, Sacramento California, September, 1997.

Shooter, S.B., "A Systems Engineering Design Experience for the Machine Design Curriculum", *Proceedings of the 1997 Frontiers in Education Conference*, Pittsburgh, Pennsylvania, November, 1997.

Shooter, S.B., P.H. Tidwell, and C.F. Reinholtz, "Analytical Approach to Cam-Modulated Linkage Synthesis Using Conjugate Geometry", *Machine Elements and Machine Dynamics in the Proceedings of the 23rd ASME Biennial Mechanisms Conference*, Minneapolis, Minnesota, DE-Vol 71, September, 1994, pp 223-232.

Fallon, J.B., S.B. Shooter and C.F. Reinholtz, "URSULA - Design of an Underwater Robot for Nuclear Reactor Vessel Inspection", *Proceedings of the 4th International Conference on Robotics for Challenging Environments*, Albuquerque, New Mexico, February, 1994, pp. 311-319.

Shooter, S.B. and C.F. Reinholtz, "Extrinsic Calibration of Portable Manipulators", *Proceedings of the 22nd ASME Biennial Mechanisms Conference*, Scottsdale, Arizona, DE-Vol. 45, September, 1992, pp 501-507.

Shooter, S.B., C.F. Reinholtz and S.G. Dhande, "On The Kinematic Design of Manipulators for Limited Access WorkSpaces (LAWS)", *Proceedings of the 22nd ASME Biennial Mechanisms Conference*, Scottsdale, Arizona, DE-Vol. 45, September, 1992, pp 493-500.

Other Conference Proceedings

Shooter, S.B., T. Kiel and S. Luckowski, "Product Platforms in Support of Rapid Response to DOD In-Theater Protection Needs," NDIA Systems Conference, San Diego, CA, October 2008.

Luckowski, S., D. Thompson, E. Bacheson, D. Robinson, and S. Shooter, "Manufacturing Process Definition and Knowledge ReUse through Configurable Supply Chains for Critical Weapon Systems," Defense Manufacturing Conference, Orlando, FL, December 2008.

Simpson, T., S. Shooter, J. Terpenney, R. Stone, S. Kumara, V. Allada, M. Scott, "Recent Advances in an Information Management Infrastructure to Support Product Family Planning and Mass Customization," *Proceedings of the NSF Design, Service and Manufacturing Grantees and Research Conference*, St. Louis, Missouri, July 2006.

Simpson, T.W., Kumara, S.R.T., Shooter, S.B., Stone, R.B. and Terpenney, J.P., "An Investigation of Semantic Web Technologies for Product Family Modeling," *Proceedings of the NSF Design, Service and Manufacturing Grantees and Research Conference*, Scottsdale Arizona, January 2005.

Select Technical Reports

Laszewski, M. and S.B. Shooter, "Development of a Software System for Managing Product Development Information in Small Businesses".

Hoffman, T., S. Shooter, and S. Szykman. "Verification of the Information Flow Model for Product Design," Internal Report of the National Institute of Standards and Technology, August, 2000. (Peer reviewed internal report publication).

Shooter, S.B. et al. (Contributing Author). *PDC Consultant's Manual*, Bucknell University Small Business Development Center, August, 1999.

Keirouz, W., S. Shooter, and S. Szykman, "A Model for the Flow of Design Information in OpenADE," Internal Report of the National Institute of Standards and Technology, September, 1999. (Peer reviewed internal report publication).

Select Presentations

Shooter, SB, "Techniques and Technologies for Product Family Planning and Rapid Response to In-Theater Warfighter Support", Research and Engineering Education Facility, Eglin Air Force Base, October 2008.

Under Review

Alizon, F., S.B. Shooter and T.W. Simpson, "Product Lifecycle Continuum: Using Previous Product Designs as a Management Tool for Future Projects," submitted to *IEEE Transactions*

on Systems, Man, and Cybernetics (SMC) Special Issue on Information Reuse and Integration, February 2008.

Alizon, F., S.B. Shooter and T.W. Simpson, "A Method for Measuring Product Information Retrieval and Recommending Levels of Reusability," submitted to *Journal of Computer Aided Design (CAD)*, March 2008.

Byron, B. and S. Shooter, "Case Study: Adoption Behaviors Regarding Changes to Information Flow in the Design of New Modular Products," submitted to *Design Studies*.

Alizon, F., S.K. Moon, S.B. Shooter and T.W. Simpson, "Three Dimensional Design Structure Matrix with Cross-Module and Cross-Interface Analyses, submitted to the *Journal of Mechanical Design*.

FUNDED PROPOSALS

Unmanned Ground Mobility in Urban Terrain, 5/2008 – Co-Principal Investigator, Office of Naval Research, Bucknell Budget= \$376,000. Total Budget = \$800,000 for 1 year.

Research Experience for Teachers – Supplement to CI-TEAM project, 11/2006 – Principal Investigator, National Science Foundation, Budget = \$10,000.

CI-TEAM Implementation Project: Collaborative Research – A National Engineering Dissection Cyber-Collaboratory, 1/2007 – Principal Investigator, Funded by the National Science Foundation, Bucknell Budget = \$101,361. Total Budget = \$900,000 for 2 years.

Research Experience for Undergraduates – Supplement to ITR Collaborative Research, 8/2006– Principal Investigator, Funded by the National Science Foundation. Budget = \$6,000.

Development of an Educational Demonstration of Themepark Technologies, 8/2005 – Principal Investigator, Funded by Universal Studios. Budget = \$3,500.

Research Experience for Undergraduates – Supplement to ITR Collaborative Research, 5/2005 – Principal Investigator, Funded by the National Science Foundation. Budget = \$6,000.

Exploration of Technologies for Development of an Innovative Concrete Mixer Truck , 9/2004 – Principal Investigator, Funded by Shumaker Industries, the Bucknell Small Business Development Center and the Pennsylvania Ben Franklin Technology Partner Program. Budget = \$61,764.

Research Experience for Undergraduates – Supplement to ITR Collaborative Research, 5/2004 – Principal Investigator, Funded by the National Science Foundation. Budget = \$6,000.

ITR: Collaborative Research – An Information Management Infrastructure for Product Family Planning and Mass Customization, 9/2003 – Principal Investigator, Funded by the National Science Foundation. Bucknell Budget = \$283, 253. Total Budget = \$1,045,000 for 3 years.

Exploration of the Fluidic Muscle for Animatronic Applications, 9/2003 – Principal Investigator, Funded by Universal Studios. Budget = \$36,000 for 9 months.

Characterization of the Powershift Transmission, 8/2000 – Principal Investigator, Funded by Powershift, Inc. and the Small Business Development Center. Budget = \$45,664.

Project Catalyst: Promoting Systemic Change in Engineering Education 10/99 – Senior Researcher (9 faculty involved), Funded by NSF, Budget = \$600,000.

The GE Faculty for the Future Initiative to Promote Careers in Academe, 10/2000 – Faculty Participant. The GE Fund. Total Budget = \$50,000.

Internships at the NIST Manufacturing Engineering Lab, 5/2000 – Principal Investigator, Funded by the National Science Foundation and the National Institute of Standards and Technology. Budget = \$15,766. Placed three students in a special summer internship at NIST.

An Innovative Collaborative Learning Environment, 9/99 – Contributing Author, Funded by Air Products and Chemicals, Inc. Foundation. Budget = \$250,000.

Establishment of An Assembly Facility for Manufacture of Floor Bridging, 7/99 – Principal Investigator, Jointly Funded by the Ben Franklin Technology Center and Bassett Manufacturing, Inc. Total Budget = \$106,365

Walbridge Design and Manufacturing Snowboard Research and Development (now Dimension Snowboards), 8/99 – Principal Investigator, Jointly Funded by the Ben Franklin Technology Center and Walbridge Manufacturing, Inc. Total Budget = \$201,547.

Development of a Continuous Solid/Liquids Mixer, 9/99 – Co-Principal Investigator, Jointly Funded by the Ben Franklin Technology Center and Specialty Process Equipment, Inc. Total Budget = \$107,335.

Summer Undergraduate Research Fellowships at the National Institute of Standards and Technology (NIST), 5/99 – Principal Investigator, Funded by the National Science Foundation and the National Institute of Standards and Technology. Budget = \$11,666.

Knowledge-Based Design for the Open Assembly Design Environment, 8/98 – Principal Investigator, Funded by the National Institute of Standards and Technology (NIST). Budget = \$33,468. Extended through 8/99 with additional budget of \$12,636.

Design and Development of the PikRite Chili Pepper Harvester, 9/97 – Principal Investigator; Jointly funded by the Ben Franklin Technology Center and PikRite, Inc. Total Budget = \$191,859.

Further Development of a New Chocolate Tempering System, Awarded 7/96 – Co-Principal Investigator; Jointly funded by the Ben Franklin Technology Center and KOCO, Inc. Total Budget = \$102,146.

TALKS AND LECTURES

Invited Speaker – “International Perspectives and Future Directions for Product Platforms”, MIT 2005 Innovations in Product Development Conference - Product Families and Product Platforms: From Strategic Innovation to Implementation, November, 2005.

Seminar – “Developing New Products”, Management of Technology Program at the Swiss Federal Institute of Technology in Lausanne (EPFL), 2003, 2004, 2005, 2006.

Seminar – “Design for Manufacturing”, International Institute for Management Development (IMD), Lausanne, Switzerland, 2003.

Educator – “Catalyst: Promoting Systemic Change in Engineering Education,” two one-week workshops to engineering faculty from across the country, 2002.

Invited Presenter – “Getting Your Client’s Product to Market, Understanding the Product Development Process,” Pennsylvania Small Business Development Center’s Annual Mini-Conference, June 16, 1999.

Lecturer, Institute for Leadership in Technology and Management Program, Bucknell June, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2004, 2005, 2006.

PROFESSIONAL ACTIVITIES

Participant, NSF EXCITED Workshop and NSF CyberInfrastructure Workshop

Review Coordinator, 2006 ASME Design Automation Conference

Reviewer, Served on proposal review committee for the National Science Foundation.
Reviewer: Journal of Mechanical Design, Journal of Mechanism and Machine Theory, Journal of Computing and Information Science in Engineering, International Journal of Mass Customization, Journal of Engineering Education, Design Studies (journal), Journal of Concurrent Engineering Research and Applications.

AFFILIATIONS

American Society for Engineering Education
American Society of Mechanical Engineers

REFERENCES

Keith W. Buffinton, Professor and Chair
Mechanical Engineering Department
Bucknell University
Lewisburg, Pennsylvania, 17837
Work Phone: (570) 577-1581
Email: buffintk@bucknell.edu

Jon Vernam, Director
Bucknell Small Business Development Center
Dana Engineering Building
Bucknell University
Lewisburg, Pennsylvania 17837
Work Phone: (570) 577-1249
Email: jvernam@bucknell.edu

Simon Szykman, Chief Information Officer
National Institute of Standards and Technology (NIST)
100 Bureau Drive, Stop 1800
Gaithersburg, MD 20899-1800
Work Phone: (301) 975-6500
Email: simon.szykman@nist.gov

Timothy Simpson
Professor
Industrial and Manufacturing Engineering
Pennsylvania State University
329 Leonhard Building
University Park, PA 16802
Work Phone: 814-863-7136
Email: tw8@psu.edu

Charles F. Reinholtz, Chair and Professor (Dissertation Advisor)
Department of Mechanical Engineering
Embry Riddle Aeronautical University
Daytona Beach, Florida
Email: reinholc@erau.edu