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Education

School	Degree	Field	Date
M.I.T.	Sc.D.	Mechanical Engineering	1988
M.I.T.	S.M.	Mechanical Engineering	1985
M.I.T.	S.B.	Mechanical Engineering	1984

Title of Doctoral Thesis: *Computation and Pre-Parametric Design*

Principal Fields of Interest

Product Design and Development
Innovation and Entrepreneurship

Employment

Position	Beginning	Ending
UNIVERSITY OF PENNSYLVANIA		
Faculty Director and Founder, Weiss Tech House	2002	2008
<i>Wharton School—Department of Operations and Information Management</i>		
CIBC Professor	2005	
Department Chair	2004	
Professor	2004	
Associate Professor	1995	2004 (on leave 00-02)
Visiting Associate Professor	1993	1995
<i>Department of Mechanical Engineering and Applied Mechanics</i>		
Professor	2004	
Associate Professor	1996	2004
NOVA CRUZ PRODUCTS, INC. (manufacturer of light electric vehicles)		
Founder and CEO	1999	2002
MIT SLOAN SCHOOL OF MANAGEMENT		
Assistant/Associate Professor	1988	1995 (on leave 93-95)

Professional Activities

Associate Editor, *Management Science*, 1998 – 2001, 2009 – present
Editorial Board of *ECR Journal – International Commerce Review*, 2001 – present
Department Editor, *Management Science*, 2001 – 2004
Editorial board of *Manufacturing and Service Operations Management*, 1996 – 2005
Editor, *Management Science* Special Issue on Design and Development, 1998 – 2001
Editorial board of *Technology and Operations Review*, 1994 – 1999
Associate Editor, *Manufacturing Review*, 1990 – 1995
Advisory Board, University of the Arts, Graduate Program in Industrial Design, 1994 – 1996
ASME Design Division, Design Theory and Methodology Committee, 1989 – 1995
National Research Council Study *Improving Engineering Design*, 1989 – 1990

Awards

Excellence in Teaching Award, Wharton School, 1996, 1997, 1998, 1999, 2006, 2007
Distinguished Fellow, POMS College of Product Innovation and Technology Management, 2006
Elective Teaching Award, Wharton Executive MBA Program, 2003, 2006
6th Annual Allan D. Shocker Lecturer, University of Minnesota, 2004
Gold Medal (Nova Cruz Products, Inc.), Consumer Product Design, *Business Week* and Industrial Design Society of America, 2002
Grand Award (Nova Cruz Products, Inc.), Recreation Category, *Popular Science* Best of What's New, 2001
Silver Medal (Nova Cruz Products, Inc.), Consumer Product Design, *Business Week* and Industrial Design Society of America, 2001
Inc. Magazine Web Awards (Nova Cruz Products, Inc.), 1st place, Design; 3rd place, Marketing; 2001
Helen Kardon Moss Anvil Award, Wharton School, 2000
Miller-Sherrerd MBA Core Teaching Award, Wharton School, 1996, 1997, 1998, 1999
MBA Core Cluster Award for Educational Excellence, Wharton School, 1995, 1996, 1997, 1998
NASA Certificate of Recognition for Creative Development of a Technical Innovation, 1997
Distinguished Service Award, MIT Leaders for Manufacturing Program, 1995
Academy of Management—Technology and Innovation Management Division, List of Best Books of 1994 for *Product Design and Development*
ASME Design for Manufacturing Committee Best Paper Award, 1992
Ford International Career Development Chair, MIT Sloan School, 1989 – 1992
Teaching Excellence Award, MIT Sloan School, 1989 – 1990
IBM Fellowship in Manufacturing Research, 1987 – 1988

Subjects Taught

Product Design	2003 –
Innovation, Problem Solving, and Design	2002 –
Product Design and Development	1994, 1996 – 1999, 2001 –
Operations Management: Quality and Productivity	1995 – 1999, 2005
Design, Manufacturing, and Marketing Integration	1994
Introduction to Operations Management	1989 – 1993, 1995
Product Development in the Manufacturing Firm	1991 – 1993, 1995
Design for Manufacturing	1988 – 1989

Recent Wharton School and University Committees

Committee on Manufacturer Responsibility (chair)	2008 – present
Committee on Faculty Attraction and Retention	2008 – present
Globalization Committee (chair FY08)	2007 – present
Exec. Committee, Integrated Product Design Program	2006 – present
Deputy Dean's Executive Committee	2007 – present
Dean's Social Impact Committee	2007 – present
Editorial Board Wharton School Publishing	2007 – present
Strategy Committee (chair)	2006 – 2007
Committee on MBA Experience and Engagement	2006 – 2008

Publications

Books

- [1] Karl T. Ulrich, *Design: Creation of Artifacts in Society*, forthcoming 2009.
- [2] Christian Terwiesch and Karl T. Ulrich, *Innovation Tournaments: Creating and Selecting Exceptional Opportunities*, Harvard Business Press, Boston, May 2009.
- [3] Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 4th Edition, 2008. Various editions also in Bahasa Indonesia, Chinese, Korean, Italian, Portugese, Spanish, and Russian.
- [4] Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 3rd Edition, 2004.
- [5] Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 2nd Edition, 2000.
- [6] Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, McGraw-Hill, New York, 1st Edition, 1995.

Articles in Refereed Journals

- [7] Karan Girotra, Christian Terwiesch, Karl Ulrich, "Valuing R&D Projects in a Portfolio: Evidence from the Pharmaceutical Industry," *Management Science*, Vol. 52, No. 9, September 2007, p. 1452-1466.
- [8] Taylor Randall, Christian Terwiesch, and Karl T. Ulrich, "User Design of Customized Products," *Marketing Science*, Vol. 26, No. 2, 2007, p.268-280.
- [9] Karl T. Ulrich and David J. Ellison, "Beyond Make-Buy: Internalization and Integration of Design and Production," *Production and Operations Management*, Vol. 14, No. 3, Fall 2005, p. 315-330.
- [10] Karl T. Ulrich, "Estimating the Technology Frontier for Personal Electric Vehicles," *Transportation Research C*, 13: 448-462, 2005.
- [11] Taylor Randall, Christian Terwiesch, and Karl T. Ulrich, "Principles for User Design of Customized Products," *California Management Review*, Summer 2005, p. 68-85 (finalist for Accenture Prize).
- [12] Shane, Scott A. and Karl T. Ulrich, "Technological Innovation, Product Development, and Entrepreneurship in Management Science," *Management Science*, Vol. 50, No. 2, February 2004, p. 133-144.
- [13] Kamalini Ramdas, Marshall Fisher and Karl Ulrich, "Managing Variety for Assembled Products: Modeling Component Systems Sharing," *Manufacturing and Service Operations Management*, Vol. 5, No. 2, Spring 2003, p.142-156.
- [14] Taylor Randall and Karl Ulrich, "Product Variety, Supply Chain Structure, and Firm Performance: Analysis of the U.S. Bicycle Industry," *Management Science*, Vol. 47, No. 12, December 2001, p. 1588-1604.
- [15] V. Krishnan. and Karl T. Ulrich, "Product Development Decisions: A Review of the Literature," *Management Science*, Vol. 47, No. 1, January 2001, p. 1-21.
- [16] Karl T. Ulrich and David J. Ellison, "Holistic Customer Requirements and the Design-Select Decision," *Management Science*, Vol. 45, No. 5, May 1999, p. 641-658.
- [17] Marshall Fisher, Kamalini Ramdas, and Karl Ulrich, "Component Sharing in the Management of Product Variety: A Study of Automotive Braking Systems," *Management Science*, Vol. 45, No. 3, March 1999, p. 297-315.
- [18] Taylor Randall, Karl Ulrich, and David Reibstein, "Brand Equity and Vertical Product Line Extent," *Marketing Science*, Vol. 17, No. 4, 1998, p. 356-379.
- [19] Bala L. Subramaniam and Karl T. Ulrich, "Producibility Analysis Using Metrics Based on Physical Process Models," *Research in Engineering Design*, Vol. 10, No. 4, 1998, p. 210-225.

- [20] David Robertson and Karl Ulrich, "Planning for Product Platforms," *Sloan Management Review*, Vol. 39, No. 4, Summer 1998, p. 19-31.
- [21] Karl T. Ulrich and Scott Pearson, "Assessing the Importance of Design through Product Archaeology," *Management Science*, Vol. 44, No. 3, March 1998, p. 352-369.
- [22] R. Ramaswamy and Karl Ulrich, "A Designer's Spreadsheet," *ASME Journal of Mechanical Design*, Vol. 119, No. 1, 1997, p.48-56.
- [23] Karl Ulrich, "The Role of Product Architecture in the Manufacturing Firm," *Research Policy*, Vol. 24, 1995, p. 419-440.
- [24] Rajan Ramaswamy and Karl Ulrich, "Augmenting the House of Quality with Engineering Models," *Research in Engineering Design*, Vol. 5, No. 2, 1993, p. 70-79.
- [25] Karl Ulrich, David Sartorius, Scott Pearson, and Mark Jakiela, "Including the Value of Time in Design for Manufacturing Decision Making," *Management Science*, Vol. 39, No. 4, 1993, p. 429-447.
- [26] R. Ramaswamy, K. Ulrich, N. Kishi and M. Tomikashi, "Solving Parametric Design Problems Requiring Configuration Choices," *ASME Journal of Mechanical Design*, Vol. 115, No. 1, 1993, p. 20-28.
- [27] Matthew B. Wall, Karl T. Ulrich, and Woodie C. Flowers, "Evaluating Prototyping Technologies for Product Design," *Research in Engineering Design*, Vol. 3, 1992, p. 163-177.
- [28] David Robertson, Karl Ulrich, Marc Filerman, "CAD and Cognitive Complexity: Beyond the Drafting Board Metaphor," *Manufacturing Review*, Vol. 4, No. 3, 1991, p. 194-204.
- [29] Steven D. Eppinger, Charles H. Fine, and Karl T. Ulrich, "Interdisciplinary Product Design Education," *IEEE Transactions on Engineering Management*, Vol. 37, No. 4, 1990, p. 301-305.
- [30] Karl T. Ulrich and Warren P. Seering, "Function Sharing in Mechanical Design," *Design Studies*, Vol. 11, No. 4, 1990, p. 223-234.
- [31] Karl T. Ulrich and Warren P. Seering, "Synthesis of Schematic Descriptions in Mechanical Design," *Research in Engineering Design*, Vol. 1, No. 1, 1989, p. 3-18.
- [32] Karl Ulrich and Warren Seering, "Computation and Conceptual Design," *Robotics and Computer-Integrated Manufacturing*. Vol. 4, No. 3, 1988, p.309-315.
- [33] S.A. Gedeon, C.D. Sorenson, K.T. Ulrich, and T.W. Eagar, "Measurement of Dynamic Electrical and Mechanical Properties of Resistance Spot Welds," *The Welding Journal*, Vol. 66, No. 12, 1987, p. 378-385.

Working Papers including Papers under Review or Revision

- [34] Karan Girotra, Christian Terwiesch, Karl Ulrich, “Idea Generation and the Quality of the Best Idea,” Under revision for resubmission to *Management Science*.
- [35] Ulrich, Karl T., “The Environmental Paradox of Bicycling,” Working Paper, The Wharton School, July 2006.
- [36] Ulrich, Karl T., “Exploration in Design,” Working Paper, The Wharton School, August 2006.
- [37] Ulrich, Karl T., “Variety,” Working Paper, The Wharton School, April 2006.
- [38] Ulrich, Karl T., “Aesthetics in Design,” Working Paper, The Wharton School, March 2006.

Chapters in Edited Volumes

- [38] Karl T. Ulrich, “The Roles of Users and Experts in Design,” in *Kluwer Handbook on New Product Development*, 2007.
- [39] Karl T. Ulrich and Warren P. Seering, “Synthesis of Schematic Descriptions in Mechanical Design,” Chapter 10 in *Engineering Design Synthesis*, Amaresh Chakrabarti (editor), Springer, London, 2002. (This chapter is substantially similar to article of same title appearing in *Research in Engineering Design* 1988.)
- [40] Karl Ulrich, “Product Architecture, Modularity, and the Enterprise,” in *Managing in the Modular Age*, Raghu Garud and Arun Kumaraswamy (editors), Blackwell, Oxford, 2002. (Commentary for reprint below.)
- [41] Karl Ulrich, “The Role of Product Architecture in the Manufacturing Firm,” in *Managing in the Modular Age*, Raghu Garud and Arun Kumaraswamy (editors), Blackwell, Oxford, 2002. (This chapter is a reprint of an article of the same title from *Research Policy* 1995.)
- [42] Karl Ulrich, Taylor Randall, Marshall Fisher, and David Reibstein, “Managing Product Variety: A Study of the Bicycle Industry,” in *Managing Product Variety*, Teck-Hua Ho and Chris Tang (editors), Kluwer Academic Publishers, 1998.
- [43] Karl Ulrich, “Fundamentals of Product Modularity,” Chapter 12 in S. Dasu and C. Eastman (editors), *Management of Design: Engineering and Management Perspectives*, p. 219-231, Kluwer Academic Publishers, 1995, (chapter is substantially similar to paper of same title appearing in *proceedings of ASME Winter Annual Meeting Symposium on Design and Manufacturing Integration*, November 1991).
- [44] Karl T. Ulrich, “Intelligent Tools for Mechanical Design,” in *Artificial Intelligence at MIT: Expanding Frontiers*, edited by P.H. Winston with S.A. Shellard, Vol. 1, Ch. 3, p. 52-69, MIT Press, 1990.
- [45] Karl T. Ulrich and Warren P. Seering, “Function Sharing in Mechanical Design,” in *Artificial Intelligence in Engineering Design* Vol. II, C. Tong and D. Sriram (Editors), p.

185-214, Academic Press, San Diego 1992, (chapter identical to “Function Sharing in Mechanical Design,” above).

- [46] Karl T. Ulrich and Warren P. Seering, “Achieving Multiple Goals in Conceptual Design,” in H. Yoshikawa and D. Gossard (editors), *Intelligent CAD*, North-Holland, 1988.

Other Articles and Case Studies

- [47] Karl T. Ulrich, “Terrapass Inc.,” Case Study, The Wharton School, August 2005, available from Epodia.com.
- [48] Karan Girotra, Christian Terwiesch, and Karl Ulrich, “Merck & Company: Managing the Drug Development Pipeline,” Case Study, The Wharton School, June 2004 (Revised June 2005), available from Epodia.com.
- [49] Karl T. Ulrich and Christian Terwiesch, “Xpult Exercise and Instructions,” Working Paper, The Wharton School, Department of Operations and Information Management, (document to accompany Xpult catapult hardware, also developed by Ulrich and Terwiesch).
- [50] Jeff Smith and Karl Ulrich, “Design Matters,” *Design Management Journal*, Vol. 12, No. 3, Summer 2001, p. 28-34.
- [51] David Reibstein, Taylor Randall, and Karl Ulrich, “Brand Equity and Line Extension: How Low Can You Go?” *The Financial Times*, October 5, 1998.
- [52] Karl T. Ulrich and Steven D. Eppinger, “Educating Product Development Leaders,” *Design Management Journal*, Vol. 3, No. 3, Summer 1992, p. 47-54.
- [53] Karl T. Ulrich, “Computer-Supported Product Design,” *Design Management Journal*, Vol. 1, No. 2, Summer 1990, p. 62-67.

Articles in Refereed Conference Proceedings

- [54] Karl T. Ulrich, “Innovation in the University,” *Proceedings of Foundations of Computer-Aided Process Design (FOCAPD)*, Princeton University, July 2004.
- [55] Bala L. Subramaniam and Karl T. Ulrich, “Producibility Analysis Using Metrics Based on Physical Models,” *Proceedings of ASME Design Theory and Methodology Conference*, September 1994, p. 353-369, Minneapolis. (Substantially similar to journal article of same title above.)
- [56] Rajan Ramaswamy and Karl Ulrich, “A Designer’s Spreadsheet,” *Proceedings of ASME Design Theory and Methodology Conference*, September 1993, p. 105-113, Albuquerque. (Substantially similar to journal article of same title above.)
- [57] Karl T. Ulrich, “The Role of (Rapid) Prototyping in (Rapid) Product Development,” *Proceedings of International Manufacturing Systems Conference*, 1993, Stuttgart.

- [58] Bala Subramaniam and Karl Ulrich, "Representation of Producibility Constraints," *Proceedings of ASME Design Theory and Methodology Conference*, September 1992, p. 65-72, Phoenix.
- [59] Dari Shalon, David Gossard, Karl Ulrich, and David Fitzpatrick, "Representing Geometric Variations in Complex Structural Assemblies on CAD Systems," *Proceedings of ASME Design Automation Conference*, September 1992, p. 121-132, Phoenix.
- [60] Rajan Ramaswamy and Karl Ulrich, "Augmenting the House of Quality with Engineering Models," *Proceedings of ASME Design Theory and Methodology Conference*, September 1992, p. 309-316, Phoenix. (Substantially similar to journal article of same title above.)
- [61] Karl Ulrich and Karen Tung, "Fundamentals of Product Modularity," *proceedings of ASME Winter Annual Meeting Symposium on Design and Manufacturing Integration*, November 1991, p. 73-79, Atlanta.
- [62] Rajan Ramaswamy, Karl T. Ulrich, Norimasa Kishi, and M. Tomikashi, "Solving Parametric Design Problems Requiring Configuration Choices," *Proceedings of ASME Design Theory and Methodology Conference*, September 1991, p. 103-110, Miami. (Substantially similar to journal article of same title above.)
- [63] David Robertson, Karl T. Ulrich, and Marc Filerman, "CAD Systems and Cognitive Complexity: Beyond the Drafting Board Metaphor," *Proceedings of ASME Design Theory and Methodology Conference*, September 1991, p. 77-83, Miami. (Substantially similar to journal article of same title above.)
- [64] Paul H. Moncevicz, Jr., Mark J. Jakiela, and Karl T. Ulrich, "Orientation and Insertion of Randomly Presented Parts Using Vibratory Agitation," *Proceedings of ASME Flexible Assembly Systems Conference*, ASME DE-Vol. 33, September 1991, p. 41-47, Miami.
- [65] Matthew Wall, Karl Ulrich, and Woodie Flowers, "Making Sense of Prototyping Technologies for Product Design," *Proceedings of ASME Design Theory and Methodology Conference*, September 1991, p. 151-158, Miami. (Substantially similar to journal article "Evaluating Prototyping Technologies for Design" above.)
- [66] Karl T. Ulrich and Peter V. Graham, "Using Producibility Constraints to Control the Automatic Generation of Sheet Metal Structures," *Proceedings of the ASME Design Theory and Methodology Conference*, September 1990, p. 97-104, Chicago.
- [67] Mark E. Friedberg, Mark J. Jakiela, and Karl T. Ulrich, "A Computer-Based Technical and Economic Model for Choosing Automated Assembly Parts Presentation Equipment," *Proceedings of the Second ASME Conference on Flexible Assembly Systems*, ASME DE-Vol. 28, Chicago 1990, p. 85-89.

- [68] R. Ramaswamy, K. Ulrich, N. Kishi, and M. Tomikashi, "Software Tools for Design: Experiences in the Automobile Industry," *Proceedings of the AAAI90 Workshop on Concurrent Design*, August 1990 (with R. Ramaswamy, N. Kishi, and M. Tomikashi).
- [69] Karl T. Ulrich and Charles H. Fine, "Cost Estimation Tools to Support Product Design," *Proceedings of the ASME Manufacturing International Conference 1990*, Atlanta 1990, p. 19-25.
- [70] Peter V. Graham and Karl T. Ulrich, "Structural Synthesis of Sheet Metal Parts: An Analogy to Path Planning Using Manufacturability as a Guide," *Proceedings of the 1989 ASME Design Automation Conference*, Montreal 1989, p. 289-294.
- [71] J.S. Oh and K.T. Ulrich, "Using Fine-Grained Parallel Simulation for Design," *Proceedings of the 1989 ASME Design Automation Conference*, Montreal 1989, p. 231-236, (with J. Oh).
- [72] Marc Filerman, Karl Ulrich, and Todd Siler, "A Tactile Input Device for Sheet Metal CAD," *Proceedings of the 1989 Conference on Human-Computer Interaction, HCI89*, 1989, Boston.
- [73] K.T. Ulrich, "A Decision Model for Part Integration in Design for Manufacturing," *Proceedings of the 1989 International Conference on Engineering Design*, Harrogate, England, August 1989, p. 387-397.
- [74] Karl T. Ulrich and Warren P. Seering, "Function Sharing in Mechanical Design," *Proceedings of the Seventh National Conference on Artificial Intelligence, AAAI88*, St. Paul, MN, August 1988, p. 342-346. (Substantially similar to journal article of same title, above.)
- [75] K. Ulrich and W. Seering, "Conceptual Design: Synthesis of Systems of Components," *Proceedings of the 1987 American Society of Mechanical Engineers Winter Annual Meeting Symposium on Integrated and Intelligent Manufacturing.*, Boston 1987, p. 57-66.
- [76] Karl Ulrich and Warren Seering, "Conceptual Design as Novel Combination of Existing Device Features," *Advances in Design Automation 1987*, p. 295-300, (*Proceedings of the 1987 ASME Design Technology Conferences—The Design Automation Conference*) (with W. Seering). (Substantially similar to journal article "Computation and Conceptual Design" above.)
- [77] Karl Ulrich and Warren Seering, "A Computational Approach to Conceptual Design," *Proceedings of International Conference on Engineering Design, ICED 87*, August 1987, Boston.

Patents

Folding Bicycle, U.S. Patent (number pending), Notice of Allowance December 2008 (with N. Ulrich), Assignee: Xootr LLC.

Folding Scooter, U.S. Patent 6,443,470, September 3, 2002 (with N. Ulrich, J. Salazar, M. Simmons), Assignee: Xootr LLC

Bruxism Biofeedback Apparatus and Method Including Acoustic Transducer Coupled Closely to User's Head Bones, U.S. Patent 6,270,466, August 7, 2001 (with L. Weinstein, T. Devlin, and C. Burns), Assignee: BruxCare, Inc.

Cervical Collars, U.S. Patent 6,254,560, July 3, 2001 (with L. Tweardy, C. Burns), Assignee: The Jerome Group, Inc.

Bruxism Biofeedback Apparatus and Method, U.S. Patent 6,117,092, September 12, 2000 (with L. Weinstein, A. McDonald, C. Burns, and T. Devlin), Assignee: BruxCare, Inc.

Measurement Device for Quantifying the Severity of Bruxism, U.S. Patent 5,911,576, June 15, 1999 (with L. Weinstein, A. McDonald, C. Burns, and T. Devlin), Assignee: BruxCare, Inc.

Wall Outlet Adapter Having Sawtooth Profile, U.S. Patent 5,605,466, February 25, 1997, (with T. Devlin and G. Favaloro), Assignee: New Vector Products, Inc.

Suction Catheter Assemblies, U.S. Patent 5,460,613, October 24, 1995, (with T. Devlin), Assignee: Smiths Industries Medical Systems, Inc. (Concord-Portex Division).

Suction Systems, U.S. Patent 5,419,769, May 30, 1995, (with T. Devlin and F. Willis.) Assignee: Smiths Industries Medical Systems, Inc. (Concord-Portex Division).

Suction Catheter Assemblies, U.S. Patent 5,349,950, September 27, 1994, (with T. Devlin), Assignee: Smiths Industries Medical Systems, Inc. (Concord-Portex Division).

Three-Dimensional Tactile Computer Input Device, U.S. Patent 5,396,265, March 7, 1995, (with E. Sachs, A. Roberts, M. Filerman, and T. Siler). Assignee: MIT.

Suction Catheter Assemblies, U.S. Patent 5,325,850, July 5, 1994, (with T. Devlin). Assignee: Smiths Industries Medical Systems, Inc. (Concord-Portex Division).

Suction Catheter Valve, U.S. Patent 5,300,043, April 5, 1994, (with T. Devlin and V. Cheung). Assignee: Smiths Industries Medical Systems, Inc. (Concord-Portex Division).

Suction Catheter Assemblies, U.S. Patent 5,254,098, October 19, 1993, (with T. Devlin). Assignee: Smiths Industries Medical Systems, Inc. (Concord-Portex Division).

Method and Means for Removing Casings from Sausages, U.S. Patent 5,246,395, September 21, 1993 (with M. Haggerty, C. Zirps, M. Russo, and J. Kwo). Assignee: Townsend Engineering Company.

Computer Aided Drawing in Three Dimensions, U.S. Patent 5,237,647, August 17, 1993, (with A. Roberts, E. Sachs, D. Stoops, T. Siler, D. Gossard, and G. Celniker). Assignee: MIT.

Dual Textured Food Piece Fabrication Method, U.S. Patent 5,208,059, May 4, 1993 (with J. Dubowik and M. Nemirow). Assignee: General Mills, Inc. (for Betty Crocker “Gushers”).

Method and Apparatus for Automatic Parts Assembly, U.S. Patent 5,155,895, October 20, 1992 (with M. Jakiela and P. Moncevicz). Assignee: MIT.

Dual Textured Food Piece Fabrication Apparatus, U.S. Patent 5,146,844, September 15, 1992 (with J. Dubowik and M. Nemirow). Assignee: General Mills, Inc. (for Betty Crocker “Gushers”).