July 2021

## Karl T. Ulrich

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# Citizenship: United States

# Education

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| **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, Innovation, Entrepreneurship, China

# Employment

**Position Beginning** **Ending**

University of Pennsylvania

Faculty Director and Founder, Weiss Tech House 2002 2008

# Wharton School

Senior Advisor to the Dean, Asia Strategy 2021

Vice Dean of Entrepreneurship & Innovation 2015 2021

Vice Dean of Innovation 2010 2015

CIBC Endowed Professor 2005   
Department Chair (Operations and Info. Mgt.) 2004 2009

Professor 2004 2005

Associate Professor 1995 2004 (on leave 00-02)

Visiting Associate Professor 1993 1995

# Department of Mechanical Engineering and Applied Mechanics

Professor 2004

Associate Professor 1996 2004

Nova Cruz Products, Inc.

Founder and CEO 1999 2002

MIT Sloan School of Management

Assistant/Associate Professor 1988 1995 (on leave 93-95)

# Professional Activities

Director, Rookie Fund (non-profit venture fund for students in China), 2017 – present

*Forbes* blog “Elevator Pitch,” 2016 – 2021

Co-Host, “Launch Pad,” weekly radio show (SiriusXM Channel 132), 2014 – present

Member, MIT Corporation Visiting Committee (Sloan School), 2013 – present

Columnist *Wall Street Journal* “The Experts,” 2013 – 2020

Channel Director, SiriusXM *Business Radio* (channel 111), 2013 – 2015

Associate Editor, *Management Science*, 1998 – 2001, 2009 – 2017

Editorial Board of *ECR Journal – International Commerce Review*, 2001 – 2016

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

Wharton School Teaching Excellence Award, 2018, 2019, 2020, 2021

INFORMS Technology, Innovation Management & Entrepreneurship Distinguished Speaker Award, 2018

Silver Medal, Industrial Design Society of America, International Design Excellence Awards (with Lunar Design), 2014

Elective Teaching Award, Wharton Executive MBA Program, 2003, 2006, 2013 - 2015

Meritorious Service Award, *Management Science*, 2010

Teaching Commitment and Curricular Innovation Award, Wharton School, 2010

Excellence in Teaching Award, Wharton School, 1996-1999, 2006, 2007, 2010

Distinguished Fellow, POMS College of Product Innovation and Technology Management, 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 Management 2018 –

Entrepreneurship (Coursera) 2015 –

Design: Creation of Artifacts in Society (Coursera) 2012 –

Product Design 2003 –

Innovation Management 2002 –

Technology Strategy 2012 – 2016

Implementation of Entrepreneurial Ventures 2017 – 2020

Innovation in China 2015 – 2017

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

Advisory Board,   
Penn Medicine Center for Health Care Innovation 2013 –

Mack Center Core Group 2007 –

Search Committee,  
Associate Vice Provost for Technology Transfer 2013

Executive Education Committee 2010

Provost’s Arts Advisory Council 2015 – 2020

Faculty Committee on Innovation 2013 – 2016

Globalization Initiative Committee 2010 – 2016

Committee on Manufacturer Responsibility (chair) 2008 – 2009

Committee on Faculty Attraction and Retention 2008 – 2009

Editorial Board Wharton School Publishing 2007 – 2010

Globalization Committee (chair FY08) 2007 – 2009

Deputy Dean’s Executive Committee 2007 – 2009

Dean’s Social Impact Committee 2007 – 2009

Exec. Committee, Integrated Product Design Program 2006 – 2014

Strategy Committee (chair) 2006 – 2007

Committee on MBA Experience and Engagement 2006 – 2008

# Publications

Books

1. Lele Sang and Karl T. Ulrich, *Winning in China, Success and Failure in the World’s Largest Economy*. Wharton School Press. 2021.
2. Karl T. Ulrich, *Design: Creation of Artifacts in Society*, University of Pennsylvania, 2011.
3. Christian Terwiesch and Karl T. Ulrich, *Innovation Tournaments: Creating and Selecting Exceptional Opportunities*, Harvard Business Press, Boston, 2009.
4. Ulrich, Karl T., Steven D. Eppinger, Maria C. Yang, *Product Design and Development*, Irwin/McGraw-Hill, New York, 7th Edition, 2019. Various editions also in Bahasa Indonesia, Chinese, Farsi, German, Italian, Korean, Portuguese, Spanish, and Russian.
5. Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 6th Edition, 2015.
6. Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 5th Edition, 2011.
7. Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 4th Edition, 2008.
8. Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 3rd Edition, 2004.
9. Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, Irwin/McGraw-Hill, New York, 2nd Edition, 2000.
10. Ulrich, Karl T. and Steven D. Eppinger, *Product Design and Development*, McGraw-Hill, New York, 1st Edition, 1995.

Articles in Refereed Journals

1. S. Kavadias and Ulrich K. T., “Innovation and New Product Development: Reflections and Insights from the Research Published in the First 20 Years of MSOM,” Manufacturing & Service Operations Management, (Anniversary Issue for the 20 years of M&SOM), 22 (1), 2020, pp. 84-92.
2. Joel O. Wooten and Karl T. Ulrich, “Idea Generation and the Role of Feedback: Evidence from Field Experiments with Innovation Tournaments,” *Production and Operations Management,* Vol. 26, 2017, p. 80–99. doi:10.1111/poms.12613.
3. Laura J. Kornish and Karl T. Ulrich, “The Importance of the Raw Idea in Innovation: Testing the Sow's Ear Hypothesis,” *Journal of Marketing Research*, Vol. 51, No. 1, 2014, p. 14-26.
4. Laura J. Kornish and Karl T. Ulrich, “Opportunity Spaces in Innovation: Empirical Analysis of Large Samples of Ideas,” *Management Science*, Vol. 57, No. 1, 2011, p. 107-128.
5. Karan Girotra, Christian Terwiesch, Karl Ulrich, “Idea Generation and the Quality of the Best Idea,” *Management Science*, Vol. 56, No. 4, 2010, p. 591-604.
6. 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.
7. Taylor Randall, Christian Terwiesch, and Karl T. Ulrich, “User Design of Customized Products,” *Marketing Science*, Vol. 26, No. 2, 2007, p.268-280.
8. 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.
9. Karl T. Ulrich, “Estimating the Technology Frontier for Personal Electric Vehicles,” *Transportation Research C*, 13: 448-462, 2005.
10. 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).
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. Taylor Randall, Karl Ulrich, and David Reibstein, “Brand Equity and Vertical Product Line Extent,” *Marketing Science*, Vol. 17, No. 4, 1998, p. 356-379.
18. 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.
19. David Robertson and Karl Ulrich, “Planning for Product Platforms,” *Sloan Management Review*, Vol. 39, No. 4, Summer 1998, p. 19-31.
20. 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.
21. R. Ramaswamy and Karl Ulrich, “A Designer’s Spreadsheet,” *ASME Journal of Mechanical Design*, Vol. 119, No. 1, 1997, p.48-56.
22. Karl Ulrich, “The Role of Product Architecture in the Manufacturing Firm,” *Research Policy*, Vol. 24, 1995, p. 419-440.
23. 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.
24. 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.
25. 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.
26. 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.
27. 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.
28. 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.
29. Karl T. Ulrich and Warren P. Seering, “Function Sharing in Mechanical Design,” *Design Studies*, Vol. 11, No. 4, 1990, p. 223-234.
30. 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.
31. Karl Ulrich and Warren Seering, “Computation and Conceptual Design,” *Robotics and Computer-Integrated Manufacturing*. Vol. 4, No. 3, 1988, p.309-315.
32. 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

1. Kornish, Laura J. and Karl T. Ulrich, “Assessing the Quality of Selection Processes,” under revision for resubmission, March 2017.
2. Wooten, J. and K. Ulrich, “The Impact of Visibility in Innovation Tournaments: Evidence from Field Experiments,” under revision for resubmission, March 2017.
3. Terwiesch, Christian and Karl T. Ulrich, “Will Video Kill the Classroom Star? The Threat and Opportunity of Massively Open On-Line Courses for Full-Time MBA Programs,” Report – Mack Center for Technological Innovation. University of Pennsylvania, July 2014.
4. Girotra, K. and K. Ulrich, “Empirical Evidence for Domain Name Performance,” Working Paper, The Wharton School, May 2011.
5. Ulrich, Karl T., “The Environmental Paradox of Bicycling,” Working Paper, The Wharton School, July 2006.

Chapters in Edited Volumes

1. Karl T. Ulrich, “The Roles of Users and Experts in Design,” in *Kluwer Handbook on New Product Development*, 2007.
2. 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.)
3. 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.)
4. 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.)
5. 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.
6. 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).
7. 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.
8. 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).
9. 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

1. Ulrich, Karl T., “Why Bicycles Are Making a Huge Comeback in China,” *Knowledge at Wharton*, March 30, 2017.
2. Ulrich, Karl T., “Design is Everything?” *Journal of Product Innovation Management*, Vol. 28, p. 394–398, 2010.
3. Karl T. Ulrich, “Terrapass Inc.,” Case Study, The Wharton School, August 2005, available from Epodia.com.
4. 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.
5. 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).
6. Jeff Smith and Karl Ulrich, “Design Matters,” *Design Management Journal*, Vol. 12, No. 3, Summer 2001, p. 28-34.
7. David Reibstein, Taylor Randall, and Karl Ulrich, “Brand Equity and Line Extension: How Low Can You Go?” *The Financial Times*, October 5, 1998.
8. Karl T. Ulrich and Steven D. Eppinger, “Educating Product Development Leaders,” *Design Management Journal*, Vol. 3, No. 3, Summer 1992, p. 47-54.
9. Karl T. Ulrich, “Computer-Supported Product Design,” *Design Management Journal*, Vol. 1, No. 2, Summer 1990, p. 62-67.

Articles in Refereed Conference Proceedings

1. Karl T. Ulrich, “Innovation in the University,” *Proceedings of Foundations of Computer-Aided Process Design* (FOCAPD), Princeton University, July 2004.
2. 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.)
3. 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.)
4. Karl T. Ulrich, “The Role of (Rapid) Prototyping in (Rapid) Product Development, *Proceedings of International Manufacturing Systems Conference*, 1993, Stuttgart.
5. Bala Subramaniam and Karl Ulrich, “Representation of Producibility Constraints,” *Proceedings of ASME Design Theory and Methodology Conference*, September 1992, p. 65-72, Phoenix.
6. 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.
7. 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.)
8. 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.
9. 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.)
10. 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.)
11. 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.
12. 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.)
13. 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.
14. 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.
15. 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).
16. 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.
17. 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.
18. 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).
19. 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.
20. 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.
21. 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.)
22. 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.
23. 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.)
24. Karl Ulrich and Warren Seering, “A Computational Approach to Conceptual Design,” *Proceedings of International Conference on Engineering Design*, ICED 87, August 1987, Boston.

# Patents

*Ice Cream Scoop,* U.S. Patent 9,173,527, November 3, 2015 (with J. Salazar et al.), Assignee: Belle-V, LLC.

*Ice Cream Scoop,* U.S. Patent D713,219S, September 16, 2014 (with J. Salazar et al.), Assignee: Belle-V, LLC.

*Pivoting Nose-Less Bicycle Seat,* U.S. Patent 8,668,259, March 11, 2014, Assignee: Nexride LLC.

*Self-Cleaning Litter Box,* U.S. Patent 8,028,659, October 4, 2011 (with A. Cook, K. Grube, T. Devlin, J. Greason, N. Ulrich, and C.L. Yau), Assignee: Lucky Litter LLC.

*Self-Cleaning Litter Box,* U.S. Patent 7,762,213, July 27, 2010 (with A. Cook, K. Grube, T. Devlin, J. Greason, N. Ulrich, and C.L. Yau), Assignee: Lucky Litter LLC.

*Folding Bicycle,* U.S. Patent 7,490,842, February 17, 2009 (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”).

# Languages: Mandarin (intermediate), Italian (intermediate)