

## **Robert G. Wilhelm**

Vice Chancellor for Research and Economic Development  
Executive Director, The Charlotte Research Institute  
Professor, Department of Mechanical Engineering and Engineering Science  
University of North Carolina at Charlotte

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### **Biographical Sketch**

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Dr. Robert G. Wilhelm, Vice Chancellor for Research and Economic Development at UNC Charlotte, has served in executive roles since 2005 and as a faculty member since 1993.

He has been instrumental in advancing the quality, diversity, and growth of research at UNC Charlotte by strongly connecting to academic programs and engaging regional and national partners. This advancement includes 6 National Science Foundation Industry/University Cooperative Research Centers, and 3 focus areas for large scale research and academic programs in Data Science/Business Analytics, Energy, and Advanced Manufacturing, as well as biomedical and bioinformatics programs. Recent initiatives support Social Sciences, Digital Humanities, and the broader research culture.

Wilhelm leads economic development efforts to start up, grow, and recruit companies for business growth. On campus, his organization supports 24 startup companies, 15 established companies with R&D presence, and numerous partnerships with companies like Sealed Air and Siemens. These efforts help attract the most talented faculty, support long term impact on the economic region, and contribute to distinctive academic programs for students.

Wilhelm joined the UNC Charlotte faculty in 1993 to work on the creation of Ph.D. programs and contributed to the formation of programs in biotechnology, information technology, mechanical engineering, nanoscale science, and physics and optical science. Since 2005, he has served as the Executive Director of the Charlotte Research Institute, UNC Charlotte's portal for business-university partnerships. Wilhelm is a Professor of Mechanical Engineering and Engineering Science, having lectured and worked in 38 states and over 18 countries.

Wilhelm worked at the Palo Alto Laboratory of Rockwell Science Center and Cincinnati Milacron as well as co-founding a high-tech company, OpSource. He holds a BSIE from Wichita State University, an MSIE from Purdue University, and a doctorate in mechanical engineering from the University of Illinois. As a Rotary Foundation Fellow in the U.K., he studied the history of science and technology at the University of Leicester and the Ironbridge Gorge Museum.

Dr. Wilhelm serves on many regional, national, and international advisory boards. He leads the reorganization of the University Research Park as chair of the University City Business Development District, is working to define a state-wide agenda for research and innovation while serving on the NC Board of Science, Technology, and Innovation, and has supported commissioning of ten new works as board member, and now board chair, for the nationally prominent Mint Museum of Craft and Design.

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### Education

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|--------------------------|---------|-------|---------------------------------|
| University of Illinois   | 1992    | Ph.D. | Mechanical Engineering          |
| Purdue University        | 1984    | M.S.  | Industrial Engineering          |
| Leicester University     | 1981-82 |       | History of Science & Technology |
| Wichita State University | 1981    | B.S.  | Industrial Engineering          |
| West Virginia University | 1977-79 |       | Civil Engineering               |

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### Personal

Born June 27, 1960 in Mobile, Alabama, USA.  
Married to Lynda Wilhelm, two children: Menaka Harshini and Amelia Ramani.

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### Leadership & Administrative Experience

**University of North Carolina at Charlotte,**

**Vice Chancellor for Research and Economic Development, 2011-present.**

**Charlotte Research Institute, Executive Director, 2005-present.**

**Associate Provost for Strategic Research Partnerships, 2009-2011.**

Lead university-wide efforts to advance the quality, diversity and growth of research with focus on outcomes for students, faculty, and partners.

Institutional leader for relationships with federal agencies, state entities, economic development community, and regional development organizations, as well as corporate and institutional partners.

Direct research organization that addresses all aspects of research enterprise including collaborative partnerships with industry and government, company access to and presence on campus, marketing, entrepreneurship and innovation, regional and state-wide economic development, grants & contracts administration, technology transfer, proposal development, compliance, research services, the millennial campus for business partners, and secure facilities for classified research.

Led the merging of Grants and Contracts Administration as well as the Charlotte Research Institute into the Research organization.

Develop and manage biomedical and bioinformatics research and educational partnerships with collaborators including Carolinas Healthcare System, UNC Chapel Hill Medical School CTSA, the North Carolina Research Campus, ibiliti – the center of innovation for North Carolina’s medical technology industry, and the North Carolina Biotechnology Center.

Foster and support focus areas for research that are aligned with regional economic clusters. Examples include EPIC, the energy production and infrastructure center, advanced manufacturing, data science and business analytics, and cyber security.

Worked with campus and regional stakeholders to develop a strategic plan for research growth that emphasizes focus areas and emerging interdisciplinary research, alignment with the economic, cultural, and social communities, and support for a research culture and research integrity. Recent initiatives include programs to support Social Sciences, Digital Humanities, and the broader research culture.

Serves as Institutional Official for research compliance.

Currently hold a security clearance.

### **Selected University-wide Leadership Experience**

Chancellor's Cabinet – executive leadership team meets weekly to discuss and act on strategic and operational decisions for UNC Charlotte.

Diversity Council.

Space and Property Steering Committee.

Information Technology Executive Steering Committee.

Steering Committee Chair, AURA, Advancing University Research Administration.

Football External Relations Committee.

Dean's Council.

Experience recruiting and developing senior academic leaders and senior research staff at UNC Charlotte: Deans, Department Chairs, Center Directors, and Executive Directors for Research Activities. Additional experience recruiting and developing senior executives for nonprofit corporations.

### **Selected Professional Leadership Development**

National Outdoor Leadership School, 2011 and 2014, Professional Leadership Training.

American Leadership Forum, Class X, Charlotte, NC, 2010.

Institute for Management and Leadership in Education, Harvard University, 2009.

Constituency-based Fund Raising Models, John Brown Limited, 2005.

Various workshops and training for Vice Presidents of Research and Graduate Deans.

### **Selected Examples of Administrative Experience and Results**

- *Strategy, Infrastructure and Program Building for Three Focus Areas*

**Energy:** Worked with the CRI Board of Directors, COE Dean, and UNC Charlotte leadership, to create the Energy Production and Infrastructure Center. Worked with partner companies to initiate steering committee and working group for EPIC to define research, education, and economic development opportunities. Recruited an initial director and chaired the search committee to attract a permanent director. Worked with Chancellor, Provost, Development Vice Chancellor, and stakeholders on campaign that yielded \$70M in state funds for facilities and \$5M (yearly) for faculty and operating expenses. Subsequently worked with development team on philanthropic gifts that currently exceed \$17M for EPIC.

**Data Science / Business Analytics:** Work with Chancellor, Provost, Development Vice Chancellor, Dean of College of Computing and Informatics and Business Partners to create academic and research programs that are aligned with goals of the economic region with emphasis on analytics and applications for financial services, health, retail, and energy.

Managed changes in research funding allocations to make strategic hires, offer executive education programs, workshop and conference events, and pursue large research proposal efforts. Supported regional cyber-security conference that has grown to national prominence, IUCRC in configuration analytics for cyber security, and the NSA scholars program, that have resulted in research funding growth and large scale proposals pending at NSF.

**Advanced Manufacturing / Metrology:** Supported and promoted internationally known research consortia for metrology and advanced manufacturing with an industrial affiliates program of 12 to 15 member companies that has grown and run successfully for over 15 years. Managed changes in research funding allocation to support large proposal development teams for an NSF Engineering Research Center for Self Aware Manufacturing and a finalist proposal for a National Network for Manufacturing Innovation Institute for Digital Design and Manufacturing Integration. Placed senior faculty member in the NIST Advanced Manufacturing Program Office for one year assignment, supported proactive 18 month proposal process, worked closely with proposal team and partners to generate \$105M in match/co-investment which included \$10M from the state of North Carolina. This large proposal is being prepared for resubmission in July 2016 with \$15M co-investment from state and institutional sources and over \$70M in corporate commitments.

- Led team that made agreement with Sealed Air Corp. to locate 30-40 R&D scientists and engineers at the PORTAL building on the Charlotte Research Institute campus at UNC Charlotte.
- Work regularly with consultants and a network of federal agency contacts to initiate new research opportunities and partnerships faculty. Results include new and increased funding with DARPA, ONR, ARL, DTRA, DOE, NSF, NIH, DOL, DOC, DOE, EPA and other federal agencies.
- Developed and recruited innovation and commercialization team with two different components of technology transfer and business startup. The Technology Transfer program is consistently ranked among the top ten U.S. Universities for disclosures, patents, licenses, and startups per \$10M in research funding by the Association of University Technology Managers. Ventureprise, a companion 501(c)(3) organization for innovation and startup companies, develops both university and community based businesses, offers academic courses and training programs, and operates the region's largest startup mentoring program and competition that attracts over 100 entries yearly from the southeast. This commitment to commercialization has led to creation of 2 new Angel funds in Charlotte, as well as planning for a statewide venture fund.
- Developed and sustain research development programs that, yearly, attract dozens of workshops and conferences to campus, initiate new research directions for teams of faculty, and initiate regional and national research collaborations.
- Worked with UNC System to fund "Open for Business" programs that created web based services to communicate key talent and accessible resources for R&D collaboration, communication and marketing collateral for partnerships, a regular program of lectures for faculty and students interested in business startups, and a program for prototyping of inventions. Subsequently merged early results on key talent and accessible resources into State-wide service called REACH NC.
- Developed master research agreements with the Electric Power Research Institute (EPRI), that represents approximately 90% of the electricity generated in the United States and extends to more than 30 countries internationally, and the Carolinas Healthcare Systems (CHS), one of the nation's largest and most comprehensive systems, with more than 60,000 full-time and part-time employees, more than 7,460 licensed beds and an annual budget

exceeding \$7.7 billion. More recent agreements have been made with Southern California Edison, SAS, and ABB.

- Fostered new medical research programs via seed funding programs in partnership with CHS that led to additional NIH funding at UNC Charlotte and CHS in areas spanning bioinformatics, cancer, and population health outcomes. Initiated a new longitudinal research program, the Charlotte Pancreatic Cancer Project, which promotes an interdisciplinary approach to research for cancer treatment and outcomes.
- Acquired community-based funding to promote cancer research at UNC Charlotte and used marketing presence to attract and recruit prominent cancer researchers to UNC Charlotte. In addition to increased student opportunities, funded research and publications, this effort has yielded a cancer diagnostics/prognostics startup company with impact in breast and pancreatic cancer.
- Developed partnership between Charlotte region and the North Carolina Biotechnology Center that has yielded a Charlotte regional office for NCBC, NCBC investments and loans in Charlotte biotech companies. Further results include equipment, startup and recruiting funds for UNC Charlotte as well as financial support and growth of the Charlotte Life Sciences Conference that draws over 300 business and research collaborators each year, increased interdisciplinary research in partnership with the North Carolina Research Campus, three growing biotechnology startups based on UNC Charlotte IP, and continued robust growth of Bioinformatics at UNC Charlotte with the creation of a bioinformatics service center for research support and academic programs spanning bachelors to Ph.D. level along with an industry oriented professional science master's degree program in bioinformatics and genomics.
- Fostered development of interdisciplinary research in optoelectronics that has generated two IUCRCs in meta-materials and free form optics as well as significant and growing publications, funded research, federal partnerships, and startup companies.
- Serve as University representative and board chair for University City Partners, the business development district surrounding UNC Charlotte. Led effort to define a new area plan for the research park adjacent to UNC Charlotte that has generated significant development in the research park and attracted thousands of jobs with companies like Wells Fargo, Electrolux, AREVA, Siemens, Cardinal Innovations, and Red Ventures. Led the reorganization of the University Research Park that is now managed by University City Partners.
- Lead research marketing and communication efforts that include the quarterly Millennial magazine for research and economic development, partnerships with regional affinity groups for CRTECH (IT), Bio-Connect (Life Sciences), and E4 (Energy), and a growing Science and Technology expo that includes a lecture series, a film series, and a daylong event with over 100 hands-on demonstrations for the general public.
- Built strong partnership with regional and state economic development partners including Charlotte Regional Partnership, the Charlotte Chamber, the North Carolina Research Campus, Business Innovation and Growth, North Carolina Department of Commerce, CED, Innoventure, and the Defense Security Technology Accelerator. Results include numerous successful company recruitments and an ongoing cycle of programs and projects for local business growth, recruitment, company startup, and defense contracting. Statewide results include a marketing campaign for the network of research campuses and research parks in North Carolina.
- Led design and construction of two different research infrastructure projects with on-time and in-budget performance. Using EDA funding, completed an 11,000 sq.ft. up-fit project in 2009 that supports shared research infrastructure and 6 R&D partners companies co-located in lab facilities on campus. Using University funds, completed the 90,000 sq.ft.

PORTAL building in 2014. Currently have 24 startups with 100 employees in PORTAL and are actively recruiting corporate R&D partners.

- Supported development and growth of campus wide interdisciplinary efforts in sustainability, results include highly competitive team in DOE solar decathlon, a startup company for biofuels processing based on UNC Charlotte IP, collaborative research with a regional Eco-Complex, NSF funding for a Research Networks program for Social Sustainability, new research efforts that connect energy and sustainability as well as new faculty initiatives in community based research.
- Lead campus wide team on “Advancing University Research Administration” for continuous improvement of administrative processes. Successful projects include stream-lined hiring processes, workflow automation, modernization of enterprise software, as well as reports and planning tools for principal investigators.
- Lead growth of the Charlotte Research Institute as the business research partnership organization for UNC Charlotte. Created process for on-site industrial collaboration that now typically serves 10-15 companies located on campus. Developed agreements, staffing, and infrastructure that allow regional and national companies to access research infrastructure for joint R&D. Leveraged endowment funding stream to bring increased research funds, post-doctoral fellows, research equipment, and prominent researchers to UNC Charlotte.
- Lead operations on campus for restricted and classified research. Maintain facility security clearance, enclosed and restricted space, and a newly constructed SCIF. Results include successful research contracts with DIA, ARL, and USSOCOM.

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## **Professional Experience**

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### **Industrial**

#### **OpSource**

Founding partner in 2001 of a high-technology manufacturing company that licensed intellectual property from UNC-Charlotte. The company had operated profitably for 5 years when I divested my holdings to pursue an academic leadership position at UNC Charlotte.

#### **Rockwell International Science Center, Palo Alto Laboratory**

Visiting Research Engineer, summer 1993.

Member of the Technical Staff, 1992.

Senior Technical Associate, 1990-1991.

#### **Cincinnati Milacron**

Industrial Software Division, Project Engineer for manufacturing software, 1986-1987.

Electronic Systems Division, Manufacturing Engineer for control hardware, 1984-1986.

### **Academic**

#### **University of North Carolina at Charlotte,**

Department of Mechanical Engineering & Engineering Science,

Professor, 2003-present,

Associate Professor, 1998-2003,

Assistant Professor, 1993-1998.

School of Information Technology,  
Associate Professor, 1998-2001.

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## **Selected Examples of University & Community Service**

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### **Community & Professional Service**

#### **Board of Directors:**

North Carolina Biotechnology Center, 2011-present. Appointed by NC Speaker of the House.

North Carolina Board of Science, Technology, & Innovation, 2013-present. Appointed by NC Governor.

University City Partners, Business Development District, 2006-present, board chair, 2008-2009 and 2014-2016.

Mint Museum of Craft and Design, 2008-present, currently board chair.

North Carolina Center of Innovation for Advanced Medical Technologies, 2008-2013.

Neurolife of the Carolinas / the Brain Tumor Fund for the Carolinas, 2006-2013.

American Society for Precision Engineering, 2001-2004.

Countryside Montessori School (Independent K-12), 2009-2012.

CLT Joules, Energy Incubator, 2016- present.

#### **Advisory Board Member:**

Charlotte National Advertising Campaign Board, 2013-present.

Charlotte Regional Partnership, Board, 2014-present.

NC Science Festival Advisory Board, 2015-present.

Charlotte Regional Partnership, Business and Marketing Advisory Committee, 2010-present.

Johnson C. Smith University, HBCU-UP/O.A.S.I.S. External Advisory Committee, 2011-present.

UNC Chapel Hill Medical School, NIH Clinical Translational Science Award, 2007-2010.

Executive Committee of Council on Research Policy and Graduate Education (CRPGE),  
Association of Public and Land-grant Universities (APLU), 2006-2009 and 2014-2015.

Charlotte Office of the North Carolina Biotechnology Center, 2006-2013, chair & co-chair.

Charlotte Area Science Network, 2006-present.

Carolinas Council of Governments, Advanced Manufacturing, 2005-2007.

UNC General Administration, Economic Transformation Council, 2005-present.

UNC General Administration, Research Council, 2011-present.

### **University Service**

Councilor (representative) for Oak Ridge Associated Universities ORAU, 2011-present.

Chair, Search Committee for Chair of Biology Department, 2010-2011.

Chair, Search Committee for Energy Production & Infrastructure Center Director 2009-2011.

Advisory Committee for UNC Charlotte School of Public Health, 2008-present.

Chair, Search Committee for Dean of the Belk College of Business, 2007-2008.

UNC Charlotte Export Control Committee, 2007-present.  
Ph.D. Program in Nanoscale Sciences, Founding Member of Faculty, 2007.  
UNC Charlotte Patent Review Committee, 2006-present.  
UNC Charlotte Representative for UNC System Graduate Council, 2001-2004.  
Planning Committee for Ph.D. Program in Optics, College of Arts & Sciences, 2001.  
Search Committee for Chief Information Officer of UNC Charlotte, 2000-2001.  
UNC Charlotte School of Information Technology Steering Committee, 1999-2001.  
UNC Charlotte Faculty Council, 1993-96, 2004-2006.  
College of Arts & Sciences, Dept. of Biology, Ph.D. Faculty 1998-2003.

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## **Selected Presentations & Lectures**

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Panelist on Higher Gains with Higher Education, Strategic Investment Summit: USA -- Insights for Growth in R&D and Manufacturing, General Consulate of the U.S., Frankfurt, Germany, 29 September 2015.

VP Research –The Three W's – Where, What and Why, New/Future VPR workshop, Summer Meeting of the Council on Research, Association of Public and Land-Grant Universities, Park City, Utah, USA, 28 June 2015.

Panelist on How I/UCRCs Fit Into the University Mission and University Support for I/UCRCs, NSF/I/UCRC Annual Meeting, Arlington, VA, USA, 9 January 2015.

Energy resiliency is an EPIC effort!, USU Innovation Challenge Pitch Session, Orlando, Association of Public and Land-Grant Universities, FL, USA, 2 November 2014.

University-Industry Collaborations and Intellectual Property, CIRP CMAG, Corporate Members Advisory Group, Pisa, Italy, 24 August 2010.

Reinventing an Innovation Ecology with New Models for Research and Research Parks, CIRP Scientific Technical Committee on Design, Boston, USA, 27 August, 2009.

New Models for Technology Transfer and Industrial Collaboration at the Charlotte Research Institute, Summer Meeting of CRPGE, NASULGC, Sedona, AZ, 26 July 2008.

The Charlotte Research Institute as a Model for Economic Development for Knowledge-based Sectors, International Economic Development Council, Federal Forum, Washington DC, 14 April 2008.

An ECN Framework for Collaborative Engineering,” CIRP Working Group on Engineering Collaboration via Negotiation, Dresden, Germany, 23 August 2007.

Application Areas for Collaborative Engineering Research, CIRP Working Group on Engineering Collaboration via Negotiation, Kobe, Japan, 24 August 2006.

Geometric Tolerances and Collaborative Engineering, CIRP workshop on Engineering Collaboration as Negotiation, Shanghai, China, 26 May 2005.

*Numerous professional presentations made in 38 states and 18 countries between 1981 & 2013.*

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## **Graduate Student Supervision**

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*Supervised 6 Ph.D. Dissertations and 14 Masters Theses. Served on 25 additional advisory committees and as external examiner for Hong Kong University of Science and Technology.*



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## Research & Educational Funding

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### Selected Infrastructure Funding

PORTAL – Partnership, Outreach, and Research to Accelerate Learning, R.G. Wilhelm, Capital Funding for 90,000 square foot building, \$37M, 2008-2014.

UNC Charlotte Open for Business Research Infrastructure, R.G. Wilhelm and S. Mosier, UNC General Administration Special Programs, \$900K awarded (\$600K budgeted), 2006-2010.

UNC Charlotte / Charlotte Research Institute Applied Optics Regional Economic Support Project, R.G. Wilhelm, J. Lorden, and M. Fiddy, US Department of Commerce Economic Development Agency, \$1.2M funding with \$1.5M institutional match, 2006-2010.

### Selected Research Funding

Automated Whole Part Inspection for Manufacturing Process Control, R.G. Wilhelm: consultant for Raindrop Geomagic, Inc. (Research Triangle Park, NC), US Department of Commerce, Advanced Technology Program (ATP), \$40,000 (portion of \$1M project), 2003-2006.

NSF Industry University Cooperative Research Center for Precision Metrology, Co-PI with R. Hocken, et al, NSF, \$350,000, 2003-2008.

Software Frameworks for Integrated Measurement Processes, R.G. Wilhelm, DaimlerChrysler, \$145,000, 2000-2004.

EECOMS Extended Enterprise Coalition for Integrated Collaborative Manufacturing Systems, Co-PI with W. Tolone, B. Chu, & J. Long (Lead for Constraint Systems), National Institute of Standards & Technology ATP, \$1.1M (UNCC portion of \$30M project), 1998-2001.

Virtual Manufacturing, R.G. Wilhelm & S. Patterson, Caterpillar, Inc., \$522,619, 1996-1999.

CIIMPLEX An Agent-Based Framework for Integrated Intelligent Planning & Execution, Co-PI with B. Chu, J. Long, & Z. Zhang (Lead for Scheduling Algorithms), National Institute of Standards & Technology ATP, \$1.14M (UNCC portion of \$23M project), 1996-1999.

NSF Young Investigator Award, R.G. Wilhelm, NSF, \$332,500, 1994-2001.

Equipment for Precision Engineering, Co-PI with R. Hocken, et al (Lead for Computing Equip.), NSF, \$1.1M, 1994-1999.

*Awarded over \$6,000,000 in peer reviewed competitive research funding 1993-2009.*

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## Selected Publications

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### Journal Publications

Scott Smith, R.G. Wilhelm, Brian Dutterer; Harish Cherukuri, Gaurav Goel, “Sacrificial structure preforms for thin part machining”, Annals of CIRP, 61(1):379-382, 2012.

R. G. Wilhelm, and B. L. Burks, “Reinventing an Innovation Ecology with New Models for Research and Research Parks”, Proceedings of the XXVI IASP World Conference on Science and Technology Parks, Raleigh, NC USA, 2009.

S.C.-Y. Lu, W. Elmaraghy, G. Schuh and R. Wilhelm, “A Scientific Foundation of Collaborative Engineering”, Keynote Paper, Annals of CIRP, 56(2):605-634, 2007.

Scott Smith and R.G. Wilhelm, “Beyond Geometry: Process Planning for High Speed Machining of Monolithic Structures”, Transactions of the North American Manufacturing Research Institute of SME, 34:175-180, 2006.

T. M. Kethara Pasupathy, X. Zhao, and R.G. Wilhelm, “Flexible Tools for Specifying Design Variation”, The International Journal of Advanced Manufacturing Technology, 28(7-8): 659-664, 2006.

R.G. Wilhelm, B. Chu, and R. Sun, “Electronic Commerce Negotiation in a Supply Chain Via Constraint Evaluation”, Annals of CIRP, 54(1):423-426, 2005.

T. M. Kethara Pasupathy, R.T. S. Raju, and R.G. Wilhelm, “Evolutionary Algorithm for the Placement of Fluid Power Valves on a Valve Stand”, Engineering with Computers, 20(4):354-362, 2005.

B. Chakravarthy, H. Cherukuri, and R.G. Wilhelm, “Prediction of Thermal Soakout Time using Analytical Models”, Journal of Precision Engineering, 26(1):15-23, 2002.

R.G. Wilhelm, R. Hocken, and H. Schwenke, “Task Specific Uncertainty in Coordinate Measurement”, Keynote Paper, Annals of CIRP, 50(2):553-563, 2001.

Yau, Hong-Tzong, Chun-Yen Chen, and R.G. Wilhelm, “Registration and Integration of Multiple Laser Scanned Data for Reverse Engineering of Complex 3-D Models”, International Journal of Production Research, 38(2):269-286, 2000.

R. Edgeworth and R.G. Wilhelm, “Adaptive Sampling for Coordinate Metrology”, Precision Engineering, 23(3):144-154, 1999.

*Over 100 peer reviewed articles, technical reports, and book chapters 1984-2013.*

## **Books**

R.G. Wilhelm and S. C-Y. Lu, Computer Methods for Tolerance Design, World Scientific Publishing Co., 1992, ISBN 981-02-1058-2.

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## **Patents Issued**

K. S. Smith, R. G. Wilhelm, and B.S. Dutterer, Patent approved: “Manufacturing Methods and Systems Using Sacrificial Structure Preforms,” U.S. Patent 9,375,818, June 28, 2016.

R.G. Wilhelm and R. Edgeworth, “Systems and methods for adaptive sampling and estimating a systematic relationship between a plurality of points”, U.S. Patent 7,787,696, Aug. 31, 2010.

K. S. Smith, and R. G. Wilhelm, “Method and system for manufacture of parts”, U.S. Patent 7,177,713, Feb. 13, 2007.

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## **Honors & Awards**

2013 Fellow, The International Academy for Production Engineering, (by Invitation & Election).

2012 NAMRI/SME S.M. Wu Research Implementation Award.

2001 Alcoa Foundation Outstanding Faculty Award in Graduate Education.

1994 NSF Young Investigator Award.

1994 SME Outstanding Young Manufacturing Engineer Award.

Rotary Foundation Fellowship for study at the University of Leicester, Great Britain, 1981-82.

NAVSEA Special Achievement Award for the development of models and software for structural analysis, 1980.

Sigma Xi, Omicron Delta Kappa, Tau Beta Pi and Alpha Pi Mu.

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## **Professional Affiliations**

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Association of Public and Land-grant Universities, Council on Governmental Relations, International Academy for Production Engineering, North American Manufacturing Research Institution, American Society of Mechanical Engineers, American Society for Precision Engineering, European Society for Precision Engineering and Nanotechnology – EUSPEN, Society of Manufacturing Engineers, American Society for Engineering Education, Association of University Research Parks, International Association of Science Parks, Association for Capital Growth, and University Industry Demonstration Partnership.