

# DAVID NEVILLE ROCHELEAU

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## Education

- Ph.D., 1992, Mechanical Engineering, University of Florida, Gainesville, FL.
- M.S., 1986, Mechanical Engineering, University of Illinois, Urbana-Champaign, IL.
- B.S., 1981, Mechanical Engineering, University of Vermont, Burlington, VT.

## Professional Employment

- 1992 to 2007, Associate Professor—tenured and promoted from Assistant Professor in 1999—Department of Mechanical Engineering, University of South Carolina. Coordinator of the Computer-Aided Engineering Curriculum. Main research interest—Advanced Actuators, Mechanical Design, Applied Mechanisms, and Design of Trans-tibial Prosthetics.
- 1988 to 1992, Graduate Research Assistant, Department of Mechanical Engineering, University of Florida. Research and development of semi-autonomous robotic system for the Department of Energy, Oak Ridge National Labs.
- 1986-1988, Software Engineer, Prime/Computervision, Bedford, MA. Developed spatial constraints algorithm and software for FRENDA application product.
- 1985 to 1986, Visiting Instructor, University of Illinois, Urbana, IL. Taught Computer-Aided Design, a senior/graduate level technical elective in mechanical engineering.
- 1984 to 1985, Graduate Research Assistant, University of Illinois, Urbana, IL. Performed research in Computer-Aided Design, and provided teaching assistance in Computer-Aided Design and Systems Control.
- 1981 to 1984, Junior/Senior/General Field Engineer, Schlumberger Well Service, Midland, TX. Exploration of oil and gas reserves. Performed measurements (logging) to aid in the production and completion of oil and gas wells.

## Professional Service

- Licensed Professional Engineer, P.E. in South Carolina
- Technical Consulting—Mechanisms, Design, Computer-Aided Engineering and Analysis.

## Professional Societies

- ASME—American Society of Mechanical Engineers
- ASEE—American Society for Engineering Education
- SPE—Society of Petroleum Engineers
- $\tau\beta\pi$ —Tau Beta Pi Engineering Honor Society
- Who's Who in Engineering Education

## Honors and Awards

- 2006 University of South Carolina Samuel Litman Distinguished Professor Award
- 2004 University of South Carolina Michael J. Mungo Excellence in Teaching Award
- 1999 Pi Tau Sigma Mechanical Engineering Professor of the Year
- 1999 Gamecock Faculty All-Star
- 1998 University of South Carolina Outstanding Service Teaching Award
- 1997 Pi Tau Sigma Mechanical Engineering Professor of the Year
- 1996 Outstanding Contribution Award 3<sup>rd</sup> Biennial European ESDA Conference, France
- 1995 Procter & Gamble Best Paper Award 4<sup>th</sup> Applied Mechanisms and Robotics Conference

## Books

- Rocheleau, David N., **INTRODUCTION TO CFDESIGN**, In process. To be published 2009.
- Dally, James W. and Rocheleau, David N., **INTRODUCTION TO ENGINEERING DESIGN**, ISBN 0-9655911-2-3, College House Enterprises, LLC, Knoxville, TN., 1998.

## Selected Publications

- Howe, M.A. and Rocheleau, D.N., *Use of Model Predictive Control (MPC) to mitigate competing performance objectives in a PEMFC system*, Journal of Fuel Cell Science and Technology, Paper number: FC-07-1117. Summer 2008.
- Jabbari, E., Rocheleau, D.N., Weijie, X. and He, X., *Fabrication of Biomimetic Scaffolds with Well-Defined Pore Geometry by Fused Desposition Modeling*, 2007 ASME International Conference on Manufacturing Science and Engineering, MSCE2007, October 15-17, 2007, Atlanta, GA. Paper Number MSCE2007-31011
- Rocheleau, D.N. and Howe, M.A., *Use of optimal controls to mitigate competing performance objectives in a PEMFC system*, Fifth International ASME Conference on Fuel Cell Science, Engineering and Technology, FUELCELL2007, June 18-20, 2007 New York, NY. Paper Number FUELCELL2007-25128
- Rocheleau, D.N. and Axtell, M., *Design of a Dual Piezoelectric Controlled Electro-hydraulic Actuator*, 2006 ASME International Design Engineering Technical Conferences, DETC2006, September 10-13, 2006 Philadelphia, PA. Paper Number DETC2006-99060.
- Rocheleau, D.N. and Sagona, J.F., *Modeling Balance of Plant Components for a PEM Fuel Cell*, Fourth International ASME Conference on Fuel Cell Science, Engineering and Technology, FUELCELL2006, June 19-21, 2006 Irvine, CA. Paper Number FUELCELL2006-97182
- Rocheleau, D.N. and Brewer, T., *Development of a Variable Dynamic Automotive Suspension Model Using Virtual Test Bed*, 2005 ASME International Mechanical Engineering Congress and Exposition, IMECE2005, November 5-11, 2005 Orlando, FL. Paper Number IMECE2005-80601.
- Rocheleau, D.N. and Sloope, D., *Dynamic Modeling of an Overhead Valve Engine Cam-Follower System Using a Resistive Companion Dynamic Simulation Solver*, 2005 ASME International Mechanical Engineering Congress and Exposition, IMECE2005, November 5-11, 2005 Orlando, FL. Paper Number IMECE2005-80309.
- Rocheleau, D.N. and Dougal, R., *A Mechanical and Electrical Engineering Interdisciplinary Capstone Design Project*, 2005 ASME International Mechanical Engineering Congress and Exposition, IMECE2005, November 5-11, 2005 Orlando, FL. Paper Number IMECE2005-81223.
- Giurgiutiu, V., Lyons, J., and Rocheleau, D.N., and Liu, W., *Mechatronics/Microcontroller Education for Mechanical Engineering Students at the University of South Carolina*, (Journal of) *Mechatronics*, Volume 15, Issue 9, November 2005 pp. 1025-1036.
- Wells, J.G., Voglewede, P.A., and Rocheleau, D.N., *Design for improved Trans-Tibial Prosthetic Devices Using Four Bar Mechanisms*, 2005 ASME Design Engineering Technical Conferences, Long Beach, CA, September 24-28, 2005.

- Brader, J.S. and Rocheleau, D.N., Development of a Piezoelectric Controlled Hydraulic Actuator for a Camless Engine -- Part I System Design, Journal of Automotive Engineering. Aug 2004 Vol. 218 No. D8.
- Brader, J.S. and Rocheleau, D.N., Development of a Piezoelectric Controlled Hydraulic Actuator for a Camless Engine -- Part II System Modeling, Journal of Automotive Engineering. Aug 2004 Vol. 218 No. D8.
- Brader, J.S., Trevett, N.R., and Rocheleau, D.N., Advances in Actuation Systems to Improve Vehicle Performance and Safety, 2003 ASME International Congress, Washington, DC, Nov 15-21, 2003.
- Giurgiutiu, V., Lyons, J., and Rocheleau, D.N., Mechatronics/Microcontroller Education for Mechanical Engineering Students at the University of South Carolina, 2004 American Society for Engineering Education Annual Conference & Exposition., Session #1526 DELOS, Salt Lake City, UT, June 20-23, 2004.
- Brader, J.S., Langdon, R.H, and Rocheleau, D.N., Application of a Piezoelectric Piloted Camless Engine Actuator, Paper Offer #: 04ANNUAL-374, SESSION TITLE: Variable Valve Actuation, P-14, 2004 SAE World Congress, Detroit, MI, March 8-11, 2004.
- Long, C.E., Gatzke, E.P and Rocheleau, D.N., Experiments for a Multi-disciplinary Industrial Controls Course, 2003 AIChE Annual Conference, San Fransisco, CA, Nov 16-21, 2003
- Rocheleau, D.N. and Dougal, R.A., Succeeding at Teaching Interdisciplinary Design, 2003 ASEE Southeastern Section Annual Conference Proceedings, Macon, GA, April 6-8, 2003.
- Rocheleau, D.N. and Brader, J.S., Failure Analysis and Redesign of a Pressure Powered Pump Mechanism, 2001 ASME International Mechanical Engineering Congress and Exposition, New York, NY, DE-Vol. 113, Book 100518 Volume 3. November 11-16, 2001.
- Rocheleau, D.N. and Moore, M.M., Design and Analysis of a Camera and Sensor Positioning Mechanism for ARIES, an Autonomous Mobile Robot, 25th Biennial Mechanisms Conference, Atlanta GA, Paper: DETC98/MECH-5988, pp. 1-6, September 13-16, 1998.
- Rocheleau, D.N., Habitat for Humanity Freshman Design and Build Experience, 1998 Frontiers in Education (FIE) Conference, Paper No. 1077, Session T4G, pp. 488-492, Tempe AZ, Nov 4-7, 1998.
- Alford, E.M. and Rocheleau, D.N., Designing Effective Writing and Presentation Assignments for Freshman Engineering Students, 1998 Frontiers in Education (FIE) conference, Paper No. 1093, Session T3H, pp. 372-377, Tempe AZ, Nov 4-7, 1998.
- Bruck, H., Rocheleau, D.N., and Rogers, C. Development of Statewide Engineering Head Start Program, 1998 Frontiers in Education (FIE) conference, Paper No. 1098, Session S4H, pp. 1361-1364, Tempe AZ, Nov 4-7, 1998.
- Lyons, Morehouse, Rocheleau, Young, and Miller, A Proposed Vehicle for Delivering a Mechanical Engineering Systems Laboratory Experience, 1998 ASEE Annual Conference, Seattle WA. Trends in Mechanical Engineering 2266, pp. 1-6, June 28 – July 1, 1998.
- Rocheleau, D.N., Combining a Freshman Year Experience Seminar with a Design and Build Experience, 1998 ASEE Southeastern Section Annual Meeting Proceedings, Orlando, FL., pp. 7-14, April 5-7, 1998.

- Rocheleau, D.N. and Ranson, W.F., III, Planar Surface Reconstruction using Circle Generator Laser Light, Optics and Lasers in Engineering (Journal of), Vol. 30 No 1 pp. 39-52, July, 1998.
- Rocheleau, D.N., Mechanical Deployment System on ARIES, an Autonomous Mobile Robot, Journal of Applied Mechanisms and Robotics, 1997.
- Rocheleau, D.N., A Mobile Robot Inspector For Low-Level Stored Radioactive Waste, Proceedings of the American Nuclear Society Seventh Topical Meeting on Robotics and Remote Systems, Vol. 1, pp. 95-98, American Nuclear Society, Augusta, GA, April 28, 1997.
- Rocheleau, D.N. and Zhao, M., Drilling Forces in High Curvature Wellbores, a Comparison of Analytical Model Results with MWD Data, 8th Annual International Energy Week, Houston, TX, Book III, Vol. I, pp. 153-160, January 28-30, 1997.
- Rocheleau, D.N. and Moore, M.M., Camera Positioning Mechanism for ARIES, an Autonomous Mobile Robot, 24th ASME Biennial Mechanisms Conference, Irvine, CA, Paper: 96-DETC/MECH-1154, pp. 1-6, August 19-22, 1996.
- Rocheleau, D.N., An assembly representation for articulated mechanisms, Third Biennial Joint Conference on Engineering Systems Design & Analysis (ESDA '96), PD-Vol. 80, Volume 8, Book #G00998, pp. 23-28, Montpellier, France, July 1-4, 1996.
- Rocheleau, D.N., Interactive assembly modelling and constraint satisfaction of articulated mechanisms, Third Biennial Joint Conference on Engineering Systems Design & Analysis (ESDA '96), PD-Vol. 80, Volume 8, Book #G00998, pp. 29-36, Montpellier, France, July 1-4, 1996.
- Rocheleau, D.N. and Ranson, W.F., III, Planar Surface Reconstruction using Soliton Wavelet and Structured Light, 1996 VIII International Congress - Post-Conference Proceedings: "Experimental Mechanics", pp. 205-210.
- Byrd, J.S., et al., ARIES: A Mobile Robot Inspector. Proceedings of the ANS 6th Topical Meeting on Robotics and Remote Systems, Vol. 2, pp. 831-837. American Nuclear Society, La Grange Park, IL, 1995.
- Rocheleau, D.N., Mechanical Deployment System on ARIES, an Autonomous Mobile Robot, Proceedings of 4th National Applied Mechanisms & Robotics Conference, Cinn., OH., Vol. 1, pp. AMR 95-020-01—07, Dec 10-13, 1995, Received Procter & Gamble Best Paper Award.
- Rocheleau, D.N., Using Geared Mechanism to Increase the Thermal Efficiency of Conventional IC-Engines, 23rd ASME Biennial Mechanisms Conference, Minneapolis, MN., DE Vol. 71 Machine Elements and Machine Dynamics pp. 303-308, Sept 11-14, 1994.
- Bono, J.E., Morse, J.S., Rocheleau, D.N. and Khan, J.A., A Study of variable-stroke constant-volume combustion spark ignition engine, Fall Technical Conference of ASME Internal Combustion Engine Division, ICE-Vol. 20, pp. 119-124, September 1993.
- Rocheleau, D.N. and Dareing, D.W., Effect of Drag Forces on Bit Weight in High Curvature Well Bores, ASME Journal of Energy Resources Technology, vol. 114, no. 3. pp. 175-180, September 1992.

- Rocheleau, D.N., Assembly Modeling of Spatial Mechanisms Using Geometric Constraints, Proceedings of the 5th Annual Conference on Recent Advances in Robotics, pp. 228-235, Boca Raton, FL, June 11-12, 1992.
- Rocheleau, D.N. and Dareing, D.W., Effect of Drag Forces on Bit Weight in High Curvature Well Bores, Energy-sources Technology Conference and Exhibition, Houston, TX., PED-Vol. 40, pp. 103-109, January 26-29, 1992.
- Rocheleau, D.N. and Crane, C.D., Development of a Graphical Interface for Robot Operation in a Hazardous Environment, Proceedings of the 1991 IEEE International Conference on Systems, Man, and Cybernetics, Charlottesville, VA, vol. 2, pp. 1077-1081, October 1991.
- Rocheleau, D.N. and Lee, K., System for Interactive Assembly Modelling, Computer-Aided Design, vol. 19, No. 2, pp. 65-72, March 1987.

### Recent Funding

- *Analysis and Redesign of Power Tool Epicyclic Gear Trains*, Cooper Power Tools, \$63,347, Aug 2007—Dec 2008.
- *Using Blow-Fill-Seal Plastic Manufacturing Technology*. Holopack International. \$68,950, Jan 2008—May 2008.
- *PEMFC Balance of Plant*. NSF I/U CRC for Fuel Cells—Savannah River National Labs. \$48,000, Jan 2008—Dec 2008.
- *Analysis of Combat Casualty Procedures and Equipment*. North American Rescue Products, Inc. \$24,600. June 2007—Nov 2007.
- *High Level Analysis Techniques for Balance of Plant*. NSF I/U CRC for Fuel Cells—Project 18 John Deere Balance of Plant. \$48,000, Jan 2006—Dec 2006, \$31,500, Jan 2004—Dec 2005 and \$15,000, September 2002—September 2003.
- *Project Management and Scheduling Tools for Wood Processing Conveyor Systems*. South Carolina Center for Manufacturing and Technology. \$15,000, March 2003—June 2003.
- *Prompting Active Learning in Engineering and Technical Disciplines through application of Problem and Case Based Learning Strategies*. Bridges Partnership Seed Grant Fund—USC Education and Engineering NSF Grant. \$8,000, March 2003—December 2003.
- *Effect of IOP and CCP on Bruch's Membrane Leading to Blindness*. Palmetto Health Alliance Research and Education Foundation. \$2,000, May 2002—December 2002.
- *Computer Based Estimating and Costing Tool for Wood Processing Conveyor Systems*. South Carolina Center for Manufacturing and Technology. \$14,145, May 2002—August 2002.
- *Collaboration for the development of the next generation Internal Combustion Engine*. USC Provost Office--Opportunity Fund. \$42,200, July 2002—June 2003.
- *Acquisition of Gage 2000 R Coordinate Measuring Machine*, Brown & Sharpe Metrology Equipment Grant Program. \$15,000, March 2002—February 2003.
- *Microcontroller/Mechatronics Education for Non-EE students at the University of South Carolina*. National Science Foundation, Division of Undergraduate Education Course Curriculum, and Laboratory Improvement (CCLI) Adaptation and Implementation. \$142,000, January 2002—December 2003 with Giurgiutiu and Lyons.

- *Design of Piezoelectric Controlled Engine Valve*. South Carolina Center for Manufacturing and Technology. \$11,000, January 2002—June 2002.
- *Testing of Camless Engine Prototype*. South Carolina Center for Manufacturing and Technology. \$11,000, July 2001—December 2001.
- *Positioning System for Core Scanning Imager*. Petro Image, Ltd. LLC. \$16,400, June 2000—August 2000.
- *Mechanical Engineering CMAT Activity FY2000*. Center for Manufacturing and Technology (USC-CMAT). \$221,733, July 2000—June 2001.
- *On the Internal Combustion Engine of the Future: The Camless Engine*. South Carolina Department of Commerce. Total: \$250,000, USC-MechE: \$80,000, PalmettoSoft: \$170,000, June 2000—May 2001 with Bayoumi and Schmid.

### **Other Notable Funding**

- *Project Exactly Delivery Device (PEDD)—Phase II*. Lockheed Martin Aircraft—Greenville, SC. Contractor: South Carolina Center for Industrial Research. \$16,500, July 1999—June 2000.
- *Center for Manufacturing and Technology*. South Carolina Center for Industrial Research. \$174,258, July 1999—June 2000. Co-PI with Abdel Bayoumi.
- *Project Exactly Delivery Device (PEDD)—Phase I*. Lockheed Martin Aircraft—Greenville, SC. Contractor: South Carolina Center for Industrial Research. \$100,131, Oct 1998—June 1999.
- *A Vehicle for Delivering a Mechanical Engineering Systems Laboratory*. NSF Laboratory Instrumentation and Laboratory Improvement Grant. \$93,000, July 1998—June 2000.
- *A Statewide Engineering High School Outreach Initiative*. Duke Energy Corp. (Duke Power) Charlotte, N.C. \$250,000, July 1998 to June 2003.
- *An Intelligent Inspection and Survey Robot*. US DOE Morgantown Energy Technology Center. Contractor: South Carolina University Research Education Foundation. Phase 2 Total: \$1,720,000, May 1994—December 1995. Phase 3 Total: \$1,500,000, January 1996—July 1998. Investigators: Byrd, Hudgins, Pettus and Rocheleau, USC; Dawson, Schalkoff and Sias, Clemson; Holland and Kennedy, Cybermotion, Inc., Salem, VA.