

**Ronald Lee Woolley, P.E., Ph.D.**

Woolley Engineering Research Corporation  
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Born: July 23, 1943 in Twin Falls, ID  
Married: Ann Mellor Woolley  
Children: Susanna, Jessie, Russell,  
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Registered Professional Engineer (Inactive licenses)  
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**RESIDENCE:**  
801-374-2890



**EXPERIENCE:**

WOOLLEY ENGINEERING RESEARCH CORP. ; Provo, Utah (801) 431-0220, February 1991 to present (DBA: Ronald L. Woolley, P.E., PhD; 1991-1995). Accident Reconstruction, Crashworthiness, Mechanical Engineering Design, Computer Simulation and Animation.

Leave of Absence, April 2015 to April 2017, Voluntary Service, Financial Secretary, Madagascar Antananarivo Mission, Church of Jesus Christ of Latter Day Saints.

COLLISION SAFETY ENGINEERING, INC., Orem, Utah (801) 229-6200 October 1980 to January, 1991. Accident Reconstruction, Crashworthiness, Mechanical Engineering Design, Computer Simulation and Animation.

BILLINGS ENERGY CORPORATION Provo, Utah (801) 375-0000 February 1975 to September 1980. Assistant to President and Past Director of Hydrogen Vehicle and Hydrogen Engine Research. Project director of hydrogen vehicle R&D programs, hydrogen utilization in industrial and home applications, heat transfer studies of metal hydride containment and storage of hydrogen, automotive design of metal hydride storage vessels, automotive engine R&D using alternative fuels and safety studies of hydrogen applications. Project engineer and lead software engineer for a computerized energy management system for the twelve production buildings at Winnebago Industries. Coal gasification feasibility studies and hydride heat pump studies.

BRIGHAM YOUNG UNIVERSITY Provo, Utah (801) 422-2625 August 1974 to June 1982. Assistant Professor of Mechanical Engineering, full and part time appointments. (Courses taught are listed on page 6).

NATIONAL SCIENCE FOUNDATION Moffet Field, California October 1973 to August 1974. Research Associate at NASA-AMES Research Center, Computational Fluid Dynamics Branch. Numerical modeling of separated turbulent flows and enhancement of methods developed by PhD program.

STANFORD UNIVERSITY Stanford, California Thermoscience Division, Department of Mechanical Engineering. September 1968 to October 1973. Research Assistant and Teaching Assistant. PhD program course work in thermal sciences. Developed a new computer algorithm for solving the Laplace Equation and developed a new method for calculating a separated flow field.

PHILCO-FORD CORPORATION Newport Beach, California, July 1967 to September 1968. Research Engineer, Space & Reentry Systems Division, Reentry Vehicle Weight & Balance Group. (Security Clearance: Secret)

GENERAL ELECTRIC COMPANY Mississippi Test Facility, Bay St. Louis, Mississippi, Summer 1965. Engineer in Training. Systems analysis for helium and hydrogen service in high pressure gas supply.

PROCTOR AND GAMBLE COMPANY Long Beach, California, Summer 1964. Management Trainee for the summer. Evaluated production equipment and methods to increase productivity.

## **EDUCATION**

- \* Ph.D. in Mechanical Engineering, Stanford University, 1974.
- \* M.S., Mechanical Engineering, Brigham Young University, 1968.
- \* B.E.S., Mechanical Engineering, Brigham Young University, 1966.
- \* Seminar, Biomechanics of Impact Trauma, Copper Mountain, CO June 4-6, 1984.
- \* Seminar, Dynamic Side Impact TOPTEC, Dearborn, MI - October 1991
- \* Seminar, Accidental Injury: Biomechanics & Prevention, San Diego, CA, November 16 and 17, 1991
- \* Seminar, Vehicle Rollovers TOPTEC, Scottsdale, Arizona - September 23, 1992
- \* Seminar, Automobile Vehicle Dynamics, SAE Professional Development, Irvine, California, January 18-21, 1995
- \* Seminar, Airbag Design & Performance TOPTEC, Costa Mesa, CA - August 14-15, 1997

- \* Seminar, Accident Reconstruction: State of the Art TOPTEC, Costa Mesa, California, December 9-10, 1999. (Invited Speaker).
- \* Seminar, Accident Reconstruction TOPTEC: Special Topics, Tempe, Arizona, May 22-23, 2001. (Invited Speaker).
- \* Seminar, Passenger Vehicle Rollover TOPTEC: Causes, Prevention and Injury Prevalence, Scottsdale, Arizona, April 22-23, 2002.
- \* Seminar, Occupant and Vehicle Kinematics in Rollovers, Course ID# C0420, SAE, Nov 30 – Dec 1, 2006, Troy Michigan.

## **PROFESSIONAL MEMBERSHIP/ACTIVITIES**

- \* Society of Automotive Engineers (SAE)
- \* American Society of Mechanical Engineers (ASME)
- \* Association for the Advancement of Automotive Medicine (AAAM)
- \* NAPARS, The National Association of Professional Accident Reconstruction Specialists, Inc.
- \* Invited Speaker, Accident Reconstruction TOPTEC: Special Topics, Tempe, Arizona, May 22-23, 2001.
- \* Invited Speaker, Accident Reconstruction: State of the Art TOPTEC, Costa Mesa, California, December 9-10, 1999.
- \* Instructor, AAAM, Seminar on Accident Reconstruction, Captiva Island, Florida, December 1990.
- \* Transportation Research Board Subcommittee on Accident Reconstruction, A3B11 (2), National Research Council.
- \* SAE Accident Investigation Techniques Task Groups  
Chairman: Collision Algorithm Comparison
- \* Invited Speaker, Zero Fatalities Safety Summit, Salt Lake City, Utah, 2014

## **HONORARY SOCIETIES:**

- \* Sigma Xi
- \* Tau Beta Pi
- \* Phi Kappa Phi

## **PUBLICATIONS:**

*Rollover Testing of Sport Utility Vehicles (SUVs) on an Actual Highway*, with Alan F. Asay. Society of Automotive Engineers, SAE 2010-01-0521, April 2010.

*Rollover Testing on an Actual Highway*, with Alan F. Asay. Society of Automotive Engineers SAE # 2009-01-1544, presented at the 2009 SAE World Congress, April 2009.

*Transitional Trigonometric Functions*, ASME International Mechanical Engineering Congress and Exposition, October 31- November 6, 2008, Boston, Massachusetts. IMECE 2008-66426

*Crash Pulse and Delta V Comparisons in a Series of Crash Tests with Similar Damage (BEV, EES)*, with Alan F. Asay. Society of Automotive Engineers paper 2008-01-0168, presented at the 2008 SAE World Congress, April 2008. Reprinted *SAE Int. J. Passeng. Cars- Mech.Syst.* 1. (1): 60-79, 2008.

*Crash Pulse Modeling of Force Limiting Structures*, Society of Automotive Engineers paper 2008-01-0175, presented at the 2008 SAE World Congress, April 2008.

*Crash Pulse Scaling Applied to Accident Reconstruction*, Society of Automotive Engineers paper 2008-01-0183, presented at the 2008 SAE World Congress, April 2008.

*Narrow Object Impact Analysis and Comparison with Flat Barrier Impacts*, with Alan F. Asay and Dagmar B Jewkes. SAE paper 2002-01-0552, presented at the 2002 SAE World Congress, March 4-7, 2002. Detroit, Michigan.

*Force Deflection Modeling of Vehicle Crush*, Invited Lecture Notes, Accident Reconstruction TOPTEC: Special Topics, SAE Continuing Professional Development Group, Tempe, Arizona, May 22-23, 2001.

*Non-Linear Damage Analysis in Accident Reconstruction*, SAE paper 2001-01-0504, presented at the 2001 SAE World Congress, March 5-8, 2001, Detroit, Michigan. *(Selected to receive the 2001 Arch T. Colwell Merit Award at the Honors Convocation during the SAE 2003 World Congress. "This award was established by Arch Colwell to recognize authors of outstanding papers presented at SAE meetings. Papers are judged for their value as contributions to existing knowledge of mobility engineering, and primarily with respect to their value as an original contribution to the subject matter. Your paper was selected from over 3000, which were published for SAE meetings during 2001. The Award Board sincerely congratulates you on a job well done!")*

*Crash Testing with a Massive Moving Barrier as an Accident Reconstruction Tool*, with Alan F. Asay, Dagmar Buzeman Jewkes (Woolley Engineering Research Corp), and Chuck Monson (GMH Engineering); SAE paper 2000-01-0604, presented at the 2000 SAE World Congress, March 6-9, 2000, Detroit, Michigan.

*Damage Energy Modeling*, Invited Lecture Notes, Accident Reconstruction: State-of-the-Art TOPTec, SAE Continuing Education Professional Development Group, Costa Mesa, California, December 9-10, 1999.

*Reference Cases for Comparison of Collision Algorithms Used in Accident Reconstruction*, with J. Rolly Kinney of Kinney Engineering Inc. SAE paper 940567, presented at the 1994 SAE International Congress and Exposition, February 27 - March 3, 1994, Detroit, Michigan.

*Determination of Vehicle Crush from Two Photographs and the Use of 3D Displacement Vectors in Accident Reconstruction*, with Karen A. White, Alan F. Asay and Jon Bready; Collision Safety Engineering, Inc. SAE paper 910118, presented at the 1991 SAE International Congress and Exposition, February 25 - March 1, 1991, Detroit, Michigan.

*Rear Stiffness Coefficients Derived from Barrier Test Data*, with Charles E. Strother and Michael B. James; Collision Safety Engineering, Inc. SAE paper 910120, presented at the SAE International Congress and Exposition, February 25 - March 1, 1991, Detroit, Michigan.

*Application of Kinematic Concepts to Side Impact Injury Analysis*, with Charles Y. Warner and Charles E. Strother; Collision Safety Engineering, Inc. SAE paper 900375, presented at the 1990 SAE International Congress and Exposition, February 26 - March 2, 1990, Detroit, Michigan.

*The Assessment of the Societal Benefit of Side Impact Protection*, with Charles Y. Warner, Charles E. Strother and Michael B. James; SAE Paper 900379, presented at the 1990 SAE International Congress and Exposition, February 26 - March 2, 1990, Detroit, Michigan.

*A Comparison Between NHTSA Crash Test Data and CRASH3 Frontal Stiffness Coefficients*, with Charles E. Strother and Michael B. James; SAE Paper 900101, presented at the 1990 SAE International Congress and Exposition, February 26 - March 2, 1990, Detroit, Michigan.

*The 'IMPAC' Program for Collision Analysis*, SAE Paper 870046, International Congress and Exposition; Detroit, Michigan; February, 1987.

*Crush Energy in Accident Reconstruction*, with Charles E. Strother, Michael B. James, and Charles Y. Warner, SAE Paper 860371; Passenger Comfort, Convenience and Safety: Test Tools and Procedures, Detroit, Michigan, February, 1986.

*An Overview of Selected Computer Programs for Automotive Accident Reconstruction*, with Charles E. Strother, Michael B. James, Charles Y. Warner and Thomas R. Perl Transportation Research Board 56th Annual Meeting, January 1986, Washington, D.C., Transportation

Research Record 1068.

*Collision Analysis Algorithms*, Presented at Session 6, SAE Accident Investigation Practices Subcommittee Workshop I, September 1986, Howell, Michigan.

*A Perspective on Automobile Crash Fires*, with Charles Y. Warner and Michael B. James, SAE Paper 850092, Field Accidents Meeting, Detroit, Michigan, February, 1985.

*The VTS Single-Vehicle Trajectory Simulation*, with Dale O. Anderson, Melaney D. Tagg, and Charles Y. Warner, SAE paper 850250, Field Accident Meeting, Detroit, Michigan, February, 1985.

*The 'IMPAC' Computer Program for Accident Reconstruction*, SAE Paper 850254, Field Accident Meeting, Detroit, Michigan, February, 1985.

*Inaccuracies in the CRASH3 program*, with Charles Y. Warner, and Melaney D. Tagg, SAE Paper 850255, Field Accident Meeting, Detroit, Michigan, February, 1985.

*Graphical Solution of Reconstruction Equations*, with Charles E. Strother, Gregory C. Smith, James R. Moulton, and Douglas L. Allsop, American Association for Automotive Medicine (AAAM), 37th Annual Proceeding, October 3-6, 1983, San Antonio, Texas.

*A Method of Computing Turbulent, Two-Dimensional, Incompressible Flow with Applications to Fully Stalled Flows, Passages of Arbitrary Shape, and Free Streamline Flows*, Transactions ASME, Journal of Fluids Engineering, Vol. 100, June 1978.

*A Method for Calculation of a Fully-Stalled Flow*, Ph.D. Dissertation, Stanford University, Stanford, California, November 1973.

*Numerical Investigations of Eddy Viscosity Similarity Laws and Developing Turbulent Flow in Smooth Tubes*, MS Thesis, Brigham Young University, May 1968.

*Rendezvous Rapid Transit*, Ground Transportation Symposium, University of Santa Clara, May 1973.

(Plus 18 other publications relating to hydrogen alternative fuel research, fuel system design, and IC engine modification and conversion; between 1976 and 1980.)

**PATENTS:**

*Structures for Lifting Outboard Side of Seat of Motor Vehicle During Side Impact Collision*

Application Number: 696,103      Filed: May 6, 1991

Issued: September 22, 1992      Patent Number: 5,149,165

*A Method and Apparatus for Providing Increased Thermal Conductivity and Heat Capacity to a Pressure Vessel Containing a Hydride-Forming Metal Material*

Serial Number: #906,089      Filed: May 15, 1978

Issued: February 5, 1980      Patent Number: 4,187,092

*Hydrogen Fuel Supply System*

Serial Number: #871,094      Filed: January 10, 1978

Status: Case Allowed

*Apparatus and Method for Transferring Heat To and From a Bed of Metal Hydrides*

Serial Number: #873,867      Filed: January 31, 1978

Issued: January 29, 1980      Patent Number: 4,185,979

*Method and Apparatus for Hydrogen Fueled Internal Combustion Engine*

Serial Number: #855,302      Filed: November 28, 1978

Issued: September 18, 1979      Patent Number: 4,167,919

### **Courses Taught at Brigham Young University or Stanford University:**

Advanced Thermodynamics

Energy Conversion & Conservation

Boundary-Layer Theory

Fluid Mechanics

Mechanical Engineering Instrumentation

Calculus

Gas Dynamics

Computer Programming Using Fortran

Mechanical Engineering Economics

Mechanical Engineering Design