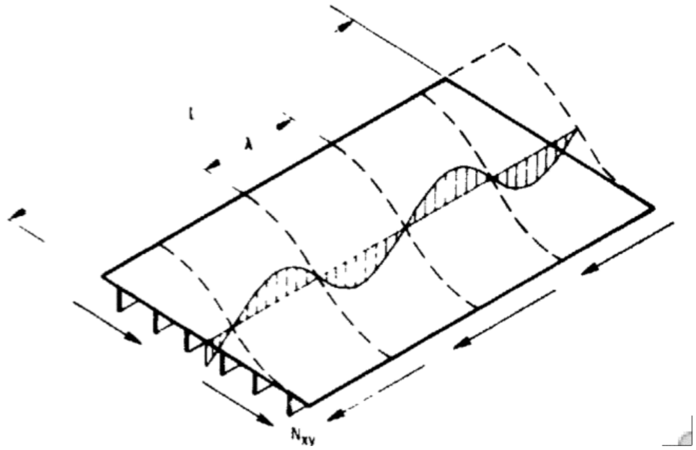

Dr. W. Jefferson Stroud (1936 – 2015)

NASA Langley Research Center, Hampton, Virginia

See:
http://www.worldcat.org/identities/lccn-n84119082/
http://classify.oclc.org/classify2/ClassifyDemo?search-author-txt=%22Stroud%2C+W.+Jefferson%22

Obituary (from Kyger funeral home in Harrisonburg, VA:
http://www.kygers.com/memsol.cgi?user_id=1532168)

Born October 25, 1936 in Douglas, GA, he was the son of Jack and Margaret Williams Stroud. In August 1961, he married Sandra Abbott of Hampton, VA.

At NASA Langley, Jeff continued his education, earning masters and Ph.D. degrees from Virginia Tech. In 1990-1991, he was awarded Langley's Floyd Thompson Fellowship for a focused study aimed at accounting for uncertainties in the design of aerospace structures. On his return to Langley, he established a cooperative research activity among Boeing, NASA, and the FAA to explore and demonstrate reliability-based design of aerospace structures. His research and analysis led to many safety and efficiency innovations in the aerospace field.

After retiring from NASA in 2005, Jeff enjoyed restoring his boyhood home in Jacksonville, FL. He and Sandra moved to Harrisonburg, VA in 2012 to be near their daughter, Lauree. They became active members of the Harrisonburg Parkinson's support group.

Jeff is survived by his wife, Sandra Stroud, his daughter, Lauree Purcell and husband Steve of Harrisonburg, his son, William Jefferson Stroud, Jr. of Durham, NC, his sister, Margaret Lockamy of Jacksonville, FL; granddaughters Hannah and Whitney Grace Purcell, and extended family.

Dr. W. Jefferson Stroud was NASA Langley's answer to the great Hollywood actor, Jimmy Stewart. Jeff had a strong resemblance in both appearance and demeanor to Mr. Stewart – tall, lean with the same genteel and unassuming qualities that endeared Jimmy Stewart to millions of fans. To see Jeff on the street, one would not begin to suspect that under his white fedora, was a man who has spent four and one-half decades shaping the way we analyze aircraft structures.

As a boy, Dr. Stroud liked airplanes – pictures of airplanes, models, visits to the airport to watch airplanes take off and land. So, after graduating from Brevard College, a small junior college in the mountains of North Carolina, he chose to go to Georgia Tech to study aeronautical engineering. In the summer of 1957, his first class in aerodynamics was taught by a former NACA employee – Dr. Pinkerton – a professor at N. C. State who worked that summer at Georgia Tech. Dr. Pinkerton's very positive comments about NACA made a lasting impression on Jeff. Upon completion of his bachelor's degree in 1959, Jeff, along with about half the Georgia Tech Aeronautical Engineering graduating class of 25 persons, chose to go to work for NASA – the new agency organized to meet the Russian threat posed by Sputnik. The NASA recruiter told all of the young students about the exciting technical work being carried out at the NASA centers and about the superb educational opportunities provided by NASA. Although the salary was the lowest of his job offers, NASA was by far the best all-around offer, and Jeff never regretted his decision to accept that offer.

Jeff began his NASA career in June 1959 in the Structural Mechanics Branch of the Structures Research Division at Langley Research Center. While working at NASA Langley, he earned his masters and doctorate degrees in engineering mechanics from Virginia Tech in 1962 and 1967, respectively. Since then, he has been involved in a broad variety of analytical and experimental research activities.

Early in his career, Jeff introduced Nonlinear Mathematical Programming optimization theory to LaRC engineers. Using optimization methods, he demonstrated realistic weight saving potential of barreling (slight meridional curvature) in stiffened shell structures. He pioneered multidisciplinary optimization by formulating and demonstrating simultaneous consideration of flutter and strength requirements in wing structural design. He delivered a major, invited, state-of-the-art lecture on automated aeroelastic design at the ASME Winter Annual Meeting, 1974. He was co-developer of PASCO – the first accurate automated procedure for designing composite stiffened panels, considering both buckling and material strength, under combined mechanical and thermal loads, with imperfections, which is still in use today. He carried out numerous studies, and gave invited demonstrations and seminars at several US aerospace companies.

Jeff conceived, planned, advocated, and led the LaRC Computational Structural Mechanics activity from 1984 to 1988, which influenced subsequent structural analysis research at Langley. He provided leadership in the structures portion of a large (>30 person) multidisciplinary team of LaRC and Boeing engineers in a 2-year High-Speed Research project known as "Longitudinal Control Alternatives Project" (LCAP) that determined potential advantages of three supersonic transport design concepts from the point of view of longitudinal control. This activity involved combined flutter and strength optimization. In his role as a Level III Manager of the ASCOT (Airframe Systems Concept-to-Test) Base program, he led activities in the development of fast and accurate structural analysis and design methods and in the development of reliability-based structural analysis and design methods. He has been active in positive technology transfer of NASA-developed technology. In that regard, he planned and established a 5-year Cooperative Agreement with MacNeal-Schwendler Corp. (MSC) by which MSC incorporated LaRC-developed Interface Technology in MSC/NASTRAN.

At a time in his career when most people would be thinking of wrapping up their work and heading towards retirement, Jeff has become NASA Langley's chief advocate of Reliability-Based Design. He believed that this revolutionary design approach would replace the traditional factor-of-safety and knockdown factor approach, reduce cost, and improve safety. In 1990-1991, Jeff was awarded Langley's Floyd Thompson Fellowship for a focused study aimed at "Accounting for Uncertainties in the Design of Aerospace Structures." During that time, Jeff collaborated with Prof. Efstratios Nikolaidis at Virginia Tech and then with Prof. Isaac Elishakoff at the Florida Atlantic University. He performed analytical studies that demonstrated how uncertainties in both initial imperfections and allowable strains affect the reliability of stiffened panels.

On his return to Langley, Jeff planned and led a research team in carrying out the first LaRC probabilistic and possibilistic analyses of the strength of a structural component – in this case, a bonded joint. He established a cooperative activity among Boeing, NASA, and the FAA to explore and demonstrate reliability-based design of aerospace structures. He partnered with FAA to establish and manage an FAA contract to the Russian research organization TsAGI to study probabilistic design of composite structures.

In 1999, Dr. Stroud was a co-winner of the NASA Software of the Year Award: GENOA – a progressive failure analysis software system that includes probabilistic analysis. In 2001, he was awarded the NASA Exceptional Service Medal for dedicated service and outstanding contributions to the advocacy of new and innovative computational structural mechanics technologies for the analysis and design of aerospace structures. Over his career, he has authored or co-authored numerous technical publications in structural stability, structural analysis, and structural design including probabilistic approaches.

Prior to Jeff's retirement in June 2005, he led a research team in developing the technology for carrying out probabilistic design of wing structures. The procedure being developed accounts for uncertainties in design parameters, such as dimensions and material properties, and seeks a design that has a prescribed likelihood of meeting strength and aeroelastic design requirements. An important goal is to make this class of problems tractable by using approximation techniques, such as response surfaces. Following his retirement, Dr. Stroud continued his research as a NASA Distinguished Research Associate working on probabilistic concepts for commercial transport wing designs.

Throughout his NASA career, Jeff was out in front of new computational structural mechanics technologies for aerospace structural designs. He did so in structural optimization methods, reliability analysis, and design. In both cases, the technology has been embraced by NASA engineers – in large part because of his persistence towards technical excellence and his willingness to share his wisdom with others. Dr. Stroud leaves a rich legacy behind within the aerospace technical community.

Selected Publications:

Stroud, W. Jefferson (NASA Langley Research Center, Hampton, Virginia), "Experimental and theoretical deflections and natural frequencies of an inflatable fabric plate", NASA Technical Note D-931, 1961

Stroud, W. Jefferson (NASA Langley Research Center, Hampton, Virginia), "Elastic constants for bending and twisting of corrugation-stiffened panels", NASA Technical Report R-166, 1963

W. Jefferson Stroud and George W. Zender, "Experimental investigation to determine utility of tension shell concept", NASA TM-X-1211, March 1966

W. Jefferson Stroud and Nancy P. Sykes (NASA Langley Research Center, Hampton, Virginia), "Stresses caused by an in-plane load used to rotate a thin-walled spherical satellite", NASA TN D-4425, 1968

Stroud, W. Jefferson, "Minimum-mass isotropic shells of revolution subjected to uniform pressure and axial load", NASA Technical Note D-6121, 1971

Stroud, W. J., and Agranoff, N., "Minimum-Mass Design of Filamentary Composite Panels Under Combined Loads: Design Procedure Based on Simplified Buckling Equations," NASA-TN D-8257, Oct. 1976.

Stroud, W. J., Anderson, M. S., and Hennessy, K. W., Effect of Bow-Type Initial Imperfections on the Buckling Load and Mass of Graphite-Epoxy Blade-Stiffened Panels, NASA TM-74063, August 1977.
Almroth's comments: Blade-stiffened composite material panels under axial compression are designed for minimum weight with buckling constraints. The bending stresses due to a bow-type imperfection are included. It is found that the weight efficiency is much better if the imperfection is allowed to affect the optimized design.
Authors' ABSTRACT: A structural synthesis computer code which accounts for first order effects of an initial bow and which can be used for sizing stiffened composite panels having an arbitrary cross section is used to study graphite blade-stiffened panels. The effect of a small initial bow on both the load carrying ability of panels and on the mass of panels designed to carry a specified load is examined. Large reductions in the buckling load caused by a small initial bow emphasize the need for considering a bow when a panel is designed.

W. J. Stroud, Nancy Agranoff, and Melvin S. Anderson (NASA Langley Research Center, Hampton, Virginia), "Minimum-Mass Design of Filamentary Composite Panels Under Combined Loads: Design Procedure Based on a Rigorous Buckling Analysis", NASA Technical Note TN D-8417, July 1977, Accession Number: ADA301714, Handle / proxy Url : http://handle.dtic.mil/100.2/ADA301714, See also NASA TN D-8257.
ABSTRACT: A procedure is presented for designing uniaxially stiffened panels made of composite material and subjected to combined inplane loads. The procedure uses a rigorous buckling analysis and nonlinear mathematical programing techniques. Design studies carried out with the procedure consider hat-stiffened and corrugated panels made of graphite-epoxy material. Combined longitudinal compression and shear and combined longitudinal and transverse compression are the loadings used in the studies. The capability to tailor the buckling response of a panel (i.e., design a panel so that it will have specified buckling loads at various buckling wavelengths) is also explored. Finally, the adequacy of another, simpler, analysis-design procedure is examined. The report demonstrates that a panel design procedure with a high-quality buckling analysis and with complete generality of constraints is practical. Such a procedure can be used to avoid failure from complex buckling modes and to determine mass and proportions of panels for multiple design load conditions and constraints.

Anderson, M.S. and Stroud, W.J., "General panel sizing computer code and its application to composite structural panels," AIAA Journal, 17, (1979) pp. 892-897.

Williams, J. G., Anderson, M. S., Rhodes, M. D., Starnes, J. H., Jr., and Stroud, W. J.: Recent Developments in the Design, Testing, and Impact-Damage Tolerance of Stiffened Composite Panels. NASA TM-80077, 1979.

Stroud, W.J. and Anderson, M.S., "PASCO: Structural panel analysis and sizing code, capability and analytical foundations," NASA TM-80181, NASA Langley Research Center, Hampton, Va., 1981
ABSTRACT: A computer code denoted PASCO which can be used for analyzing and sizing uniaxially-stiffened composite panels is described. Buckling and vibration analyses are carried out with a linked-plate analysis computer code denoted VIPASA, which is incorporated in PASCO. Sizing is based on nonlinear mathematical programming techniques and employs a computer code denoted CONMIN, also incorporated in PASCO. Design requirements considered are initial buckling, material strength, stiffness, and vibration frequency. The capability of the PASCO computer code and the approach used in the structural analysis and sizing are described.

W. Jefferson Stroud, William H. Greene and Melvin S. Anderson, "Current research on shear buckling and thermal loads with PASCO: Panel analysis and sizing code, NASA-TM-83206, September 1981

W. Jefferson Stroud, "Optimization of composite structures", NASA TM 84544, August 1982

Stroud, W.J., Greene, W.H., and Anderson, M.S., "Buckling loads of stiffened panels subjected to combined longitudinal compression and shear: Results obtained with PASCO, EAL, and STAGS computer programs," NASA TP 2215, Nasa Langley Research Center, Hampton, Va., January 1984.

W. Jefferson Stroud (NASA Langley Research Center), "Computational methods for structural mechanics and dynamics: proceedings of a workshop sponsored by the National Aeronautics and Space Administration and held at NASA Langley Research Center, Hampton, Virginia, June 19-21, 1985", NASA conference publication 3034, 1985

Knight, N. F., Jr., Greene, W. H., and Stroud, W. J.: Nonlinear Response of a Blade-Stiffened Graphite-Epoxy Panel with a Discontinuous Stiffener. Computational Methods for Structural Mechanics and Dynamics, Part 1, W. Jefferson Stroud, Jerrold M. Housner, John A. Tanner, and Robert J Hayduk (Compilers), NASA CP-3034 Part 1, 1989, pp. 51-65.

Schiermeier, J. E., Housner, J. M., Ransom, J. B., Aminpour, M. A., and Stroud, W. J., "The Application of Interface Elements to Dissimilar Meshes in Global/Local Analysis," Proceedings of the 1996 MSC World Users' Conference, Newport Beach, CA, June 3-7, 1992.

W. Jefferson Stroud (NASA Langley Research Center), "Reliability of stiffened structural panels: two examples", NASA Technical Memorandum, 107687, 1992

W. Jefferson Stroud and Efstratios Nikolaidis (NASA Langley Research Center), "Reliability-based structural optimization: a proposed analytical-experimental study", NASA TM 109055, 1993

W. Jefferson Stroud, T. Krishnamurthy and Steven A. Smith (NASA Langley Research Center), "Probabilistic and Possibilistic Analyses of the Strength of a bonded joint", AIAA paper AIAA 2001-1238, 42nd AIAA Structures, Structural Dynamics and Materials Conference, April 2001

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Research Center, Hampton, Virginia), "Minimum weight structural design of three alternate HSCT concepts", 9th AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, AIAA Paper AIAA 2002-5407, September 2002

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Erdem Acar, Amit Kale, Raphael T. Haftka and W. Jefferson Stroud, "Structural Safety Measures for Airplanes", Journal of Aircraft, Vol. 45, No. 1, January-February 2006

Stroud, W. Jefferson, Dexter, Cornelia B. and Stein, Manual (NASA Langley Research Center), Automated preliminary design of simplified wing structures to satisfy strength and flutter requirements", http://classify.oclc.org/classify2/ClassifyDemo?owi=24852515 , publisher and date not given

Stroud, W. Jefferson, "The use of a Ritz procedure in determining minimum weight shells of revolution", http://classify.oclc.org/classify2/ClassifyDemo?owi=23694249 , publisher and date not given