



College of Engineering
Department of
Mechanical & Industrial Engineering

The Sidney E. Fuchs Seminar Series

3:00-4:00pm, Friday, March 2, 2018
1263 Patrick F Taylor Hall



Progress in Aero-propulsion: The Role of Materials

by **Jim Williams***

NAE Member and Honda Chair Emeritus, Ohio State University

Over the past ~25 years, there has been a significant improvement in the performance of aircraft engines, as stated in the broadest sense. That is, this improvement can be expressed both in traditional terms (higher thrust to weight and lower specific fuel consumption) as well as in expanded terms that include durability and reliability parameters (increased time on wing, reduced unscheduled removals and in-flight shutdowns). These improvements have been realized in both military and commercial engines, but the baseline for tracking these is different because of the different utilization patterns and mission requirements. Concurrently, the marketplace for commercial aircraft engines also has changed. Here, new technical challenges such as reduced noise and emissions and economic factors such as increased reliability, lower operating and ownership costs are assuming an ever-increasing importance.

The origins of these improvements can be traced to better design methods, to improved component efficiency and to advanced materials and processing methods. This talk will use engine performance data to highlight some of the improvements in performance, reliability and durability. The focus of this talk will be the evolution of better materials and processes. This evolution will be described and illustrated using examples of improved materials to show how materials technology has enabled more competitive aircraft engines.

* Jim Williams is Professor of Materials Science and Engineering and Honda Chair Emeritus at The Ohio State University (OSU). He also holds a quarter time appointment as a Distinguished Research Professor at the University of North Texas. From July 2001 until June 2004 he was Dean of Engineering and Honda Chair also at OSU. Until March 1999 he was General Manager, Materials and Process Engineering Department, GE Aircraft Engines. He is a member of the National Academy of Engineering, a Fellow of TMS/AIME and a Fellow of ASM International. He is the recipient of the 1992 ASM Gold Medal, the 1993 TMS/AIME Leadership Award, the 1994 Prairie A&M Univ. Spirit Award, the 2002 TMS/AIME Application to Practice Award, the International Titanium Association 2003 Achievement Award and was inducted into the GE Aircraft Engines Propulsion Hall of Fame in 2003. He served on The US Air Force Scientific Advisory Board from 1994 -2000. Prior to joining GE in 1988 he spent 13 years at Carnegie Mellon University as Professor ('75-'80), President of Mellon Institute ('80-'83) and Dean of Engineering ('83-'88).

Williams received his B.S., M.S. and Ph.D. degrees, in Metallurgical Engineering, from the University of Washington, the latter in 1968.