

## Abstract - Materials and Manufacturing in Low Earth Orbit

### Dr. David B. Williams, FASM, President (2022-2023)



**Dr. David B. Williams, FASM**  
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#### Abstract

NASA awarded a \$160M space-act agreement in 2021 to Voyager/Nanoracks to design Starlab, the first privately owned, commercially driven, free-flying, space station which will be launched in 2027/28. Starlab will be integrated with the George Washington Carver Science Park (GWCSP), the first such park devoted to space research both on earth and in low-earth orbit (LEO). OSU serves as a founding partner in the GWCSP and is responsible, *inter alia*, for building university-industry research partnerships to drive the creation of commercially valuable products both on the ground and in LEO. The Terrestrial Analog Facility (TAF) for Starlab will contain a fully working copy of Starlab along with experiment development, testing, and prototyping capabilities. Researchers will be able to conduct tests in the TAF prior to launch and run parallel experiments to those being carried out in LEO. In fall 2022, due to support from multiple universities industries and organization including ASM international, it was announced that the TAF will be built at OSU's Aerospace & Air Transportation Campus. One of the key pillars in the planned spectrum of commercial research is *manufacturing and materials*. OSU's ERC for Hybrid Autonomous Manufacturing, Center for Design and Manufacturing Excellence and Center for Electron Microscopy and Analysis will all help develop new manufacturing processes in LEO. This presentation will introduce the concepts behind Starlab / GWCSP / TAF and how universities and industries can engage in the project.

#### Bio

Dave Williams is emeritus dean of OSU's College of Engineering. He is helping create university-industry partnerships to build out the GWCSP both in Columbus and in LEO. As dean from 2011-2021, Williams led ~1000 faculty and staff and the education of almost 10,000 students via a >\$300M budget. Williams represented OSU on the Business Higher Education Forum and the Council on Competitiveness, where he is a Senior Fellow. He served on the board of One Columbus, driving central Ohio's economic development growth strategy. He was President of the University of Alabama in Huntsville from 2007 to 2011, where he led the university into the Carnegie Tier-1 research category, and served on boards of the Tennessee Valley Corridor, the Huntsville Chamber of Commerce and the Alabama Business Council. From 2000-2007, he was VP Research at Lehigh University, PA where he was on the boards of the NE PA Ben Franklin Technology Partnership and the Central PA Life Sciences Greenhouse, investing state funds in early-stage technology and life-science companies. Williams holds B.A., M.A., Ph.D., and Sc.D. degrees from The University of Cambridge. He is a (co-) author and editor of 13 textbooks and conference proceedings and (co-) author of 450 publications on electron microscopy studies of materials. He is a fellow of nine national/international societies for materials, electron microscopy/analysis, aerospace and aeronautics. In addition, if time permits, a summary of ASM's strategic Ppan will also be presented.

## Abstract - How Universities and Industry Can Collaborate\*

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ASM is unique among materials professional societies in the distribution of industrial (>70%) and academic (<30%) members. Therefore, we are interested in ensuring that our members can benefit from each other. However, universities and industries are both well-established (and therefore somewhat entrenched) organizations with centuries-long histories. Not surprisingly, therefore, they have fundamentally different roles, responsibilities and metrics for success. Too often these differences make it challenging (on both sides) to engage in successful partnerships. Likewise, the expectation for faculty to engage primarily in federally funded *research* and to focus on fundamental academic rather than practical *teaching* presupposes that industrial research and hands-on learning are less valued in the university culture. Similarly, *outreach* usually emphasizes academic roles (e.g. professional societies, journal editorships) and not developing relations with industry leaders. At OSU's College of Engineering, we have consistently ranked in the top five in the nation for industry-funded research; thousands of undergraduates engage annually in internships and co-ops and hundreds of companies vie to hire our graduates. In recent years, we have developed methods to encourage faculty, staff and students to partner with industries and engage in entrepreneurial activities including starting their own companies. This talk will focus on examples of how we have developed (in some cases unique) outward-looking, industry-friendly research facilities and education programs. In addition, if time permits, a summary of the ASM's strategic plan will also be presented. *\*Despite their differences*

### Bio

Williams was Dean of the College of Engineering at OSU from 2011-2021, responsible for 1000 faculty and staff educating 10,000 students via a \$310M budget. Williams represented OSU on the Business Higher Education Forum and the Council on Competitiveness, where he is a Senior Fellow. He also served on the board of One Columbus, driving central Ohio's economic development and regional growth strategy. Williams was President of the University of Alabama in Huntsville from 2007 to 2011. There he served on the boards of the Tennessee Valley Corridor, the Huntsville Chamber of Commerce and the Alabama Business Council. Williams was VP Research at Lehigh University, Bethlehem, PA from 2000-2007 where he was on the boards of the NE PA Ben Franklin Technology Partnership and the Central PA Life Sciences Greenhouse, investing state funds in early-stage technology and life-science companies. Williams holds B.A., M.A., Ph.D., and Sc.D. degrees from The University of Cambridge. He is a (co-) author and editor of 13 textbooks and conference proceedings and (co-) author of 450 publications on electron microscopy studies of metals and alloys. He is a fellow of nine national/international societies for materials, electron microscopy, aerospace and aeronautics.