

BIOGRAPHICAL INFORMATION

Bruce A. Banks

Bruce A. Banks, Chief, Electro-Physics Branch, joined the staff of the National Aeronautics and Space Administration's Lewis Research Center in 1966. Mr. Banks received a Bachelor of Science degree in physics in 1964 from Case Institute of Technology (now Case Western Reserve University). He also received a Master of Science degree in physics in 1966 from the University of Missouri at Rolla. During his career at NASA, Mr. Banks has specialized in research and development activities involving electron bombardment ion thrusters and ion beam applications.

As a result of performing 10 years of research associated with the development of electric rocket engines, Mr. Banks became familiar with the potential for using the exhaust ion beams to modify surfaces as well as to deposit unique coatings on materials. In the late 1970's he initiated the LeRC Ion Beam Applications Program, whose objective was to enable the development of new or improved materials, products and processes through the non-propulsive applications of ion thruster technology.

From 1976 to 1980, as head of the Ion Beam Applications section at Lewis Research Center, he led an effort involving in-house research, 23 grants with universities, and approximately 40 collaborative projects with industry to transfer ion beam technology for industrial and biomedical applications. As a result of these efforts, several NASA spin-off products emerged and companies formed whose businesses relied upon the use of NASA's spin-off technology. Some of these products include surgical implant devices, produced by Applied Medical Technology, diamond-like carbon films for sunglasses marketed by Bausch & Lomb and produced by Optical Diamond Products, strain gauges for household scales produced by JP Technology and optical baffles for star-trackers produced by the Spire Corporation. He initiated NASA's first Technology Assistant Agreement to transfer NASA diamond-like film coating technology to private industry for sunglass fabrication.

Mr. Banks is a member of the three-person team who proposed and initiated the Lewis Research Center Bioengineering program, whose objectives were to apply Lewis-produced research and technology to solve biological problems. Numerous spin-off collaborative efforts involving biomedical applications were initiated by his Branch under this program.

Currently as Chief of the Electro-Physics Branch, Mr. Banks leads a team effort to develop new and improved space power materials surfaces and coatings. As an integral part of this effort, over 50 collaborative projects with external organizations have been initiated to transfer NASA's surface texturing and coating technologies to develop new consumer products, and medical devices. Bruce Banks is the Technical Program Manager of the Advanced

Coatings and Surface Texturing Consortium in collaboration with the Great Lakes Industrial Technology Center (Regional Technology Transfer Center) which is responsible for transferring technology developed at NASA LeRC to industry. Some examples of the technology transfer activities include textured baby bottle nipples, abrasion resistant coatings for plastic lenses, textured surfaces for direct in-growth of orthopaedic implants, oxygen barrier coatings for food packaging materials, and use of atomic oxygen beams for restoration of degraded and fire-damaged paintings.

Mr. Banks is currently the third most patented NASA employee, holding 29 patents of which two have been licensed to industry for spin-off applications. He has authored 94 technical publications as well as 16 NASA Tech Brief articles. He has also received, in 1981, the Arthur S. Fleming award for being selected as one of the ten outstanding young employees in the Federal Government. He received two Federal Laboratory Consortium awards for excellence in technology (in 1988 and 1991), and an Enterprise Development Innovation award in 1993 for the development of diamond-like carbon film coatings which have been used to produce the Rayban diamond-hard sunglasses with current sales of \$20 million.

Mr. Banks is married with four grown children and enjoys local archaeology as a hobby.

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As Chief of the Electro-Physics Branch, he is responsible for the development of new materials for space power technology applications. Mr. Banks has authored 108 technical papers and 27 Technical Briefs in these areas, and has been awarded 32 patents. In addition, he has received 81 Invention and Meritorious Performance awards and is the most patented researcher in the history of the NASA Lewis Research Center.

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Bruce Banks received a B.S. in physics from Case Institute of Technology in 1964 and an M.S. in Physics from the University of Missouri at Rolla, Missouri in 1966. He is Chief of the Electro-Physics Branch at the National Aeronautics and Space Administration's Lewis Research Center in Cleveland, Ohio. He leads a team of scientists and engineers to develop durable power materials, surfaces and low temperature electronics to meet NASA, national, and U.S. industry needs. Mr. Banks has conducted research programs on electric rocket engines, thin film coatings, surface texturing processes and low earth orbital atomic oxygen interactions. His efforts have resulted in 19 space flight experiments or functional space applications of technology developed by his research team. In addition to space oriented research he has applied the results of this research to commercial, industrial, and biomedical applications resulting in the formation of new companies and products ranging from surgical implants to scratch resistant sun glasses. He has authored 114 technical publications, 27 NASA Tech Briefs, 32 patents and has received 82 invention and meritorious performance awards. Bruce Banks is NASA's Lewis Research Center's most patented researcher.