

Ara Manukian is the current Chief Executive Officer of ARS, inc. and has served as the Director of Engineering for the last 15 years, where he has been responsible for the management of all engineering projects for the company. Mr. Manukian is a senior member of the American Institute of Aeronautics and Astronautics (AIAA), and is a systems design engineer specializing in the development of electronic and analytical instrumentation, computer based control systems, electrical-mechanical interfacing, fluid flow, pressure and temperature systems. He has been responsible for over 500 engineering contract projects during the past 15 years for several academic, government, military, and private industry laboratories, working on projects ranging from design of avionic and space experiment hardware, analytical instruments, design and development of many entomological bioassay and volatile collection systems, chemical and fermentation bio-reactors, along with various material processing equipment.

Recent research, Mr. Manukian was a co-inventor of ARS' patented Hydrocapsule® technology and was primarily responsible for the development of the hardware systems used to encapsulate entomopathogenic nematodes (EPN) and other biological & chemical AI's in polymeric capsules. He was instrumental in receiving three consecutive US Federal grants from the US Dept. of Agriculture (USDA) to fund the development of this encapsulation technology. Subsequently, Mr. Manukian was also successful in commercializing this technology with two private entomological based biological control companies (Entomos, LLC. USA and Koppert Biological Systems, The Netherlands). In 2002, he was awarded the Florida Entomological Society's (FES) Achievement Award for Industry and Team Research "*for Technological Improvements in the Mass Rearing and Commercialization of Biological Control Agents*".

His most recent research activities resulted in a co-authored technical paper "*Hydrocapsules: A New Method for Aqueous Drug Delivery*" that was the featured cover article in the January 2008 issue (Vol. 8 No.1) in Drug Delivery Technology journal, available online at (<http://www.drugdeliverytechnology.com/drugdelivery/200801/>). The Hydrocapsule® technology was also featured in the ITI Life Sciences (Dundee, Scotland) Annual 2008 European Drug Delivery Foresighting Report as the leading case study for micro-encapsulation of microbial, viral or other living organisms and AI's (<http://www.itilifesciences.com/uploads/documents/DrugDeliveryForesightingReport08.pdf>).

While at ARS, inc. Mr. Manukian has successfully written several government funded research grants and formed Cooperative Research and Development Agreements (CRADA's) as well as received funding from multiple Fortune 100 companies to develop several proprietary agricultural related technologies. He has 4 US patents and 4 patent-pending applications in addition to over 50 active industry research agreements.

Prior to working at ARS, inc., Mr. Manukian worked for 10 years at the U.S. Department of Agriculture (USDA), Agricultural Research Services (ARS), Center for Medical and Veterinary Entomology (CMAVE) laboratory in Gainesville, FL, in the Chemistry Research Group. In his last position as a systems engineer, he was responsible for the development of a wide range of automated volatile collection systems, bioassay systems, analytical instrument and chemical analysis methods development for insect and plant semiochemical research. Mr. Manukian was a collaborating investigator on 10 research grants during his last 5 years at the USDA and received 4 USDA Government Merit Awards for "Outstanding Performance". Additionally he has co-authored over 20 scientific papers (including the Proceedings of the National Academy of Science, Science, Nature, other peer-reviewed journals, and technical government articles), and has been referenced and acknowledged for contributions in over 500 hundred scientific peer-reviewed journals, in addition to making presentations at several international scientific conferences.

During undergraduate and graduate studies at the University of Florida, Mr. Manukian was funded as a research assistant in several positions under grants from NASA, University Space Research Association (USRA), Florida Space Grant Consortium, Florida Space Foundation, the Florida Challenger Astronaut Memorial Foundation. Research under these grants covered topics related to developing systems for growing crop plants in space and mathematical modeling of dynamic control systems used in a spaced based Closed Environmental Life Support System (CELSS).