

## ***Dr. ANDREW C. SCHUERGER (PI)***

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### **EDUCATION**

Doctor of Philosophy in Plant Pathology, 1991, University of Florida, Gainesville, FL; GPA 3.75.

Master of Science in Plant Pathology, 1981, University of Arizona, Tucson, AZ; GPA 3.85.

Bachelor of Science in Plant Pathology and Entomology, 1979, U. of Arizona, Tucson, AZ; GPA 3.45.

### **PROFESSIONAL EXPERIENCE**

**Research Assistant Professor, Mars Astrobiology and Plant Pathology of Bioregenerative Advanced Life Support (ALS) Systems**, Dept. of Plant Pathology, University of Florida, Space Life Sciences Laboratory, Kennedy Space Center, FL. October 2003 to present.

**Project Manager, Mars Astrobiology and Plant Pathology of Bioregenerative ALS**, Dynamac Corporation, Kennedy Space Center, FL. September 1997 – 2003.

**Senior Scientist, Plant Pathology**, Science & Technology Office, The Land, Epcot, Lake Buena Vista, FL. February 1982 – August 1997.

### **RECENT ASTROBIOLOGY GRANTS WON AS PI (12 additional as Co-I)**

**2013 NASA Mars Fundamental Research Program (#NNX14AG45G)**: “A Fast Degradation Mechanism for Atmospheric Methane on Mars.” Grant value = \$448K for 2014-2018.

**2012 NASA Planetary Protection Research Grant (#NNX12AJ84G)**; “Metabolism, Growth, and Genomic Responses of *Serratia liquefaciens* under Simulated Martian Conditions.” Grant value = \$658K for 2013-2018.

**2008 NASA Planetary Protection Research Grant (#NNX08AQ81A)**; “Biototoxicity of Mars Soils: Compatibility of Terrestrial Microorganisms to Simulated Conditions of Special Regions on Mars.” Grant value: \$395K for 2008-2011.

**2007 NASA Mars Fundamental Research Grant (#NNX07AR65G)**; “Degradation of Organic Compounds by UV Irradiation under Martian Conditions: A Possible Source of Methane on Mars.” Grant value: \$340K for 2007-2011.

**2006 UCF/UF Space Research Initiative Grant (#20040009; jointly funded by University of Central Florida and University of Florida)**; “Degradation of Organic Compounds by UV Irradiation under Martian Conditions.” Grant value: \$186K for 2006-2007.

**2004 UCF/UF Space Research Initiative Grant (#20020023/21988; jointly funded by University of Central Florida and University of Florida)**; “Survival, Ecology, and Detection of Endolithic Microbial Communities under Simulated Martian Environmental Conditions.” Grant value: \$210K for 2004.

**2002 JPL/NASA (#JPL-GJT-569274)**; “Effects of Diffuse UV Irradiation on the Survival of Terrestrial Bacteria on Spacecraft Components.” Grant Value: \$115 K for FY2002 – FY2004.

### **AWARDS**

**2008 NASA Innovative Technology Award**: “A Mars Simulation Chamber for the 21<sup>st</sup> Century;” July 2008.

**2007 NASA Innovative Technology Award**; “UV Sterilization of Spacecraft Surfaces: New Procedures for Assuring the Sterility of Spacecraft;” August 2007.

## SELECTED PUBLICATIONS IN ASTROBIOLOGY, AEROBIOLOGY, & PLANT PATHOLOGY

- Berry, B. J., Jenkins, D. G., and **Schuerger, A. C.** 2010. Inhibition of *Escherichia coli* and *Serratia liquefaciens* under high-salt, low-pressure, and low-temperature environments that approach surface conditions on Mars. *Appl. Environ. Micro.* 76(8), 2377-2386.
- Mickol, R. L., Page, J., and **Schuerger, A. C.** 2017. Magnesium sulfate salt solutions and ices fail to protect *Serratia liquefaciens* from the biocidal effects of UV irradiation under martian conditions. *Astrobiology (in press)* 11-11-16).
- Nicholson, W. L., Fajardo-Cavazos, P., Fedenko, J., Ortiz-Lugo, J.-L., Rivas-Castillo, A., and **Schuerger, A. C.** 2010. Exploring the low-pressure growth limit: Laboratory evolution of *Bacillus subtilis* to enhanced growth at 5 kilopascals. *Appl. Environ. Micro.* 76(22), 7559-7565.
- Nicholson, W. L., Krivushin, K., Gilichinsky, D., **Schuerger, A. C.** 2013. Growth of *Carnobacterium* spp. isolated from Siberian permafrost under simulated Mars conditions of pressure, temperature and atmosphere. *PNAS*, 110(2), 666-671.
- Schuerger, A. C.**, Clausen, C., and Britt, D. 2011. Methane evolution from UV-irradiated spacecraft materials under simulated Martian conditions: Implications for the Mars Science Laboratory (MSL) mission. *Icarus*, 213, 393-403.
- Schuerger, A. C.**, Golden, D. C., and Ming, D. W. 2012. Biototoxicity of Mars soils: 1. Dry deposition of analog soils on microbial colonies and survival under martian conditions. *Planetary Space Science* 72, 91-101.
- Schuerger, A. C.**, and Hammer, W. 2009. Use of cartridge filtration to suppress root disease in hydroponic pepper plants caused by *Pythium myriotylum*. *Phytopathology* 99, 597-607.
- Schuerger, A. C.**, and Lee, P. 2015. Microbial ecology of a crewed rover traverse in the high Arctic: Low microbial dispersal and implications for planetary protection on human Mars missions. *Astrobiology* 15(6), 478-491.
- Schuerger, A. C.**, Mancinelli, R. L., Kern, R.G., Rothschild, L. J., and McKay, C P. 2003. Survival of endospores of *Bacillus subtilis* on spacecraft surfaces under simulated Martian environments: Implications for the forward contamination of Mars. *Icarus* 165:253-276.
- Schuerger, A. C.**, Ming, D. W., and Golden, D. C. 2017. Biototoxicity of Mars Soils: 2. Survival of *Bacillus subtilis* and *Enterococcus faecalis* in Aqueous Extracts Derived from Six Mars Analog Soils. *Icarus* doi:org/10.1016/j.icarus.2017.02.023
- Schuerger, A. C.**, Moores, J. E., Barlow, N., Clausen, C., and Britt, D. 2012. Methane evolution from UV-irradiated carbonaceous meteorites under simulated Martian conditions. *JGR Planets* 117 (E08007), doi:10.1029/2011JE004023.
- Schuerger, A. C.**, and Nicholson, W. L. 2016. Twenty species of hypobarophilic bacteria recovered from diverse soils exhibit growth under simulated martian conditions at 0.7 kPa. *Astrobiology* 16(12), 964-976.
- Schuerger, A. C.**, and Richards, J. T. 2006. Effects of artificial lighting on the detection of plant stress with spectral reflectance remote sensing in bioregenerative life support systems. *International J. Astrobiology* 5(2), 151-169.
- Schuerger, A. C.**, Ulrich, R., Berry, B. J., and Nicholson, W. L. 2013. Growth of *Serratia liquefaciens* under 7 mbar, 0 °C, and CO<sub>2</sub>-enriched anoxic atmospheres. *Astrobiology* 13(2), 115-131.
- Smith, D. J., Griffin, D., and **Schuerger, A. C.** 2010. Stratospheric microbiology at 20 km over the Pacific Ocean. *Aerobiologia* 26, 35-46.
- Smith, D. J., Jaffe, D. A., Birmele, M. N., Griffin, D. W., **Schuerger, A. C.**, Hee, J., Roberts, M. S. 2012. Free tropospheric transport of microorganisms from Asia to North America. *Microbial Ecology* 64(4), 973-985.
- Young, H. M., George, S., Naváez, D. F., Srivastava, P., **Schuerger, A. C.**, Wright, D. L., and Marois, J. J. 2012. Effect of solar irradiation on severity of soybean rust. *Phytopathology* 102, 794-803.