Curriculum Vitae: CHARLES G. SIMON, PH.D. September 4, 2009

Precision Analytical Laboratories, Inc.
2106 NW 67th Place, Suite-10
Gainesville, Florida 32653
Phone: (352) 335-1890 Fax (352) 335-1891

AREAS OF SPECIALIZATION:

Stationary Source Air Emission Testing	PSD/NSR Reviews
VOC Emission Testing and Analysis	Small Particle and Surface Analysis
Expert Witness, Air Emissions	Hypervelocity Impact Phenomena

EDUCATION:

University of Florida, Ph.D. (Experimental Physical Chemistry), 1988.
University of South Carolina, M.S. (Environmental/Analytical Chemistry), 1979.
Jacksonville University, B.S. (Chemistry), 1976.

POSITIONS HELD:

Precision Analytical Laboratories, Inc., Gainesville, FL. Vice President and Senior Scientist since 1994. Established and operate USEPA Method 25 VOC analysis laboratory. Consultant to the US Department of Justice, Environmental and Natural Resources Division, the US EPA Office of Enforcement and Compliance Assurance, and the Canadian Ministry of the Environment specializing in the performance of quantitative historical analyses of air pollutant emissions from stationary sources.

Air Compliance Testing, Inc., Gainesville, FL Senior Scientist, 2008-current. Advisory role for stationary source air-emission compliance and diagnostic testing firm.

Air Consulting and Engineering, Inc., Gainesville, FL Senior Scientist, 1996-2008. Advisory responsibilities for stationary source air-emission compliance and diagnostic testing firm. Perform stationary source emission testing for criteria and hazardous air pollutants.

Air Consulting and Engineering, Inc., Gainesville, FL Senior Scientist, 1994-1996. Management responsibilities for stationary source air-emission compliance and diagnostic testing firm. Director of in house analytical laboratories for source emission measurements of particulate matter and gases. Perform stationary source emission testing for criteria and hazardous air pollutants.

Institute for Space Science and Technology, Inc., Gainesville, FL. Research Scientist/Technical Programs Manager from 1991-1994. Co-investigator on NASA's Long duration Exposure Facility (LDEF) Interplanetary Dust Experiment (IDE), a retrieved active metal-oxide silicon (MOS) capacitor-type impact sensor array; discovered long-term (multi-year) flux variability of microparticles in low earth orbit; analyzed residual debris from micro-impactors on IDE sensors and other LDEF surfaces using scanning electron microscope and energy dispersive x-ray spectroscopy (SEM/EDS) and secondary ion mass spectroscopy (SIMS) techniques; organized computer-based archive of all IDE analytical data and results; assisted with gamma-ray measurements of the Eureca spacecraft; established the IMPACt *(In-situ* monitors of the Particulate Ambient: Circumterrestrial) consortium - suppliers of space-flight qualified small-particle monitors. Investigated manufacturing technologies and consumer products from recycling of off-spec and spent thermoset resins and monomers.

Physics Department, McDonnell Center for the Space Sciences, Washington University, St. Louis, MO Research Scientist from 1989-1991. Participated in development of a dust particle trajectory/velocity and capture cell device for the Cosmic Dust Collection Facility (CDCF), a Space Station attached payload; performed hypervelocity impact experiments on combined sensor/capture cell assemblies; analyzed hypervelocity impactor residues extracted from capture cells using SEM, 2-dimensional x-ray (EDS) mapping, and quantitative EDS; joined the Long Duration Exposure Facility (LDEF) Meteoroid and Debris Special Investigation Group (M&DSIG) Analytical Team; participated in the development and use of instrumentation and methodology used to record locations and morphologies of thousands of hypervelocity impacts on the retrieved LDEF satellite.

Chemistry- Department, University of Florida, Gainesville, FL. Graduate Research Assistant from 1985-1988. Constructed and operated laser plasma reaction systems which produced gold/carbon nano-particles from gas/solid interactions; characterized particles and thin films made from these particles using SEM/EDS, quantitative x-ray photoelectron spectroscopy (XPS), infrared spectroscopy (IR), visible microreflectometry, ion cyclotron resonance mass spectroscopy (ICRMS), and electrical resistance measurements: participated in the development of a site selective chemical vapor deposition technique for the formation of gold interconnects in microcircuits.

Ph.D. Dissertation: "Gold thin films produced from laser stimulated plasma reaction products."

National Council of the Paper Industry for Air and Stream Improvement, Inc. (NCASI) Gainesville, FL. Analytical/Environmental Research Chemist from 1980-1985. Participated in the development of EPA Reference Method-25 for the determination of volatile organic compound (VOC) emissions from stationary sources; assisted in development of novel, multi-stage gas chromatograph capable of performing automated Method-25 analyses of CO, C02, CH4 and volatile hydrocarbons in the ppm to % range; performed and reported on several extensive source emission evaluations utilizing the newly developed Method-25 technology (mixed-fuel power boilers, recovery furnaces, lime kilns, thermomechanical pulping operations, veneer and lumber dryers); investigated and reported on the efficiencies of wet bottom electrostatic precipitators for removing gas phase total reduced sulfur (TRS) species from recovery furnace flue gas; developed novel gas chromatographic analysis method for chlorine (Cl) and chlorine-dioxide ($C10_2$) using sub-ambient microbore Teflon column with electron capture detector; carried out and reported on instrument performance evaluation studies for ambient air monitors (chlorine, chlorine-dioxide, TRS); developed test methods and apparatus, evaluated and reported on removal efficiencies of respirator cartridges for gas phase chlorine and chlorine-dioxide.

SCM/PCR. Inc. Gainesville, *FL.* Analytical Chemist/Industrial Hygienist from 1979-1980. Developed novel in-house gas chromatographic analytical techniques, including ultra-fast microbore packed column technology; troubleshooter for specialty chemical production facility; developed waste water treatment system for removal of residual (ppm) fluoride from process water; developed and implemented the company's first personnel monitoring program for worker exposure to regulated compounds.

Chemistry Department/Marine Science Department. University of South Carolina, Columbia, SC. Graduate Research Assistant from 1976-1978. Responsible for collection and analysis of pesticides in air, airborne particles, and estuarine samples; established empirical relationship for collection efficiencies of filter media used to collect high-volume air samples; developed semi-micro gas-saturation vapor pressure measurement system for low-volatility pesticides and halogenated hydrocarbons; instructed undergraduate physical chemistry and biochemistry laboratories.

Master's Thesis: "Sampling airborne polychlorinated biphenyls with polyurethane foam — a chromatographic approach to determining retention efficiencies."

CURRENT PROFESSIONAL SOCIETIES AND AFFILIATIONS:

American Physical Society (APS)

American Vacuum Society (AVS)

Member, Stack Testing Accreditation Council Technical Assessment Board (STAC-TAB)

Publications

"Sampling airborne polychlorinated biphenyls with polyurethane foam, a chromatographic approach to determining retention efficiencies." C.G. Simon and T.F. Bidleman. *Analytical Chemistrv* 51. pp 1110-1113 (1979).

"Determination of PCBs' vapor pressure by a semi-micro gas saturation method." T.F. Bidleman and C.G. Simon, *Environmental Science and Technology* 15, pp. 1375-1380 (1981).

"Investigation of volatile organic compound emissions provides a data base for the industry." V.J. Dallons and C.G. Simon. *Technical Association of the Pulp and Paper Industry* 65. pp. 67- 71 (1982).

"A study of organic compound emissions from veneer dryers and means for their control." V.J. Dallons and C.G. Simon, *NCASI Tech .Bul.* 405 (1983).

"Total gaseous non-methane organic emissions from the thermomechanical pulping process." C.G. Simon and A.L. Caron, *NCASI Tech. Bul.* 410 (1983).

"Theoretical plate measurements and collection efficiencies for high volume air samplers using polyurethane foam." T.F. Bidleman, N.F. Burdick, C. G. Simon and F. Yu, J. *Chromatography* 301 pp. 448-453 (1984).

"Volatile organic compound emissions from wood-residue fired power boilers in the southeast." C. G Simon, *NCASI Tech. Bul.* 455 (1985).

"Laboratory and field examination of several area, survey and personal work place atmospheric chlorine monitors." C.G. Simon and R.P. Fisher, *NCASI Tech. Bul.* 485 (1986).

"Evaluation of respirator cartridges for effectiveness of chlorine dioxide removal." C.G. Simon, J.D. Davidson and R.P. Fisher. *American Industrial Hygiene Assoc.* J. 48. pp. 1-8 (1987).

"Gold thin films produced from laser stimulated plasma reaction products." C.G. Simon, doctoral dissertation. University of Florida (1988).

"Intact capture of cosmic dust analogs in aerogel." P. Tsou, J.P. Bradley, D.E. Brownlee. H. Fechtig, L.W. Hrubesh, P.W. Keaton, M. Laurance, C.G. Simon, G.L. Stradling, A. Teetsov and A.L. Albee, *21st Lunar and Planet. Sci. Conf. Abstracts,* pp. 1264-1265 (1990).

"Micrometeoroid experiment on the LDEF." S. Amari, J. Foote, E.K. Jessberger, C. Simon, P. Swan, R. Walker and E. Zinner, *Meteoritical Soc. Meeting Abstracts,* Perth, Australia, pp. 347-348 (1990).

"Meteoroid and debris impact features documented on the Long Duration Exposure Facility." M. Zolensky, D. Atkinson, T. See, M. Allbrooks and C. Simon, *NASA/JSC publication* #24608 (1990).

"SIMS chemical analysis of extended impact features from the trailing edge portion of experiment AO 187-2. " S. Amari, J. Foote, C. Simon, P. Swan. R. Walker and E. Zinner, LDEF-69 Months in Space: First Post Retrieval Symposium. *NASA CP 3134,* pp. 503-516 (1991).

"Meteoroid and Debris Special Investigation Group data acquisition procedures." M. Zolensky, D. Atkinson, T. See, M. Allbrooks C. Simon, and C.A. Sapp, LDEF-69 Months in Space: First Post Retrieval Symposium. *NASA CP 3134,* pp. 459-476 (1991).

"Ion microprobe elemental analysis of impact features on Interplanetary Dust Experiment sensor surfaces." C.G. Simon, J.L. Hunter. D.P. Griffis and J.J. Wortman. LDEF-69 Months in Space: First Post Retrieval Symposium. *NASA CP 3134.* pp.529-548 (1991).

"Gold/carbon superfine particles produced in pulsed $C0_2$ laser stimulated plasmas." S.O. Colgate. C.G. Simon, S.J. Bogess, M. Moini, A.T. D'Agostino and J.M. Ammons, *J. Vac. Sci. Technol. B* 9(3), pp. 1577-1595, May/Jun (1991).

"Meteoroid and debris record on the Long Duration Exposure Facility." M. Zolensky, D. Atkinson. T. See, M. Allbrooks, C. Simon, M. Finckenor and J. Warren, *J. Spacecraft and Rockets,* Vol. 28(2), pp. 204-214(1991).

"Correlative ion and electron microscopy of single micrometeoroid impacts from the Long Duration Exposure Facility Interplanetary Dust Experiment", J.L. Hunter, C.G. Simon, D.P. Griffis and J.J. Wortman, SIMS VIII Conference Proceedings (1991).

"SIMS chemical analysis of extended impacts on the leading and trailing edges of LDEF experiment A0187-2." S. Amari, J. Foote, C. Simon, P. Swan, R. Walker and E. Zinner, E. Jessberger, G. Lange and F. Staderman, *23rd Lunar and Planet. Sci. Con/Abstracts* . pp. 25-26 (1992).

"LDEF Interplanetary Dust Experiment: A high time-resolution snapshot of the near-Earth particulate environment." J.D. Mulholland, J.P. Oliver, S.F. Singer, J.L. Weinberg, W.J. Cooke, N.L. Montague P.C. Kassel. C.G. Simon. J.J. Wortman, and W.H. Kinard, Hypervelocity Impacts in Space. (J.A.M. McDonnell, ed., University of Kent at Canterbury. England) ISBN 0904938328 (1992).

"Long-term Particle Flux Variability Indicated by Comparison of Interplanetary Dust Experiment (IDE) Timed Impacts for LDEF's First Year in Orbit with Impact Data for the Entire 5.77 Year Orbital Lifetime." J.D. Mulholland, J.P. Oliver, C.G. Simon, W.J. Cooke and P.C. Kassel. LDEF-69 Months in Space: Second Post Retrieval Symposium. *NASA CP-3194,* pp. 693-702 (1993).

"Contaminant interferences with SIMS analyses of microparticle impactor residues on LDEF surfaces." C.G. Simon, J.L. Hunter, D.P. Griffis, V. Misra, D.A. Ricks and J.J. Wortman, *Adv. Space Res.,* Vol. 13, No. 8, pp. (8)115-(8)118, (1993).

"Elemental analyses of hypervelocity microparticle impact sites on Interplanetary Dust Experiment sensor surfaces." C.G. Simon, J.L. Hunter, D.P. Griffis, V. Misra, D.A. Ricks, J.J. Wortman, and D.E. Brownlee, LDEF-69 Months in Space: Second Post Retrieval Symposium. *NASA CP-3194,* pp. 677-692(1993).

"Hypervelocity impact testing of micrometeorite capture cells in conjunction with a PVDF thin-film velocity-trajectory sensor and a simple plasma velocity detector." C.G. Simon, *Int. J. Impact Engineering,* Vol. 14, pp. 683-694 (1993).

"Penetrations of multiple thin films in micrometeorite capture cells." C.G. Simon, *Workshop on Particle Capture and Velocity/Trajectory Measurement Technologies,* Lunar and Planetary Institute, Houston TX. Sept. 1993.

"Long-term microparticle impact fluxes on LDEF determined from optical survey of Interplanetary Dust Experiment (IDE) sensors." C. G. Simon, J.P. Oliver, W.J. Cooke, K.I. Downey and P.C. Kassel, presented at LDEF-69 Months in Space: Third Post Retrieval Symposium. *NASA CP 3275* (1995).

"Secondary ion mass spectrometry (SIMS) analyses of hypervelocity microparticle impact sites on LDEF surfaces." C.G. Simon, A.J. Buonaquisti, D.A. Batchelor, J.L. Hunter, D.P. Griffis, V. Misra, D.A. Ricks, J.J. Wortman, D.E. Brownlee, S.R. Best, M.S. Crumpler, B. Arad, S. Eliezer, S.E. Moshe, S. Maman and I. Gilath, LDEF-69 Months in Space: Third Post Retrieval Symposium. *NASA CP* J275(1995).

"IMPA:Ct - In-situ Monitors of the Particulate Ambient: Circumterrestrial - An International consortium of instrument suppliers" C.G. Simon, C. Maag, R. Munzenmeyer, R.A. Skrivanek, W.G. Tanner, Jr., A.J. Tuzzolino, O.M. Uy, and J.J. Wortman, presented at the IAA International Conference on Low-Cost Planetary Missions, Johns Hopkins University/APL, 1994.

"Interplanetary Dust Experiment (IDE) impact detector results", J.P. 01iver,C.G. Simon, W.J. Cooke, S.F. Singer and J.L. Weinberg; in *Space Instrumentation and Dual-Use Technologies,* Firooz A. Allahdadi, M.P. Chrisp, C.R. Guiliano, W.P. Latham and J.F. Shanley, Editors, Proc. SPIE 2214, pp. 76-84 (1994).

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"The Orbital Characteristics of Debris Particle Rings as Derived from IDE Observations of Multiple Orbit Intersections with LDEF", William J. Cooke, John P. Oliver and Charles G. Simon, LDEF-69 Months in Space: Third Post Retrieval Symposium. Williamsburg, Virginia, Nov. 5-12. 1993 *NASA CP 3275* (1995).

"VOC Residual, Blanks and Limits of Detection Using EPA Method 25 with Sample Recovery Temperatures of 200°C and 500°C", C.G. Simon and C.P. Sneeringer, Proceedings, *Measurement of Toxic and Related Air Pollutants.* VIP-74, Vol. 2, pp 904-916 (1997).

"Elimination of interference from Carbon Dioxide when Sampling High-Moisture/High-$C0_2$ Gases for VOC Using Method 25", C.G. Simon and C.P. Sneeringer, Proceedings, *Measurement of Toxic and Related Air Pollutants.* VIP-74. Vol. 2, pp 916-925 (1997).