

## **Dr. Aaron Michael Schinder**

US Citizen  
36502 Nickel Street  
Palmdale, CA 93550  
937-626-7651  
website: [www.amssolarempire.com](http://www.amssolarempire.com)

Aerospace Engineer, Sr.  
Revolutionary Technology Programs Group  
Lockheed Martin Aeronautics Company  
[aschinder@amssolarempire.com](mailto:aschinder@amssolarempire.com) (personal)  
[aaron.m1.schinder@lmco.com](mailto:aaron.m1.schinder@lmco.com) (work)

### **Overview:**

- PhD with electric propulsion, fusion, and experimental plasma physics experience. Seeking hands-on research and development position. Willing to relocate.

### **Experience:**

#### 2017 - Present: Aerospace Engineer Sr., Revolutionary Technology Programs, Lockheed Martin

- Experimenter and analyst for RTP's Compact Fusion Reactor T4B experiment. Designed analysis tools for plasma diagnostics. Performed experiments in support of T4B research objectives. Wrote MATLAB and Labview analysis tools for automating kHz swept Langmuir probe, allowing efficient point density and electron temperature measurements. Compiled LSP and in-house modeling code against HPC libraries on supercomputer and windows workstations, enabling modeling group to execute and distribute models. Debugged electrical noise and contributed to analysis routine for a dispersion interferometer, enabling measurements of line integrated plasma density on T4B.

#### 2016 - 2017: Aerospace Engineer, Chemical and Thermal Propulsion Systems Branch, NASA Glenn Research Center (GRC/LTR0)

- Engineer and analyst for the Orion project. Performed analysis, modeling, and engineering support for the development of the propulsion subsystem of the European Service Module. Modeled prop feed-system water-hammer, pressurization system and engine performance. NASA analyst for 2017 European Service Module propulsion qualification test.

#### Fall 2011 - Sep 2016: PhD Student, High Power Electric Propulsion Lab, Georgia Institute of Technology

- Joint PhD student of Prof Mitchell Walker's High Power Electric Propulsion Lab, and Prof Julian Rimoli's Computational Solid Mechanics Lab.
- Studied the physical processes behind the erosion of channel wall materials in Hall effect thrusters (HETs). Computational and experimental basic research into plasma-material interactions with application to life limiting processes.
- Experience with electric propulsion devices, plasma device physics, space plasma physics, and modeling and simulation. Wrote parallel C++ engineering simulations to predict surface features developed during plasma erosion of a heterogeneous borosil microstructure. Other simulation experience with molecular dynamic simulation of grain boundary energy in metals.
- Coursework in fusion plasma physics, space plasma physics, spacecraft electric propulsion, laser physics, and advanced orbital mechanics.
- Assisted with data collection in testing of Hall effect thrusters. Experienced with Solidworks and 3-axis mill and lathe. Designed and machined test fixtures for research.

#### Summer 2011: Intern through Aerotek for Ball Aerospace, AFRL Laser Effects Research Branch.

- Developed FORTRAN plug-in and Python wrapper for ABAQUS FEM software, enabling the simulation of high energy laser burn-through of multi-wall structures.

#### Mar 2007 - Dec 2011: USAF Officer, Laser Effects Engineer, AFRL Laser Effects Research Branch

- Obtained DoD security clearance (currently under investigation for reactivation).
- Project officer and principal investigator for an exploratory study. Planned and executed a year-long multi-part test effort on coupon level samples, searching for an effect of interest to the Air Force.
- Project officer, analyst and experimenter for several tests. On the MANPADS test, a major outdoor testing program, I performed analysis on expectations for rocket thrust and nozzle ejection velocity, and briefed the air base wing commander and senior civilian division director on safety and risk mitigation for the test, enabling the test to proceed. Produced GUI software for

laser pointing corrections, and cut data reduction by 50% for FAST test program. For basic research into surface reflection, led 600 tests over weekends and evenings using high demand test equipment, saving \$200k in additional hardware which would have otherwise been needed.

- Worked on both individual research and on large test teams. Optics and high-energy laser experience. Experience analyzing thermal infrared (LWIR, MWIR), NIR, and UV cameras.

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### **Education, Credentials, and Awards:**

- PhD, Aerospace Engineering, Georgia Institute of Technology, Fall 2016.
- National Defense Science and Engineering Graduate Fellow, American Society of Engineering Education, Sep 2013 to Sep 2016.
- MS, Aeronautical Engineering, High Power Electric Propulsion Lab, Georgia Institute of Technology, Atlanta GA, 2013. GPA: 3.93.
- BS Aeronautical Engineering, Major Concentration: Propulsion, Minor Concentration: Structures, Minor in Economics, Purdue University, West Lafayette IN, 2006. GPA 3.91.
- Engineer Intern License, ET30707657, Indiana Professional Licensing Agency
- Directed Energy Directorate, 3rd Quarter Scientist and Engineer Award, AFRL Directed Energy Directorate, Nov 2009.
- Directed Energy Directorate 4th Quarter Technical Teamwork Award, AFRL Directed Energy Directorate, Dec 2007.

### **Skills, Interests, Activities:**

- Experience programming, compiling, and running simulation and HPC software in Windows, Linux, and supercomputer environments. C, C++, FORTRAN, Matlab, and Python languages. Familiarity with numerical libraries (LAPACK, PETsc). Developed engineering simulations, and designed websites: [www.republicedm.com](http://www.republicedm.com), [www.amssolarempire.com](http://www.amssolarempire.com), and others.
- Experience with Solidworks, CATIA, Fluent, 3-axis mill and lathe. Designed and built test fixtures for experiments. Strain gages, thermocouples, plasma diagnostics, microscopes, and other lab instruments.
- Experience with Eaglecad, Kicad, and LTSpice.
- Math tutor, Highland High-school, Albuquerque NM 2008-2011, currently tutoring one-on-one.
- Enrolled in flying lessons, anticipate private pilot's license with one more year of lessons.
- Interests: 3D printing, cryptography, physics, space exploration.
- Chair of Albuquerque AIAA chapter, 2010-2011.

### **Publications**

- Schinder, A. M., Rimoli, J. J., and Walker, M. L. R., "Investigation of Plasma Material Erosion Under Mechanical Stress," *Journal of Propulsion and Power*, Sep. 2016, doi: 10.2514/1.B36253.
- Schinder, Aaron, Walker, M., Rimoli, J. "3D Model for Erosion of a Hall Effect Thruster Discharge Channel Wall." *Journal of Propulsion and Power*, 2014. doi:10.2514/1.B35098.
- Schinder, Aaron, Walker, M., Rimoli, J., "3D Model for Atomic Sputtering of Heterogeneous Ceramic Compounds." *49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference*. American Institute of Aeronautics and Astronautics, 2013. DOI 10.2514/6.2013-4127.

**References are available upon request**