

**Dr. Samuel G. Trahan**  
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## SUMMARY

Software engineer, solutions architect, and geospatial data scientist.

## SKILLS

**Efficient, Massively Parallel, Programs** with workflows distributed among multiple sites scaling past 30,000 cores.

**Computer Languages** Many computer languages known at experienced or expert level such as: Python, C++, R, Fortran, Java, Ruby, Matlab, IDL, XML, HTML, Javascript.

**Optimization** of code to allow more science to be done with less resources.

**Model Diagnostics** Statistical comparison of observational data and ground-truth values to model output to discern problems in the model and to quantize model skill.

**Low-Overhead Real-Time Websites** Interactive, low-overhead, real-time, AJAX websites, that use back-end-generated static files and client-side Javascript to give a dynamic experience without server-side load.

**High-Resolution Atmospheric Modeling** Creation and maintenance of near- or sub-convective scale atmospheric forecasting models.

## EMPLOYMENT

**2009–Present** - Senior Software Engineer, *Environmental Modeling Center (EMC)*

- Project lead for a National Weather Service workflow modernization effort.
- Created or maintained massively parallel programs in multi-site workflows.
- Chief software architect on several high-reliability, data-intensive, projects.
- Pioneered Agile development in EMC (hybrid DSDM/Scrum)
- Implemented the first NCEP operational Python workflow
- Rewrote 90,000 lines of aging ksh scripts as 30,000 lines of object-oriented Python.
- Acting manager of a 20-member hurricane research group for a year.
- Developed Hurricane Weather Research and Forecasting (HWRF) model world-wide forecast capabilities.
- Primary route to EMC of community, open-source, HWRF interaction.

**2004–2009** - Support Scientist, *University of Maryland Baltimore County (UMBC)*

- Collaborated with scientists to design, develop, and support UMBC's first campus-wide, scientific computing, cluster.
- Created observational data comparison methods to diagnose numerical weather model issues.
- Worked with UMBC and Goddard researchers to produce parallel NWP programs.
- Assisted a number of research projects across a wide range of disciplines.

**1997–2004** - Research Assistant *National Institute of Standards and Technology (NIST)*

- Evaluated the skill of commercial biometrics recognition algorithms.
- Created a similarity score normalization technique that improved face recognition algorithm skill.
- Made a lossless gait video compression algorithm.
- Eliminated the need for a cluster through python-based, efficient, mass data processing.

**EDUCATION**

**2011** Ph.D. in Atmospheric Physics, University of Maryland, Baltimore County (UMBC)

**2005** Master of Science in Applied Physics, UMBC

**2003** Bachelor of Science in Computer Science, UMBC

**PROFESSIONAL MEMBERSHIPS**

**IEEE** Institute of Electrical and Electronics Engineers

**AGU** American Geophysical Union

**AMS** American Meteorological Society

**APS** American Physical Society

**SELECTED PUBLICATIONS AND GRANTS**

Trahan, Samuel, et.al., 2017: "NCEP Coding Standards." *NCEP Office Note 492*

Trahan, Samuel, L. Sparling, and J. Halverson, 2008: "Scale analysis of spatial variability in observations of tropical cyclones." *28th Conference on Hurricanes and Tropical Meteorology*.

Trahan, Samuel, L. C. Sparling, V. Tallapragada, S. A. Braun, and J. Halverson, 2010a: "Statistical comparison of scales and spatial distributions of convection in observational data and simulated hurricanes." *29th Conf. on Hurricanes and Tropical Meteorology*.

Trahan, Samuel, V. Tallapragada, Z. Zhang, J. Oconnor, L. C. Sparling, and B. Lapenta, 2010b: "A high resolution version of operational hwrf: forecast ability and computational challenges presented by an operational environment." *29th Conf. on Hurricanes and Tropical Meteorology*.

Trahan, Samuel, 2011: "Multi-Scale Analysis of Observations of Tropical Cyclones with Applications to High-Resolution Hurricane Modeling." Ph.D. thesis, Dept of Physics, UMBC, 2011.

Trahan, Samuel, and L. Sparling, 2012: "An Analysis of NCEP Tropical Cyclone Vitals and Potential Effects on Forecasting Models." *Wea. Forecasting*, 27, 744-756.

Trahan, Samuel, et.al., 2014: "Improved Telescopic Nesting and Accurate Storm Tracking in the NCEP Operational HWRf Model." *31st Conf. on Hurricanes and Tropical Meteorology*. 14D.2.

Bernardet, Ligia, V. Tallapragada, S. Bao, S. Trahan, et.al., 2015: "Community Support and Transition of Research to Operations for the Hurricane Weather Research and Forecasting Model." *Bull. Amer. Meteor. Soc.*, 96, 953-960.

Sparling, Lynn and S. Trahan, 2008: "Impact of small-scale inner core dynamics on tropical cyclone intensity." National Science Foundation, Teragrid allocation (supercomputer access grant) TG-ATM080003N.

Tallapragada, Vijay, S. Trahan, et.al., 2014: "Significant Advances to the NCEP Operational HWRf Modeling System for Improved Hurricane Forecasts." *31st Conf. on Hurr. and Trop. Meteorology*, 14D.1.

Tallapragada, Vijay, C. Kieu, S. Trahan, et.al., 2015: "Forecasting Tropical Cyclones in the Western North Pacific Basin using the NCEP Operational HWRf Model. Real-time Implementation in 2012." *Weather and Forecasting*, in print.

Tallapragada, Vijay, Y. Kwon, Q. Liu, S. Trahan, et.al., 2012: "Operational Implementation of High-Resolution Triple-Nested HWRf at NCEP/EMC - A Major Step Towards Addressing Intensity Forecast Problem." *30th Conference on Hurricanes and Tropical Meteorology*.