Dr. Samuel G. Trahan

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SUMMARY

Software engineer, atmospheric modeler, with a specialty in hurricanes.

SKILLS

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

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.

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

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

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

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.

EMPLOYMENT

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

- Created or maintained massively parallel programs in multi-site workflows.
- Chief software architect on several high-reliability, data-intensive, projects.
- 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.
- Added novel products to the NCEP operational workflow.
- 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 to improve face recognition algorithms.
- 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 Meterology*.

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 Meter.*

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 Meter.*

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 Meteor.* 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. Meteor.*, 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*.