

Dr. Freeman Rufus Jr.

Global Technology Connection, Inc., 2839 Paces Ferry Road, #1160, Atlanta, GA 30339

Email: frufus@globaltechinc.com US Citizen

Education

Ph.D., Electrical & Computer Engineering, Georgia Institute of Technology, Atlanta, Georgia, May 2001

MS of Electrical Engineering, Georgia Institute of Technology, Atlanta, Georgia, March 1996

Bachelor of Science in Mathematics, Morehouse College, Atlanta, Georgia, May 1994

Bachelor of Electrical Engineering, Georgia Institute of Technology, Atlanta, Georgia, March 1994

Principal Fields of Expertise

- Batteries, Motors & Generators failures
- Machinery & Equipment Failures
- Product Failure Analysis
- Repair / Preventive Maintenance
- Electrical Failures
- Design, analysis and validation of diagnostic and prognostic algorithms.

Professional Experience

Global Technology Connection, Inc., Atlanta, Georgia

April 2003 – Present

Principal Engineer – Engineering Department

Responsibilities: Principal Investigator for NAVAIR STTR Phase I/II program on diagnostics and health management of aircraft electrical generator systems. In Phase II, algorithms were being developed to differentiate between failure modes (bearings, winding failures, etc.), normal aircraft operational modes (speed, load, etc.) and environments. The diagnostic algorithms were trained to correlate electrical signatures to the state-of-health (failure type, severity and location) of low-hour/healthy and degraded generators. Principal Investigator for NAVAIR SBIR Phase I/II program on assessing remaining useful life of Lithium-ion Batteries after deep discharges below 2V/cell that was finished in 2008. Developed and implemented innovative algorithms to determine the actual condition of a battery utilizing available voltage response to applied current loads. Developed detailed remaining useful life models to account for the change in a batteries' state-of-health (SOH) as a function of (deep) discharge depth and duration. Principal Investigator for a Phase II.5 program (2nd Phase II program) awarded to develop PHM system for JSF 28V and 270V Li-ion batteries. Other activities included development of Quad Charts, Narrative Briefings and Phase III transition plans for several projects.

Georgia Tech Research Institute, Atlanta, Georgia

December 2002 – October 2004

Research Staff — Electro-Optics, Environment, & Materials Laboratory

Responsibilities: Conducted a system-level FMECA study of the Air Force Satellite Control Network using outage and maintenance data over a 2.5 year period to determine the communication and range segment systems that have the greatest impact to its performance and availability.

ChanneLogics, Inc., Atlanta, Georgia

November 2000 – July 2002

Senior Member of Technical Staff — Software Development Department

Responsibilities: Redesigned, coded and tested a C++ software component for managing prediction algorithms that were used to predict future bandwidth usage patterns of cable modem users. Designed and coded a C++ wrapper for validating, parsing and generating XML documents using Libxml1.8.15. Wrote a technical report on designing and implementing fuzzy neural networks to perform long-term forecasting of future bandwidth usage by cable modem users.

Computer Software Skills

- Microsoft Visual Studio .NET C++ & C#, ASP.NET
- MATLAB, SIMULINK
- Past programming experience in: Visual Basic, Fortran, Pascal and C

Selected Publications

1. F. Rufus, S. Lee, A. Thakker, Sean Field and Nathan Kumbar, “**Advanced Electrical Signature Analysis of Aircraft Electrical Generators**,” SAE AeroTech Conference, Paper # 2009-01-3162, November, 2009.
2. F. Rufus, S. Lee, A. Thakker, Sean Field and Nathan Kumbar, “**Advanced Diagnostics of Aircraft Electrical Generators**,” SAE International Journal of Aerospace, Vol. 1, No. 1, pp. 1064-1071, 2008.
3. F. Rufus, S. Lee, A. Thakker, Sean Field and Nathan Kumbar, “**Advanced Diagnostics of Aircraft Electrical Generators**,” SAE Power Systems Conference, Paper # 2008-01-2923, November, 2008.
4. F. Rufus, S. Lee, and A. Thakker, “**Health Monitoring Algorithms for Space Application Batteries**,” the IEEE International Conference on Prognostics and Health Management 2008, Denver, CO, October 2008.
5. F. Rufus, G. Vachtsevanos and B. Heck, “**Real-time Adaptation of Mode Transition Controllers**,” Journal of Guidance, Control and Dynamics, Vol. 25, No. 1, pp. 167-175, 2002.
6. F. Rufus and G. Vachtsevanos, “**Design of Mode-to-Mode Fuzzy Controllers**,” International Journal of Intelligent Systems, Vol. 15, No. 7, pp. 657-685, 2000.
7. F. Rufus, G. Vachtsevanos and B. Heck, “**Adaptive Mode Transition Control of Nonlinear Systems Using Fuzzy Neural Networks**,” 8th IEEE Mediterranean Conference on Control & Automation, University of Patras, Rio, Greece, July 17-19, 2000.

Patents

1. United States Patent no. 7,499,453, Apparatus and Methods for Incorporating Bandwidth Forecasting and Dynamic Bandwidth Allocation into a Broadband Communication System, Carlson, William S.; Moyer, Matthew J.; McKinnon, Martin W., III; Freeman, Rufus, Jr.; Hart, John Bradford; March 3, 2009.

Professional Memberships

IEEE Member (2001 – Present)
IEEE Control Systems Society (2001 – Present)
SAE Member (2008 – Present)
Electrochemical Society Member (2009)
Tau Beta Pi National Engineering Honor Society
Eta Kappa Nu Electrical Engineering Honor Society