

# JAMES T. ADAMS, Ph.D.

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## SUMMARY

A distinguished senior applied scientist and engineer with experience across multiple Intelligence, Surveillance, and Reconnaissance programs. Particularly experienced in Remote Sensing for Electro-Optical and Radar Systems for Air and Space borne platforms. Excellent communicator with a history of technical writing and presentation as well as proposal and grant writing.

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### *Algorithm Analysis and Design / Software Engineering Strong Scientific and Mathematical Skills*

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#### PROFESSIONAL HIGHLIGHTS:

**Stephen F Austin State University**, Nacogdoches, TX  
**Associate Professor**, August 2017 to Present

- *Undergraduate Research* – Working with students on basic research in computational and experimental physics. Summer projects have involved collection of polarimetric data using commercial cameras and development of software for the display and management of polarimetric data. Also guided students through orbital simulations using Runge-Kutta algorithms, developed in C++.
- *Graduate Research* – Two masters students with completed theses. “An Application of Differential Mathematical Modeling Techniques to Study the Ongoing Rabies Epizootic in China”, Christopher Turner (2022) and “Data Driven Approach to Identification of Key Terms in TCPA Dynamics”, Thomas Elie Free (2023).
- *Teaching* – Instructor for Electrodynamics, Quantum Mechanics, Mathematical Applications in Physics, Technical Physics for Engineers and Physicists as well as College Physics for other STEM disciplines. Taught mainly face-to-face classes but also involved in online course development.

**ISPA Technology**, Alexandria, VA, San Diego, CA, & Panama City Beach, FL  
**Principal Scientist**, July 2004 to Present

- *Evaluation of Operational Analysis Algorithms in Mine-Warfare* – Currently working on problems in mine-clearing operations, specifically in the planning and prediction of effectiveness for those operations. This work involves statistics, physics, and a great deal of computational modeling for evaluating the performance of mine sweeping and hunting operations by air and surface vehicles. The modeling and simulation component involves existing applications written in C and Java, and rapid prototyping in Python.
- *Development of software tools for analysis of hyperspectral datasets* – Worked on an NRL system that uses simulation to generate spectra for various oceanic conditions based on ocean bottom characteristics and water composition. These spectra are used to generate specialized maps from imagery collected from a space borne hyperspectral sensor. This system was several years old and had become extremely slow and unusable. My tasking involved reworking the algorithms for generating spectra, cleaning up the C# code which connected to the back-end MySQL database, and optimizing the MySQL configuration. Final rate of spectra generation was approximately a thousand times greater than that of the initial system.
- *Analysis of field data from radar systems*. (AREPS – Advanced Refractive Effects Prediction System). This work on an existing tactical application involved separating the calculation of generated radio fields from the determination of radar returns from targets and areas of radio reception. Separating the calculation threads in this application required understanding of the underlying physics of the problem, and a great deal of analysis, design and testing of existing and new software components.

**Boeing Corporation, Springfield, VA**

**Product Engineering Project Specialist, June 2002 to July 2004**

- *Development of sensor model for integration of optical satellite data.* Commercial Satellite Sensor Integration. Designed, developed, and delivered a complete sensor model including a Least-Squares error model capability into SoftPlotter (A Boeing-Autometric Imagery Package) for the QuickBird satellite system. This involved ingesting raw ephemeris data from the satellite, modeling the optics of the sensor system, and integrating new software with a very complex and undocumented legacy system.
- *Error model upgrade for optical and radar imagery.* Implemented an upgrade to SoftPlotter triangulation capability. SoftPlotter uses a Least Squares Algorithm for estimating sensor accuracy between platforms. The upgrade involved replacing hard-coded calculations of derivatives for each sensor model with numerical derivatives. This simplified the process of adding new sensor models and removed the need for an engineer to derive analytic expressions for derivatives in the model (Approximate 50% reduction in cost for sensor model development).
- *Orbit simulation and sensor performance estimation.* Worked on proprietary spacecraft and sensor model simulations involving orbit propagation and access generation for the mission analysis of a future system. This set of tasks demonstrated the proposed system performance and utility in accomplishing requirements of the program.

**Cisco Systems, Austin, TX**

**Network Security Scientist, November 1999 – May 2002**

- *Statistical analysis of sequence number generation for multiple Cisco products.* Conducted statistical analyses for various network components and protocols including TCP ISN generation and IPSEC cookie values for Cisco's VPN implementation (Altiga, PIX).
- *Vulnerability analysis and discovery.* Modified existing scripts and codes (Python, Perl, C, shell script) to develop exploits against Cisco products. Wrote scripts (custom fuzzers) to generate and pass ranges of network traffic (legitimate and malformed) to target machines in order to perform vulnerability enumeration. (Protocols included CDP, HTTP, FTP, IP, TCP, UDP, and SIP)
- *Security analysis and testing of products.* Lead Engineer on PIX firewall evaluation. Wrote test plans and performed evaluations in 4 separate areas: Remote Identification, Fragmentation, State Handling, and Authentication Services. Presented findings and bug reports to PIX development team.

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**TECHNICAL SKILL SET:**

**Certifications:** SCJA, SCJP

**Languages/Tools:** Python, JavaScript/HTML/CSS, Java, C/C++, FORTRAN

**Operating Systems:** Microsoft Windows, LINUX (Debian(w/Mint, Ubuntu))

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**EDUCATION:**

**Ph.D. in Physics**

Texas A&M University – Department of Physics  
College Station, TX; 1997

**Bachelors of Science (BS) in Physics**

University of Texas at Arlington  
Arlington, TX; 1990

## **PUBLICATIONS:**

### **Appearance of circularly polarized light in an atmosphere-ocean system**

James T. Adams

Applied Optics 59(29), 9174-9184 (2020).

### **Observation of non-principal plane neutral points in the upwelling polarized light field above a water surface**

James T. Adams, Deric J. Gray, and Simon Rayner

Applied Optics 51(22), 5387-5391 (2012).

### **Neutral Points in an Atmosphere-Ocean System. 2: Downwelling Light Field**

James T. Adams, Deric J. Gray

Applied Optics 50(3), 335-346 (2011).

### **Comparison of Radiance and Polarization Values Observed in the Mediterranean Sea and Simulated in a Monte Carlo Model**

James T. Adams, Eyvind Aas, Niels K. Hojerslev, and Bo Lundgren

Applied Optics 41, 2724-2735 (2002)

### **Neutral Points in an Atmosphere-Ocean System. 1: Upwelling Light Field**

James T. Adams and George W. Kattwar

Applied Optics 36, 1976-1986 (1997)

### **Polarimetric LIDAR Returns in the Ocean: A Monte Carlo Simulation**

Ocean Optics XIII Proceedings, SPIE, Halifax, Nova Scotia (1996)

### **Investigation of the genotype III to genotype I shift in Japanese encephalitis virus and the impact on human cases**

Han, N., J. Adams, P. Chen, W. Fang, Si-Qing Liu and S. Rayner

Virologica Sinica. 20(4), 277-289 (2015).

### **Comparison of Genotypes I and III in Japanese encephalitis virus reveal distinct differences in their genetic and host diversity**

Han, N., J. Adams, P. Chen, Z.-y. Guo, X.-f. Zhong, W. Fang, N. Li, L. Wen, X.-y. Tao, Z.-m. Yuan and S. Rayner

Journal of virology: JVI. 02050-02014. (2014).

### **The limited number of available nucleotide and protein sequence data from the recent H7N9 cases in China impeded investigation and characterization of the outbreak**

Liu, H., N. Han, W. Fang, J. Adams, K. Zheng, T. Li, Z. Hu and S. Rayner

Virologica Sinica 29(2): 126-127.(2014).

### **National Borders Effectively Halt the Spread of Rabies: The Current Rabies Epidemic in China Is Dislocated from Cases in Neighboring Countries**

Guo Z, Tao X, Yin C, Han N, Yu J, J Adams, S Rayner et al.

PLoS Negl Trop Dis 7(1): e2039. doi:10.1371/journal.pntd.0002039 (2013)

### **Molecular phylogenetic analysis indicates lineage displacement occurred in Chinese rabies epidemics between 1949 to 2010**

Tao, X.-Y., Q. Tang, S. Rayner\*, Z.-Y. Guo, H. Li, S.-L. Lang, C.-P. Yin, N. Han, W. Fang and J. Adams

PLoS neglected tropical diseases 7(7): e2294. (2013).

**National Borders Effectively Halt the Spread of Rabies: The Current Rabies Epidemic in China is Dislocated from Cases in Neighboring Countries**

Z. Guo, X. Tao, C. Yin, N. Han, J. Yu, H. Li, H. Liu, W. Fang, J. Adams, J. Wang, G. Liang, Q. Tang, and S. Rayner

PLoS neglected tropical diseases 7(7): e2039. doi:10.1371/journal.pntd.0002039 (2013)

**The Spatial and Temporal Dynamics of Rabies in China**

Jinning Yu, Hao Li, Qing Tang, Simon Rayner, Na Han, Zhenyang Guo, Haizhou Liu, James Adams, Wei Fang, Xiaoyan Tao, Shumei Wang, Guodong Liang

PLoS Negl Trop Dis 7(1): e1640. doi:10.1371/journal.pntd.0001640 (2012)