RONALD W. LEE

127 Brentwood Dr.	Phone: 865-207-1716
Oak Ridge, TN 37830	Email: rlee.ics85@gtalumni.org
	LinkedIn: http://www.linkedin.com/pub/ron-lee/7/53a/6b0/

QUALIFICATIONS

Twenty-nine years of experience as a developer, team leader, and architect for software development and integration projects ranging from prototypes to 24-by-7 operational deployments. Subject areas include: defense intelligence, planning, and decision support; consequence assessment and hazard prediction; scientific analysis and modeling; data visualization; real-time data acquisition and dissemination; and situation display. Areas of expertise include:

- Object-Oriented, Object-Based, and Component-Based Software Architecture and Development
- Web/Internet Services and Web Applications
- Graphical User Interfaces, Interactive Graphics and Data Representation
- Cross-Platform Development and Deployment: Unix/Linux, Windows, Mac OS X
- Wide Range of Languages and Environments, Including Java, C/C++, C#.NET, Python, Perl
- Application of Engineering Principles to Achieve Software Engineering Goals

EDUCATION

1986   M.S. in Computer Systems, *Air Force Institute of Technology*, Wright-Patterson AFB, Ohio
Distinguished Graduate, GPA: 3.952/4.0
Specialization: Computer Architecture (Parallel Processing), Communication Networks

1985   B.S. in Information and Computer Science, *Georgia Institute of Technology*, Atlanta, Georgia
Highest Honor, GPA: 3.953/4.0
Specialization: Computer Engineering, System Software

PROFESSIONAL EXPERIENCE

Oak Ridge National Laboratory, Oak Ridge, Tennessee
Computational Science and Engineering Division
Data Systems Sciences and Engineering, Geospatial Information Science and Technology, and
Applied Software Engineering Research Groups
(Senior Science and Technology Staff, *October 1999 - present*)

Primarily responsible for architecture, development (including team and schedule management), and deployment of software systems. Also responsible for submitting research and development proposals to sponsors. Sponsors for successful proposals and projects have included: the Defense Threat Reduction Agency (DTRA), Department of Homeland Security (DHS), Defense Intelligence Agency (DIA), Defense Logistics Agency (DLA), Department of Energy (DOE), Federal Aviation Administration (FAA) , and the Port of Memphis.

*Notable Accomplishment*s:

- Principal maintainer of the Nuclear Facility Accident (NFAC) incident source model for the Hazard Prediction and Assessment Capability (HPAC). NFAC models a wide range of nuclear facility accidents and analytical definitions of radioactive releases. NFAC is implemented in Java as an Open Service Gateway Initiative (OSGi) component with a Swing-based GUI. Developed an OSGi component to drive JUnit tests for unit and integration tests.
- Principal developer and maintainer of PopLib, a Fortran- and C-callable population counting library that reads and processes LandScan data. Implemented in C++, PopLib uses generalized polygon clipping to process raster population data of various resolutions.
- Principal developer and architect of VERAView, an engineering visualization and browser tool for output from Virtual Environment for Reactor Applications (VERA) models developed for the Consortium for Advanced Simulation of Light Water Reactors (CASL) program (github.com/casl/VERAview).
- Lead developer for the Fallout Planning Tool, a field-deployable tool to assist forensics assessment teams in planning collection missions. It provides interactive definition of a detonation event, map-based route creation and editing, and KML visualization of fallout and dose fields as well as dose accumulated along defined routes. The GUI is an AJAX Web application using the ExtJS framework communicating to a Web services layer implemented

in Java that wraps the DELFIC code and provides route dose calculations.

- Software team leader for the SensorNet for Fire and First Responder (SNIFFER) system developed for DHS. Software components include interfaces to an array of detectors in a DAQ agent, Web services implemented in Java providing storage and retrieval of raw and processed sensor data, desktop and mobile situation display Web applications, and generation of KML situation displays. Developed a SNIFFER detector simulator in Python used for conference displays and demonstrations.

- Developed and deployed a general purpose Atom-based framework , Web services, and relational database in support of the SmartWaste initiative at ORNL. The framework allows tagging and categorization (metadata) of any data in terms of Atom feeds and entries and provides search and query functions.

- In support of the DOD Explosives Safety Board (DDESB), developed Python modules providing the functions and calculations of DDESB's Explosives Consequence Assessment Tool (ExCAT) and deployed the modules as Web services in a proof of concept. Built a database and Web service for the "Yellow Book" hazard classification data.

- In support of the Congestion Pricing project, developed KML generators to produce 3D animated visualizations of baseline and model results.

- Developed the Environmental Monitoring Server, a set of ReSTful Web services deployed for 24x7 operations as part of the Biological Warning and Incident Characterization (BWIC) pilot program. Developed and deployed data acquisition agents (implemented in C#.NET) at laboratories and air quality organizations of participating municipalities.

- Developed and deployed the Threat Detection and Analysis System (TDAS) at the Port of Memphis. The system includes Web services, DAQ agents for various detectors and sensors, a Java GUI situation display application, and performs continuous consequence assessment calculations on pre-defined chemical releases. The system was operational 24x7 at the Port from 2005 through early 2009.

- Co-created and published the Risk-Based Sensor Placement Methodology (RBSP). Developed Java components implementing functions of the methodology and a Java GUI application tool.

- Developed C/C++ and Java wrapper components for the Second Order Closure Integrated Puff (SCIPUFF) model. The components manage consequence assessment and effects calculations and generate exposure level contours as Web Feature Service (WFS) feature collections and KML overlays. These components have been integrated in several projects.

- Developed and deployed map-based Java Network Editor and Animator GUI applications as part of the Consolidated Air Mobility and Planning System (CAMPS) at HQ Air Mobility Command. Implemented .NET Web services for retrieval and storage of network data, and developed C# CAMPS component modules for launching and managing the Java applications.

- Principal architect and lead developer for the version 4 re-engineering of the Hazard Prediction and Assessment Capability (HPAC) for DTRA. Designed a CORBA-based distributed object system around HPAC's atmospheric dispersion calculation engine. Built an extensible Java client GUI with map-based 2D graphics for generating source terms and plotting results and with RMI and CORBA services and clients. Developed C++ class library and C-callable functions for accessing and processing LandScan population and protection type data, ported to Unix/Linux and Windows.

- Analyzed Enhanced Traffic Management System (ETMS) data as part of a NASA research task order. Team contributor in the analysis effort in which sector traffic flows and controller workload were characterized in terms of complexity metrics, focusing on the ZOB48 sector. Developed reusable Java components and tools for processing and analyzing ETMS data.

Independent Consultant to Metron Aviation, Herndon, Virginia
(*October 2002 – December 2003*)

Processed and analyzed Aviation System Performance Metrics data in support of the Operational Evolution Plan. Produced Perl modules and scripts for metrics calculation and statistical processing, and prepared plots for macro scale metrics.

Oak Ridge National Laboratory, Oak Ridge, Tennessee
Computational Physics and Engineering Division, Reactor Physics Group
(Computing Consultant, *April 1997 - September 1999*)

For DIA, developed the Nuclear Fuel Cycle Analyzer (NFCA), a distributed Java application for interactive construction and editing of elements of a nuclear fuel cycle with calculation and viewing of material flows. Developed a Web application for on-line abstract review for the 1998 American Nuclear Society Radiation Protection and Shielding Division Topical Conference.

Computer Science and Mathematics Division
Bioinformatics Group
(Computing Consultant, *February 1994 - March 1997*)

Responsible for design, configuration, and development of software for research and prototype development projects for industry and federal government agencies. Developed desktop and Web applications interfacing the Gene Recognition and Assembly Internet Link (GRAIL) and GenQuest systems for the Human Genome Project. Developed the National Sourcing Database (NSDB) Web application for the Demand Activated Manufacturing Architecture (DAMA) program. Lead developer for the "VisGRAIL" project, a multi-sensor neural network to classify imagery for the National Photographic Imagery Center (NPIC). Participated in research and developed tools for visual data compression for the ORNL Large Scale Data Analysis project.

Martin Marietta Energy Systems, Oak Ridge, Tennessee
Data Systems Research and Development Division
(Computing Specialist, *December 1989 - February 1994*)

Responsible for software development/engineering and analysis tasks. Projects included: near real-time flight message matching and client-server distribution systems for the FAA; data analysis for the Congressionally-mandated National Airspace System study; geographic and graphic representation of troop and cargo movement data for the Military Traffic Management Command (MTMC).

Sterling Federal Systems, Bellevue, Nebraska
(Technical Consultant, *May 1989 – November 1989*)

Responsible for software development/engineering and analysis tasks. Developed a message keyword indexing system with real time look-ups for the Strategic Air Command Warnings and Indications System (SACWARNS).

HQ Strategic Communications Division, USAF, Offutt AFB, Nebraska
(Officer, Intelligence System Software Analyst, *January 1987 – April 1989*)

One of the developers of the Constant Web Relational Analysis of Internetted Linkages Subsystem (CWRAILS) at HQ SAC, used for command and control targetting analysis during Desert Storm. Analyzed performance requirements for the SAC Intelligence Network.

SECURITY CLEARANCES

DOD: Top Secret, SCI (active)
DOE: Q (active), L (active)

REFERENCES

- Dr. Jess C. Gehin
  Director
  Consortium for Advanced Simulation of Light Water Reactors
  Oak Ridge National Laboratory

  E-mail: gehinjc@ornl.gov
  Phone: (865) 576-5093

- Dr. Vincent J. Jodoin
  Leader, Nuclear Security Modeling Group
  Nuclear Science and Isotope Technology Division
  Oak Ridge National Laboratory

  E-mail: jodoinvj@ornl.gov
  Phone: (865) 574-0420

- Mr. Richard M. Lusk
  Director, UAS Research Center
  Oak Ridge National Laboratory

  E-mail: luskrm@ornl.gov
  Phone: (865) 574-8864

- Mr. Morey Parang
  Research Associate
  University of Tennessee

  E-mail: mparang1@utk.edu
  Phone: (865) 406-6780

- Dr. Darrell Reich
  Senior Programmer
  Leidos, University of California at San Diego

  E-mail: darrell.reich@leidos.com
  Phone: (865) 482-5643

- Dr. James A. Rome
  Research Scientist (retired)
  Computational Science and Mathematics Division
  Oak Ridge National Laboratory

  E-mail: jamesrome@alumni.mit.edu
  Phone: (865) 482-5643

- Dr. C. David Sulfredge
  Research Scientist
  Computational Science and Engineering Division
  Oak Ridge National Laboratory

  E-mail: sulfredgecd@ornl.gov
  Phone: (865) 241-4394

- Dr. Johnny S. Tolliver
  Research Scientist
  Computational Science and Engineering Division
  Oak Ridge National Laboratory

  E-mail: tolliverjs@ornl.gov
  Phone: (865) 574-1305

CERTIFICATIONS

- Sun Certified Developer for the Java 2 Platform (May 2000)
- Sun Certified Programmer for the Java 2 Platform (July 1999)
- Sun Certified Java Programmer (August 1997)

TEACHING EXPERIENCE

Pellissippi State Technical Community College, Knoxville, Tennessee
(Adjunct Instructor, Computer Science, *January 1990 - June 1992*)

Taught Advanced C and Introductory UNIX curriculum courses. Developed a SunOS System Administration course for the Continuing Education Department.

PUBLICATIONS

- Jodoin, V.J., R.W. Lee, D.E. Peplow, J.P. Lefebvre, "Application of the ORIGEN Fallout Analysis Tool and the DELFIC Fallout Planning Tool to National Technical Nuclear Forensics", American Nuclear Society 11th Emergency Preparedness and Response Conference, Knoxville, TN, August, 2011, https://newton.ornl.gov/~re7/papers/EPRRSD-tools-NTNF.pdf.

- Jodoin, V.J., R.W. Lee, "Mission Planning Tools for NTNF", ORNL/TM-2011/520, December, 2011, OUO.

- Lee, R.W., J.J. Kulesz, "A risk-based sensor placement methodology", Journal of Hazardous Materials, Vol. 158, pp. 417-429, October, 2008, https://newton.cped.ornl.gov/~re7/papers/placement.jhazmat.pdf.

- Lee, R.W., "Moving the Hazard Prediction and Assessment Capability to a Distributed, Portable Architecture", ORNL/TM-2002/145, UT-Battelle, LLC, August, 2002, http://newton.cped.ornl.gov/~re7/papers/hpac-paper.tm.pdf .

- Rome, J.A., R.W. Lee, S.D. Rose, "Distributed Air Ground (DAG) CE-7 En Route Traffic Flow Management (TFM) Control Degree of Freedom Analysis", for NASA Ames Research Center, October, 2001.

- Rome, J.A., S.D. Rose, R.W. Lee, J.H. Cistone, G.F. Bell, and W.S. Leber, "Ripple delay and its mitigation", Air Traffic Control Quarterly, Vol. 9(2), pp. 59-98, 2001.

- Uberbacher, E.C., Y. Xu, M. Beckerman, C.W. Glover, R.W. Lee, and R.C. Mann, "Analysis of Satellite Imagery Using Multi-Sensor/Neural Network Systems", *Applied Imagery Pattern Recognition '95*, Washington, D.C., October, 1995.

- Lee, R.W., "Experiences in Effective Use of Tcl/Tk", ORNL/TM-12811, Martin Marietta Energy Systems, Inc., 1994.

- Henson, J., R. Lee, D. Lopez, D. O'Dell, N. Prince, K. Streetman, and H. Weeks, "Marine Safety Management System Database Analysis", K/DSRD-1632, Martin Marietta Energy Systems, Inc., for the U.S. Coast Guard, 1994.

- Lee, R.W., "Flight Modeler Development Methodology", K/DSRD-1620, Martin Marietta Energy Systems, Inc., for the Federal Aviation Administration, 1993.

- Lee, R.W., and R. Hume, "Geoserver: A Dynamic Geographic Presentation System", *Proceedings of the 1992 ACM Symposium on Applied Computing*, Vol. 3, pp 1265-1273.

- Berry, L., R. Dory, R. Lee, M. Pung, J. Rome, R. Solanki, R. Tannert Jr., and T. Vineyard, "An Analysis of the National Airspace Capacity", K/DSRD-1098, Martin Marietta Energy Systems, Inc., for the Federal Aviation Administration, 1992.

Fallout Planning Tool, (*November 2008 – present*).

This work is sponsored by DOE/NA22, but the target/user organization is NA45. The Defense Land Fallout Interpretive Code (DELFIC), written in Fortran, is the basis for computing dose rate and activity grids for small nuclear detonations. My responsibility has been development of an interactive, field-deployable tool to aid planners of forensics collection missions as well as supporting consequence management. The development team consists of myself as lead with support from two additional developers. We have developed and independently tested Java components (libraries of classes, JAR files) which: read and process grids and contours in DELFIC output files; generate DELFIC input files from descriptions of detonation events; manage DELFIC execution; calculate dose accumulated along a specified route; generate KML documents showing output grids (as images), routes, and details of dose accumulations; expose all functionality in a Web services layer.

Further, the application is a browser-based Web application deployed as a standalone desktop application. The user interface is built with the the ExtJS JavaScript framework and OpenLayers for interactive map display and route definition. After evaluation of several open source Web server implementations, a very light weight Java Web server has been implemented to support standalone deployment. Supported platforms include Linux (32- and 64-bit), Windows, and (Intel) Mac OS X, and DELFIC has been ported to each platform.

FEMA Serious Game

HPAC/NFAC, PopLib

CITDB JscipuffMgr JscipuffServer

LandScan service and web app

Server support

DDESB Savannah study

USBP forms

ORNL Emergency Operations Center (EOC) Support, (*March 2009 – present*).

I provide ongoing support to the EOC's meteorologist to acquire and process data from various weather stations and towers. Mostly, this involves development of Python components and scripts to retrieve data and generate XML and HTML representations. Scripts run on Linux and Windows servers.

SensorNet for Fire and First Responders (SNIFFER), (*July 2008 – present*).

The SNIFFER program is sponsored by DHS S&T, and I am the software systems team leader for two prototype developments or phases, the first of which was field-tested at the Maryland Fire and Rescue Institute (MFRI). There are three system components requiring software: the portable Box containing various detector and sensor hardware, a Data Server for collecting and disseminating detector data, and Viewers or client systems running situation displays.

Following the Java Distributed Data Acquisition and Control (JDDAC) / IEEE 1451 architecture, the prototype Box runs Windows XP/Pro and includes Transducer Interface Modules (TIMs) implemented using LabView and a Network Capable Application Processor (NCAP) which forwards data to the Data Server via Web service calls. The Box communicates with the Data Server over 900 MHz radio at the site. The Data Server is a laptop running in a command vehicle. Services are implemented as Java servlets running under Jetty with SQLite for a DBMS. There are two Situation Display viewer apps, one an AJAX application targeted to fully-functional desktops, and another targeting mobile browsers on handhelds. I personally developed the Data Server services and mobile Situation Display viewer, and other members of my team developed the other components.

SensorPedia, (*October 2007 – present*).

SensorPedia is a Web application and set of services providing a catalog and search of sensors and sensor data. My responsibility has been development and deployment of ReSTful Web services support XML and JSON formats. The services are implemented as Java servlets with PostgreSQL as the backign DBMS. I have also been responsible for maintaining 24x7 service availability. We are applying a framework and concept built on the Atom specification in which metadata about any entity is represented as a feed with entries describing time-sensitive information about

the entity. We have expanded the SensorPedia concept into other areas, such as the SmartWaste initiative at ORNL, an attempt to link or associate information in a variety of hazard material and waste management databases and systems across the Oak Ridge complex.

Biological Warning and Incident Characterization (BWIC), (*July 2006 – November 2008*).

BWIC was a multi-lab (ANL, LANL, LLNL, ORNL, and PNNL managed by SNL) pilot program sponsored by DHS S&T. ORNL was responsible for the Environmental Monitoring (EM) Server, and I was the team lead. The EM Server collects environmental data and makes it available on demand to BWIC application servers. Data are acquired via pushes from the Centers for Disease Control (CDC) Laboratory Response Network (LRN) system as well as DAQ agents we deployed at laboratories and air quality organizations at participating municipalities. Services also produce KML situation displays showing the current status of all system collectors.

Services are implemented as Java servlets deployed to a Linux server and interact with a PostgreSQL database managed by another team member. DHS certified the server for intermediate FISMA compliance. I developed the DAQ agents in C# with pluggable modules for forwarding the data via HTTP/HTTPS and SMTP.

BWIC remained operational 24x7 in 2007 and through program termination in November 2008.

Visualizing Energy Resources Dynamically on the Earth (VERDE), (*January 2008 – July 2008*).

VERDE is a highly visible ORNL project in which I participated for a short time. I developed a database and associated Web services. The deployment platform was Linux, the DBMS was PostgreSQL, and the services were implemented as Java servlets. Access control is implemented via a unique per-row hierarchical label tag and application of a regular expression in the where-clause to enforce access controls. My efforts also included scripts for ingesting source data into the database.

JScipuffMgr, (*July 2006 – present*).

This effort is composed of three parts. The first is the hpactoolx library which fronts the SCIPUFF or HPACtool library developed as part of the HPAC program and now maintained by Sage Management Enterprise, LLC. The HPACtool library is written in Fortran with ports to Windows and Linux provided. Hpactoolx provides a C header and functions to front all the Fortran calls as well as a layer of C++ classes for describing releases and scenarios in XML and retrieving outputs and results in XML. Both Java (JScipuffMgr) and .NET (netscipuff) wrappers for hpactoolx have produced.

Risk-Based Sensor Placement Tool (RBSP), (*July 2006 – December 2007*).

After development of the Risk-Based Sensor Placement methodology, we received UT-Battelle maturation funding to develop a Java desktop application or tool implementing the methodology. I developed the tool in Java for platform portability. The user interface uses the Java Swing component library and generates KML visualizations for view with Google Earth. The Tool reuses the JScipuffMgr components described above to executing SCIPUFF for threat consequences.

https://kepler.cped.ornl.gov/~re7/papers/placement.jhazmat.pdf
https://kepler.cped.ornl.gov/~re7/study/rbsp/review-200705.pdf
https://kepler.cped.ornl.gov/~re7/study/rbsp/review-200712.pdf

Threat Detection and Analysis System (TDAS), (*July 2005 – August 2007*).

Architected and implemented the system deployed at the Port of Memphis to support first responders and emergency planners. TDAS continuously models known threats using live local and regional weather data to characterize exposure levels and affected population in short and long term views. Components include: Java servlet Web services; a Java GUI situation display viewer application; C#.NET agent to acquire data from Smiths Centurion detectors; Java agent wrapping Hazard Prediction and Assessment Capability calculations.

https://kepler.cped.ornl.gov/~re7/papers/TDAS_brochure_7_19_revised.pdf

Java:
    Sun JDK/JRE through Java 6 (Solaris, Linux, Windows, Mac OS X)

Cray:
    FORTRAN

Windows (through Vista, Server 2008):
    .NET through 2.0 (C#), VS.NET (C#/VB), MSVC++ through 6.0, Absoft Fortran 4.2, Borland C++ through 5.0, FoxPro 2.5,
    Java Development Kit (JDK) 1.6.0, MASM through 5.1, MS Visual Basic 3.0, Perl 5, Turbo Assembler through 3.0,
    Microsoft SQL Server, Access 3.0

MVS:
    FORTRAN, GPSS

Unix/Linux:
Shells	awk, Bourne shell, C-shell, Korn shell, Perl through 5.8, Python through 2.6, Tcl/Tk through 8.1
Compilers	SunPRO C/C++ and Fortran, bison, C, C++ (GNU), flex, FORTRAN, Intel Fortran through version 11 (Windows, MacOS, 32- and 64-bit Linux), lex, TeleSoft Ada, Verdix Ada, yacc
DBMS	MySQL through 5.0, Oracle through 10g, PostgreSQL 8.3, SQL Server 2005, Sybase through 4.10
Graphics	KML through 2.2, Java2D, JOGL, Visual Toolkit 2.2, AVS, PHIGS, Pixrect, PostScript, SunGKS, Xlib
System	IPC, RPC, Sockets
Windowing	JFC/Swing, Motif, Open Windows, SunView, SunWindows, Xt, XView

VMS:
    C, DCL, Teradata SQL