

Frederick T. Sheldon, Principal Investigator (Computational Science and Engineering Div., ORNL)
Sr. Research Scientist, Cyberspace Sciences and Information Intelligence Research Group
Full CV: www.csiir.ornl.gov/sheldon/cv.pdf (US Citizen; Q-Cleared)

Education and Training:

University of Texas at Arlington	Computer Science	Ph.D., 1996
University of Texas at Arlington	Computer Science	M.S., 1988
University of Minnesota	Microbiology + Computer Science	B.Sc., 1977 + 1983

Summary of Qualifications:

With 25+ years of experience in software engineering and computer science, Dr. Sheldon has held faculty appointments with research universities including R&D positions at 3 fortune 100 companies. He lead several significant efforts in Formal Methods for Integrated Diagnostics (WPAFB) and the YF-22 VMS Kernel; visiting scholar at NASA (Langley and Ames/Stanford); published over 100 papers and edited five books concerned with developing and validating models, applications, methods and tools for the creation of safe, secure and dependable infrastructure and systems. He holds 12 IDs/patent pending, is Sr. Member IEEE and received: Sigma Xi outstanding dissertation award; key contributor & several significant event awards from UT-Battelle. He Chairs the [CSIIR Workshop](#) among other venues, Co-PIs projects: CKMS, SCI-FI for CEDS, IRCS (Intrusion Resilient Cloud Services) Middleware and participates on the NESCOR team. He has served as a guest editor and is an active PC member for several cyber conferences, panelist and invited speaker. He received a PhD in CS from UT Arlington in 1996.

Professional Experience:

2002–present: Sr. Research Scientist, PI, Oak Ridge National Laboratory, Oak Ridge, TN
2001–02: Sys. Safety Research Engineer, Research Info. & Comm., Daimler AG, Stuttgart, Germany
1999–02: Assistant Professor, School of EECS, Washington State University, Pullman, WA
1996–99: Assistant Professor, CS Department, University of Colorado, Colorado Springs, CO
1996–96: NRC Post-Doctoral Fellow, NASA Langley Research Center, Langley, VA
1993–96: Assist. Instructor/NASA GSRP Fellow, Comp. Sci. and Engineering, UT Arlington.
1988–93: Sr. Engr/Engrng Specialist, Lockheed Martin (formerly General Dynamics), Ft. Worth, TX
1984–88: Software Design Engr/Test Engr, Raytheon (formerly Texas Instruments), Dallas, TX

Publications (selected):

- A. Aissa, R. Abercrombie, **F. Sheldon**, and A. Mili, “Defining and Computing a Value Based Cyber-Security Measure,” [Information Systems and E-Business](#), 10:4, 433-453, Dec. 2012.
- F. Sheldon**, S. Yoo, J. Webber, and W. Pan, “Insecurity of Wireless Networks,” [IEEE Security and Privacy Magazine](#): *SI on Internet Infrastructure Security* 10:4 Jul/Aug 2012.
- L. Hively, **F. Sheldon**, and A. Squicciarini, “[A Vision for Scalable Trustworthy Systems](#),” *IEEE Security and Privacy*, 9:3 July/Aug 2011.
- F. Sheldon** and C. Vishik, “[Moving Toward Trustworthy Systems: R&D Essentials](#),” *IEEE Computer*, 43:9, 31-40, Sept 2010.
- A. Aissa, R. Abercrombie, **F. Sheldon**, and A. Mili, “[Quantifying Security Threats and Their Impact: Theory and Practice](#),” [Innovations in Systems and Software Engineering](#), 6:4, 269-281, March 2010.
- M. Kirkpatrick, E. Bertino, and **F. Sheldon**, “[Restricted Authentication and Encryption for Cyber-physical Systems](#),” *DHS Wkshp on Future Directions in CPS Security*, Newark, July 22-24, 2009.
- R. Abercrombie, **F. Sheldon**, H. Aldridge, M. Duren, T. Ricci, E. Bertino, A. Kulatunga, and U. Navaratne, “Secure Cryptographic Key Management System (CKMS) Considerations for Smart Grid Devices,” 7th [CSIIRW](#), Oak Ridge, Oct 2011.
- F. Sheldon**, M. Duren, and E. Bertino, “Prospectus: Adaptive Resilient Cryptographic Key Management System for Energy Delivery Systems,” [Smart Grid Cybersecurity Information Exchange](#), Aug 2011.
- R. Abercrombie, **F. Sheldon**, and A. Mili, “Managing Complex IT Security Processes with Value Based Measures,” *IEEE Symposium Computational Intelligence in Cybersecurity*, April 1, 2009.
- F. Sheldon**, R. Abercrombie, and A. Mili, “Methodology for Evaluating Security Controls Based on Key Performance Indicators and Stakeholder Mission,” *HICSS-42*, Big Island, HI, Jan. 5-8, 2009.

Selected Patent Pending and IP Disclosures:

- ID 201202785, Method to Evaluate Denial of Service Attacks Using MFC and ROI, F. Sheldon and A. Mili, January 22, 2012.
- U.S. Patent Application No. 13/443,702 – Cyberspace Security System, R. Abercrombie, F. Sheldon, and E. Ferragut, April 10, 2012.
- ID 201002482, DOE-S Number: S-115 – Cyber Security Econometrics System for Assessing/ Ranking Threats, F. Sheldon and R. Abercrombie, December 3, 2010.
- ID 201002432, DOE-S Number: S-115,484 – Environment for Access Control Policy Analysis and Management of Sensors, F. Sheldon and R. Abercrombie, July 23, 2010.
- ID 200902353, DOE-S No. S-115,393 – Ontology-Based Probability Modeling for Distributed Real-Time Anomaly Detection, E. Ferragut, R. Abercrombie, B. Lagesse, F. Sheldon, G. Shue, C. Rathgeb, L. Wilder, Dec. 28, 2009.
- U.S. Patent Application 12/421,933 – System and Method for Implementing and Monitoring a Cyberspace Security Econometrics System, F. Sheldon, R. Abercrombie, and A. Mili, 12 Nov. 09.

Copyrighted Software:

- Integrating Message Sequence Charts (MSC) formalism into the Mobius Framework.
- The CSPL Graphic Editor (CGE): Implementation of Graph Layout Algorithms and CSPL Parser.
- A Translation Tool (PCX) from PROMELA/Spin to C-Based Stochastic Petri Net Language.
- A Translation Tool (CSPN) from CSP to Stochastic Petri Nets (CSPL).

Synergistic Activities:

- Relevant ongoing funded projects ORNL Co-PI: [Supply Chain Integration for Integrity \(DOE/CEDS\)](#), [Cyber Sciences Laboratory \(CSL\)](#), [NESCOR DOE/CEDS](#), [Centralized Cryptographic Key Management for Energy Delivery Systems \(DOE/CEDS\)](#).
- 2012-13 National Laboratories Panelist/Participant (member applicant): Ideation Session of the [Cyber Security Research Institute \(CSRI\) Workshop](#), CSRA Founders Group (Intel, AMD, LMCO, Honeywell and EMC) CSRA.
- 2011 Significant Event Award UT-Battelle: (1) FUSEnet Team: *Design and Implementation of the Virtual Computing Environment for Scientific Experimentation*.
- 2011 Significant Event Award UT-Battelle in recognition for contribution to the *ORNL Response to the April Advanced Persistent Threat Cyber Attack*.
- 2005-13 General/Program Chair, Proceedings Editor (and National Laboratory Panelist), Cyber Security and Information Intelligence Research Workshop ([CSIIRW](#)) for eight consecutive years.

Pending Support:

- Siometrics for Supply Chain Risk Management (SCRM), Solicitation # [DE-FOA-0000797](#) Innovation for Increasing Cybersecurity for Energy Delivery Systems, 5 Apr. 2013 \$4M: 36 mos., Sypris Electronics Lead, ORNL PIs: F. Sheldon and R. Abercrombie
- Survivable SCADA, Solicitation # [DE-FOA-0000797](#) Innovation for Increasing Cybersecurity for Energy Delivery Systems, 5 Apr. 2013 \$1.5M: 24 mos., Siemens Lead, ORNL PI: F. Sheldon
- A Semantic Framework for Representing Data, Querying Global/Local Temporal Ontologies and Linking Published Data Sources, Solicitation# [ICPDP-2013-0001](#) Area 12.18: Mapping Semantic Times onto Place Names, 18 Jan. 2013, \$240,000: PoP 24 mos., F. Sheldon (PI), J. Huang (Co-PI)
- Investigating Online Stimuli of Influence and Persuasion within Social Structures Using a Small World Simulation Tool, Solicitation # [ICPDP-2013-0001](#) AREA 12.5: How Will They React and Who Are They?, 18 Jan. 2013, \$240K: PoP 24 mos., F. Sheldon (PI), J. Stoll (Co-PI)

Current Support:

- SCI-FI: Supply Chain Integration For Integrity, DOE/OE #[RC-CEDS-2012-02](#), D. Manz, J. Smith (PNNL) F. Sheldon Ph.D. (ORNL), D. Quinlan and K. Masica, (LLNL) 0.3FTE/yr ending 12/15
- DDDAS-based Resilient Cyberspace (DRCS) [Dynamic Data Driven Applications Sys], Solicitation # [BAA-AFOSR-2011-01](#) (F. Darema, PM, AFOSR) PoP 48 mos., PIs: S. Hariri UAZ, F. Sheldon ORNL, (\$200,000 ORNL Part of \$1.2M) 0.1FTE/yr. ending 9/16

Application for Centralized Cryptographic Key Management, Solicitation # [DE-FOA-0000359](#),
Innovation for Increasing Cyber Security for Energy Delivery Systems (I2CSEDS), PoP 36 mos., *F. Sheldon Co-PI at ORNL*, (ORNL, Purdue, EPRI and Sypris: \$3.056M Total) 0.1FTE/yr. ending 9/13
Island World: A Small World Simulation Tool in a Virtual Community for Evaluating Environmental Stressors; Cyber Space Derivation of Social Patterns with Respect to Stressors, *F. Sheldon (PI)* 0FTE/yr. ending 9/14 (\$240K [IC Postdoc](#))

Recurring Support:

DOE/NNSA National Laboratory Support to the [Cyber Sciences Laboratory](#) (CSL) Implementation, Seed Money PIs: *F. Sheldon, Joe Trien, Dick Davis, Dick Webber PIs ORNL*, (DOE/NNSA OCIO Sponsored \$1.3M) 0.15FTE/yr.

Annual [Cyber Security and Information Intelligence Workshop](#) (8th Annual Jan. 8-10), DOE/NNSA, PoP 6 mos., Start July 15, 2012, *F.T. Sheldon and J.P. Trien, PIs ORNL*, (\$100-150K) 0.25FTE/yr.