

Thomas E. Potok, Ph.D.

Oak Ridge National Laboratory
PO Box 2008, Oak Ridge, TN 37831
423-574-0834, potokte@ornl.gov
<http://aser.ornl.gov/potok/personal/index.html>
Clearance: DOE Q/SCI

Experience:**OAK RIDGE NATIONAL LABORATORY/ADJUNCT FACULTY AT UNIVERSITY OF TENNESSEE****Applied Software Engineering Research Group Leader - June 1997 – Present**

Lead a group of 17 computer science researchers with an annual research budget of \$4M. Principal or co-principle investigator on a number of software agent research projects, including:

1. **Piranha** a DHS funded project to extract information from large volumes of textual information using intelligent agent technology and high performance computing.
2. **Image to Intelligence Archive (I2IA)** to develop an innovative software agent-driven processes that can autonomously search through distributed image data sources and retrieve new and updated information.
3. **Virtual Information Process Agent Research (VIPAR)** for the US Pacific Command using intelligent agents and novel knowledge discovery techniques to organize open source information.

Adjunct Faculty Member - September 1998 – Present

Develop and teach graduate level software engineering courses at the University of Tennessee.

IBM'S SOFTWARE SOLUTIONS LABORATORY, RESEARCH TRIANGLE PARK, NORTH CAROLINA.**Software Engineering Consultant - August 1996 – May 1997**

Conducted various customer consulting engagements on object-oriented analysis and design, project management, and VisualAge for Smalltalk.

Ph.D. Scholarship - January 1995 - August 1996

Awarded the highly competitive IBM Resident Study scholarship to pursue a Ph.D. at full pay and benefits. Pioneered research and simulation modeling of object-oriented systems in commercial software development environments.

Software Engineering Manager - August 1993 - December 1994

Achieved ISO 9000 certification for the 700 member Software Solutions lab in 9 months, a result considered unachievable at the outset.

Architecture Team Lead - January 1992 - July 1993

Delivered the *Enterprise Model Version 2* object model as part of the initial release of IBM's AD/Cycle Platform, on schedule within budget. The *Enterprise Model* (approximately 100 classes) is a complex, multi-vendor object model that enables application development tools to share information.

Architecture and Planning - August 1988 - December 1991

Created the initial product plan and process used to manage the *Enterprise Model* among multiple IBM sites and vendors. This model was the data model used to manage the multi-billion dollar, 1500 person AD/Cycle project. Co-authored the 300 page *Guide to the Enterprise Model Volume 1* (SC26-4845) explaining the usage and rationale of the model.

Programming Team Leader - March 1986 - July 1988

Delivered an AI based "calibration aid" on schedule within budget which solved the major customer complaint about VM Performance Planning Facility (VMPPF) program product, an analytic performance model of the VM operating system.

Programmer - May 1984 - February 1986

Delivered VMPPF 1.3 – 1.6 on schedule within budget. Lead programmer responsible for design, coding, testing, packaging, and 3rd level support for the release.

Education:

- **Ph.D. Computer Engineering** at North Carolina State University, July 1996, *Development of a Quantitative Process Model for Object-Oriented Software Development* under the direction of Dr. Mladen Vouk.
- **MS Computer Engineering**, 1991 from NCSU, focused on software engineering and risk management.
- **BS Computer Science**, 1984 from NCSU.

Professional Service

Journal Editorial Boards

- Editorial Board of the *International Journal of Web Services Research (JWSR)* (2003- Present)
- Editorial Board of the *International Journal of Computational Intelligence Theory and Practice (IJCITP)* (2006 – Present)

Conference Organizing Committee

- IEEE Swarm Intelligence Symposium 2006 Special Session On: *Swarm Optimization Algorithms and Applications in Dynamic Environments* (2006)
- Semantic Web Minitrack at *Hawaii International Conference on System Sciences* (2002 – Present)
- DHS Text Analysis Workshop (5/2005)
- Homeland Security Workshop on Information Analysis, Synthesis, and Cybersecurity (2003)

Conference Program Committee

- IEEE Swarm Intelligence Symposium (2006)
- Workshop on “Artificial Intelligence and the Web” at the *American Association for Artificial Intelligence Conference AAAI-06* (2006)
- Workshop on "Ambient Intelligence - Agents for Ubiquitous Environments" at the *Fourth International Joint Conference on Autonomous Agents and Multiagent Systems Conference* (2005)
- Workshop on “Agent-Based Computing II (ABC 2005)” at the *Ninth International Conference on Knowledge-Based Intelligent Information & Engineering Systems*, (2003 – Present).
- The *first international conference on Collaborative Computing Conference* (2005)
- ‘Intelligent Agent Systems: Theory, Design and Implementation special track’ at the *International FLAIRS Conference* (2004 – Present)
- *International Conference on Free/Open Source Software, Technologies and Content: FOSSTEC* (2005).
- *IEEE Service International Conference on Services Computing SCC* (2005)
- *IEEE International Conference on Web Services (ICWS 2004)*
- *IEEE The 2nd International Conference on Collaborative Computing: Networking, Applications and Worksharing* (2006)

Selected Publications:

Book Chapters

1. X. Cui, and T. Potok, “Swarm Intelligence in Document Clustering”, book chapter in *Handbook of Research on Text and Web Mining Technologies*, Idea Group Inc. Accepted for publication 2008, USA.
2. X. Cui, and T. E. Potok, “A Distributed Agent Implementation of Multiple Species Flocking Model for Document Partitioning Clustering,” book chapter in *Lecture Notes in Computer Science (LNCS), Cooperative Information Agents*, Volume 4149/2006, September, 2006, Springer Berlin / Heidelberg, ISBN: 978-3-540-38569-1.
3. Y. Jiao, A.R. Hurson, T.E. Potok, and B.G. Beckerman, “Integrating mobile-based systems with health care databases,” *Web Mobile-Based Applications for Healthcare Management*, pp.197-225, Idea Group Inc., Hershey, PA, 2007.
4. Y. Jiao, A.R. Hurson, and T.E. Potok, “Mobile agent-based information systems and security,” *The Encyclopedia of Information Science and Technology*, 2nd ed.

Journals

5. X. Cui, and T. E. Potok, “A Bio-inspired Clustering Approach for Dynamic Document Distributed Analysis”, *International Journal of Computational Intelligence Theory and Practice*, 2006, ISSN: 0973-5267.
6. X. Cui, J. Gao and T. E. Potok, “A Flocking Based Algorithm for Document Clustering Analysis,” *Journal of System Architecture, Special issue on Nature Inspired Applied Systems*, 2006.
7. X. Cui, T.E. Potok, “Document Clustering Analysis based on Hybrid PSO+K-means Algorithm,” *Special Issue on Efficient Heuristics for Information Organization in the Journal of Computer Science*, 2005.
8. F.T. Sheldon, T.E. Potok, & K.M. Kavi, “Multi-Agent System Case Studies in Command and Control, Information Fusion and Data Management,” *Informatica*, 28 (Special Issue on Agent Based Computing), 2004.
9. F.T. Sheldon, T.E. Potok, A. Krings, and P. Oman, “Critical Energy Infrastructure Survivability, Inherent Limitations, Obstacles and Mitigation Strategies,” *Int'l Journal of Power and Energy Systems –Special Theme Blackout*, ACTA Press, Calgary Canada, 2004.

10. N.F. Samatova, T.E. Potok, and M.R. Leuze, "Vector Space Model for the generalized Parts Grouping Problem," *Robotics and Computer-Integrated Manufacturing*, 17(1-2): pp. 73-80, 2001.
11. T.E. Potok and M. Vouk, "Productivity Analysis of Object-Oriented Software Development in a Commercial Environment." *Software – Practice and Experience*, Vol. 29, No. 10, pp 833-847, 1999.
12. N. F. Samatova, T.E. Potok, and M. Leuze "A Vector Perturbation Approach to the Generalized Aircraft Spare Parts Grouping Problem," *International Journal of Flexible Automation and Integrated Manufacturing*.
13. NA Ivezic, TE Potok, and L Pouchard "Multiagent Framework for Lean Manufacturing." *IEEE Internet Computing*, 9, 1999.
14. TE Potok and MA Vouk "The effects of the business model on object-oriented software development productivity," *IBM System Journal*, Vol. 36, No.1, 1997.
15. T. Potok et al., "Guide to the Enterprise Model Volume 1", IBM Publication number SC26-4845, 3/1990.

Conferences

16. E. Jean, Y. Jiao, A.R. Hurson, and T.E. Potok, "SAS: A secure aglet server," In *Proc. of Computer Security Conference 2007*, available online at <http://computersecurityconference.com/Papers2007/CSC2007Jean.doc>.
17. X. Cui and T. Potok, "A Particle Swarm Social Model for Multi-Agent Based Insurgency Warfare Simulation", In *Proc. of 5th International Conference on Software Engineering Research, Management and Applications (SERA'07)*, Busan, Korea, August, 2007.
18. X. Cui and T. Potok, "Distributed Adaptive Particle Swarm Optimizer in Dynamic Environment," In *Proc. of the 23rd IEEE International Parallel and Distributed Processing Symposium, Nature Inspired Distributed Computing workshop (IPDPS'07 & NIDISC'07)*, Long Beach, CA, March 2007, ISBN: 1-4244-0910-1.
19. X. Cui and T. Potok, "Modeling the collective strategic searching of artificial insurgent groups: a particle swarm approach," In *Proc. of Annual Conference of the North American Association for Computational Social and Organizational Sciences (NAACSOS'07)*, Atlanta, GA, June, 2007.
20. R.M. Patton and T.E. Potok, "Discovering Event Evidence Amid Massive, Dynamic Datasets," In *Proc. of the 2007 Genetic and Evolutionary Computation Conference (GECCO-2007)*, July 2007. ACM Press.
21. X. Cui, and T. E. Potok, "A Distributed Flocking Approach for Information Stream Clustering Analysis", In *Proc. of the Seventh International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing*, Las Vegas, Nevada, June, 2006, ISBN: 0-7695-2611-X.
22. R.M. Patton and T.E. Potok, "Characterizing Large Text Corpora Using a Maximum Variation Sampling Genetic Algorithm," In *Proc. of the 2006 Genetic and Evolutionary Computation Conference (GECCO-2006)*, July 2006. ACM Press.
23. B. Yang, A.R. Hurson, Y. Jiao, and T.E. Potok, "Multimedia correlation analysis in unstructured peer-to-peer networks. In *Proc. of the 2006 IEEE International Symposium on a World of Wireless, Mobile, and Multimedia Networks (WoWMoM'06)*, pp. 332-338, 2006.
24. J.W. Reed, Y. Reed, T.E. Potok, B.A. Klump, M.T. Elmore, and A.R. Hurson, "TF-ICF: A new term weighting scheme for clustering dynamic data streams," In *Proc. of the 5th International Conference on Machine Learning and Applications (ICMLA'06)*, pp.258-263, 2006.
25. P. Yan, Y. Jiao, A.R. Hurson, and T.E. Potok, "Semantic-based information retrieval of biomedical data," In *Proc. of the 21st Annual ACM Symposium on Applied Computing –Semantic-Based Resource Discovery, Retrieval and Composition (RDRC)*, pp.1700-1704, 2006.
26. P. Palathingal, T. E. Potok, and R.M. Patton, "Agent Based Approach for Searching, Mining, and Managing Enormous Amounts of Spatial Image Data," In *Proc. of the 18th International FLAIRS Conference*, May 2005.
27. X. Cui, T.E. Potok, and P. Palathingal, "Document clustering using particle swarm optimization," In *Proc. of the IEEE Swarm Intelligence Symposium*, 2005.
28. X. Cui, C. T. Hardin, R. K. Ragade, T. E. Potok, and A. S. Elmaghraby, "Tracking Non-stationary Optimal Solution By Particle Swarm Optimizer," In *Proc. of the 6th ACIS International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing (SNPD05)*, 2005.
29. M. T. Elmore, J. W. Reed, and T. E. Potok, "Real-Time Document Cluster Analysis for Dynamic Data Sets," IPSI-Amalfi, 2005

30. Robert Patton and Thomas Potok, "Adaptive Sampling of Text Documents," In *Proc. of the 13th International Conference On Intelligent And Adaptive Systems And Software Engineering*, 2004
31. J.W. Reed, T.E. Potok, and R.M. Patton, "A Multi-Agent System for Distributed Cluster Analysis," In *Proc. of the Software Engineering for Large-Scale Multi-Agent Systems (SELMAS)*, 2004.
32. F. T. Sheldon, T.E. Potok, A. Loebel, A. Krings, and P. Oman, "Managing Secure Survivable Critical Infrastructures To Avoid Vulnerabilities," In *Proc. of the Eighth IEEE Int'l Symp. on HIGH ASSURANCE SYSTEMS ENGINEERING*, Tampa Florida, 2004.
33. T.E. Potok, M. Elmore, J. Reed, and F.T. Sheldon, "VIPAR: Advanced Information Agents Discovering Knowledge in an Open and Changing Environment," In *Proc. 7th World Multiconference on Systemics, Cybernetics and Informatics Special Session on Agent-Based Computing*, Orlando FL, pp. 28-33, July 27-30, 2003.
34. Z. Zhou, F.T. Sheldon, and T.E. Potok, "Modeling with Stochastic Message Sequence Charts," In *Proc. of the International Conference on Computer, Communication, and Control Technology (CCCT'03)*, Orlando, Florida , 2003.
35. T.E. Potok, L. Phillips, R. Pollock, A. Loebel, and F.T. Sheldon, "Suitability of Agent Technology for Command and Control in Fault-tolerant, Safety-critical Responsive Decision Networks," In *Proc. 16th Int'l Conf. Parallel and Distributed Computing Systems*, Reno NV, pp. 283-290, Aug. 13-15, 2003
36. F.T. Sheldon, T.E. Potok, A. Loebel, A. Krings and P. Oman, "Energy Infrastructure Survivability, Inherent Limitations, Obstacles and Mitigation Strategies," In *Proc. of IASTED Int'l Power Conference -Special Theme Blackout*, New York NY, pp. 49-53, Dec. 10-12, 2003
37. F.T. Sheldon M.T. Elmore and T.E. Potok, "An Ontology-Based Software Agent System Case Study," In *Proc. of IEEE International Conf. on Information Technology: Coding and Computing*, Las Vegas Nevada, pp. 500-506, April 28-30 2003
38. M.T. Elmore T.E. Potok and F.T. Sheldon, "Dynamic Data Fusion Using An Ontology-Based Software Agent System," In *Proc. of the 7th World Multiconference on Systemics, Cybernetics and Informatics*, 2003
39. J.W. Reed and T. E. Potok, "A Multi-Agent System for Analyzing Massive Scientific Data," In *Proc. of the Software Engineering for Large-Scale Multi-Agent Systems (SELMAS)*, 2003.
40. T.E. Potok, L. Phillips, R. Pollock, and A. Loebel, "Suitability of Agent Technology for Military Command and Control in the Future Combat System Environment," *Proceedings of the 8th International Command and Control Research and Technology Symposium*, 2003
41. Thomas E. Potok, Laurence Phillips, Robert Pollock, Andy Loebel and Frederick T. Sheldon, "Suitability of Agent Technology for Command and Control in Fault-tolerant, Safety-critical Responsive Decision Networks," In *Proc. of the 16th Int'l Conf. Parallel and Distributed Computing Systems*, Reno NV, Aug. 13-15, 2003
42. T. E. Potok, M. T. Elmore, J. W. Reed, and N. F. Samatova, "An Ontology-based HTML to XML Conversion Using Intelligent Agents," *Proceedings of the Hawaii International Conference On System Sciences*, 1/2002.
43. T.E. Potok, N.A. Ivezic, and N.F. Samatova, "Agent-based architecture for flexible lean cell design, analysis, and evaluation," In *Proc. of the 4th Design of Information Infrastructure Systems for Manufacturing Conference*, (2000).
44. N. Ivezic, M. Barbacci, D. Libes, T.E. Potok, and J. Robert, "An Analysis of a Supply Chain Management Agent Architecture," In *Proc. of the 4th International Conference on Multi-agent Systems*, Germany, pp. 401-402, 2000.
45. N. Ivezic, M. Barbacci, D. Libes, T. Potok, T. & J. Robert, "An Architecture Analysis of Agent-based Systems," In *Proc. of ESAW'00. Engineering Societies in the Agents' World*, 2000.
46. T. E. Potok and N. Ivezic, "A Multi-Agent Spare Part Grouping System For Logistics Optimization," In *Proc. of the 5th. Int'l Conference on Information Systems Analysis and Synthesis*, 1999.
47. N.A. Ivezic and T.E. Potok, "An Agent-Based Approach for Supply Chain Management," In *Proc. of the 5th International Conference on Information Systems Analysis and Synthesis*, 570-573, 1999.
48. T. E. Potok, M. T. Elmore, and N. Ivezic "Collaborative Management Environment," In *Proc. of the InForum'99 Conference*, 1999.
49. T.E. Potok and M.A. Vouk, "A Model of Correlated Team Behavior in a Software Development," In *Proc. of the Workshop on Application Specific Software Engineering and Technology*, 1999.
50. T.E. Potok, N. Ivezic, and B.A. Singletary "XML For Web Based Collaboration," In *Proc. of XML98 Conference*, Chicago, IL, 1998.

51. N Ivezic, TE Potok, KD Barnes “Achieving Maturity of Compositional Software Engineering.” Workshop on Compositional Software Architectures, Monterey, CA, 1998.
52. T.E. Potok, “Development of a Quantitative Process Model for Object-Oriented Software Development,” doctoral thesis, Department of Computer Science, North Carolina State University, Raleigh, NC (1996).
53. T.E. Potok, “Development Productivity for Commercial Software using Object-Oriented Methods,” In *Proc. of the 1995 CASCON conference*, 1995.
54. T.E. Potok “Extensions to the Spiral Model to Support Joint Development of Complex Software Systems,” In *Proc. of the ACM Southeast Conference*, 1992.
55. T. Wilson and T. Potok, “Service Machine Performance,” In *Proc. of SHARE and GUIDE*, 1987.

Technical Reports

56. T.E. Potok, “Prototype Grouping Agent Final Report,” Lockheed Martin Energy Systems Technical Report Y/DSRD-3142, 5/1999.
57. T.E. Potok, “Prototype Grouping Agent Design Specification Document,” Lockheed Martin Energy Systems Technical Report Y/DSRD-3140, 5/1999.
58. T.E. Potok, “Productivity of Object-Oriented Software Development,” Center for Advanced Computing Communications, CACC-TR-96/31, 1996.
59. T.E. Potok, “Reducing Development Risk Through the Spiral Model,” IBM Software Solution’s Technical Vitality Newsletter, 2/1994.
60. T.E. Potok, “A Detailed Process for Data Model Development Based on the Spiral Process,” IBM Technical Report TR29.1731, 7/1993.
61. T.E. Potok, “Object-Oriented Programming, Process, and Metrics,” IBM Technical Report TR29.1707, 7/1993.
62. T.E. Potok, “Electronic Data Interchange Mapping to the AD/Cycle Enterprise Model,” IBM Technical Report TR29.1501, 11/1992.
63. T.E. Potok, “Risk Analysis of Current Versus Graphical Representation of Information Model Constraints,” IBM Technical Report TR 29.1299, 1/1992.
64. T.E. Potok, “Expert System Application in Performance Modeling,” IBM Technical Report TR 29.0733P, 6/1987.

Patents:

1. **Method For Detecting Sophisticated Cyber Attacks** submitted (2005)
2. **An Agent-based Method for Distributed Clustering of Textual Information** submitted (2004)
3. **Method for Gathering and Summarizing Internet Information**, application number 20030120639 (2003).
4. **Method for distributed agent-based non-expert simulation of manufacturing process behavior**, issued as patent number 6,826,518 (2004).
5. **Methods for automatically evaluating a transition from a batch manufacturing techniques to a lean manufacturing technique**, issued as patent number 6,629,004 (2003).
6. **Method and apparatus for automatically generating database definitions of indirect facts from entity-relationship diagrams**, issued as patent 5535325 (1996).
7. **System and method for automating implementation and execution of constraint most likely to be violated in a database**, issued as patent 5488722 in the US, filed as docket ra992052 in Japan, (1996).

Invention Disclosures:

1. T. Potok “Object-Oriented Technology to Improve Statistical Process in Process Modeling” IBM Technical Disclosure Bulletin, Vol.37, No. 12, (12/94).
2. T. Potok “Diagramming Technique for Representing Entity Relationship Models with Subtyping,” IBM Technical Disclosure Bulletin, Vol.37, No. 10, (10/94).
3. T. Potok, “Representing Entity-Relationship Models using Adjacency Lists,” IBM Technical Disclosure Bulletin, Vol. 37, No. 4A, (4/1994).
4. T. Potok, “A Data Model for Hierarchical Views of Entity Oriented Information,” IBM Technical Disclosure Bulletin, (1/1994).

5. T. Potok, "Conceptual Graphs to Represent Information Model Constraints," IBM Technical Disclosure Bulletin, Vol.36, No. 3, (3/1993).
6. "An Automated Method of Model Calibration using Artificial Intelligence Techniques," IBM Technical Disclosure Bulletin, Vol.32, No. 12 ,(10/1989).

Funding History:

1. NIHM Project, by DOD, 2006 – 2007, \$600k.
2. Advanced Technology Program, funded by DOE, 2005 – 2007, \$700K.
3. Logistics Analysis Project, funded by Lockheed Martin, 2006 – 2007, \$250K.
4. Advanced Scientific Computing Project, funded by DHS, 2004 – 2007, \$950K.
5. ADVISE Project, funded by DHS, 2005 – 2007, \$765K.
6. Expert Panel Project, funded by MDA, 2004 – 2005, \$30K.
7. JICPAC Project, funded by Navy, 2004 – 2006, \$500K.
8. InGen Project, funded by Army, 2003 – 2004, \$300K.
9. VPAT Project, funded by TSWG, 2004 – 2005, \$100K.
10. InSpire Vipar Integration Project, funded by Battelle, 2004 – 2004, \$30K.
11. FIST Project, funded by Army, 2003 – 2004, \$200K.
12. ORION Project, funded by ORNL, 2003 – 2005, &600k.
13. I2IA Project, funded by ORNL, 2002 – 2004, \$600K.
14. SciDac Project, funded by DOE, 2002 – 2003, \$400K.
15. Railroad Project, funded by IC, 2002 – 2003, \$500K.
16. CIPHER Project, funded by DOE, 2001 – 2002, \$200K.
17. VIPAR Project, funded by the Office of Naval Research, 2000 – 2001, \$400.
18. SURGE Project, funded by Lockheed Martin, 1998 – 1999, \$800K.
19. MABES Project, funded by Lockheed Martin, 1998 – 1999, \$600K.
20. Collaborative Management Environment Project, funded by DOE, 1996 – 1999, \$2000K.