



Shannon R. Bowling
Updated 2/01/2008



COLLEGE OF ENGINEERING AND TECHNOLOGY

Name:

Dr. Shannon R. Bowling
D.O.B. 08/07/1977
Assistant Professor
Old Dominion University
Engineering Management and Systems Engineering
07/2004 – Start Date

Education

Ph.D. Industrial Engineering
Clemson University, SC
08/2003

M.S. Engineering Technology
East Tennessee State University, TN
08/2000

B.S. Electrical Engineering Technology
Bluefield State College, WV
12/1998

High School
Rocky Gap High School, VA
05/1995

SCIENTIFIC AND PROFESSIONAL SOCIETIES MEMBERSHIP

IIE (Institute of Industrial Engineers)
ASEM (American Society for Engineering Management)
HFES (Human Factors and Ergonomics Society)
ASQ (American Society for Quality)
ISA (Instrument Society of America)
AMS (American Mathematical Society)
Alpha Pi Mu (Honor Society)
Epsilon Mu Eta (Honor Society)
Alpha Epsilon Lambda (Honor Society)
Phi Kappa Phi (Honor Society)

PROFESSIONAL CHRONOLOGY

SIEMENS Energy and Automation, Johnson City, TN
Research Assistant (08/98/ - 08/99)

Smith Services, Inc. Bluefield, WV
Resource Manager (01/96 – 08/98)

Honors and Awards

Tetteh, E. G., Jiang, X., Mountjoy, D. N., **Bowling, S. R.**, Gramopadhye, A. K., and Khasawneh, M. T., "An Evaluation of Systematic Search Strategies on Inspection Performance Using a Job-Aiding Tool," Proceedings of the Industrial Engineering Research Conference, ***Selected as Best Ergonomics Paper***, Houston, Texas, May 15-19, 2004.

COURSES TAUGHT

ENTC 2170 – Computer Aided Design Drafting
ENTC 1110 – Engineering Drafting
IE 465/665 – Facilities Planning and Design
IE 340 – Systems and Flows
ENMA 603 – Operations Research
ENMA 420/520 – Statistical Concepts in Engineering Management
ENMA 751/851 – System of Systems Integration.
ENMA 723/823 – Enterprise System Dynamics
MSIM 651 – Analysis 1

Journal Publications (Refereed)

Bowling, S. R., "Exploring Factors Affecting Worker Motivation and Employee Satisfaction in a Small U.S. Manufacturing Firm," (To be Submitted: Journal of Comparative International Management)

Bowling, S. R., Khasawneh, M. T., Kaewkuekool, S., and Cho, B. R. "A Logistic Approximation to the Cumulative Normal Distribution," (Working Paper)

Bowling, S. R., Rabadi, G., and Keating, C. "A Monte Carlo Approach for Initiative Selection in Complex Systems of Systems", (To be Submitted: IEEE Transactions on Engineering Management)

Bowling, S. R., Rabadi, G., and Keating, C. "A Risk Based Approach to Conducting Sensitivity Analysis for Complex System Dynamics Models: A Case Study of the Secure Border Initiative", (Working Paper)

Bowling, S. R., Khasawneh, M. T., Kaewkuekool, S., and Gramopadhye, A. K., "Evaluating the effectiveness of a priori information on process measures in a virtual reality inspection task", International Journal of Industrial Ergonomics (Submitted)

1. **Bowling, S. R.**, Khasawneh, M. T., Kaewkuekool, S., Jiang, X., and Gramopadhye, A. K., "Evaluating the Effects of Virtual Training in an Aircraft Maintenance Task," *International Journal of Aviation Psychology*, 18:1, 104 -116, 2008.
2. Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., and Cho, B. R., "A Markovian Approach to Determining Optimum Process Means in a Production System with Independent Quality Characteristics," *Journal of System Science and System Engineering*, ISSN: 1004-3756 (Paper), 1861-9576 (Online), 2008.
3. Bhowmick, A., Khasawneh, M.T., **Bowling, S. R.**, Gramopadhye, A. K., and Melloy, B. J., "Evaluation of Alternate Multimedia for Web-Based Asynchronous Learning," *International Journal of Industrial Ergonomics*, Vol 37/7 pp 615-629, 2007.
4. Rao, P., **Bowling, S. R.**, Khasawneh, M.T., Gramopadhye, A. K., and Melloy, B. J., "*Impact of Training Standard Complexity on Inspection Performance*," *Human Factors and Ergonomics in Manufacturing*, 16(2), 109-132, 2006.
5. Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., and Cho, B. R., "*Tables of a Truncated Standard Normal Distribution: A Singly Truncated Case*," *Quality Engineering*, 17, 33-50, 2005.
6. Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., and Cho, B. R., "*Tables of a Truncated Standard Normal Distribution: A Doubly Truncated Case*," *Quality Engineering*, 17, 33-50, 2005.
7. Master, R., Jiang, X., **Bowling, S. R.**, Khasawneh, M. T., Gramopadhye, A. K., Melloy, B. J., and Grimes, L. "*Measurement of Trust Over Time in Hybrid Inspection Systems*," *Human Factors and Ergonomics in Manufacturing*, 15(2), 2005.
8. Kelkar, K., Khasawneh, M.T., **Bowling, S. R.**, Gramopadhye, A. K., and Melloy, B. J., "*The Added Usefulness of Process Measures Over Performance Measures in Interface Design*," *International Journal of Human Computer Interaction*, 18(1), 1-18, 2005.
9. **Bowling, S. R.**, Khasawneh, M. T., Kaewkuekool, S., and Cho, B. R., "*A Markovian Approach to Determining Optimum Process Target Levels for a Multi-Stage Serial Production System*," *European Journal of Operational Research*, 159(3), 636-650, 2004.

10. Singh, V., Khasawneh, M. T., **Bowling, S. R.**, and Gramopadhye, A. K., "*The Evaluation of Alternate Learning Systems: Asynchronous, Synchronous and Classroom: Production Planning and Control Course*," International Journal of Industrial Ergonomics, 33(6), 495-505, 2004.
11. Jiang, X., Khasawneh, M. T., Master, R., **Bowling, S. R.**, Gramopadhye, A. K., Melloy, B. J., and Grimes, L., "*Measurement of Human Trust in a Hybrid Inspection System Based on Signal Detection Theory Measures*," International Journal of Industrial Ergonomics, 34(5), 407-419, 2004.
12. Gramopadhye, A. K., Melloy, B. J., Jiang, X., Khasawneh, M. T., Kaewkuekool, S., **Bowling, S. R.**, Bingham, J., Master, R., Chen, S., and Watson, J., "*Using High Fidelity Simulator for Aircraft Inspection Training: Development and Usability Analysis*," Human Factors and Aerospace Safety, 3(2), 121-146, 2003.

Refereed national/international proceedings

1. Khasawneh, M. T., Marie, A., Zhang, J., Zain El Abdein, T., **Bowling, S. R.**, "A System Dynamics Approach to Modeling China's Population," Proceedings of the Modeling, Simulation, & Gaming Student Capstone Conference, Suffolk VA, April, 2008.
2. **Bowling, S. R.**, Rabadi, G., Keating, C., "*An Integrated Framework for Modeling and Simulation of the U.S. Southern Border: A Border Patrol Perspective*," Proceedings of the Industrial Engineering Research Conference Orland FL, May, 2006.
3. Jiang, X., Lyons, L., Nuschke, P., **Bowling, S. R.**, "*Application of Eye-tracking in a Job-Aiding Tool for Inspection Task*," Proceedings of the Industrial Engineering Research Conference, Orland FL, May, 2006.
4. Khasawneh, M. T., Alshara, K. M., **Bowling, S. R.**, "*Determining the Most Economic Process Mean for Various Quality Characteristics*," Proceedings of the Industrial Engineering Research Conference, Orland FL, May, 2006.
5. Samanlioglu, F., Khasawneh, M. T., **Bowling, S. R.**, Jiang, X., "*A Multi-Criteria Strength-Stress Reliability Optimization Model in Engineering Design*," Proceedings of the Industrial Engineering Research Conference, Orland FL, May, 2006.
6. Kaewkuekool, S., Samanlioglu, F., **Bowling, S. R.**, Khasawneh, M. T., "*A Logistic Regression Model for Predicting Trust in an Inspection System*," Proceedings of the Industrial Engineering Research Conference, Orland FL, May, 2006.

7. Peterson, B., Henrie, M., **Bowling, S. R.**, "Where's the Management?," American Society for Engineering Education Conference, Chicago IL 2006.
8. **Bowling, S. R.**, Khasawneh, M. T., Kaewkuekool, S., Jiang, X., " *Evaluating the use of Velocity and Acceleration Based Finite Impulse Response Filters for 3D Eye Movement Analysis in a Virtual Environment,*" Proceedings of the Industrial Engineering Research Conference, Atlanta GA, May, 2005.
9. Thiruvengadachari, S., Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, Jiang, X., " *Human-Machine Systems Reliability: Current Status and Research Perspective,*" Proceedings of the Industrial Engineering Research Conference, Atlanta GA, May, 2005.
10. Jiang, X., Khasawneh, M. T., **Bowling, S. R.**, " *Measuring Trust in Inspection Systems: A Multivariate Approach,*" Proceedings of the Industrial Engineering Research Conference, Atlanta GA, May, 2005.
11. Kaewkuekool, S., Nansa-arg, S., Khasawneh, M.T., **Bowling, S.R.**, Jiang, X., and Gramopadhye, A.K., " *Effect of Prior Information on Task Environments and Feedback Training to Improve Aircraft Inspection Performance,*" The 9th Baltic Region Seminar on Engineering Education, Gdynia, Poland, June 17-20, 2005.
12. **Bowling, S. R.**, " *Developing an Evaluation Tool for System of Systems using a Desirability Function Methodology,*" Proceedings of the American Society of Engineering Management, Virginia Beach, VA, October, 2005.
13. Khasawneh, M. T., **Bowling, S. R.**, Jiang, X., Gramopadhye, A. K., and Melloy, B. J., " *Investigating Human Perception and Trust Due to Changes in Hybrid Inspection System Parameters,*" Proceedings of the Industrial Engineering Research Conference, Houston TX, May, 2004.
14. **Bowling, S. R.**, Khasawneh, M. T., Jiang, X., and Gramopadhye, A. K., " *An Empirical Study on the Effect of Arrangement on Performance of Two Inspectors,*" Proceedings of the Industrial Engineering Research Conference, Houston TX, May, 2004.
15. **Bowling, S. R.**, Howard, J. A., Kohl, R. M., Vining, B. J., and Khasawneh, M. T., " *An Approximate Solution for the Optimum Process Mean in a Single Stage Production System,*" Proceedings of the Industrial Engineering Research Conference, Houston TX, May, 2004.
16. Tetteh, E. G., Jiang, X., Mountjoy, D. N., **Bowling, S. R.**, Gramopadhye, A. K., and Khasawneh, M. T., " *An Evaluation of Systematic Search Strategies on Inspection Performance Using a Job-Aiding Tool,*" Proceedings of the Industrial Engineering Research Conference, *Selected as Best Ergonomics Paper*, Houston, Texas, May 15-19, 2004.

17. Khasawneh, M. T., **Bowling, S. R.**, Jiang, X., Gramopadhye, A. K., and Melloy, B. J., "Effect of Error Severity on Human Trust in Hybrid Systems," Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting, New Orleans, Louisiana, September, 2004.
18. Kaewkuekool, S., Khasawneh, M. T., **Bowling, S. R.**, Jiang, X., and Gramopadhye, A. K., "Effect of Alternate Training Strategies on Aircraft Inspection Performance," Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting, New Orleans, Louisiana, September, 2004.
19. Hall, R., Jiang, X., **Bowling, S. R.**, Khasawneh, M. T., Kaewkuekool, S., and Gramopadhye, A. K., "*An Evaluation of Job-Aiding for an Inspection Task*," Proceedings of the Human Factors and Ergonomics Society, Denver, October 2003.
20. Jiang, X., Khasawneh, M. T., Kaewkuekool, **Bowling, S. R.**, Taylor, W., Bankers, S., McClendon, C., Gramopadhye, A. K., and Melloy, B. J., *Impact of Task Complexity on Hybrid Inspection System Performance*, Proceedings of the Human Factors and Ergonomics Society, Denver, October 2003.
21. Gramopadhye, A. K., Desai, R., **Bowling, S. R.**, and Khasawneh, M. T., "*Task Analysis of General Aviation Inspection Activities: Methodology and Findings*," Proceedings of the Human Factors and Ergonomics Society, Denver, October 2003.
22. Khasawneh, M. T., Kaewkuekool, S., **Bowling, S. R.**, Desai, R., Jiang, X., Duchowski, A. T., and Gramopadhye, A. K., "*The Effect of Eye Movements on Visual Inspection Performance*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003.
23. Kaewkuekool, S., **Bowling, S. R.**, Khasawneh, M. T., and Gramopadhye, A. K., "*Correlating Humans' Trust to System's Action and Inspector's Intervention Behavior in a Hybrid Inspection System*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003.
24. Jiang, X., Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, Gramopadhye, A. K., and Melloy, B. J., "*Communication between Humans and Machines in a Hybrid Inspection System*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003.
25. Jiang, X., Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, Gramopadhye, A. K., and Melloy, B. J., "*Correlating Signal Detection Theory Measures with Trust in a Hybrid Inspection System*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003.

26. Taylor, R., **Bowling, S. R.**, and Gramopadhye, A. K., "*The Effects of Intermittent, Random, and Continuous Noise on the Visual Search Component of a Visual Inspection Task*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003.
27. Gopinath, M., Kaewkuekool, S., Khasawneh, M. T., **Bowling, S. R.**, and Gramopadhye, A. K., "*A Tool for Conducting Ergonomic Audits*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003.
28. Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., and Cho, B. R., "*The Determination of Optimum Process Target Values in Production Systems: A Markovian Approach*," Proceedings of Industrial Engineering Research Conference), Oregon, 2003. ([Invited](#))
29. Cho, B. R., Kaewkuekool, S., **Bowling, S. R.**, and Khasawneh, M. T., "*The Optimum Target Value for a Process Based on A Quadratic Loss Function*," Proceedings of Industrial Engineering Research Conference, Oregon, 2003. ([Invited](#))
30. Gramopadhye, A. K., Duchowski, A. T., **Bowling, S. R.**, Khasawneh, M. T., and Kaewkuekool, S., "*Technology the Equalizer: Can it be Used to Improve Novice Inspection Performance?*," HCI International, Crete, Greece, 2003. ([Invited](#))
31. **Bowling, S. R.**, Kaewkuekool, S., Khasawneh, M. T., Jiang, X., and Gramopadhye, A. K., "Evaluating the Use of Virtual Reality for Training in Aircraft Inspection," Proceedings of The 8th Annual International Conference on Industrial Engineering Theory, Applications and Practice, pp. 246-251, Las Vegas, NV, November, 2003 ([Invited](#))
32. Khasawneh, M. T., **Bowling, S. R.**, Jiang, X., Gramopadhye, A. K., and Melloy, B. J., "A Model for Predicting Human Trust in Automated Systems," Proceedings of The 8th Annual International Conference on Industrial Engineering Theory, Applications and Practice, pp. 216-222, Las Vegas, NV, November, 2003. ([Invited](#))
33. Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., and Cho, B. R., "*A Cost Effective Strength-Stress Reliability Modeling and Optimization in Engineering Design*," Proceedings of the Industrial Engineering Research Conference, Orlando, 2002.
34. Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., Gramopadhye, A. K., and Melloy, B. J., "*Measurement of Trust in Hybrid Inspection Systems: Review and Evaluation of Current Methodologies and Future Approach*," Proceedings of the Industrial Engineering Research Conference, Orlando, 2002.

35. Kaewkuekool, S., Khasawneh, M. T., **Bowling, S. R.**, Gramopadhye, A. K., Duchowski, A. T., and Melloy, B. J., "*Using Virtual Reality Technology to Support Job Aiding and Training*," Proceedings of the Industrial Engineering Research Conference, Orlando, 2002.
36. **Bowling, S. R.**, Kaewkuekool, S., Khasawneh, M. T., and Gramopadhye, A. K., "*Confined Space Work In Aircraft Maintenance Industry: Scope for Improving Safety and Reducing Errors*," Proceedings of the Industrial Engineering Research Conference, Orlando, 2002.
37. Gramopadhye, A. K., **Bowling, S. R.**, Khasawneh, M. T., Kaewkuekool, S., Melloy, B. J., Duchowski, A. T., Medlin, E., and Cournia, N., "*Using Training to Improve Performance of Inspectors on the Hangar Floor*," Proceedings of the 16th Human Factors in Aviation Maintenance Symposium, San Francisco, April, 2002.
38. Sahasrabudhe, R., **Bowling, S. R.**, Khasawneh, M. T., Gramopadhye, A. K., and Melloy, B. J., "*Analysis of Per-Item vs. Per Lot Paced Visual Inspection for High Target Probability*," Proceedings of the Human Factors and Ergonomics Society, Baltimore, September 2002.
39. Ginwalla, N. Z., Kaewkuekool, S., **Bowling, S. R.**, Gramopadhye, A. K., and Melloy, B. J., "*Measurement of Trust in a Hybrid Inspection for Different Levels of Error Randomness*," Proceedings of the Human Factors and Ergonomics Society, Baltimore, September 2002.
40. Singh, V., Khasawneh, M. T., **Bowling, S. R.**, Jiang, X., Master, R. and Gramopadhye, A. K., "*The Evaluation of Alternate Learning Systems: Asynchronous, Synchronous and Classroom*," Proceedings of the International Conference on Computer-Aided Ergonomics and Safety, Maui, August 2001.

Technical Reviewer for Journals

IIE Transactions – 07'

Computers and Industrial Engineering – 07'

Engineering Management Journal – 05'

Pakistan Journal of Statistics -06'

International Journal of Production Economics – 06'

Reviewer for EM BoK (Body of Knowledge) – 07'

International Journal of Simulation and Process Modeling – 08'

Technical Reviewer for Conference Proceedings

Industrial Engineering Research Conference – IERC

Human Factors and Ergonomics Society – HFES

American Society of Engineering Management Conference – ASEM

Summer Computer Simulation Conference 2007 - SCSC

Session Chair for Conferences

Industrial Engineering Research Conference – IERC (2003 (2), 2005)

American Society of Engineering Management Conference - 2005

International Conference of Business, Economics and Management Disciplines - 2006

Short Courses – Total of 5 Courses

Modeling and Simulation short course for SPAWAR (Space and Naval Warfare Command) (May, 07')

Introduction to Modeling and Simulation short course for Northrop Grumman (Feb 06', 07', 08')

Statistics Review Course for Maersk Shipping Company (Mar, 07')

Technical reports

1. **Bowling, S. R.**, Rabadi, G., and Keating, C. (2008) "Initiative Mapping for System of Systems Application", Agency: MITRE and DHS, Technical Report for grant # 781681. (Working)
2. **Bowling, S. R.**, Rabadi, G., and Keating, C. (2008) "*Risk Based Sensitivity Analysis Framework for the Temporary Worker Program using the SBI Immigration Simulation Model*", Agency: MITRE and DHS, Technical Report for grant # 781681. (104 Pages)
3. **Bowling, S. R.**, Rabadi, G., and Keating, C. (2007) "*Risk Based Sensitivity Analysis Framework for the 287(g) Program using the SBI Immigration Simulation Model*", Agency: MITRE and DHS, Technical Report for grant # 775021. (81 Pages)
4. Rabadi, G., **Bowling, S. R.**, and Keating, C. (2007) "*Sensitivity Analysis for the Secure Border Initiative System Dynamics Simulation Model*", Agency: MITRE and DHS, Technical Report for grant # 763641. (22 Pages)
5. Gramopadhye, A. K., Melloy, B. J., Khasawneh, M. T., **Bowling, S. R.**, Kaewkuekool, S., and Duchowski, A. T., Medlin, E., and Cournia, N., "*Virtual Environment Technology for Aircraft Visual Inspection: Training and Job-Aiding*," Technical Report submitted to NASA, Ames Research Center, 2002.
6. Castle, C., Gramopadhye, A. K., Khasawneh, M. T., **Bowling, S. R.**, and Kaewkuekool, S., "*Evaluation of the Integrated AMT/AMT-T Curriculum*," Technical Report submitted to the Federal Aviation Administration,

Biomedical and Behavioral Sciences Division, Washington, DC, Human Factors in Aviation Maintenance Research Program, Final Report, 2002.

Workshops, Presentations & Posters

Bowling, S. R., and Khasawneh, M. T., Kaewkuekool, S. "Industrial Engineering Department Tour: Research at the Advanced Technology Systems Laboratory," Industrial Engineering Department Tour, Clemson University, Clemson, SC, October 2001.

Bowling, S. R., and Khasawneh, M. T., "Modeling Humans in Inspection Systems: The Use of Advanced Technology," Workshop, IIE Regional Conference, Clemson University, Clemson, SC, February 2003.

Bowling, S. R., "Evaluation of the Use of Feedforward Information in a Virtual Reality Environment: Aircraft Maintenance Industry," Poster Presentation, Clemson University Research Forum, Clemson, SC, March 2003.

Proposals Submitted (Funding)

Total PI - \$129,998

Total Co-Pi – \$1,222,349

% Contribution of Co-Pi Projects - \$162,970

Total % Contribution Pi/Co-Pi- \$292,968

Total Amount in Proposals Submitted - \$1,918,149

1. Yetiv, S.A., Earnest, D., "Economic Globalization and Vulnerability: How Vulnerable is the Global Shipping System to Terrorist and Adversarial Nation Attacks", (**Bowling, S. – Reviewer, PRT 5%**) Agency: National Science Foundation, May 08 (Duration 29 months), **Amount: \$367,648 - Submitted**
2. **Bowling, S.**, Rabadi, G., Keating, C., Landaeta, R., Earnest, D., Unal, R., "System-of-Systems Engineering Modeling and Analysis for the Secure Border Initiative (SBI) – Phase II", Agency: MITRE Corporation (funded by the Department of Homeland Security), September 2007 – March 2008, **Amount: \$129,998 - Funded**, Contract No.: 781681.
3. Rabadi, G., Keating, C., **Bowling, S.**, Landaeta, R., Earnest, D., Unal, R., "System-of-Systems Engineering Modeling and Analysis for the Secure Border Initiative (SBI)", Agency: MITRE Corporation (funded by the Department of Homeland Security), June 2007 – September 2007, **Amount: \$145,000 - Funded**, Contract No.: 775021.
4. "MITRE DHS Systems of Systems ," Submitted Department of Homeland Security – Subcontract to MITRE Corporation, March 2006. Co-PI (**\$218,581 – Funded**), Contract No.: 763641.

5. "DHS Border System-of-Systems Engineering Analysis," Submitted to NAVAIR Orlando Training Systems Division, July 2004. Co-PI (**\$848,768 – Funded**), Contract No.: 247591.
6. "Exploration of the Operational and Business Value of Different Sources of Project's Resource and Labor in the US Army Corps of Engineers," Submitted to USACE-NAO, March 2006. Co-PI (**\$10,000 – Funded**), Contract No.: 262611.
7. "What Features Should be Included in Simulation-based Training to have a Positive Effect on Training Transfer and Retention?," Submitted to Army Research Institute, BRO BAA FY 2006, April 2006. Co-PI (**\$695,800 – Not Funded**).

Patents

'Mapping Program Including a Map, Process and System for Precisely Representing or Determining a Location on the Map and an Electronic Device and a Storage Medium Therefore,' Patent Pending, Submitted 02/03/05.